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स. 9(2)/DSR/CE/CSQ(E)/2025/E- 9178656/445 हि.

दिनांक 29/8/2025

कार्यालय ज्ञापन

**Sub: Release of Delhi Schedule of Rates (E&M)-2025.**

In suppression of earlier OM No. 9(2)/DSR/CE/CSQ(E)/2025/E- 9178656/416-h dated 13.08.2025 the Delhi Schedule of Rates (E&M) - 2025 has been released and is applicable with immediate effect. The cost Index base is 100 as on 01.04.2025 in the Delhi Schedule of Rates (E&M)-2025. The English Version of Delhi Schedule of Rates (E&M) -2025 is available in PDF Format and Printable Version in "Documents-CPWD Publications" at CPWD Website.

Errors or Omissions and suggestions for improvement, if any, may kindly be brought to the notice of the Superintending Engineer (E) TAS in the office of Chief Engineer CSQ (E) CPWD New Delhi-110011 (Tel No-011-23061418, Email: delceecsqa.cpww@nic.in, delseetas.cpww@nic.in).

This issues with the approval of the Competent Authority.

(संतोष कुमार धनगर)

अधीक्षण अभियंता (वै) टी ए एस

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भारत सरकार

**GOVERNMENT OF INDIA**

केंद्रीय लोक निर्माण विभाग



**CENTRAL PUBLIC WORKS DEPARTMENT**

# **DELHI SCHEDULE OF RATES (E&M)-2025**



महानिदेशालय, के.लो.नि.वि.,निर्माण भवन, नई दिल्ली 110011

DIRECTORATE GENERAL, CPWD, NIRMAN BHAWAN, NEW DELHI 110011





**GOVERNMENT OF INDIA**  
**CENTRAL PUBLIC WORKS DEPARTMENT**

**DELHI SCHEDULE OF RATES**  
**(E & M)**  
**2025**



**PUBLISHED UNDER THE AUTHORITY OF**  
**DIRECTOR GENERAL, CPWD, NIRMAN BAHAWAN, NEW DELHI-110011**

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*Disclaimer*

*The Rates taken in the Delhi Schedule of Rates (E&M) 2025 are indicative and actual rates shall be governed by the market forces. Further, its use by the own risk and discretion, CPWD shall not be responsible for any ambiguity, discrepancy, dispute or financial loss arising directly or indirectly by using or following items of DSR (E&M) 2025 by Department/PSUs/Private Bodies/Individuals.*

**A GOVERNMENT OF INDIA PUBLICATION**

Published by under the authority of  
**Director General**  
Central Public Works Department  
Nirman Bhawan  
New Delhi-110011



सतिंदर पाल सिंह  
महानिदेशक  
**Satinder Pal Singh**  
**Director General**



भारत सरकार  
**Government of India**



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## FOREWORD

CPWD is the benchmarking organisation in the building construction sector and its documents are also made use of by other Government Departments, Undertakings and Autonomous Bodies for their works. This Delhi Schedule of Rates (E&M) is a comprehensive document which may be widely followed by these organisations.

The Delhi Schedule of Rates (E&M) 2025 is a revision and amalgamation of CPWD Delhi Schedule of Rates (E&M) 2022, DSR (E&M) for Solar Photovoltaic Power Plant – 2019, DSR (E&M) for Facade Lighting -2019 and Delhi Schedule of Rates (E&M) (Energy efficient materials) Vol.-II- 2025. It takes into account the increased labour and material cost, including the effect of GST on Works Contracts. In addition, new chapters for Low Voltage E&M services (CCTV Camera System, EPABX /IP-PBX, LAN, Access Control System & BMS), Fountains and Lifts have also been added.

I acknowledge the hard work and sincere effort put in by Sh. Mohd. Kamal Ahmad, SDG (HQ), Sh. Chita Ranjan Nanda, ADG (Tech.), Sh. Ram Raj Meena, CE CSQ (E), Sh. Ramayan Prasad Gupta, SE TAS(E), Sh. Santosh Kumar Dhangar, SE TLQA (E) and other staff of CSQ (E) unit, whose names are not mentioned here for the sake of brevity.

I hope that the Delhi Schedule of Rates (E&M) 2025 will be useful to all Engineers of CPWD and to other engineering organizations of Central/State Governments, practicing Architects and E&M Consultants.

**(Satinder Pal Singh)**  
**Director General**

**Place:** New Delhi  
**Date:** July, 2025







**Mohd. Kamal Ahmad**  
**Spl. Director General (HQ)**



**भारत सरकार**  
**Government of India**



**केन्द्रीय लोक निर्माण विभाग**  
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## **MESSAGE**

CPWD is the major Central Government organization setting norms in building construction and its documents are used by various government departments and organizations. CPWD aims to lead in executing, maintaining, and standardizing India's built environment while supporting sustainable development. To achieve this goal, the CPWD continuously updates its Delhi Schedule of Rates by incorporating the New Items of E&M services, Energy Efficient Materials, Building Security System and Building Management Systems.

The DSR (E&M) – 2025 is a updated version of CPWD Delhi Schedule of Rates (E&M) 2022, DSR (E&M) for Solar Photovoltaic Power Plant – 2019, DSR (E&M) for Facade Lighting -2019 and Delhi Schedule of Rates (E&M) (Energy efficient materials) Vol.-II- 2025 and incorporation of New Chapters related to Low Voltage E&M services (CCTV Camera System, EPABX /IP-PBX, LAN, Access Control System & BMS), Fountain and Lifts.

Credit is given to individuals who contributed to the preparation of this schedule specially to Shri Chita Ranjan Nanda, ADG(Tech), Shri Ram Raj Meena, CE, CSQ (E), Sh. Ramayan Prasad Gupta, SE TAS(E), Sh. Santosh Kumar Dhangar, SE TLQA (E) and others.

This edition incorporates updated items related to various E&M services which are energy efficient and leads to sustainable development. To ensure significant energy savings compared to conventional buildings the items of higher level of energy performance parameters and Low Voltage E&M Services related to Building Management, Security and Communication have been added.

Sincere gratitude is expressed to Shri Satinder Pal Singh, Director General, CPWD for his trust and support in the preparation of this document.

**Place:** New Delhi  
**Date:** July, 2025

  
(Mohd. Kamal Ahmad)  
Special Director General (HQ)







**Chita Ranjan Nanda**  
Additional Director General



**भारत सरकार**  
Government of India



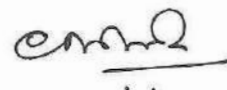
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## PREFACE

1. The Delhi Schedule of Rates (E&M) usually called as DSR (E&M) is updated as DSR (E&M) 2025 which derived from Delhi Schedule of Rates (E&M) 2022, DSR (E&M) for Solar Photovoltaic Power Plant – 2019, DSR (E&M) for Facade Lighting -2019 and Delhi Schedule of Rates (E&M) (Energy efficient materials) Vol.-II- 2025 & new specialized E&M services chapters in the Construction Industry i.e. CCTV- Camera System, EPABX /IP-PBX, LAN, Access Control System, BMS, Fountain and Lifts.
2. DSR (E&M) 2025 is based on the prevailing market rates of materials in Delhi during the last six months. The labour rates adopted are as per minimum wages applicable with effect from 01.04.2025 issued by Chief Labour Commissioner, Govt. of India/Commissioner (Labour), Govt. of Delhi, whichever is higher.
3. The cost index for DSR (E&M) 2025 is 100 (as on 1.04.2025) with reference to CPWD Plinth Area Rates 2025.
4. This Delhi Schedule of Rates (E&M) 2025 shall be read along with relevant CPWD Specifications of Electrical and Mechanical Services. The DSR (E&M) 2025 hereby replace the Delhi Schedule of Rates (E&M) 2022, DSR (E&M) for Solar Photovoltaic Power Plant – 2019, DSR (E&M) for Facade Lighting -2019, Items for VRF/VRV Air-Conditioning System – 2019, Wet Riser and Sprinkler System - 2019 and Delhi Schedule of Rates (E&M) Vol.-II- 2025 Energy efficient materials.
5. The salient Features of DSR (E&M) 2025 are as follows:
  - a. The Items of Works contained herein are to be executed as per CPWD General Specifications for Electrical Works Part-I Internal 2023, Part-II External 2023, Part – III Lift & Escalators 2003, Part- IV Sub-Station 2013, Part – V Wet Riser and Sprinkler System 2020, Part – VI Fire Detection and Alarm System 2018, Part – VII DG Set 2013, CPWD General Specification for HVAC Works 2024, with up-to-date amendments/correction slips and relevant standards/codes of Bureau of Indian Standards.
  - b. The rates in this DSR (E&M) are for working height up to 4.5 meter from floor level wherever height not specified. The rates of materials are for reputed brands, factory fabricated and tested wherever available from manufacturers as submitted by field units and in confirmation with Bureau of Indian Standard Codes and Guidelines.
  - c. Effect of GST on works contracts and Labour Cess have been incorporated in all items.
6. Wholehearted commitment and considerable efforts have been put by team of CSQ (E) unit for preparation of this edition of Delhi Schedule of Rates (E&M) 2025. I convey my deep appreciation and sincere thanks to Sh. Ram Raj Meena, CE CSQ (E), Sh. Ramayan Prasad Gupta, SE TAS(E), Sh. Santosh Kumar Dhangar, SE TLQA (E), Sh. Himanshu Phulwaria, EE (E), Sh. Shashank Gaur, AEE (E)TAS, Sh. Sandeep Kumar Das, AE(E)TAS-I, Sh. Harjeet Singh, AE (E) TLQA-I, Sh. Sundeep Kumar, AE (E) TLQA-II, Ms. Preeti Verma, AE (E) TLQA – III and other staff of CSQ (E) unit.



7. Although, due care has been taken in bringing out DSR (E&M) 2025, still there is possibility that some errors may remain inadvertently. Errors & omission may be brought to the notice of Superintending Engineer (TAS) (E) O/o CE CSQ (E), CPWD, Room No. 224, A-wing, Nirman Bhawan, New Delhi-110011 Telephone No. 011-23061418/ 1697 and Email: [delseetas.cpwd@nic.in](mailto:delseetas.cpwd@nic.in) / [delceecsqa.cpwd@nic.in](mailto:delceecsqa.cpwd@nic.in).



**Place:** New Delhi

**Date:** July, 2025

**(Chita Ranjan Nanda)**  
**Additional Director General (Tech)**



## **GENERAL NOTE**

**The Delhi Schedule of Rate (E&M) 2025 has been prepared on the following**

1. The items of works are to be executed as per CPWD General Specifications for Electrical Works Part-I Internal 2023 , Part-II External 2023, Part-III-Lift & Escalators 2003, Part-IV Sub-Station 2013, Part V Wet Riser & Sprinkler Systems 2020, Part VI Fire Detection and Alarm System 2018, Part VII D.G. Sets 2013, Part VIII Gas Based Fire Extinguishing System 2013 and CPWD General Specifications for HVAC Works 2024, with up to date amendments/correction slips, the Bureau of Indian Standards Codes as amendment upto date and latest ENS 2024/ ECSBC 2024 whichever is more stringent.
2. The Basic Rates of labour and materials have been provided in Appendix-I & II. The effect of GST on works contract has been incorporated in all the items.
3. The rates are complete i.e. including all material, labour, taxes & duties (in Delhi), T&P etc. and overhead & profit as per orders of the department applicable as on date.
4. The rates in this DSR (E&M) 2025 and DAR (E&M) 2025 are for working height upto 4.5m from floor level wherever height is not specified.
5. The Rating of APFC Panel shall be selected by the NIT approving authority so as achieve average power factor ideally up to unity including considering the depreciation. Hybrid type of APFC panel shall be used where requirement of APFC and building has complex type load using electronics ballast/VFD Drives etc.
6. The rates of materials are from reputed manufacturers and market trends, factory fabricated and tested where ever available from manufactures.
7. The Delhi Schedule of Rates (E&M) 2025 is supersede the CPWD Delhi Schedule of Rates (E&M) 2022, DSR (E&M) for Solar Photovoltaic Power Plant – 2019, DSR (E&M) for Facade Lighting -2019 and Delhi Schedule of Rates (E&M) (Energy efficient materials) Vol.-II- 2025. In addition, new chapters for Low Voltage E&M services (CCTV Camera System, EPABX /IP-PBX, LAN, Access Control System & BMS), Fountains and Lifts have also been added.
8. This edition also aims to incorporate latest items to achieve Energy Efficiency in Buildings by implementation of Energy conservation Sustainable building code-2024 & Eco-Niwas Samhita (ENS) 2024 developed by BEE.
9. To adopt modern technology and Energy Efficient material for faster, ecofriendly and quality Contribution to buildings the NIT approving authority have to analyze for any change in parameter.





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## CHAPTER-1 WIRING

Item No.	Description	Unit	Rate
<b>WIRING IN STEEL &amp; PVC CONDUIT</b>			
1.1	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, with piano type switch, phenolic laminated sheet, suitable size MS box and earthing the point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.		
1.1.1	Group A	Point	1417
1.1.2	Group B	Point	1661
1.1.3	Group C	Point	2078
1.2	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface / recessed steel conduit, 2 way piano type switch, phenolic laminated sheet, suitable size MS box and earthing the point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.	Point	2090
1.3	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.		
1.3.1	Group A	Point	1440
1.3.2	Group B	Point	1684
1.3.3	Group C	Point	2101
1.4	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface / recessed steel conduit, 2 way modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm. FRLS/HFFR PVC insulated copper conductor single core cable etc .as required.	Point	2242



1.5	Wiring for light/ power plug with 2X4 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit along with 1 No. 4 sq. mm FRLS PVC insulated copper conductor single core cable for loop earthing as required.	Meter	480
1.6	Wiring for light/ power plug with 4X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit along with 2 Nos. 4 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	Meter	724
1.7	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in surface/ recessed steel conduit as required.		
1.7.1	2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire	Meter	370
1.7.2	2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire	Meter	414
1.7.3	2 X 4 sq. mm + 1 X 4 sq. mm earth wire	Meter	476
1.7.4	2 X 6 sq. mm + 1 X 6 sq. mm earth wire	Meter	652
1.7.5	2 X 10 sq. mm + 1 X 6 sq. mm earth wire	Meter	778
1.7.6	2 X 16 sq. mm + 1 X 6 sq. mm earth wire	Meter	1020
1.7.7	4 X 2.5 sq. mm + 2 X 2.5 sq. mm earth wire	Meter	621
1.7.8	4 X 4 sq. mm + 2 X 4 sq. mm earth wire	Meter	744
1.7.9	4 X 6 sq. mm + 2 X 6 sq. mm earth wire	Meter	1001
1.7.10	4 X 10 sq. mm + 2 X 6 sq. mm earth wire	Meter	1253
1.7.11	4 X 16 sq. mm + 2 X 6 sq. mm earth wire	Meter	1760
1.8	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed medium class PVC conduit, with piano type switch, phenolic laminated sheet, suitable size M.S. box and earthing the point with 1.5 sq.mm. FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.		
1.8.1	Group A	Point	1166
1.8.2	Group B	Point	1339
1.8.3	Group C	Point	1680
1.9	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface / recessed medium class PVC		

	conduit, 2 way piano type switch, phenolic laminated sheet, suitable size MS box and earthing the point with 1.5 sq.mm. FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.	Point	1693
1.10	Wiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed medium class PVC conduit, with modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.		
1.10.1	Group A	Point	1189
1.10.2	Group B	Point	1362
1.10.3	Group C	Point	1704
1.11	Wiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable in surface / recessed medium class PVC conduit, 2way modular switch, modular plate, suitable GI box and earthing the point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.	Point	1803
1.12	Wiring for light/ power plug with 2X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed medium class PVC conduit along with 1 No. 4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	Meter	373
1.13	Wiring for light/ power plug with 4X4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed medium class PVC conduit along with 2 Nos. 4 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable for loop earthing as required.	Meter	587
1.14	Wiring for circuit/ submain wiring along with earth wire with the following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in surface/ recessed medium class PVC conduit as required.		
1.14.1	2 X 1.5 sq. mm + 1 X 1.5 sq. mm earth wire	Meter	267
1.14.2	2 X 2.5 sq. mm + 1 X 2.5 sq. mm earth wire	Meter	311
1.14.3	2 X 4 sq. mm + 1 X 4 sq. mm earth wire	Meter	373

1.14.4	2 X 6 sq. mm + 1 X 6 sq. mm earth wire	Meter	482
1.14.5	2 X 10 sq. mm + 1 X 6 sq. mm earth wire	Meter	621
1.14.6	2 X 16 sq. mm + 1 X 6 sq. mm earth wire	Meter	832
1.14.7	4 X 2.5 sq. mm + 2 X 2.5 sq. mm earth wire	Meter	452
1.14.8	4 X 4 sq. mm + 2 X 4 sq. mm earth wire	Meter	587
1.14.9	4 X 6 sq. mm + 2 X 6 sq. mm earth wire	Meter	813
1.14.10	4 X 10 sq. mm + 2 X 6 sq. mm earth wire	Meter	1078
1.14.11	4 X 16 sq. mm + 2 X 6 sq. mm earth wire	Meter	1454
1.15	Rewiring for light point/ fan point/ exhaust fan point/ call bell point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable and 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable as earth wire in existing surface/ recessed steel/PVC conduit including dismantling as required.		
1.15.1	Group A	Point	687
1.15.2	Group B	Point	752
1.15.3	Group C	Point	1064
1.16	Rewiring for twin control light point with 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable and 1.5 sq.mm FRLS/HFFR PVC insulated copper conductor single core cable as earth wire in existing surface/ recessed steel/PVC conduit including dismantling as required.	Point	1064
1.17	Supplying and drawing following sizes of FRLS/HFFR PVC insulated copper conductor, single core cable in the existing surface/ recessed steel/ PVC conduit as required.		
1.17.1	1 x 1.5 sq. mm	Meter	51
1.17.2	2 x 1.5 sq. mm	Meter	77
1.17.3	3 x 1.5 sq. mm	Meter	104
1.17.4	4 x 1.5 sq. mm	Meter	130
1.17.5	5 x 1.5 sq. mm	Meter	169
1.17.6	6 x 1.5 sq. mm	Meter	195
1.17.7	7 x 1.5 sq. mm	Meter	234
1.17.8	8 x 1.5 sq. mm	Meter	260
1.17.9	9 x 1.5 sq. mm	Meter	311
1.17.10	10 x 1.5 sq.mm	Meter	338
1.17.11	2 x 2.5 sq. mm	Meter	107
1.17.12	3 x 2.5 sq. mm	Meter	148
1.17.13	4 x 2.5 sq. mm	Meter	189

1.17.14	5 x 2.5 sq. mm	Meter	242
1.17.15	6 x 2.5 sq. mm	Meter	283
1.17.16	7 x 2.5 sq. mm	Meter	337
1.17.17	8 x 2.5 sq. mm	Meter	378
1.17.18	9 x 2.5 sq. mm	Meter	443
1.17.19	10 x 2.5 sq. mm	Meter	484
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1.17.27	9 x 4 sq. mm	Meter	616
1.17.28	10 x 4 sq. mm	Meter	690
1.17.29	2 x 6 sq. mm	Meter	234
1.17.30	3 x 6 sq. mm	Meter	326
1.17.31	4 x 6 sq. mm	Meter	431
1.17.32	5 x 6 sq. mm	Meter	524
1.17.33	6 x 6 sq. mm	Meter	641
1.17.34	7 x 6 sq. mm	Meter	733
1.17.35	8 x 6 sq. mm	Meter	838
1.17.36	9 x 6 sq. mm	Meter	930
1.17.37	10 x 6 sq. mm	Meter	1029
1.18	Supplying and drawing following pair 0.5 mm dia FRLS/HFFR PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC conduit as required.		
1.18.1	1 Pair	Meter	33
1.18.2	2 Pair	Meter	39
1.18.3	4 Pair	Meter	53
1.19	Supplying and drawing co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid and protected with PVC sheath in the existing surface/ recessed steel/ PVC conduit as required.		Meter 54
1.20	Supplying and fixing of following sizes of steel conduit along with accessories in surface/recess including painting in case of surface conduit, or cutting the wall and making good the same in case of recessed conduit as required.		

1.20.1	20 mm	Meter	254
1.20.2	25 mm	Meter	289
1.20.3	32 mm	Meter	360
1.20.4	40 mm	Meter	515
1.20.5	50 mm	Meter	634
1.21	Supplying and fixing of following sizes of medium class PVC conduit along with accessories in surface/recess including cutting the wall and making good the same in case of recessed conduit as required.		
1.21.1	20 mm	Meter	151
1.21.2	25 mm	Meter	168
1.21.3	32 mm	Meter	209
1.21.4	40 mm	Meter	257
1.21.5	50 mm	Meter	316
1.22	Supplying and fixing metal box of following sizes (nominal size) on surface or in recess with suitable size of phenolic laminated sheet cover in front including painting etc. as required.		
1.22.1	75 mm X 75 mm X 60 mm deep	Each	213
1.22.2	100 mm X 100 mm X 60 mm deep	Each	245
1.22.3	150 mm X 75 mm X 60 mm deep	Each	252
1.22.4	150 mm X 150 mm X 60 mm deep	Each	360
1.22.5	180 mm X 100 mm X 60 mm deep	Each	282
1.22.6	200 mm X 125 mm X 60 mm deep	Each	372
1.22.7	200 mm X 150 mm X 60 mm deep	Each	406
1.22.8	200 mm X 150 mm X 75 mm deep	Each	414
1.22.9	200 mm X 250 mm X 60 mm deep	Each	528
1.22.10	200 mm X 250 mm X 75 mm deep	Each	549
1.22.11	200 mm X 150 mm X 100 mm deep	Each	469
1.22.12	200 mm X 250 mm X 100 mm deep	Each	568
1.22.13	200 mm X 300 mm X 60 mm deep	Each	587
1.22.14	200 mm X 300 mm X 100 mm deep	Each	625
1.22.15	250 mm X 300 mm X 60 mm deep	Each	673
1.22.16	250 mm X 300 mm X 100 mm deep	Each	721
1.23	Supplying and fixing following piano type switch/ socket on the existing switch box/ cover including connections etc. as required.		

1.23.1	5/6 amps switch	Each	63
1.23.2	2 way 5/6 A switch	Each	75
1.23.3	15/16 A switch	Each	140
1.23.4	3 pin 5/6 A socket outlet	Each	81
1.23.5	6 pin 15/16 A socket outlet	Each	156
1.23.6	Telephone socket outlet	Each	127
1.23.7	TV antenna socket outlet	Each	112
1.23.8	Bell push	Each	100
1.24	Supplying and fixing following modular switch/ socket on the existing modular plate & switch box including connections but excluding modular plate etc. as required.		
1.24.1	5/6 A switch	Each	121
1.24.2	2 way 5/6 A switch	Each	168
1.24.3	15/16 A switch	Each	176
1.24.4	3 pin 5/6 A socket outlet	Each	136
1.24.5	6 pin 15/16 A socket outlet	Each	219
1.24.6	Telephone socket outlet	Each	168
1.24.7	TV antenna socket outlet	Each	168
1.24.8	Bell push	Each	159
1.25	Supplying and fixing two module stepped type electronic fan regulator on the existing modular plate switch box including connections but excluding modular plate etc. as required.	Each	402
1.26	Supplying and fixing modular blanking plate on the existing modular plate & switch box excluding modular plate as required.	Each	47
1.27	Supplying and fixing following size/ modules, GI box along with modular base & cover plate for modular switches in recess etc. as required.		
1.27.1	1 or 2 Module (75mmX75mm)	Each	354
1.27.2	3 Module (100mmX75mm)	Each	384
1.27.3	4 Module (125mmX75mm)	Each	401
1.27.4	6 Module (200mmX75mm)	Each	462
1.27.5	8 Module (125mmX125mm)	Each	517
1.27.6	12 Module (200mmX150mm)	Each	614
1.28	Supplying and fixing following Modular base & cover plate on existing modular metal boxes etc. as required.		



1.28.1	1 or 2 Module	Each	156
1.28.2	3 Module	Each	175
1.28.3	4 Module	Each	182
1.28.4	6 Module	Each	207
1.28.5	8 Module	Each	238
1.28.6	12 Module	Each	301
1.29	Supplying and fixing metal box of 150mm X 75mm X 60mm deep (nominal size) on surface or in recess with suitable size of phenolic laminated sheet cover in front including providing and fixing 3 pin 5/6 A socket outlet and 5/6 A piano type switch, connections, painting etc. as required.	Each	423
1.30	Supplying and fixing metal box of 180mm X 100mm X 60mm deep (nominal size) on surface or in recess with suitable size of phenolic laminated sheet cover in front including providing and fixing 6 pin 5/6 & 15/16 A socket outlet and 15/16 A piano type switch, connections, painting etc. as required.	Each	558
1.31	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 3 pin 5/6 A modular socket outlet and 5/6 A modular switch, connections etc. as required.	Each	545
1.32	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 6 pin 5/6 & 15/16 A modular socket outlet and 15/16 A modular switch, connections etc. as required.	Each	659
1.33	Supplying and fixing 3 pin, 5 A ceiling rose on the existing junction box/ wooden block including connections etc. as required.	Each	104
1.34	Supplying and fixing brass batten/ angle holder including connection etc. as required.	Each	154
1.35	Installation, Testing, Commissioning of wall bracket /ceiling fittings of all sizes and shapes containing upto two GLS/CFL/LED lamps per fitting, complete with all accessories including connections etc. as required.	Each	151

1.36	Supplying and fixing stiff pendent with 300 mm long, 20 mm dia X 1.6 mm thick steel conduit, aluminium cast back plate and brass holder complete, including wiring the down rod with 1.5 sq. mm FRLS/HFFR PVC insulated, copper conductor, single core cable and painting etc. as required.	Each	353
1.37	DELETED		
1.38	Supplying and fixing call bell/ buzzer suitable for single phase, 230 V, complete as required.	Each	112
1.39	Providing and fixing plain 16/0.20mm (0.50sqmm) twin flat flexible, FRLS/HFFR PVC insulated, copper conductor cable, in PVC sleeve of suitable size on the floor/ wall, or side of the table/ door etc. as required.	Meter	47
1.40	Providing and fixing plain 16/0.20mm (0.50sqmm) twin circular flexible FRLS/HFFR PVC insulated, PVC sheathed copper conductor cable direct on the wall with PVC clips etc. as required.	Meter	40
1.41	Installation, Testing and Commissioning of pre-wired, fluorescent fitting / compact fluorescent/ LED fitting of all types, complete with all accessories and tube/lamp etc. directly on ceiling/ wall, including connections with 1.5 sq. mm FRLS/HFFR PVC insulated, copper conductor, single core cable and earthing etc. as required.	Each	259
1.42	Installation, Testing and Commissioning of pre-wired, fluorescent fitting / compact fluorescent/ LED fitting of all types, complete with all accessories and tube/lamp etc., including supplying and fixing ball and socket arrangement, 2 Nos. down rods of 20 mm dia X 1.6 mm thick steel conduit upto 30 cm length, painting and wiring the down rods and connections with 1.5 sq. mm FRLS/HFFR PVC insulated, copper conductor, single core cable and earthing etc. as required.	Each	556
1.43	Supplying and fixing extra conduit down rod of 20 mm dia, 2 X 10 cm length, wiring with 2 X 1.5 sq. mm FRLS/HFFR PVC insulated, copper conductor, single core cable including painting etc. as required. (Note : More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)	Each	64

1.44	Installation, Testing and Commissioning of ceiling fan, including wiring the down rods of standard length (upto 30 cm) with 1.5 sq. mm FRLS/HFFR PVC insulated, copper conductor, single core cable etc. as required.	Each	266
1.45	Installation, Testing and Commissioning of ceiling fan, including wiring the down rods of standard length (upto 30 cm) with 1.5 sq. mm FRLS/HFFR PVC insulated, copper conductor, single core cable, including providing and fixing phenolic laminated sheet cover on the fan box etc. as required.	Each	332
1.46	DELETED		
1.47	Supplying and fixing extra down rod of 10 cm length G.I. pipe, 15 mm dia, heavy gauge including painting etc. as required. (Note: More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)	Each	53
1.48	Supplying and fixing extra conduit down rod of 20 cm length G.I. pipe 15 mm dia, heavy gauge including painting etc. as required. (Note : More than 5 cm length shall be rounded to the nearest 10 cm and 5 cm or less shall be ignored)	Each	59
1.49	Numbering of ceiling fan/ exhaust fan/ fluorescent fittings as required.	Each	72
1.50	Installation, Testing and Commissioning of exhaust fan in the existing opening, including making good the damage, connection, testing, commissioning etc. as required.		
1.50.1	Upto 450 mm sweep	Each	556
1.50.2	510 mm sweep	Each	800
1.51	Extra for fixing the louvers/ shutters complete with frame for a exhaust fan of all sizes.	Each	260
1.52	Painting of ceiling fan in installed position with one or more coats of spray painting with synthetic enamel paint of approved brand and manufacture to give an even shade, including cleaning of surface with detergent etc. as required.	Each	186

1.53	Deleted		
1.54	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point (without independent switch etc.) with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed steel conduit, and earthing the point with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.		
1.54.1	Group A	Point	914
1.54.2	Group B	Point	1083
1.54.3	Group C	Point	1246
1.55	Wiring for group controlled (looped) light point/fan point/exhaust fan point/ call bell point ( without independent switch etc.) with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable in surface/ recessed PVC conduit, and earthing the point with 1.5 sq. mm FRLS/HFFR PVC insulated copper conductor single core cable etc. as required.		
1.55.1	Group A	Point	776
1.55.2	Group B	Point	885
1.55.3	Group C	Point	994
1.56	Supplying and fixing suitable size GI box with modular plate and cover in front on surface or in recess, including providing and fixing 2 nos. 3 pin 5/6 A modular socket outlet and 2 nos. 5/6 A modular switch, connections etc. as required. (For light plugs to be used in non residential buildings).	Each	757
1.57	Supplying & fixing suitable size GI box with modular plate and cover in front on surface or in recess including providing and fixing 25 A modular socket outlet and 25 A modular SP MCB, "C" curve including connections, painting etc. as required.	Each	807
1.58	Supplying and fixing PVC batten/ angle holder including connections etc. as required.	Each	132

1.59	Dismantling of ceiling fan and painting the same with one or more coats of spray painting with synthetic enamel paint of approved brand and manufacture to give an even shade, including cleaning of surface with detergent and replacing the damaged rubber reel, nuts and bolts with washers and safety pins, reinstalling the same as required.	Each	324
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## CHAPTER-2 MCCB, MCB & DB'S

Item No.	Description	Unit	Rate
2.1	Providing and fixing following capacity TP&N disconnecter fuse switch unit inside the existing panel board with ISI marked HRC fuses including drilling holes in cubicle panel, making connections, etc. as required.		
2.1.1	32 A TP&N	Each	2292
2.1.2	63 A TP&N	Each	3342
2.1.3	100 A TP&N	Each	6414
2.1.4	125 A TP&N	Each	7577
2.1.5	160 A TP&N	Each	8546
2.1.6	200 A TP&N	Each	10198
2.1.7	315 A TP&N	Each	15308
2.1.8	400 A TP&N	Each	18722
2.2	Providing and fixing following rating and breaking capacity and pole MCCB with thermomagnetic release and terminal spreaders in existing cubicle panel board including drilling holes in cubicle panel, making connections, lcs=100% lcu and Operational Voltage 690V etc. as required.		
2.2.1	100 A, 16 KA,TPMCCB	Each	4003
2.2.2	125 A, 16 KA,TPMCCB	Each	5103
2.2.3	150 A, 16 KA,TPMCCB	Each	6326
2.2.4	200 A, 16 KA,TPMCCB	Each	8111
2.2.5	200 A, 25 KA,TPMCCB	Each	11586
2.2.6	250 A, 25 KA,TPMCCB	Each	13647
2.2.7	250 A, 35 KA,TPMCCB	Each	14584
2.2.8	315 A, 35 KA,TPMCCB	Each	22644
2.2.9	400 A, 35 KA,TPMCCB	Each	22644
2.2.10	500 A, 35 KA,TPMCCB	Each	26812
2.2.11	630 A, 50 KA,TPMCCB	Each	29222
2.2.12	800 A, 50 KA,TPMCCB	Each	37895
2.2.13	100 A,30KA,FPMCCB	Each	8127
2.2.14	125 A,36KA,FPMCCB	Each	8644
2.2.15	200 A,36KA,FPMCCB	Each	15956
2.2.16	250 A,36KA,FPMCCB	Each	18372
2.2.17	250 A,50KA,FPMCCB	Each	19313
2.2.18	400 A,50KA,FPMCCB	Each	44663
2.2.19	630 A,50KA,FPMCCB	Each	45108



2.3	Supplying and fixing following way, single pole and neutral, sheet steel, MCB distribution board, 240 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator)		
2.3.1	6 way , Double door	Each	2390
2.3.2	8 way , Double door	Each	2773
2.3.3	12 way , Double door	Each	2871
2.3.4	16 way, Double door	Each	3367
2.4	Supplying and fixing following way, horizontal type three pole and neutral, sheet steel, MCB distribution board, 415 V, on surface/ recess, complete with tinned copper bus bar, neutral bus bar, earth bar, din bar, interconnections, powder painted including earthing etc. as required. (But without MCB/RCCB/Isolator).		
2.4.1	4 way (4 + 12), Double door	Each	4377
2.4.2	6 way (4 + 18), Double door	Each	5299
2.4.3	8 way (4 + 24), Double door	Each	6337
2.5	Supplying and fixing of following ways surface/ recess mounting, vertical type, 415 V, TPN MCB distribution board of sheet steel, dust protected, duly powder painted, inclusive of 200 A tinned copper bus bar, common neutral link, earth bar, din bar for mounting MCBs (but without MCBs and incomer ) as required . (Note : Vertical type MCB TPDB is normally used where 3 phase outlets are required.)		
2.5.1	4 way (4 + 12), Double door	Each	7951
2.5.2	8 way (4 + 24), Double door	Each	10724
2.5.3	12 way (4 + 36), Double door	Each	13512
2.6	DELETED		
2.7	DELETED		
2.8	DELETED		
2.9	DELETED		

2.10	Supplying and fixing 5 A to 32 A rating, 240/415 V, 10 kA, "C" curve, miniature circuit breaker suitable for inductive load of following poles in the existing MCB DB complete with connections, testing and commissioning etc. as required.		
2.10.1	Single pole	Each	285
2.10.2	Single pole and neutral	Each	643
2.10.3	Double pole	Each	696
2.10.4	Triple pole	Each	1070
2.10.5	Triple pole and neutral	Each	1301
2.11	Supplying and fixing single pole blanking plate in the existing MCB DB complete etc. as required.	Each	14
2.12	Supplying and fixing following rating, double pole, 240 V, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required.		
2.12.1	40 A	Each	472
2.12.2	63 A	Each	569
2.13	Supplying and fixing following rating, four pole, 415 V, isolator in the existing MCB DB complete with connections, testing and commissioning etc. as required.		
2.13.1	40 A	Each	1049
2.13.2	63 A	Each	1115
2.13.3	100 A	Each	1317
2.14	Supplying and fixing following rating, double pole, (single phase and neutral), 240 V, residual current circuit breaker (RCCB), having a sensitivity current 30 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required.		
2.14.1	25 A	Each	2141
2.14.2	40 A	Each	2512
2.14.3	63 A	Each	2866

2.15	Supplying and fixing following rating, four pole, (three phase and neutral), 415 volts, residual current circuit breaker (RCCB), having a sensitivity current 30 mA in the existing MCB DB complete with connections, testing and commissioning etc. as required.		
2.15.1	25 A	Each	3137
2.15.2	40 A	Each	3452
2.15.3	63 A	Each	3597
2.16	Supplying and fixing DP sheet steel enclosure on surface/ recess along with 25/32 A 240 V "C" curve DP MCB complete with connections, testing and commissioning etc. as required.	Each	1258
2.17	Supplying and fixing TP sheet steel enclosure on surface/ recess along with 16/25/32 A 415 V "C" curve TP MCB complete with connections, testing and commissioning etc. as required.	Each	1707
2.18	Supplying and fixing 20 A, 240 V, SPN Industrial type socket outlet, with 2 pole and earth, metal enclosed plug top along with 20 A "C" curve, SP, MCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.	Each	1806
2.19	Supplying and fixing 20 A, 415 V, TPN Industrial type socket outlet, with 4 pole and earth, metal enclosed plug top along with 20 A "C" curve, TPMCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.	Each	2773
2.20	Supplying and fixing 30 A, 415 V, TPN Industrial type socket outlet, with 4 pole and earth, metal enclosed plug top along with 30 A "C" curve, TPMCB, in sheet steel enclosure, on surface or in recess, with chained metal cover for the socket out let and complete with connections, testing and commissioning etc. as required.	Each	4358

2.21	Providing and fixing M.V. danger notice plate of 200 mm X 150 mm, made of mild steel, at least 2 mm thick, and vitreous enamelled white on both sides, and with inscription in single red colour on front side as required.	Each	315
2.22	Providing and fixing H.T. danger notice plate of 250 mm X 200 mm, made of mild steel, at least 2 mm thick, and vitreous enamelled white on both sides, and with inscription in single red colour on front side as required.	Each	340
2.23	Supplying and fixing Cable End Box (Loose Wire Box) suitable for following single pole and neutral, sheet steel, MCB distribution board, 240 Volts, on surface/ recess, complete with testing and commissioning etc. as required.		
2.23.1	For 6 way, Double door SPN MCBDB	Each	834
2.23.2	For 8 way, Double door SPN MCBDB	Each	918
2.23.3	For 10 way, Double door SPN MCBDB	Each	895
2.23.4	For 14 way, Double door SPN MCBDB	Each	990
2.24	Supplying and fixing Cable End Box (Loose Wire Box) suitable for following triple pole and neutral, sheet steel, MCB distribution board, 415 Volts, on surface/ recess, complete with testing and commissioning etc.as required.		
2.24.1	For 4 way, Double door TPN MCBDB	Each	1177
2.24.2	For 6 way, Double door TPN MCBDB	Each	1223
2.24.3	For 8 way, Double door TPN MCBDB	Each	1448
2.25	Supplying and fixing Cable End Box (Loose Wire Box) suitable for triple pole and neutral, sheet steel, Vertical MCB distribution board, 415 Volts, on surface/ recess, complete with testing and commissioning etc. as required.	Each	1271



## CHAPTER 3

### RISING MAINS & BUS TRUNKING

Item No.	Description	Unit	Rate
3.1	Supplying Installation, Testing and Commissioning of on wall, testing and commissioning of following capacity rising mains made of 1.6mm thick IP 42 sheet steel enclosure duly painted with powder coating, wall straps, fully PVC insulated 4 Nos aluminium bus bars having current density of 130 A/sq.cm at nominal current rating in convenient sections and suitable for 415 V, 3 phase, 4 wire, 50 Hz, A.C. supply with extension joints, fire proof barriers, expansion joints, thrust pads including jointing and earthing with 2 runs of galvanised iron strips etc. as required. (Rising mains confirming to IS 8623, TEC 439).		
3.1.1	200 A (S.C. rating for 1 sec - 15 kA)	Meter	7778
3.1.2	300 A (S.C. rating for 1 sec - 20 kA)	Meter	8097
3.1.3	400 A (S.C. rating for 1 sec - 25 kA)	Meter	9907
3.1.4	600 A (S.C. rating for 1 sec - 45 kA)	Meter	11033
3.1.5	800 A (S.C. rating for 1 sec - 50 kA)	Meter	13241
3.2	Supplying Installation, Testing and Commissioning of following capacity TPN tap off box made of 1.6mm thick sheet steel enclosure duly painted with powder coating on existing rising mains complete with TPN disconnector FSU and HRC fuses, connections, earthing etc. as required.		
3.2.1	16 A TPN	Each	8550
3.2.2	32 A TPN	Each	10711
3.2.3	63 A TPN	Each	12116
3.2.4	100 A TPN	Each	14902
3.2.5	200 A TPN	Each	19804
3.2.6	315 A TPN	Each	26889
3.2.7	400 A TPN	Each	30594

3.3	Supplying Installation, Testing and Commissioning of following capacity TPN distribution tap off box made of 1.6mm thick sheet steel enclosure duly painted with powder coating on existing rising mains complete with HRC fuses, interconnections, earthing etc. as required.		
3.3.1	16 A TPN, 2 way	Each	12817
3.3.2	16 A TPN, 4 way	Each	28498
3.3.3	16 A TPN, 6 way	Each	32727
3.3.4	16 A TPN, 8 way	Each	55866
3.3.5	32 A TPN, 2 way	Each	15772
3.3.6	32 A TPN, 4 way	Each	30315
3.3.7	32 A TPN, 6 way	Each	40364
3.3.8	32 A TPN, 8 way	Each	56230
3.3.9	63 A TPN, 2 way	Each	17953
3.3.10	63 A TPN, 4 way	Each	32134
3.3.11	63 A TPN, 6 way	Each	42181
3.3.12	63 A TPN, 8 way	Each	58592
3.4	Supplying Installation, Testing and Commissioning of following capacity End Feed Unit made of 1.6mm thick sheet steel enclosure duly painted with powder coating to existing rising mains complete with TPN disconnecter FSU and HRC fuses, mounting stands, cable end box, brass compression gland, connections, earthing etc. as required.		
3.4.1	200 A TPN	Each	25637
3.4.2	300 A TPN	Each	28194
3.4.3	400 A TPN	Each	31265
3.4.4	600 A TPN	Each	33791
3.4.5	800 A TPN	Each	38140
3.5	Supplying, installation including suspension, testing and commissioning of following capacity bus trunking with aluminium bus bars having current density of 130 A/ sq.cm at nominal current rating in 1.6mm thick IP 42 sheet steel enclosure in convenient sections for use on, 3 phase, 4 wire, 415 V, 50 Hz, A.C. supply including jointing of sections, flexible joints, expansion joints, bends and earthing with 2 runs of galvanised iron strips, suspenders, angle iron bracket, steel fasteners, connecting to earthing system etc. as required.		

3.5.1	800 A	Meter	14713
3.5.2	1000 A	Meter	17350
3.5.3	1250 A	Meter	22339
3.5.4	1400 A	Meter	27793
3.5.5	1600 A	Meter	27906
3.6	Supplying, installation, testing and commissioning of following capacity overhead distribution bus trunking with aluminium bus bars having current density of 130 A/ sq.cm at nominal current rating in 1.6mm thick IP 42 sheet steel enclosure in convenient sections with provision of tapping points for use on, 3 phase, 4 wire, 415 volts, 50 Hz, A.C. supply including jointing of sections, bends, earthing with 2 runs of galvanised iron strips, all installation accessories etc. as required.		
3.6.1	200 A	Meter	8623
3.6.2	400 A	Meter	10986
3.7	Supplying, installation, testing and commissioning of following capacity TPN tap off box / plug-in box made of 1.6mm thick sheet steel enclosure duly painted with powder coating on existing overhead bus bar system complete with TPN disconnecter FSU and HRC fuses, connections, earthing etc. as required.		
3.7.1	32 A	Each	10711
3.7.2	63 A	Each	12116
3.7.3	100 A	Each	14902
3.8	Supplying, installation on wall, testing and commissioning of following capacity Air Insulated Compact Type Rising Mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with enclosure having IP-54 rating after fixing the tap off boxes and all accessories, made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars having current density of 130 A/ sq cm at nominal current rating, necessary joints & expansion joints, fire barrier at each floor, provision of tapping at every metre, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required.		



3.8.1	200 A, Isc = 15kA for 1 second	Meter	8445
3.8.2	315 A, Isc = 25kA for 1 second	Meter	9849
3.8.3	400 A, Isc = 30kA for 1 second	Meter	11717
3.8.4	500 A, Isc = 35kA for 1 second	Meter	11779
3.8.5	630 A, Isc = 50kA for 1 second	Meter	13584
3.8.6	800 A, Isc = 50kA for 1 second	Meter	19714
3.8.7	1000 A, Isc = 50kA for 1 second	Meter	20411
3.8.8	1250 A, Isc = 50kA for 1 second	Meter	24174
3.9	Supplying, installation on wall or suspension on ceiling, testing and commissioning of following capacity Air Insulated Compact Type Bus Trunking for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with metal clad enclosure having IP-54 rating after fixing the tap off boxes and all accessories, made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars having current density of 130 A/ sq.cm at nominal current rating, necessary joints, elbow joints & expansion joints, fire barrier at each floor, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, suspenders, angle iron bracket, steel fasteners, connecting to earthing system etc. as required.		
3.9.1	200 A, Isc = 15kA for 1 second	Meter	8522
3.9.2	315 A, Isc = 25kA for 1 second	Meter	9940
3.9.3	400 A, Isc = 30kA for 1 second	Meter	11827
3.9.4	500 A, Isc = 35kA for 1 second	Meter	11888
3.9.5	630 A, Isc = 50kA for 1 second	Meter	13711
3.9.6	800 A, Isc = 50kA for 1 second	Meter	19902
3.9.7	1000 A, Isc = 50kA for 1 second	Meter	19902
3.9.8	1250 A, Isc = 50kA for 1 second	Meter	23098
3.10	DELETED		
3.11	Supplying, installation, testing & commissioning of following capacity End Feed Unit for the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick steel sheet enclosure (IP54) duly powder coated with provision of MCCB/ACB (but without MCCB/ACB) complete with necessary joints including clamping brackets, angle iron bracket, steel fasteners, connecting to earthing system etc. as required		

3.11.1	200 A, Isc= 15kA for 1 sec	Each	8899
3.11.2	315 A, Isc= 25kA for 1 sec	Each	10718
3.11.3	400 A, Isc= 30kA for 1 sec	Each	11888
3.11.4	500 A, Isc= 35kA for 1 sec	Each	11888
3.11.5	630 A, Isc= 50kA for 1 sec	Each	14120
3.11.6	800 A, Isc= 50kA for 1 sec	Each	18772
3.11.7	1000 A, Isc= 50kA for 1 sec	Each	18772
3.11.8	1250 A, Isc= 50kA for 1 sec	Each	20873
3.12	Supplying, installation, testing & commissioning of following capacity Plug In/ tap off box on the existing Air Insulated Compact Type bus trunking/ rising mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply made with 1.6mm thick sheet steel enclosure (IP54) duly powder coated with provision of MCCB/ACB (but without MCCB/ACB) complete etc. as required		
3.12.1	125 A, Isc= 15kA for 1 sec	Each	9104
3.12.2	200 A, Isc= 25kA for 1 sec	Each	9104
3.12.3	250 A, Isc= 30kA for 1 sec	Each	11171
3.12.4	400 A, Isc= 35kA for 1 sec	Each	11171
3.12.5	500 A, Isc= 50kA for 1 sec	Each	16806
3.12.6	630 A, Isc= 50kA for 1 sec	Each	16806
3.13	Supplying, installation by suspension on ceiling, testing and commissioning of following capacity Sandwich Type Rising Mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with metal clad enclosure having IP-54 rating after fixing the tap off boxes and all accessories, made of 1.6mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium bus bars having current density of 130 A/ sq cm at nominal current rating, necessary joints, elbow joints & expansion joints and bends, fire barrier at each floor, provision of tapping at every metre, adopter box and copper flexible for joints, continuous earthing with 2 Nos aluminium strip of suitable size (one on each side) including, G.I. clamping brackets, suspenders, angle iron bracket, steel fasteners, connecting to earthing system etc. as required		
3.13.1	400 A, Isc= 25kA for 1 sec	Meter	16196
3.13.2	500 A, Isc= 30kA for 1 sec	Meter	17152

3.13.3	630 A, Isc= 50kA for 1 sec	Meter	20225
3.13.4	800 A, Isc= 50kA for 1 sec	Meter	22841
3.13.5	1000 A, Isc= 50kA for 1 sec	Meter	25416
3.13.6	1250 A, Isc= 50kA for 1 sec	Meter	27733
3.13.7	1600 A, Isc= 50kA for 1 sec	Meter	32974
3.13.8	2000 A, Isc= 50kA for 1 sec	Meter	42110
3.13.9	2500 A, Isc= 50kA for 1 sec	Meter	46745
3.13.10	3200 A, Isc= 50kA for 1 sec	Meter	58373
3.13.11	4000 A, Isc= 50kA for 1 sec	Meter	98975

## CHAPTER-4 CABLE TRAYS

Item No.	Description	Unit	Rate
4.1	Supplying and installaton following size of perforated painted with powder coating M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers MS/GI Suspenders i/c base of suitable size MS/GI angle, bolts & nuts, painting suspenders, fastener etc as required.		
4.1.1	100 mm width X 50 mm depth X 1.6 mm thickness	Meter	623
4.1.2	150 mm width X 50 mm depth X 1.6 mm thickness	Meter	686
4.1.3	200 mm width X 50 mm depth X 1.6 mm thickness	Meter	775
4.1.4	300 mm width X 50 mm depth X 1.6 mm thickness	Meter	866
4.1.5	375 mm width X 50 mm depth X 2.0 mm thickness	Meter	1116
4.1.6	450 mm width X 50 mm depth X 2.0 mm thickness	Meter	1243
4.1.7	600 mm width X 50 mm depth X 2.0 mm thickness	Meter	1482
4.1.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1025
4.1.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1160
4.1.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1348
4.1.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1597
4.1.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1830
4.1.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	2109
4.1.14	600 mm width X 75 mm depth X 2.0 mm thickness	Meter	1633
4.1.15	750 mm width X 75 mm depth X 2.0 mm thickness	Meter	1844
4.1.16	900 mm width X 75 mm depth X 2.0 mm thickness	Meter	2145
4.2	Supplying and installation following size of perforated painted with powder coating M.S. cable trays bends with perforation not more than 17.5%, joined with connectors, suspended from the ceiling with two numbers MS/GI Suspenders i/c base of suitable size MS/GI angle, bolts & nuts, painting suspenders, fastener etc as required.		
4.2.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	948
4.2.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1105
4.2.3	200 mm width X 50 mm depth X 1.6 mm thickness	Each	1323
4.2.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	1544
4.2.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	2138
4.2.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	2437
4.2.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	3009
4.2.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	1930

4.2.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2244
4.2.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2657
4.2.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3244
4.2.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3805
4.2.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4403
4.2.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	3332
4.2.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	3895
4.2.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	4493

4.3 Supplying and installation following size of perforated painted with powder coating M.S. cable trays Tee with perforation not more than 17.5%, joined with connectors, suspended from the ceiling with two numbers MS/GI Suspenders i/c base of suitable size MS/GI angle, bolts & nuts, painting suspenders, fastner etc as required.

4.3.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1089
4.3.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1281
4.3.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	1552
4.3.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	1826
4.3.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	2558
4.3.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	2923
4.3.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	3628
4.3.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2305
4.3.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2686
4.3.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3165
4.3.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3885
4.3.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4578
4.3.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5309
4.3.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	3995
4.3.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	4691
4.3.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	5422

4.4 Supplying and installing following size of perforated painted with powder coating M.S. cable trays Cross Member with perforation not more than 17.5%, joined with connectors, suspended from the ceiling with two numbers MS/GI Suspenders i/c base of suitable size MS/GI angle, bolts & nuts, painting suspenders, fastner etc as required.

4.4.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1231
4.4.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1498

4.4.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	1783
4.4.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	2110
4.4.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	2978
4.4.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	3410
4.4.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	4247
4.4.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2681
4.4.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3129
4.4.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3674
4.4.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4526
4.4.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5352
4.4.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	6215
4.4.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	4658
4.4.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	5487
4.4.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	6350

- 4.5 Supplying and installing following size of perforated painted with powder coating M.S. cable trays Reducer with perforation not more than 17.5%, joined with connectors, suspended from the ceiling with two numbers MS/GI Suspenders i/c base of suitable size MS/GI angle, bolts & nuts, painting suspenders, fastner etc as required.

4.5.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1089
4.5.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1281
4.5.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	1562
4.5.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	1876
4.5.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	2568
4.5.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	2933
4.5.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	3628
4.5.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2305
4.5.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2686
4.5.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3165
4.5.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3885
4.5.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4578
4.5.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5309
4.5.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	3995
4.5.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	4691
4.5.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	5422

#### **Hot Dipped Galvanized Iron Cable Tray**

- 4.6 Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray (Galvanisation thickness not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined

with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.

4.6.1	100 mm width X 50 mm depth X 1.6 mm thickness	Meter	754
4.6.2	150 mm width X 50 mm depth X 1.6 mm thickness	Meter	803
4.6.3	225 mm width X 50 mm depth X 1.6 mm thickness	Meter	991
4.6.4	300 mm width X 50 mm depth X 1.6 mm thickness	Meter	1062
4.6.5	375 mm width X 50 mm depth X 2.0 mm thickness	Meter	1322
4.6.6	450 mm width X 50 mm depth X 2.0 mm thickness	Meter	1439
4.6.7	600 mm width X 50 mm depth X 2.0 mm thickness	Meter	1925
4.6.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1299
4.6.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1477
4.6.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	1713
4.6.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	2064
4.6.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	2428
4.6.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Meter	2793
4.6.14	600 mm width X 75 mm depth X 2.0 mm thickness	Meter	2111
4.6.15	750 mm width X 75 mm depth X 2.0 mm thickness	Meter	2441
4.6.16	900 mm width X 75 mm depth X 2.0 mm thickness	Meter	2799

4.7 Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "bends" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.

4.7.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1252
4.7.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1368
4.7.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	1811
4.7.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	1977
4.7.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	2580
4.7.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	2844
4.7.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	3985
4.7.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2537
4.7.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2946
4.7.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3460
4.7.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3966
4.7.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5122
4.7.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5932
4.7.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	4383
4.7.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	5156

4.7.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	5957
4.8	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "Tee" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.		
4.8.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1427
4.8.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1486
4.8.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	2097
4.8.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	2294
4.8.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	3012
4.8.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	3324
4.8.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	4687
4.8.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2965
4.8.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3505
4.8.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4038
4.8.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5084
4.8.12	750 mm width X 62.5 mm depth X 2.0 mm thickness	Each	6014
4.8.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	6984
4.8.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	5137
4.8.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	6061
4.8.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	7013
4.9	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "Cross member" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.		
4.9.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1427
4.9.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	1486
4.9.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	2117
4.9.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	2513
4.9.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	3289
4.9.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	3770
4.9.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	4702
4.9.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	2972
4.9.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3448



4.9.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4044
4.9.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5000
4.9.12	750mm width X 62.5 mm depth X 2 mm thickness	Each	4505
4.9.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5196
4.9.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	5140
4.9.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	6014
4.9.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	6984
4.10	Supplying and installing following size of perforated Hot Dipped Galvanised Iron cable tray "Reducer" (galvanisation not less than 50 microns) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with two numbers GI Suspenders i/c base of suitable size GI angle, GI bolts & nuts, fastner etc as required.		
4.10.1	100 mm width X 50 mm depth X 1.6 mm thickness	Each	1771
4.10.2	150 mm width X 50 mm depth X 1.6 mm thickness	Each	2049
4.10.3	225 mm width X 50 mm depth X 1.6 mm thickness	Each	2572
4.10.4	300 mm width X 50 mm depth X 1.6 mm thickness	Each	2991
4.10.5	375 mm width X 50 mm depth X 2.0 mm thickness	Each	3624
4.10.6	450 mm width X 50 mm depth X 2.0 mm thickness	Each	3929
4.10.7	600 mm width X 50 mm depth X 2.0 mm thickness	Each	5418
4.10.8	300 mm width X 62.5 mm depth X 2.0 mm thickness	Each	3583
4.10.9	375 mm width X 62.5 mm depth X 2.0 mm thickness	Each	4178
4.10.10	450 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5000
4.10.11	600 mm width X 62.5 mm depth X 2.0 mm thickness	Each	5567
4.10.12	750mm width X 62.5 mm depth X 2 mm thickness	Each	6758
4.10.13	900 mm width X 62.5 mm depth X 2.0 mm thickness	Each	7826
4.10.14	600 mm width X 75 mm depth X 2.0 mm thickness	Each	6291
4.10.15	750 mm width X 75 mm depth X 2.0 mm thickness	Each	6842
4.10.16	900 mm width X 75 mm depth X 2.0 mm thickness	Each	7912

## CHAPTER-5 EARTHING

Item No.	Description	Unit	Rate
5.1	Earthing with G.I. earth pipe 4.5 Meter long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. (but without charcoal/ coke and salt) as required.	Set	5958
5.2	Earthing with G.I. earth pipe 4.5 Meter long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.	Set	7658
5.3	Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Meter long etc. (but without charcoal/ coke and salt ) as required.	Set	7080
5.4	Earthing with G.I. earth plate 600 mm X 600 mm X 6 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Meter long etc. with charcoal/ coke and salt as required.	Set	8351
5.5	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Meter long etc. (but without charcoal/ coke and salt) as required.	Set	13733
5.6	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 Meter long etc. with charcoal/ coke and salt as required.	Set	15004

5.7	Supplying and laying 6 SWG G.I. wire at 0.50 Meter below ground level for conductor earth electrode, including connection/ termination with GI thimble etc. as required.	Meter	62
5.8	Supplying and laying 25 mm X 5 mm copper strip at 0.50 metre below ground as strip earth electrode, including connection/ terminating with nut, bolt, spring, washer etc. as required. (Jointing shall be done by overlapping and with 2 sets of brass nut bolt & spring washer spaced at 50mm)	Meter	1024
5.9	Supplying and laying 25 mm X 5 mm G.I strip at 0.50 metre below ground as strip earth electrode, including connection/ terminating with G.I. nut, bolt, spring, washer etc. as required. (Jointing shall be done by overlapping and with 2 sets of G.I. nut bolt & spring washer spaced at 50mm)	Meter	160
5.10	Providing and fixing 25 mm X 5 mm copper strip in 40 mm dia G.I. pipe from earth electrode including connection with brass nut, bolt, spring, washer excavation and re-filling etc. as required.	Meter	1638
5.11	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	Meter	755
5.12	Providing and laying earth connection from earth electrode with 6 SWG dia G.I. Wire in 15 mm dia G.I. pipe from earth electrode including connection with G.I. thimble excavation and re-filling as required.	Meter	313
5.13	Providing and laying earth connection from earth electrode with 4.00 mm dia copper wire in 15 mm dia G.I. pipe from earth electrode including connection with copper thimble excavation and re-filling as required.	Meter	400
5.14	Providing and fixing 25 mm X 5 mm copper strip on surface or in recess for connections etc. as required.	Meter	1246
5.15	Providing and fixing 25 mm X 5 mm G.I. strip on surface or in recess for connections etc. as required.	Meter	287

5.16	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing as required.	Meter	84
5.17	Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing as required.	Meter	173
5.18	Providing and fixing 6 SWG dia G.I. wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	Meter	50
5.19	Providing and fixing 4.00 mm dia copper wire on surface or in recess for loop earthing along with existing surface/ recessed conduit/ submain wiring/ cable as required.	Meter	139
5.20	Providing and fixing earth bus of 50 mm X 5 mm copper strip on surface for connections etc. as required.	Meter	2245



## CHAPTER 6 LIGHTNING CONDUCTOR

Item No.	Description	Unit	Rate
6.1	DELETED		
6.1	Providing and fixing of lightning conductor finial, made of 25 mm dia 300 mm long, G.I. tube, having single prong at top, with 85 mm dia 6 mm thick G.I. base plate including holes etc. complete as required.	Each	609
6.2	Fixing of lightning conductor finial (single prong) with base plate including holes etc. complete as required.	Each	422
6.3	Jointing copper / G.I. tape (with another copper/ G I tape, base of the finial or any other metallic object) by riveting / nut bolting/ sweating and soldering etc as required.	Each	139
6.4	DELETED		
6.5	DELETED		
6.6	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For horizontal run)	Meter	148
6.7	Providing and fixing G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For vertical run)	Meter	238
6.8	Fixing of copper/ G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For horizontal run)	Meter	100
6.9	Fixing of copper/ G.I. tape 20 mm X 3 mm thick on parapet or surface of wall for lightning conductor complete as required.(For vertical run)	Meter	201
6.10	DELETED		
6.10	Providing and fixing testing joint, made of 20 mm X 3 mm thick G.I. strip, 125 mm long, with 4 nos. of G.I. bolts, nuts, chuck nuts and spring washers etc. complete as required.	Each	140

6.11	DELETED		
6.11	Providing and laying G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required.	Meter	221
6.12	Laying copper/ G.I. tape 32 mm X 6 mm from earth electrode directly in ground as required.	Meter	96

## CHAPTER 7 LIGHTING CONTROLS

Item No.	Description	Unit	Rate
7.1	Supplying, Installation, Testing and commissioning of Passive Infrared (PIR) technology based occupancy sensor having high performance, non regulating programmable type, suitable for connected load upto 10Amp , for mounting height up to 3 meter and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	Each	4896
7.2	Supplying, Installation, Testing and commissioning of Passive Infrared(PIR) technology based occupancy sensor with day light dimming(lightning level shall be regulated as per availability of natural day light in an area along with occupancy detection.) having high performance, regulating programmable type, suitable for connected load upto 10Amp , for mounting height up to 3 mtr and for 5 m diameter coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	Each	9670
7.3	Supplying, Installation, Testing and commissioning of Microwave technology based occupancy sensor having high performance, non regulating programmable type, suitable for connected load upto 10Amp , for mounting height up to 3 meter and for 5m X 20m coverage area along with necessary fixing arrangements i/c programming at site etc. complete as required.	Each	12515
7.4	Supplying, Installation, Testing and commissioning of Astronomical time switch of following configuration to be mounted in feeder pillars / Lighting DBs for automatic switching On & OFF of street lights at sun set & sun rise or twilight(Auto ON, Auto OFF, Auto modes) with manual override facility with 12/24 hour display format with suitable battery and indication for relay status i/c programming at site complete as required.		
7.4.1	1 output per phase and suitable for single phase supply	Each	4673



7.4.2	2 output per phase and suitable for single phase supply	Each	9029
7.4.3	3 output(1output per phase) and suitable for three phase supply	Each	11161

## CHAPTER-8 LED LIGHT

Item No.	Description	Unit	Rate
8.1	LED Down lighter (SMD Type) (System lumen efficacy $\geq 105 < 120$ lm/Watt )  Supplying, Installation, Testing & Commissioning of LED Recessed/ surface Down lighter (Round/ square/ Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS : 10322 with driver as per the requirement with Driver efficiency $>85\%$ , Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range $-5^{\circ}\text{C}$ to $40^{\circ}\text{C}$ , internal surge protection of 2.5 KV with Short & Open circuit protection ,THD $< 10\%$ , P. F. $\geq 0.95$ , IP20, CRI $\geq 80$ , UGR (Unified Glare Rating) $\leq 19$ , Flicker free (flicker should be below 5%), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends, CCT 3000°K /4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching) $<3$ , Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy $\geq 105$ and $<120$ lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above $90^{\circ}\text{C}$ ) Powder coated die cast /Extruded aluminium Body including trim		
8.1.1	5 - 7 watt	Each	542
8.1.2	8 - 10 watt	Each	624
8.1.3	12 -15 watt	Each	715
8.1.4	18 watt	Each	920

8.1.5	22 watt	Each	942
8.1.6	30 watt	Each	1439

8.2 LED Down lighter (SMD Type) (System lumen efficacy  $\geq 120 < 135 \text{ lm/Watt}$ )

Supplying, installation, Testing & Commissioning of LED Recessed/surface Down lighter (Round/ square/ Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS : 10322 with driver as per the requirement with Driver efficiency  $> 85\%$ , Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range  $-5^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection, THD  $< 10\%$ , P. F.  $\geq 0.95$ , IP20, CRI  $\geq 80$ , UGR (Unified Glare Rating)  $\leq 19$ , Flicker free (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends, CCT  $3000^{\circ}\text{K}$  /  $4000^{\circ}\text{K}$  /  $5700^{\circ}\text{K}$  /  $6500^{\circ}\text{K}$  (As per ANSI Bin), SDCM (Standard Deviation Color Matching)  $< 3$ , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 120 < 135 \text{ lm/Watt}$  output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above  $90^{\circ}\text{C}$ ).

Powder coated die cast /Extruded aluminium Body including trim .

8.2.1	5 - 7 watt	Each	542
8.2.2	8 - 10 watt	Each	624
8.2.3	12 -15 watt	Each	715

8.2.4	18 watt	Each	942
8.2.5	22 watt	Each	967
8.2.6	30 watt	Each	1539
8.3	LED Down lighter (SMD Type) (System lumen efficacy >135lm/Watt)		

Supplying, Installation, Testing & Commissioning of LED Recessed/surface Down lighter (Round /square/Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range - 5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI ≥80, UGR (Unified Glare Rating) ≤ 19, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K/ 4000°K /5700°K / 6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy >135 lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Powder coated die cast /Extruded aluminium Body including trim .

8.3.1	5 - 7 watt	Each	567
8.3.2	8 - 10 watt	Each	657
8.3.3	12 -15 watt	Each	756

8.3.4	18 watt	Each	1004
8.3.5	22 watt	Each	1029
8.3.6	30 watt	Each	1579
8.4	LED Down lighter (COB Type) (System lumen efficacy $\geq 105 < 120$ lm/Watt ).		

Supplying, installation, Testing & Commissioning of LED Recessed/ surface Down lighter (Round/ square/ Rectangular) COB Type of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency  $>85\%$ , Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range  $-5^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ , internal surge protection of 2.5 KV with Short & Open circuit protection ,THD  $< 10\%$  , P. F. $\geq 0.95$ , IP20, CRI  $\geq 80$ , UGR (Unified Glare Rating)  $\leq 19$ , Flicker free (flicker should be below 5%), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends, CCT  $3000^{\circ}\text{K}$  /  $4000^{\circ}\text{K}$  /  $5700^{\circ}\text{K}$  /  $6500^{\circ}\text{K}$  (As per ANSI Bin), SDCM (Standard Deviation Color Matching)  $<3$ , Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 105$  and  $<120$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above  $90^{\circ}\text{C}$ ) Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector

8.4.1	5 - 7 watt	Each	826
8.4.2	8 - 10 watt	Each	878
8.4.3	12 -15 watt	Each	1042
8.4.4	18 watt	Each	1181

8.4.5	22 watt	Each	1330
8.4.6	30 watt	Each	1654

8.5 LED Down lighter (COB Type) (System lumen efficacy  $\geq 120$  lm/Watt )

Supplying, Installation, Testing & Commissioning of LED Recessed/surface Down lighter (Round / square/ Rectangular) COB Type of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency  $>85\%$ , Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range  $-5^{\circ}\text{C}$  to  $40^{\circ}\text{C}$ , internal surge protection of 2.5 KV with Short & Open circuit protection ,THD  $< 10\%$  , P. F. $\geq 0.95$ , IP20, CRI  $\geq 80$  , UGR (Unified Glare Rating)  $\leq 19$ , Flicker free (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), life time of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends , CCT  $3000^{\circ}\text{K}$  /  $4000^{\circ}\text{K}$  /  $5700^{\circ}\text{K}$  /  $6500^{\circ}\text{K}$  (As per ANSI Bin), SDCM(Standard Deviation Colour Matching)  $<3$ , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. OEM must have its own in house NABL lab setup for all testing facilities for LED fixtures. "complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 120$   $<135$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above  $90^{\circ}\text{C}$ ). Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector

8.5.1	5 - 7 watt	Each	926
8.5.2	8 - 10 watt	Each	945
8.5.3	12 -15 watt	Each	1187

8.5.4	18 watt	Each	1470
8.5.5	22 watt	Each	1506
8.5.6	30 watt	Each	2052

8.6 LED Panel light 2x2 ft. (System lumen efficacy  $\geq 105$  <120 lm/Watt)

Supplying, installation, Testing & Commissioning of Panel light 2x2 ft., of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection, THD < 10% , P. F.  $\geq 0.95$ , IP20, CRI  $\geq 80$ , UGR (Unified Glare Rating)  $\leq 19$ , Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with, 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 105$  <120 lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

Powder coated die cast /Extruded aluminium Body (Thickness  $\geq 1.20$  mm)

8.6.1	15 watt	Each	1508
8.6.2	18 watt	Each	2060
8.6.3	22 watt	Each	2370

8.6.4	36 watt	Each	2508
8.6.5	40 watt	Each	2681
8.6.6	45 watt	Each	3166
	Powder Coated CRCA Sheet Body (Thickness $\geq$ 0.50 mm)		
8.6.7	15 watt	Each	1388
8.6.8	18 watt	Each	1712
8.6.9	22 watt	Each	1948
8.6.10	36 watt	Each	2059
8.6.11	40 watt	Each	2197
8.6.12	45 watt	Each	2527
8.7	LED Panel light 2x2 ft. (System lumen efficacy $\geq 120$ <135 lm/Watt)		

Supplying, Installation, Testing & Commissioning of Panel light 2x2 ft., of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F. $\geq$ 0.95, IP20, CRI  $\geq$ 80, UGR (Unified Glare Rating)  $\leq$ 19, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 120$  <135 lm/Watt output .LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).



Powder coated die cast /Extruded aluminium Body  
(Thickness  $\geq$  1.20 mm)

8.7.1	15 watt	Each	1633
8.7.2	18 watt	Each	2240
8.7.3	22 watt	Each	2695
8.7.4	36 watt	Each	2962
8.7.5	40 watt	Each	3685
8.7.6	45 watt	Each	3913

Powder Coated CRCA Sheet Body (Thickness  $\geq$  0.50 mm)

8.7.7	15 watt	Each	1549
8.7.8	18 watt	Each	1920
8.7.9	22 watt	Each	2031
8.7.10	36 watt	Each	2225
8.7.11	40 watt	Each	2527
8.7.12	45 watt	Each	2584

8.8 LED Panel light 2x2 ft., (System lumen efficacy >135 lm/Watt)

Supplying, installation, Testing & Commissioning of Panel light 2x2 ft., of following body material and construction as per IS : 10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection, THD < 10% , P. F.  $\geq$  0.95, IP20, CRI  $\geq$  80, UGR (Unified Glare Rating)  $\leq$  19, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends ,CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as

required with Minimum 5 year OEM warranty. System lumen efficacy >135 lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

	Powder coated die cast /Extruded aluminium Body (Thickness $\geq$ 1.20 mm)		
8.8.1	15 watt	Each	1758
8.8.2	18 watt	Each	2420
8.8.3	22 watt	Each	3581
8.8.4	36 watt	Each	3997
8.8.5	40 watt	Each	4246
8.8.6	45 watt	Each	4827
	Powder Coated CRCA Sheet Body (Thickness $\geq$ 0.50 mm)		
8.8.7	15 watt	Each	1646
8.8.8	18 watt	Each	2024
8.8.9	22 watt	Each	2793
8.8.10	36 watt	Each	2846
8.8.11	40 watt	Each	2867
8.8.12	45 watt	Each	2924

8.9 LED Batten light (System lumen efficacy  $\geq$ 105 <120 lm/Watt).

Supplying, Installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection, THD < 10%, P. F. $\geq$ 0.95, IP20, CRI  $\geq$ 80, Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation

Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 105 < 120$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

	Powder coated die cast /Extruded aluminium Body (Thickness $\geq 1.20$ mm)		
8.9.1	18- 22 Watt	Each	681
8.9.2	24 -26watt	Each	692
8.9.3	36 watt	Each	678
8.9.4	40 watt	Each	721
	Powder Coated CRCA Sheet Body (Thickness $\geq 0.50$ mm)		
8.9.5	18- 22 Watt	Each	629
8.9.6	24 -26watt	Each	639
8.9.7	36 watt	Each	649
8.9.8	40 watt	Each	663
8.10	LED Batten light (System lumen efficacy $\geq 120 < 135$ lm/Watt) Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F. $\geq 0.95$ , IP20, CRI $\geq 80$ , Flicker free (flicker should be below 5 %), life time (LED,Driver & electrical circuitry), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6500°K		

(As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 120 < 135$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

	Powder coated die cast /Extruded aluminium Body (Thickness $\geq 1.20$ mm)		
8.10.1	18- 22 Watt	Each	734
8.10.2	24 -26watt	Each	745
8.10.3	36 watt	Each	760
8.10.4	40 watt	Each	779
	Powder Coated CRCA Sheet Body (Thickness $\geq 0.50$ mm)		
8.10.5	18- 22 Watt	Each	681
8.10.6	24 -26watt	Each	692
8.10.7	36 watt	Each	705
8.10.8	40 watt	Each	721
8.11	LED Batten light (System lumen efficacy $\geq 135$ lm/Watt) Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85% ,Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -5 °C to 40 °C, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F. $\geq 0.95$ , IP20, CRI $\geq 80$ , Flicker free (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours		

with 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 135$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

	Powder coated die cast /Extruded aluminium Body (Thickness $\geq 1.20$ mm)		
8.11.1	18- 22 Watt	Each	787
8.11.2	24 -26watt	Each	797
8.11.3	36 watt	Each	816
8.11.4	40 watt	Each	837
	Powder Coated CRCA Sheet Body (Thickness $\geq 0.50$ mm)		
8.11.5	18- 22 Watt	Each	734
8.11.6	24 -26watt	Each	745
8.11.7	36 watt	Each	760
8.11.8	40 watt	Each	779

- 8.12 LED Street light fixture, powder coated pressure die cast aluminium body (System lumen efficacy  $\geq 105 < 120$  lm/Watt)

Supplying, installation, Testing & Commissioning of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC

61000-3-2, P. F.  $\geq 0.95$ , IP-66, IK-10, CRI  $\geq 70$ , under voltage and over voltage protection, EMI-EMC As per CISPR -15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching)  $< 5$ , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 105 < 120$  lm/Watt output .LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

8.12.1	10 watt	Each	778
8.12.2	14 watt	Each	917
8.12.3	15 watt	Each	930
8.12.4	18 watt	Each	973
8.12.5	20 watt	Each	982
8.12.6	24 watt	Each	986
8.12.7	25 watt	Each	1000
8.12.8	30 watt	Each	1020
8.12.9	36 watt	Each	1228
8.12.10	40 watt	Each	1297
8.12.11	45 watt	Each	1366
8.12.12	50 watt	Each	1782
8.12.13	72 watt	Each	1920
8.12.14	90 watt	Each	2162
8.12.15	100 watt	Each	2543

8.12.16	120 watt	Each	2612
8.12.17	150 watt	Each	3374
8.12.18	180 watt	Each	4550
8.12.19	200 watt	Each	4689
8.13	<p>LED Street light fixture, powder coated pressure die cast aluminium body (System lumen efficacy <math>\geq 120 &lt; 135</math> lm/Watt)</p> <p>Supplying, installation, Testing &amp; Commissioning of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency <math>&gt; 85\%</math>, Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range <math>-5^{\circ}\text{C}</math> to <math>50^{\circ}\text{C}</math>, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency <math>&gt; 85\%</math>, THD <math>&lt; 10\%</math> as per IEC 61000-3-2, P. F. <math>\geq 0.95</math>, IP-66, IK-10, CRI <math>\geq 70</math>, under voltage and over voltage protection, EMI-EMC As per CISPR 15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time (LED, Driver &amp; electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT <math>3000^{\circ}\text{K}</math> / <math>4000^{\circ}\text{K}</math> / <math>5700^{\circ}\text{K}</math> / <math>6500^{\circ}\text{K}</math> (As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <math>&lt; 5</math>, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy <math>\geq 120 &lt; 135</math> lm/Watt output . LM79 &amp; LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above <math>90^{\circ}\text{C}</math>).</p>		
8.13.1	10 watt	Each	830
8.13.2	14 watt	Each	982
8.13.3	15 watt	Each	1011

8.13.4	18 watt	Each	1173
8.13.5	20 watt	Each	1297
8.13.6	24 watt	Each	1477
8.13.7	25 watt	Each	1526
8.13.8	30 watt	Each	1553
8.13.9	36 watt	Each	1629
8.13.10	40 watt	Each	1643
8.13.11	45 watt	Each	1744
8.13.12	50 watt	Each	1934
8.13.13	72 watt	Each	2128
8.13.14	90 watt	Each	2335
8.13.15	100 watt	Each	2681
8.13.16	120 watt	Each	2958
8.13.17	150 watt	Each	3443
8.13.18	180 watt	Each	4827
8.13.19	200 watt	Each	5035

8.14 LED Street light fixture, powder coated pressure die cast aluminium body (System lumen efficacy  $\geq 135$  lm/Watt).

Supplying, Installation, Testing & Commissioning of Street light LED fixture, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%, THD < 10% as per IEC 61000-3-2, P. F.  $\geq 0.95$ , IP-66, IK-10, CRI  $\geq 70$ , under voltage and over voltage protection, EMI-EMC as per CISPR-15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time (LED, Driver & electrical circuitary) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all



respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 135$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

8.14.1	10 watt	Each	916
8.14.2	14 watt	Each	1055
8.14.3	15 watt	Each	1087
8.14.4	18 watt	Each	1193
8.14.5	20 watt	Each	1228
8.14.6	24 watt	Each	1539
8.14.7	25 watt	Each	1591
8.14.8	30 watt	Each	1678
8.14.9	36 watt	Each	1747
8.14.10	40 watt	Each	1886
8.14.11	45 watt	Each	1966
8.14.12	50 watt	Each	2185
8.14.13	72 watt	Each	2578
8.14.14	90 watt	Each	2820
8.14.15	100 watt	Each	3374
8.14.16	120 watt	Each	4066
8.14.17	150 watt	Each	5090
8.14.18	180 watt	Each	5450
8.14.19	200 watt	Each	6142

8.15 LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy  $\geq 105$  <120 lm/Watt).

Supplying, Installation, Testing & Commissioning of Flood Light, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 °C to

50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P. F.≥0.95, IP-66,IK-10, CRI ≥70, under voltage and over voltage protection, EMI-EMC as per CISPR -15, lenses for beam angle 30 deg-120deg as per the application and the project requirement., suitable tilt able fitting, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin) , SDCM(Standard Deviation Color Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥105 <120 lm/Watt output .LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

8.15.1	50 watt	Each	1436
8.15.2	70 watt	Each	2114
8.15.3	100 watt	Each	2266
8.15.4	150 watt	Each	3166
8.15.5	200 watt	Each	4550
8.15.6	250 watt	Each	5450
8.16	LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy ≥120 and <135 lm/Watt).		

Supplying, Installation, Testing & Commissioning of Flood Light, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement with Driver efficiency >85%, Input voltage: Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10%

as per IEC 61000-3-2, P. F.  $\geq 0.95$ , IP-66, IK-10, CRI  $\geq 70$ , under voltage and over voltage protection, EMI-EMC as per CISPR-15, lenses for beam angle 30 deg-120deg as per the application and the project requirement, suitable tilt able fitting, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K / 6500°K (As per ANSI Bin), SDCM (Standard Deviation Colour Matching)  $< 5$ , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 120$  and  $< 135$  lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

8.16.1	50 watt	Each	2009
8.16.2	70 watt	Each	2299
8.16.3	100 watt	Each	2467
8.16.4	150 watt	Each	3457
8.16.5	200 watt	Each	4689
8.16.6	250 watt	Each	5969

- 8.17 LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy  $\geq 135$  lm/Watt)

Supplying, Installation, Testing & Commissioning of Flood Light, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement with Driver efficiency  $> 85\%$ , Input voltage: Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range  $-5^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ , internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency  $> 85\%$ , THD  $< 10\%$  as per IEC 61000-3-2, P. F.  $\geq 0.95$ , IP-66, IK-10, CRI  $\geq 70$ , under voltage and over voltage protection,

EMI-EMC as per CISPR-15, lenses for beam angle 30 deg-120deg as per the application and the project requirement., suitable tilt able fitting, life time (LED, Driver & electrical circuitry) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin) , SDCM(Standard Deviation Colour Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 135$  lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

8.17.1	50 watt	Each	2089
8.17.2	70 watt	Each	2392
8.17.3	100 watt	Each	2567
8.17.4	150 watt	Each	3602
8.17.5	200 watt	Each	5504
8.17.6	250 watt	Each	6229

- 8.18 LED Smart Street light fixture, powder coated pressure die cast aluminium (System. System lumen efficacy  $\geq 105$  and  $< 120$  lm/Watt)

Supplying, installation, Testing & Commissioning of Smart Street light LED fixture, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement (  $< 700$ ma), Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range  $-15^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ , internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency  $> 85\%$ , THD  $< 10\%$  as per IEC 61000-3-2, P. F. $\geq 0.95$ , IP-66, IK-08, CRI  $\geq 70$ , under voltage and over voltage

protection, EMI- EMC as per CISPR-15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 105$  and  $< 120$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). Smart inbuilt controller shall have following features.

1. Control and monitor LED luminaries with bi directional control ( Status, Fault, Alarm, dimming level, wattage, energy)
2. to measure voltage, current, power, power factor, apparent energy, active energy, operating hours.
3. Inbuilt ambient light sensor, motion sensor based on Passive Infra Red (PIR).
4. Wi-Fi LoRA/Zigbee/Powerline with ethernet network based IOT feature as per site requirement or engineer in charge.
5. should be controlled through auto/ manual
6. Programmable level of not less than 48 different light intensity settings,
7. inbuilt repeater & relay signals function to other controllers

8.18.1	45 watt	Each	5081
8.18.2	50 watt	Each	5300
8.18.3	72 watt	Each	5825
8.18.4	90 watt	Each	6088
8.18.5	100 watt	Each	7226
8.18.6	120 watt	Each	7576

8.18.7	150 watt	Each	9485
8.18.8	180 watt	Each	9660
8.18.9	200 watt	Each	11341
8.19	LED Smart Street light fixture, powder coated pressure die cast aluminium (System lumen efficacy $\geq 120$ and $< 135$ lm/Watt)		

Supplying, installation, Testing & Commissioning of Smart Street light LED fixture, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement (  $< 700$ ma), Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range  $-5^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ , internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency  $>85\%$ , THD  $< 10\%$  as per IEC 61000-3-2, P. F.  $\geq 0.95$ , IP-66, IK-08, CRI  $\geq 70$ , under voltage and over voltage protection, EMI- EMC as per CISPR-15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report , CCT  $3000^{\circ}\text{K}$  /  $4000^{\circ}\text{K}$  /  $5700^{\circ}\text{K}$  /  $6500^{\circ}\text{K}$  (As per ANSI Bin) , Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 120$  and  $< 135$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above  $90^{\circ}\text{C}$ ).

Smart inbuilt controller shall have following features.

1. Control and monitor LED luminaries with bi directional control( Status, Fault, Alarm, dimming level, wattage, energy)
2. To measure voltage, current, power, power factor, apparent energy, active energy, operating hours.

3. Inbuilt ambient light sensor, motion sensor based on Passive Infra Red (PIR).
4. Wi-Fi LoRA/Zigbee/Powerline with ethernet network based IOT feature as per site requirement or engineer in charge.
5. Should be controlled through auto/ manual
6. Programmable level of not less than 48 different light intensity settings,
7. Inbuilt repeater & relay signals function to other controllers

8.19.1	45 watt	Each	5563
8.19.2	50 watt	Each	5804
8.19.3	72 watt	Each	6382
8.19.4	90 watt	Each	6671
8.19.5	100 watt	Each	7923
8.19.6	120 watt	Each	8308
8.19.7	150 watt	Each	10408
8.19.8	180 watt	Each	10600
8.19.9	200 watt	Each	12449
8.20	LED Smart Street light fixture, powder coated pressure die cast aluminium (System. System lumen efficacy $\geq 135$ lm/Watt).		

Supplying, installation, Testing & Commissioning of Smart Street light LED fixture, powder coated pressure die cast aluminium body with built in or separate driver as per the requirement ( < 700ma), Input voltage: 140-270 Volt AC, frequency 50/60 hz, Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2, P.F. $\geq 0.95$ , IP-66,IK-08, CRI  $\geq 70$ , under voltage and over voltage protection, EMI- EMC as per CISPR-15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6500°K (As per ANSI Bin), Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c external

connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy  $\geq 135$  lm/Watt output . LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C)

Smart inbuilt controller shall have following features.

1. Control and monitor LED luminaries with bi directional control( Status, Fault, Alarm, dimming level, wattage, energy)
- 2.to measure voltage, current, power, power factor, apparent energy, active energy, operating hours
- 3.Inbuilt ambient light sensor, motion sensor based on Passive Infra Red (PIR).
4. Wi-Fi LoRA/Zigbee/Powerline with ethernet network based IOT feature as per site requirement or engineer in charge.
- 5.should be controlled through auto/ manual
- 6.Programmable level of not less than 48 different light intensity settings,
- 7.inbuilt repeater & relay signals function to other controllers

8.20.1	45 watt	Each	5804
8.20.2	50 watt	Each	6056
8.20.3	72 watt	Each	6660
8.20.4	90 watt	Each	6962
8.20.5	100 watt	Each	8271
8.20.6	120 watt	Each	8674
8.20.7	150 watt	Each	10869
8.20.8	180 watt	Each	11070
8.20.9	200 watt	Each	13003

## 8.21 **Solar outdoor LED light**

- 8.21.1 Supplying, installation, Testing & Commissioning of the integrated type solar PV lighting system on the existing pole structure, comprising of 20 watt, 6V



Mono Passivated Emitter and Rear Contact (PERC) Solar Panel (minimum efficiency 21%), Pulse with modulation (PWM)/Maximum Power point tracking (MPPT) Charge Controller in the box with a sleek appearance and a sturdy structure, is weather-proof, and is simple to install, With Lithium- Iron Phosphate Battery (LiFePO<sub>4</sub>), charging time 6-8 hours, Battery backup time 12 hours (minimum), LED fixture 20 watt, Input voltage: 12V DC, Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%, IP-66, IK-08, CRI ≥70 , under voltage and over voltage protection, Electro Magnetic Interference (EMI) Electro Magnetic Compatibility (EMC) As per CISPR 15, lenses for beam angle as per Illuminating Engineering Society of North America (IESNA) type I/II/III as per the width of the road and the project requirement, Correlated Colour Temperature (CCT) 5700°K / (As per American National Standard Institute (ANSI Bin)), life time (LED, Driver & electrical circuitry) of 50K hours lamp burning hours till the 70 % of initial Lumen maintained as per LM80 extrapolation IES TM-21-11 report, automatic switch on/off, Alluminium or Acrylonitrile Butadiene Styrene (ABS body), can be installed on a pole or wall. System lumen efficacy ≥120 lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted. All as per pre approved by Engineer in-charge complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required, complete with mounting structure for the battery and accessories suitable for withstand wind storm speed as per the site location. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

**20 Watt (System lumen efficacy ≥120 lm/Watt)**

Each

18601

8.21.2 Supplying, installation, Testing & Commissioning of the integrated type solar PV lighting system on the existing pole structure, comprising of 30 watt, 6V Mono Passivated Emitter and Rear Contact (PERC) Solar Panel (minimum efficiency 21%), Pulse with modulation (PWM)/Maximum Power point tracking (MPPT) charge Controller in the box with a sleek appearance and a sturdy structure, is weather-proof, and is simple to install, With Lithium- Iron Phosphate Battery (LiFePO4), charging time 8-10 hours, Battery backup time 12 hours (minimum), LED fixture watt 30 watt, Input voltage: 12V DC , Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%, IP-66,IK-08, CRI >70 , under voltage and over voltage protection, Electro Magnetic Interference (EMI) Electro Magnetic Compatibility (EMC) As per CISPER 15 A, lenses for beam angle as per Illuminating Engineering Society of North America (IESNA) type I/II/III as per the width of the road and the project requirement, Correlated Colour Temperature (CCT) 5700°K (As per American National Standard Institute (ANSI Bin)) , life time (LED,Driver & electrical circuitary) of 50K hours lamp burning hours till the 70 % of initial Lumen maintained as per LM80 extrapolation IES TM-21-11 report, automatic switch on/off, Alluminium or Acrylonitrile Butadiene Styrene (ABS body), can be installed on a pole or wall. System lumen efficacy  $\geq 120$  lm/Watt output. LM79 & LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. All as per pre approved by Engineer in-charge complete in all respect i/c external connections with 1.5 sq mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required, complete with mounting structure for the battery and accessories suitable for withstand wind storm speed as per the site location. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).

**30 Watt (System lumen efficacy  $\geq 120$  lm/Watt)**

Nos

23100

8.21.3	<p>Supplying, installation, Testing &amp; Commissioning of the integrated type solar PV lighting system on the existing pole structure, comprising of 35 watt, 6V Mono Passivated Emitter and Rear Contact (PERC) Solar Panel (minimum efficiency 21%),, Pulse with modulation (PWM)/Maximum Power point tracking (MPPT) Charge Controller in the box with a sleek appearance and a sturdy structure, is weather-proof, and is simple to install, with Lithium-Iron Phosphate Battery (LiFePO4), charging time 8-10 hours, Battery backup time 12 hours (minimum), LED fixture watt 35 watt, Input voltage: 12V DC , Operating temp range -5 °C to 50 °C, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency &gt;85%, IP-66,IK-08, CRI <math>\geq 70</math> , under voltage and over voltage protection, Electro Magnetic Interference (EMI) Electro Magnetic Compatibility (EMC) As per CISPR 15 , lenses for beam angle as per Illuminating Engineering Society of North America (IESNA) type I/II/III as per the width of the road and the project requirement, Correlated Colour Temperature (CCT) 5700°K (As per American National Standard Institute (ANSI Bin)), life time (LED, Driver &amp; electrical circuitry) of 50K hours lamp burning hours till the 70 % of initial Lumen maintained as per LM80 extrapolation IES TM-21-11 report, automatic switch on/off, Alluminium or Acrylonitrile Butadiene Styrene (ABS body), can be installed on a pole or wall. System lumen efficacy <math>\geq 120</math> lm/Watt output. LM79 &amp; LM80 Test report and all testing required for LED fixtures as per BIS shall be submitted.. All as per pre approved by Engineer in-charge complete in all respect i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required, complete with mounting structure for the battery and accessories suitable for withstand wind storm speed as per the site location. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).</p>		
<b>35 Watt (System lumen efficacy <math>\geq 120</math> lm/Watt)</b>	Each	29329	

## CHAPTER-9 BLDC FAN

Item No.	Description	Unit	Rate
9.1	<b>Brush Less Direct Current (BLDC) Fan with Remote</b>  Supply, Installation, Testing and Commissioning of ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. metal(Aluminium alloy) blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, steel/Al body. Power Factor not less than 0.9, Service Value (CM/M/W) minimum as below, 350 RPM (tolerance as per IS : 374-2019), THD (Total Harmonic Distortion) less than 10%, remote (preferably mobile app based) for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 °C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC supply Ceiling Fan compliant to IS 374:2019 fan i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required.		
9.1.1	900mm, service value $\geq 5.1$ CM/Min/Watt, air delivery 130 CM/Min (Minimum)	Each	2737
9.1.2	1050mm, service value $\geq 5.1$ CM/Min/Watt, air delivery 150 CM/Min (Minimum)	Each	2766
9.1.3	1200mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 210 CM/Min (Minimum)	Each	2882
9.1.4	1400mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 245 CM/Min (Minimum)	Each	2913
9.2	<b>Brush Less Direct Current (BLDC) Fan without Remote</b>  Supply, Installation, Testing and Commissioning of ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 nos. metal( Aluminium alloy) blades, 30 cm long down rod, 2 nos. canopies, shackle kit, safety rope, copper winding, steel/Al body Power Factor not less than 0.9, Service Value		

(CM/M/W) minimum as below, 350 RPM (tolerance as per IS : 374-2019), THD (Total Harmonic Distortion) less than 10%, suitable for operation with regulator for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 °C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC supply, Ceiling Fan compliant to IS 374:2019 fan i/c external connections with 1.5 sq.mm FRLS/HFFR, PVC insulated copper conductor single core cable and earthing etc. as required.

9.2.1	900mm, service value $\geq 5.1$ CM/Min/Watt, air delivery 130 CM/Min (Minimum)	Each	2560
9.2.2	1050mm, service value $\geq 5.1$ CM/Min/Watt, air delivery 150 CM/Min (Minimum)	Each	2587
9.2.3	1200mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 210 CM/Min (Minimum)	Each	2695
9.2.4	1400mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 245 CM/Min (Minimum)	Each	2737

## CHAPTER-10 MV CABLE LAYING

Item No.	Description	Unit	Rate
10.1	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc as required.		
10.1.1	Upto 35 sq. mm	Meter	453
10.1.2	Above 35 sq. mm and upto 95 sq. mm	Meter	475
10.1.3	Above 95 sq. mm and upto 185 sq. mm	Meter	497
10.1.4	Above 185 sq. mm and upto 400 sq. mm	Meter	564
10.2	Laying of one number additional PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground in the same trench in one tier horizontal formation including excavation, sand cushioning, protective covering and refilling the trench etc as required.		
10.2.1	Upto 35 sq. mm	Meter	313
10.2.2	Above 35 sq. mm and upto 95 sq. mm	Meter	335
10.2.3	Above 95 sq. mm and upto 185 sq. mm	Meter	357
10.2.4	Above 185 sq. mm and upto 400 sq. mm	Meter	423
10.3	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground including excavation and refilling the trench etc as required, but excluding sand cushioning and protective covering.		
10.3.1	Upto 35 sq. mm	Meter	253
10.3.2	Above 35 sq. mm and upto 95 sq. mm	Meter	276
10.3.3	Above 95 sq. mm and upto 185 sq. mm	Meter	298
10.3.4	Above 185 sq. mm and upto 400 sq. mm	Meter	364
10.4	Laying of one number additional PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size direct in ground in the same trench in one tier horizontal formation including excavation and refilling the trench etc as required, but excluding sand cushioning and protective covering.		

10.4.1	Upto 35 sq. mm	Meter	160
10.4.2	Above 35 sq. mm and upto 95 sq. mm	Meter	182
10.4.3	Above 95 sq. mm and upto 185 sq. mm	Meter	204
10.4.4	Above 185 sq. mm and upto 400 sq. mm	Meter	270
10.5	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.		
10.5.1	Upto 35 sq. mm	Meter	47
10.5.2	Above 35 sq. mm and upto 95 sq. mm	Meter	72
10.5.3	Above 95 sq. mm and upto 185 sq. mm	Meter	97
10.5.4	Above 185 sq. mm and upto 400 sq. mm	Meter	170
10.6	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size in the existing masonry open duct as required.		
10.6.1	Upto 35 sq. mm	Meter	36
10.6.2	Above 35 sq. mm and upto 95 sq. mm	Meter	58
10.6.3	Above 95 sq. mm and upto 185 sq. mm	Meter	80
10.6.4	Above 185 sq. mm and upto 400 sq. mm	Meter	146
10.7	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on wall surface as required.		
10.7.1	Upto 35 sq. mm (clamped with 1mm thick saddle)	Meter	64
10.7.2	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	Meter	151
10.7.3	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	Meter	180
10.7.4	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	Meter	271
10.8	Laying and fixing of one number PVC insulated and PVC sheathed / XLPE power cable of 1.1 KV grade of following size on cable tray as required.		
10.8.1	Upto 35 sq. mm (clamped with 1mm thick saddle)	Meter	53

10.8.2	Above 35 sq. mm and upto 95 sq. mm (clamped with 25x3mm MS flat clamp)	Meter	109
10.8.3	Above 95 sq. mm and upto 185 sq. mm (clamped with 25/40x3mm MS flat clamp)	Meter	138
10.8.4	Above 185 sq. mm and upto 400 sq. mm (clamped with 40x3mm MS flat clamp)	Meter	226
10.9	Supplying and making cable route marker with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size ) of size 60 cm X 60 cm at the bottom and 50 cm X 50 cm at the top with a thickness of 10cm including inscription duly engraved as required.	Each	683
10.10	Supplying and fixing cable route marker with 10 cm X 10 cm X 5 mm thick G.I. plate with inscription there on, bolted /welded to 35 mm X 35 mm X 6 mm angle iron, 60 cm long and fixing the same in ground as required.	Each	598





## CHAPTER 11

### MV CABLE JOINTING & END TERMINATION

Item No.	Description	Unit	Rate
11.1	Supplying and making end termination with brass compression gland and aluminium lugs for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.		
11.1.1	2 X 6 sq. mm (19mm)	Each	294
11.1.2	2 X 10 sq. mm (19mm)	Each	295
11.1.3	2 X 16 sq. mm (22mm)	Each	311
11.1.4	2 X 25 sq. mm (22mm)	Each	314
11.1.5	2 X 35 sq. mm (25mm)	Each	376
11.1.6	2 X 50 sq. mm (28mm)	Each	419
11.1.7	3 X 10 sq. mm (22mm)	Each	312
11.1.8	3 X 16 sq. mm (25mm)	Each	326
11.1.9	3 X 25 sq. mm (25mm)	Each	330
11.1.10	3 X 35 sq. mm (28mm)	Each	419
11.1.11	3 X 50 sq. mm (32mm)	Each	442
11.1.12	3 X 70 sq. mm (35mm)	Each	495
11.1.13	3 X 95 sq. mm (38mm)	Each	636
11.1.14	3 X 120 sq. mm (45mm)	Each	694
11.1.15	3 X 150 sq. mm (50mm)	Each	781
11.1.16	3 X 185 sq. mm (57mm)	Each	984
11.1.17	3 X 225 sq. mm (62mm)	Each	1102
11.1.18	3 X 240 sq. mm (62mm)	Each	1136
11.1.19	3 X 300 sq. mm (70mm)	Each	1305
11.1.20	3½ X 25 sq. mm (28mm)	Each	371
11.1.21	3½ X 35 sq. mm (32mm)	Each	437
11.1.22	3½ X 50 sq. mm (35mm)	Each	484
11.1.23	3½ X 70 sq. mm (38mm)	Each	542
11.1.24	3½ X 95 sq. mm (45mm)	Each	684
11.1.25	3½ X 120 sq. mm (45mm)	Each	710
11.1.26	3½ X 150 sq. mm (50mm)	Each	798
11.1.27	3½ X 185 sq. mm (57mm)	Each	1001
11.1.28	3½ X 225 sq. mm (62mm)	Each	1126
11.1.29	3½ X 240 sq. mm (62mm)	Each	1160
11.1.30	3½ X 300 sq. mm (70mm)	Each	1336
11.1.31	3½ X 400 sq. mm (82mm)	Each	1713
11.1.32	4 X 10 sq. mm (25mm)	Each	325
11.1.33	4 X 16 sq. mm (28mm)	Each	366

11.1.34	4 X 25 sq. mm (28mm)	Each	373
11.1.34	4 X 35 sq. mm (32mm)	Each	438
11.1.35	4 X 50 sq. mm (35mm)	Each	489
11.2	Supplying and making outdoor end termination with cast resin compound including aluminium lugs and other jointing materials for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.		
11.2.1	2 X 16 sq. mm	Each	1477
11.2.2	2 X 25 sq. mm	Each	1582
11.2.3	2 X 35 sq. mm	Each	1582
11.2.4	2 X 50 sq. mm	Each	1582
11.2.5	3 X 16 sq. mm	Each	1582
11.2.6	3 X 25 sq. mm	Each	1582
11.2.7	3 X 35 sq. mm	Each	1582
11.2.8	3 X 50 sq. mm	Each	1679
11.2.9	3 X 70 sq. mm	Each	1679
11.2.10	3 X 95 sq. mm	Each	2023
11.2.11	3 X 120 sq. mm	Each	2023
11.2.12	3 X 150 sq. mm	Each	2023
11.2.13	3 X 185 sq. mm	Each	2643
11.2.14	3 X 225 sq. mm	Each	2643
11.2.15	3 X 240 sq. mm	Each	3028
11.2.16	3 X 300 sq. mm	Each	3028
11.2.17	3½ X 25 sq. mm	Each	1582
11.2.18	3½ X 35 sq. mm	Each	1679
11.2.19	3½ X 50 sq. mm	Each	1679
11.2.20	3½ X 70 sq. mm	Each	1827
11.2.21	3½ X 95 sq. mm	Each	2023
11.2.22	3½ X 120 sq. mm	Each	2023
11.2.23	3½ X 150 sq. mm	Each	2643
11.2.24	3½ X 185 sq. mm	Each	2117
11.2.25	3½ X 225 sq. mm	Each	3028
11.2.26	3½ X 240 sq. mm	Each	3028
11.2.27	3½ X 300 sq. mm	Each	3444
11.2.28	3½ X 400 sq. mm	Each	3897
11.2.29	4 X 16 sq. mm	Each	1582
11.2.30	4 X 25 sq. mm	Each	1582
11.2.31	4 X 35 sq. mm	Each	1679
11.2.32	4 X 50 sq. mm	Each	1679

11.3	Supplying and making straight through joint with cast resin compound including ferrules and other jointing materials for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.		
11.3.1	2 X 16 sq. mm	Each	2902
11.3.2	2 X 25 sq. mm	Each	2902
11.3.3	2 X 35 sq. mm	Each	2902
11.3.4	2 X 50 sq. mm	Each	3285
11.3.5	3 X 16 sq. mm	Each	3285
11.3.6	3 X 25 sq. mm	Each	2902
11.3.7	3 X 35 sq. mm	Each	2902
11.3.8	3 X 50 sq. mm	Each	3285
11.3.9	3 X 70 sq. mm	Each	3810
11.3.10	3 X 95 sq. mm	Each	4093
11.3.11	3 X 120 sq. mm	Each	4565
11.3.12	3 X 150 sq. mm	Each	4565
11.3.13	3 X 185 sq. mm	Each	5386
11.3.14	3 X 225 sq. mm	Each	6067
11.3.15	3 X 240 sq. mm	Each	6067
11.3.16	3 X 300 sq. mm	Each	7845
11.3.17	3½ X 25 sq. mm	Each	3285
11.3.18	3½ X 35 sq. mm	Each	3285
11.3.19	3½ X 50 sq. mm	Each	3810
11.3.20	3½ X 70 sq. mm	Each	3841
11.3.21	3½ X 95 sq. mm	Each	4565
11.3.22	3½ X 120 sq. mm	Each	5386
11.3.23	3½ X 150 sq. mm	Each	5386
11.3.24	3½ X 185 sq. mm	Each	6067
11.3.25	3½ X 225 sq. mm	Each	6172
11.3.26	3½ X 240 sq. mm	Each	7429
11.3.27	3½ X 300 sq. mm	Each	9156
11.3.28	3½ X 400 sq. mm	Each	5482
11.3.29	4 X 16 sq. mm	Each	2902
11.3.30	4 X 25 sq. mm	Each	3285
11.3.31	4 X 35 sq. mm	Each	3285
11.3.32	4 X 50 sq. mm	Each	3810
11.4	Supplying and making straight through joint with heat shrinkable kit including ferrules and other jointing materials for following size of PVC insulated and PVC sheathed / XLPE aluminium conductor cable of 1.1 KV grade as required.		

11.4.1	2 X 16 sq. mm	Each	2374
11.4.2	2 X 25 sq. mm	Each	2698
11.4.3	2 X 35 sq. mm	Each	2698
11.4.4	2 X 50 sq. mm	Each	2698
11.4.5	3 X 16 sq. mm	Each	2374
11.4.6	3 X 25 sq. mm	Each	2698
11.4.7	3 X 35 sq. mm	Each	2698
11.4.8	3 X 50 sq. mm	Each	2698
11.4.9	3 X 70 sq. mm	Each	3623
11.4.10	3 X 95 sq. mm	Each	3819
11.4.11	3 X 120 sq. mm	Each	4886
11.4.12	3 X 150 sq. mm	Each	4886
11.4.13	3 X 185 sq. mm	Each	4886
11.4.14	3 X 225 sq. mm	Each	5283
11.4.15	3 X 240 sq. mm	Each	5283
11.4.16	3 X 300 sq. mm	Each	6599
11.4.17	3½ X 25 sq. mm	Each	2698
11.4.18	3½ X 35 sq. mm	Each	2698
11.4.19	3½ X 50 sq. mm	Each	2698
11.4.20	3½ X 70 sq. mm	Each	3623
11.4.21	3½ X 95 sq. mm	Each	3819
11.4.22	3½ X 120 sq. mm	Each	4886
11.4.23	3½ X 150 sq. mm	Each	4886
11.4.24	3½ X 185 sq. mm	Each	4886
11.4.25	3½ X 225 sq. mm	Each	5283
11.4.26	3½ X 240 sq. mm	Each	5283
11.4.27	3½ X 300 sq. mm	Each	6599
11.4.28	3½ X 400 sq. mm	Each	8541
11.4.29	4 X 16 sq. mm	Each	4210
11.4.30	4 X 25 sq. mm	Each	2698
11.4.31	4 X 35 sq. mm	Each	3623
11.4.32	4 X 50 sq. mm	Each	3623

## CHAPTER 12

### POLE ERECTION

Item No.	Description	Unit	Rate
12.1	Erection of RCC/ PCC pole of following length in brick ballast and ramming the foundation, finishing with 150mm thick cement concrete (1:3:6) layer on top with including excavation and refilling etc as required.		
12.1.1	Above 4.5 Meter and upto 6.5 Meter	Each	6847
12.1.2	Above 6.5 Meter and upto 8.0 Meter	Each	7594
12.1.3	Above 8.0 Meter and upto 11.0 Meter	Each	9135
12.1.4	Above 11.00 metre and upto 13.00 Meter	Each	10016
12.2	Erection of RCC/ PCC pole strut in brick ballast and ramming the foundation including excavation and refilling and secured with holding clamps, bolts, nuts, etc. as required.	Each	11859
12.3	Erection of metallic pole of following length in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) foundation including excavation and refilling etc. as required.		
12.3.1	Above 4.5 Meter and upto 6.5 Meter	Each	6123
12.3.2	Above 6.5 Meter and upto 8.0 Meter	Each	7178
12.3.3	Above 8.0 Meter and upto 10.0 Meter	Each	8300
12.3.4	Above 10.00 Meter and upto 12.00 Meter	Each	9517
12.4	Erection of steel tubular or rail pole strut in cement concrete 1:3:6 (1 cement: 3 coarse sand: 6 graded stone aggregate 40 mm nominal size) foundation including excavation and refilling and secured with holding clamps, bolts, nuts, etc. as required.	Each	10363
12.5	Providing and making steel pole collar with cement concrete (1 cement: 3 coarse sand: 6 stone aggregate 20mm) of specified size and shape including form work, plastering if required, curing etc as required. (volume of pole/ pipe not to be deducted)	cum	8834
12.6	Supplying and embedding following dia G.I. pipe (medium class) in pole collar/ foundation (during casting) for cable entry including bending the pipe to		

the required shape complete as required.

12.6.1	32 mm dia	Meter	559
12.6.2	40 mm dia	Meter	626

## CHAPTER 13

### MV OVER HEAD LINE WORK

Item No.	Description	Unit	Rate
13.1	Supplying and erection of stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, turn buckle ( 20 mm X 60 cm ), 7/ 4.00 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size) foundation including excavation and refilling etc. as required.	Each	6098
13.2	Supplying and erection of stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, turn buckle ( 20 mm X 60 cm ), 7/ 3.15 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling etc. as required.	Each	5961
13.3	Supplying and erection of stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, bow tightener, 7/ 4.00 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling etc. as required.	Each	5901
13.4	Supplying and erection of stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, bow tightener, 7/ 3.15 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling etc. as required.	Each	5759



13.5	Supplying and erection of bow stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, turn buckle ( 20 mm X 60 cm ), 7/ 4.00 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling and also with 0.6 m long brace of size 50 mm X 50 mm X 6 mm angle iron with 50 mm dia pulley fixed at one end of the brace as required.	Each	6494
13.6	Supplying and erection of bow stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, turn buckle ( 20 mm X 60 cm ), 7/ 3.15 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling and also with 0.6 m long brace of size 50 mm X 50 mm X 6 mm angle iron with 50 mm dia pulley fixed at one end of the brace as required.	Each	6351
13.7	Supplying and erection of bow stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, bow tightener), 7/ 4.00 mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling and also with 0.6 m long brace of size 50 mm X 50 mm X 6 mm angle iron with 50 mm dia pulley fixed at one end of the brace as required.	Each	6297
13.8	Supplying and erection of bow stay set complete (galvanised) with 19/20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm, thimble, stay clamps, bow tightener), 7/ 3.15mm dia G.I. stay wire and strain insulator etc in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling and also with 0.6 m long brace of size 50 mm X 50 mm X 6 mm angle iron with 50 mm dia pulley fixed at one end of the brace as required.	Each	6155

13.9	Erection of stay set complete (galvanised) in cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling etc. as required.	Each	4775
13.10	Supplying of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) cross arm for 2 wire over head line complete with clamps, bolts, nuts and washer etc including drilling of holes for insulator pins etc (as per drawing) and painting with primer and finished paint as required .	Set	885
13.11	Supplying of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) cross arm for 4 wire over head line complete with clamps, bolts, nuts and washer etc including drilling of holes for insulator pins etc (as per drawing) and painting with primer and finished paint as required .	Set	1444
13.12	Erection of angle iron/ channel iron cross arm on wood/ RCC/ PCC/ steel tubular/ rail pole etc. as required.	set	391
13.13	Supplying and erection of galvanised 'D' iron clamps complete with shackle insulator (75 mm X 90 mm),G. I. bolts, nuts and washers, coach screws etc. as required.	Set	316
13.14	Supplying and erection of galvanised 'D' iron clamps complete with shackle insulator (100 mm X 110 mm), G.I. bolts, nuts and washers, coach screws etc. as required.	Set	345
13.15	Erection of galvanised 'D' iron clamps and insulator on pole as required.	Set	98
13.16	Supplying and erection of 75 mm X 90 mm shackle insulator with G. I. Bolt, nuts and straps etc. as required .	Set	206
13.17	Supplying and erection of 100 mm X 110 mm shackle insulator with G. I. Bolt, nuts and straps etc. as required .	Set	236

13.18	Supplying and erection of 100 mm X 65 mm pin insulator complete with G. I. Spindle and nuts etc. as required .	Set	176
13.19	Supplying and erection of 100 mm X 80 mm pin insulator complete with G. I. Spindle and nuts etc. as required .	Set	176
13.20	Erection of LV/MV shackle/pin insulator etc. as required.	Set	107
13.21	Erection of ACSR conductor of 7/2.11 mm to 7/3.00 mm diameter including binding etc. as required.	Kg	258
13.22	Erection of ACSR conductor of 7/3.35 mm to 7/4.00 mm diameter and above including binding etc. as required.	Kg	340
13.23	Erection of all aluminium conductor of 7/1.96 mm to 7/3.10 mm diameter including binding etc. as required.	Kg	340
13.24	Erection of all aluminium conductor of 7/3.40 mm to 7/4.00 mm diameter and above including binding etc. as required.	Kg	260
13.25	Erection of G.I. Wire No. 8 SWG including binding etc. as required.	Kg	52
13.26	Erection of hexagonal type guard as required.	Each	279
13.27	Erection of ring type guard as required.	Each	93
13.28	Erection of cradle guard as required.	Each	186
13.29	Supplying and erection of 15 A aerial fuse complete as required.	Each	160
13.30	Supplying and erection of 30 A aerial fuse complete as required.	Each	170
13.31	Erection of aerial fuse as required.	Each	142
13.32	Supplying and fixing MV horn gap lightening arrestor as required.	Each	323
13.33	Fixing of MV lightning arrestor as required.	Each	213

13.34	Supplying and fixing of 32 mm dia X 2.00 metres long G.I. pipe (medium class) bracket for mounting of fluorescent / HPMV / HPSV street light fitting on pole including bending the pipe to the required shape, 2 nos 40 mm X 3 mm flat iron clamps with nuts, bolts and washer, painting the flat iron with primer and finish paint etc. as required.	Each	1647
13.35	Providing and fixing 50 mm dia X 3.2 metres G.I. pipe (including accessories) complete with 50 mm X 50 mm X 6 mm angle iron bracket on wall and 75 mm X 90 mm shackle insulator with straps for house service connection including painting the angle and flat iron with primer and finish paint etc. as required.	Each	3357
13.36	Providing and fixing 50 mm dia X 5.6 metres G.I. pipe (including accessories) complete with 50 mm X 50 mm X 6 mm angle iron cross arm and 40 mm X 3mm M.S. flat iron clamps bends for guard wire, 75 mm X 90 mm shackle insulator and straps, 7/ 3.15 mm G.I. wire stay set for house service connection including painting the angle and flat iron with primer and finish paint etc. as required.	Each	5225
13.37	Supplying and fixing of light class G.I. pipe of 50 mm dia. (nominal) 3 metres length along the pole for protection of under ground cable as required.	Each	2783
13.38	Supplying and fixing of light class G.I. pipe of 80 mm dia. (nominal) 3 metres length along the pole for protection of under ground cable as required.	Each	3871
13.39	Supplying and fixing of light class G.I. pipe of 100 mm dia. (nominal) 3 metres length along the pole for protection of under ground cable as required.	Each	5231
13.40	Dismantling of over head lines comprising of copper/ aluminium over head conductor, G.I. wire, cross arms, insulators etc. as required.	Kg	111
13.41	Dismantling of pole/ street light standard/ strut embedded in brick ballast foundation etc. as required.	Each	2543
13.42	Dismantling of pole/ street light standard/ strut embedded in cement concrete foundation etc. as required.	Each	3378



## CHAPTER 14

### HV OVER HEAD LINE WORK

Item No.	Description	Unit	Rate
14.1	Supplying and erection of galvanised stay set for 11 KV over head lines complete with 19/ 20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm thick, thimble, stay clamps, turn buckle ( 20 mm X 600 mm ), 7/ 4.00 mm dia G.I. stay wire and 11 KV strain insulator etc in cement concrete 1:3:6 ( 1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling etc. as required.	Set	6130
14.2	Supplying and erection of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) pole top bracket/ cross arm for single 11 KV over head line conductor complete with 50 mm X 6mm flat iron clamp, bolts, nuts and washers including drilling holes for insulator pins, bolts and nuts etc and painting with primer and finish paint as required.	Each	693
14.3	Supplying and erection of 50 mm X 8 mm M.S. flat iron pole top bracket/ cross arm for single 11/22/33 KV over head line conductor complete with fixing clamps, bolts, nuts and washers drilling holes for insulator pins, bolts and nuts etc and painting with primer and finish paint as required.	Each	716
14.4	Supplying and erection of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) cross arm for two 11 KV over head line conductors complete with 50 mm X 50 mm X 6 mm (angle iron bracket welded to the channel iron and complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts, nuts and washers etc (as per drawing) and painting with primer and finish paint as required.	Each	2604
14.5	Supplying and erection of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) V shape cross arm for two 11 KV over head line conductors complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts, nuts and washers etc (as per drawing) and painting with primer and finish paint as required.	Each	2310

14.6	Erection of pole top/ straight two wire/ V shape two wire, angle iron/ channel iron, cross arm on steel tubular/ rail/ PCC pole for 11/22/33 KV as required.	Set	710
14.7	Supplying and erection of two lengths of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) double pole cross arm for three wire 11KV over head line conductors complete with through bolts and nuts for clamping to the poles, 50 mm X 6 mm M.S. flats welded on one side to the channel iron and with bolts and nuts on the other side for tying the cross arms together, including drilling holes for insulator pins/ fittings, bolts, nuts and washers etc (as per drawing) and painting with primer and finish paint as required.	Set	5789
14.8	Supplying and erection of a set of cross bracing frame work for 11 KV over head line double pole structure having four members fabricated out of 50 mm X 50 mm X 6 mm angle iron to form a rectangle of minimum size 1400 mm width X 2500 mm height , complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts and nuts etc (as per drawing) and painting with primer and finish paint as required.	Set	9084
14.9	Erection of double pole 3 wire cross arm for 11KV/ 22KV/ 33 KV over head lines as required.	Each	1629
14.10	Supplying and erection of 11 KV pin insulator complete with large steel head G.I. pin, nuts, washers etc. as required.	Set	370
14.11	Supplying and erection of 11 KV disc insulator for 11 KV over head lines with galvanised insulator fittings, ball and socket type and complete with galvanised strain clamps, bolts, nuts, washers etc. as required.	Set	1086
14.12	Erection of disc/ pin insulator for 11 KV over head lines as required.	Set	213
14.13	Supplying and erection of three piece nonlinear resistor type lightning arrestor suitable for 3 wire, 11 KV overhead lines with rated voltage 9 KV (rms) with a nominal discharge current rating of 5 KA and complete with galvanised clamping arrangement, G.I. bolts, nuts, washers etc. as required.	Set	2854

14.14	Supplying and erection of galvanised stay set for 33 KV over head lines complete with 19/ 20 mm dia X 1.8 metres long stay rod, anchor plate of size 45 cm X 45 cm X 7.5 mm thick, thimble, stay clamps, turn buckle ( 20 mm X 600 mm ), 7/ 4.00 mm dia G.I. stay wire and 33 KV strain insulator etc in cement concrete 1:3:6 ( 1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size ) foundation including excavation and refilling etc. as required.	Set	6142
14.15	Supplying and erection of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) pole top bracket/ cross arm for single 33 KV over head line conductor complete with 50 mm X 6mm flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts, nuts, washers etc and painting with primer and finish paint as required.	Each	721
14.16	Supplying and erection of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) cross arm for two 33 KV over head line conductors complete with 50 mm X 50 mm X 6 mm angle iron bracket welded to the channel iron and complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts, nuts, washers etc and painting with primer and finish paint as required.	Each	3155
14.17	Supplying of channel iron 75 mm X 40 mm X 6 mm (7.14 kg per metre) V shape cross arm for two 33 KV over head line conductors complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts and nuts etc and painting with primer and finish paint as required.	Each	2565
14.18	Supplying and erection of channel iron 100 mm X 50 mm X 6 mm (9.56 kg per metre), pole top bracket/ cross arm for single 33 KV over head line conductor complete with 50 mm X 6 mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts and nuts etc and painting with primer and finish paint as required.	Each	886
14.19	Supplying and erection of channel iron 100 mm X 50 mm X 6 mm (9.56 kg per metre) cross arm for two wire 33 KV over head line conductors complete with 50 mm X 50 mm X 6 mm angle iron bracket welded to the channel iron and complete with 50 mm X 6mm M.S.	Each	3919



flat iron clamps, bolts and nuts including drilling holes for insulator pins/ fittings, bolts, nuts, washers etc and painting with primer and finish paint as required .

14.20	Supplying and erection of channel iron 100 mm X 50 mm X 6 mm (9.56 kg per metre) V shape cross arm for two 33 KV over head line conductors complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts, nuts, washers etc and painting with primer and finish paint as required .	Each	3043
14.21	Supplying and erection of two lengths of channel iron 100 mm X 50 mm X 6 mm (9.56 kg per metre) double pole cross arm for three wire 33 KV over head line conductors complete with through bolts and nuts for clamping to the poles, 50 mm X 6 mm M.S. flats welded on one side to the channel iron and with bolts and nuts on the other side for tying the cross arms together, including drilling holes for insulator pins/ fittings, bolts, nuts, washers etc and painting with primer and finish paint as required .	Set	8164
14.22	Supplying and erection of a set of cross bracing frame work for 33 KV over head line double pole structure having four members fabricated out of 65 mm X 65 mm X 6 mm angle iron to form a rectangle of minimum size 2400 mm width X 2800 mm height complete with 50 mm X 6mm M.S. flat iron clamps, bolts and nuts including drilling holes for insulator pins, bolts, nuts, washers etc and painting with primer and finish paint as required .	Set	12444
14.23	Supplying and erection of 33 KV pin insulator complete with large steel head G.I. pin, nuts, washers etc. as required.	Set	928
14.24	Supplying and erection of a set of three 11 KV disc insulator for 33 KV over head lines with galvanised insulator fittings, ball and socket type and complete with galvanised strain clamps, bolts, nuts, washers etc. as required.	Set	3122
14.25	Supplying and erection of single piece nonlinear resistor type lightning arrestor suitable for 3 wire, 33 KV overhead lines with rated voltage 30 KV (rms) with a nominal discharge current rating of 10 KA (station class) and complete with galvanised clamping arrangement, G.I. bolts, nuts, washers etc. as required.	Set	18176

## CHAPTER 15

### MISC.CIVIL ITEMS

Item No.	Description	Unit	Rate
15.1	Excavation for foundation in soft soil including dressing of sides and ramming of bottoms, lift upto 1.5 m including getting out the excavated soil and disposal of surplus excavated soil as directed, within a lead of 50 metres.	cum	Rate to be taken from Civil DSR
15.2	Excavation for cable trenches of depth upto 1.2 m in soft soil including getting out the excavated soil and disposal of surplus excavated soil as directed within a lead of 50 metres.	cum	Rate to be taken from Civil DSR
15.3	Filling available excavated earth (excluding rock) in trenches, sides of foundations etc. in layers not exceeding 20cm in depth, consolidating each deposited layer by ramming and watering, lead up to 50 metres.	cum	323
15.4	Excavation for cable trenches in soft soil, depth upto 1.2 m including dressing of sides lift upto 1.5 m, including getting out the excavated soil, refilling with sand and or good soil after laying of cable/ pipe etc in layers of 20 cm, ramming, watering and disposal of surplus excavated soil as directed, within a lead of 50 metres.	cum	830
15.5	Deduct for not consolidation by ramming and watering while re-filling with sand and or good soil in cable/ pipe laying.	cum	184
15.6	Excavation of the cable trenches in hard rock not exceeding 1.5 metres in width, and lift upto 1.5 metres, including getting out the excavated soil and disposal of excavated soil as directed within a lead of 50 metres.	cum	1543
15.7	Providing and laying in position cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) in foundation of pump, DG set etc including form work etc as required.	cum	Rate to be taken from Civil DSR
15.8	Providing and laying in position cement concrete 1:3:6 (1 cement : 2 coarse sand : 6 graded stone aggregate 20 mm nominal size) in foundation of pump, DG set etc including form work etc as required.	cum	Rate to be taken from Civil DSR
15.9	Providing and laying in position cement concrete 1:3:6 (1 cement : 2 coarse sand : 6 graded stone aggregate 40 mm nominal size) in foundation of pump, DG set etc including form work etc as required.	cum	Rate to be taken from Civil DSR

15.10	Providing and laying in position reinforced cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 graded stone aggregate 20 mm nominal size) in foundation of pump, DG set etc including form work etc as required (excluding reinforcement).	cum	Rate to be taken from Civil DSR
15.11	Providing brick work (in width 225 mm or more) with F.P.S. bricks of class designation 7.5 in cement mortar 1:4 (1 cement : 4 coarse sand) at all levels.	cum	Rate to be taken from Civil DSR
15.12	Providing 15mm thick cement plaster of mix 1:4 (1 cement : 4 fine sand) at all levels.	sqm	Rate to be taken from Civil DSR
15.13	Providing, laying and fixing following dia G.I. pipe (medium class) in ground complete with G.I. fittings including trenching (75 cm deep) and re-filling etc as required		
15.13.1	50 mm dia	Meter	Rate to be taken from Civil DSR
15.13.2	80 mm dia	Meter	Rate to be taken from Civil DSR
15.13.3	100 mm dia	Meter	1918
15.13.4	150 mm dia	Meter	2894
15.14	Providing, laying and fixing following dia RCC pipe NP2 class (light duty) in ground complete with RCC collars, jointing with cement mortar 1:2 (1 cement : 2 fine sand) including trenching (75 cm deep) and refilling etc as required.		
15.14.1	100 mm dia	Meter	771
15.14.2	150 mm dia	Meter	846
15.14.3	250 mm dia	Meter	1120
15.14.4	300 mm dia	Meter	1293
15.15	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc. in the existing trench, complete as required.		
15.15.1	63 mm dia (OD-63 mm & ID-51 mm nominal)	Meter	136
15.15.2	90 mm dia (OD-90 mm & ID-76 mm nominal)	Meter	183
15.15.3	120 mm dia (OD-120 mm & ID-103 mm nominal)	Meter	264

15.15.4	160 mm dia (OD-160 mm & ID-135 mm nominal)	Meter	385
15.15.5	200 mm dia (OD-200 mm & ID-175 mm nominal)	Meter	580
15.16	Supplying and laying of following size DWC HDPE pipe ISI marked along with all accessories like socket, bend, couplers etc. conforming to IS 14930, Part II complete with fitting and cutting, jointing etc.direct in ground (75 cm below ground level) including excavation and refilling the trench but excluding sand cushioning and protective covering etc., complete as required.		
15.16.1	63 mm dia (OD-63 mm & ID-51 mm nominal)	Meter	289
15.16.2	90 mm dia (OD-90 mm & ID-76 mm nominal)	Meter	336
15.16.3	120 mm dia (OD-120 mm & ID-103 mm nominal)	Meter	417
15.16.4	160 mm dia (OD-160 mm & ID-135 mm nominal)	Meter	537
15.16.5	200 mm dia (OD-200 mm & ID-175 mm nominal)	Meter	733

#### ADDITIONAL CIVIL ITEMS INTRODUCED

Note:- There are few items which are contained in Civil DSR which are required to be used in exclusive electrical works. Field units should use these items for such purposes.

- |   |                                 |
|---|---------------------------------|
| i) Providing and fixing M.S. Fan clamps of 16 mm dia M.S. bar, bent to shape with Hooked ends in R.C.C. slabs or beams during laying, including painting the exposed portion of loop, all as per standard design complete (DSR Civil-2014 item no. 10.17)   | Rate to be taken from Civil DSR |
| ii) Providing and fixing circular/Hexagonal G.I. Box for ceiling fan clamps, of internal dia 140 mm, 73 mm height, top LID of 1.5 mm thick G.I. sheet with its top surface hacked for proper bonding, top LID shall be screwed into the G.I. box by means of 3.3 mm dia rounded screws, one lock at the corners. Clamps shall be made of 12 mm dia M.S. bar bent to shap as per standard drawing. (DSR Civil-2014 item no. 10.18) | Rate to be taken from Civil DSR |
| iii) Making hole for installation of exhaust fan of size upto 450mm sweep by demolishing brick work manually/by mechanical means including disposal of malba within 50 meters lead and making good the wall by plastering etc. as required. (DSR Civil-2014 item no. 15.7.4 and 13.1.2)   | Rate to be taken from Civil DSR |

iv) Painting with one or more coat of synthetic enamel paint of approved brand and manufacture of required colour to give an even shade. (DSR Civil-2014 item no. 14.54)	Rate to be taken from Civil DSR
v) Painting with one or more coat of aluminum paint of approved brand and manufacture to give an even shade. (DSR Civil-2014 item no. 14.55)	Rate to be taken from Civil DSR
vi) Painting with one or more coat of black anticorrosive bituminous paint of approved brand & manufacturer to give an even shade (DSR civil 2014-Item no. 14.56)	Rate to be taken from Civil DSR
vii) Re-lettering with black Japan paint of approved brand and manufacture. (DSR Civil-2014 item no. 14.60)	Rate to be taken from Civil DSR

## CHAPTER- 16

### SOLAR WATER HEATING SYSTEM

Item No.	Description	Unit	Rate
16.1	<p>SOLAR WATER HEATING SYSTEM (Evacuated Tube Collector)</p> <p>Supplying, Installation, Testing, Commissioning of following capacity Evacuated Tube Collector (ETC) Solar Water Heating System comprising of all glass ETC tube absorber. The inner layer of absorber shall be of solar selected absorbing coated tube, Vacuum jacket, cover glass tube, getter and getter mirror surface, as per IS 16543. The system shall have temperature gauges, strainer, 2 nos. water meters, Suitable capacity cold and hot water tank, all MS structure for installation including suitable electric control panel complete with control and power wiring, necessary plumbing including piping for cold and hot water line between tank and solar water system, water heater and thermostat including non-return valve, float valve and other valve etc. as required. The various component shall have following specification.</p> <ol style="list-style-type: none"> <li>1. The Absorber area i.e. the number, dimension and thickness of solar evacuated tube as per IS:16544 clause 5.4 and IS: 16543 clause 4.2</li> <li>2. Boro Silicate Glass 3.3 for cover plat as per ISO: 3585.</li> <li>3. The material for three target coating shall be aluminum nitrate, aluminum nitrate stainless steel and copper multi layer selecting coating as per IS: 16543.</li> <li>4. Manifold shall be of Mild steel section with PP coating and Inner material shall be of SS 304.</li> <li>5. Recommended operating pressure:10 Bars.</li> <li>6. The capacity of hot water tank shall be minimum 1.5 times the rated capacity system. Inner Material shall be Stainless Steel SS 316 b) as per IS 1730 grade SS304-2B (22SWG). The hot water tank shall be insulated with high density injected PUF insulation 50 mm thickness between inner and outer tank. Tank stand shall be of mild steel and shall be design to withstand wind velocity of 100km/hours (minimum) or more as per site.</li> <li>7. Suitable nos. ISI Marked electrical heaters along</li> </ol>		

control panel, with suitable breaker, all protections, and all safety provisions so as to achieve 60 °C temperature rise in an hour. The range of thermostat shall be upto 80 °C.

16.1.1	100 LPD	Set	22674
16.1.2	200 LPD	Set	44773
16.1.3	300 LPD	Set	66944
16.1.4	500 LPD	Set	90626

#### SOLAR WATER HEATER (FLAT PLATE TYPE COLLECTOR)

16.2 Supply, Installation, Testing & Commissioning of Flat Plate collector (FPC) Solar Water Heating System comprising of solar flat plate collector ISI Marked made of copper sheet/copper tube, absorber toughened glass cover and aluminium extruded channel conform to IS: 12933 (Part 1,2,3&5). The system shall have temperature gauges, strainer, water meter 2 nos., cold and hot water tank. The system shall have suitable electric backup complete with control and power wiring etc., as following.

1. Cover plate: cover plate shall be toughened glass and thickness of 4.0 mm (min) conforming to section -1 of IS: 12933(pt-2)/2003 the solar transmittances of the cover plate shall be minimum 82 percent at near normal incidence.

2. Collector box: collector box shall be made of aluminium sections. The type grade, size, and finish of the material used shall be as per section-2 of IS: 12933 (pt-2)/2003: the minimum thickness of aluminium shall be as under:

- a. Channel section for sides 1.6 mm
- b. Sheet for bottom 0.7 mm
- c. Support for glass retaining 1.2 mm
- d. Sheet for entire body 1.0 mm

The insulation of collector box shall be minimum 0.96 sq.m °C/W for back insulation and minimum

0.48 m square degree c/w for side insulation conform to sec. 4 of IS 12933 (Part – 2) / 2003. (b) Gaskets and grommets: gaskets and grommets shall conform to Sec. 5 of IS 12933 (pt-2)/2003.

3.Absorber Shall Consist of riser, Header and Sheet for absorber. The Diameter of header shall be 25.4 + /-0.5mm and thickness 0.71mm. The Diameter of riser shall be 12.7 + /-0.5 mm and thickness 0.56mm and made of copper only. The distance between the risers from centre to centre shall be 120mm. type grade, size , workmanship and finish of the material used shall be as per section- 3 of IS : 12933 (pt -2 ) /2003 the sheet for absorber shall be of copper sheet 34 gauge/copper tube (at least 10 nos.)

4.Riser and header assembly designed for working pressure up 245 k pa (2.5 kg/ cm square) shall be tested for leakage at a minimum hydraulic pressure of 490 k pa (5 kg/ cm square). Sheet for absorber shall be made of copper only. Type Grade, size, workmanship and finis of the material used shall be per Section -3 of IS: 12933 (pt -2) /2003.

5.HDPE/LDPE cold water tank and hot water tank shall be dully erected on MS angle /channel duly painted with dual coats of enamel paint. The overall structure of solar collector plate module shall be design to with stand wind velocity of 100 kms /hr (minimum) or more as per site.

6.Hot water tank : The tank capacity shall be minimum 1.25 time the rated capacity of system. Inner tank material shall be stainless steel SS 316, as per IS 1730 GRADE SS304-2B. Hot water shall be insulated with high density injected PUF insulation: 50 mm, of 50 mm thickness between inner and outer tank ensures maximum heat rotenone ever season.

7. Suitable nos. ISI Marked electrical heaters along control panel, suitable breaker all protections, and all safety provisions so as to achieve 60°C temperature rise in an hour. The range of thermostat shall be upto 80°C.

16.2.1	100 LPD	Set	30528
16.2.2	200 LPD	Set	61057



16.2.3	250 LPD	Set	71119
16.2.4	300 LPD	Set	91584
16.2.5	500 LPD	Set	152641

## CHAPTER- 17

### SOLAR PV POWER GENERATION

Item No.	Description	Unit	Rate
<b>Solar Photovoltaic Power Plant</b>			
17.1	<p>Supplying Installation, Testing and Commissioning of on-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity Authority Regulations and CPWD Specifications as amended up to date, consisting of Mono/Poly Crystalline silicon solar cells module, net metering facility, necessary control, protections, earthing, cabling, mounting structure, junction boxes, power conditioning units, Real time online web interfaced Data Monitoring System, Distribution panels, grid connecting arrangement, conduits, pipes, cable trays and other accessories etc. as required.</p> <p>a) High Energy Efficiency Solar Photovoltaic Module of capacity 330 Wp or above, manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730-Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 23% at STC with temperature coefficient of Pmax better than -0.30% per °C. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years. Solar Modules shall be designed to operate in relative humidity upto 100% with temperature between -10 °C and +85 °C. Further, each PV module used in any solar power project must have Radio frequency identification tag with information such as name of manufacturer, month and year of manufacturing, country of origin (separately for Solar cell and module), I-V curve, Unique Serial No and Model No of the module, Wattage, Im, Vm and FF, name of test lab issuing IEC certificate.</p> <p>b)Power Conditioning Unit (PCU) of 350-800 V DC Input voltage range and 415 V AC, three phase, 4 wire, 50Hz +/- 2.5 Hz, output voltage suitable to generate AC with a variation of 10% at nominal voltage. Power with efficiency not less than 97%, total harmonic distortion less than 3% and suitable for ambient temperature from 0 to 50 °C, Minimum IP-65 for outdoor and Minimum IP 21 for indoor, Built-in</p>		

meter and data logger, MPPT, switching devices IGBT/MOSFETs and controller Microprocessor /DSP. PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown. The PCU shall be able to withstand unbalanced load conforming to IEC standard with shutdown/standby mode. It must be provided with grid islanding along with manual disconnect pole isolation switch besides automatic disconnection. Minimum protections: Mains Under / Over Voltage, Over current, Over/Under grid frequency, Over temperature, Surge voltage induced at output due to external source, Short-circuit, Lightening, Anti Islanding (for grid synch. Mode) and other protections as per applicable standards. LCD/LED display of minimum parameters: DC input voltage, DC current, AC Voltage and current (all 3 phases, in case of 3 phase), Instantaneous & cumulative AC output power, Daily DC energy produced and other parameters applicable standard. Communication interface RS 485 / RS 232.

c) Module mounting structure: The roof top solar plant generation units shall be installed by using supporting Aluminium/Galvanized MS structure (mass of zinc coating shall be as per IS4759 ) having minimum head room clearance of 2.4 meter above the terrace level / ground level. The mounting structure would be designed to sustain wind load and seismic parameter of the site of installation. All the structure shall be design as per applicable BIS code and the material shall also confirm the applicable BIS Code. Structural material shall be corrosion resistant and electrolytically compatible with the materials used in the module frame, its fasteners, nuts and bolts. The suitable arrangements for maintenance and cleaning shall be provided.

d) Real time online web interfaced Data Monitoring System complete with accessories for various parameters such as Solar Irradiance, temperature, AC Output Voltage and current, Output Power, Power factor, DC Input Voltage and Current, Time Active, Time disabled, Time Idle, Power produced and other parameters as per standard practices.

e) Array junction box & Main junction box with IP 65 protection and termination arrangement for incoming and outgoing cable along with glands, lugs and other

accessories etc. as required. Each junction box shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy with full dust, water & vermin proof arrangement with High quality Suitable capacity Metal Oxide Varistors(MOVs) (semiconductor diode with resistant applied voltage)/ surge arrestors and suitable Reverse Blocking Diodes, isolation switches isolate the DC input to Inverter, copper bus bar etc.

f) Lightning, surge voltage protection, earthing protection and grid islanding.

g) Cables: Connections & Interconnections by required size IR/UV protected XLPE insulated copper conductor 1.1 kV grade armored power and control cables(ISI Marked) along with supplying & fixing of necessary channel/conduit, GI cable trays, supports, lugs, thimble and other accessories etc. as required.

h) DC Distribution Board And AC Distribution Panel Board: IP65, free standing, metal cladded, having copper bus bar, having required protection and control gears, connection-interconnection, etc. as required.

kWp 54280.00



## CHAPTER 18

### ELECTRICAL VEHICLE CHARGER

Item No.	Description	Unit	Rate
18.1	Supplying Installation, Testing and Commissioning of EV charging station As per specifications and in Compliance to relevant IS codes etc.		
18.1.1	Light EV AC Charger (Mode-3) Power : 7 kW, Input power supply: 1phase 230 $\pm$ 10% Volt, output supply: 230 Volt AC, Frequency:50 Hz $\pm$ 3%, Operational temperature range : -25 to 55 $^{\circ}$ C (outdoor), -5 to 55 $^{\circ}$ C (Indoor)., RH upto 95%, Charging Device as per IS-17017-22-1 EV-EVSE Communication: as per relevant IS Codes, Bluetooth Low Energy, one Charge Point Plug/ Socket as per IS-60309 and IS-17017-2, Vehicle Inlet/ Connector As per EV manufacturer, suitable for 2 Wheelers and 4 wheelers. Indoor use: at least IP42; Outdoor use: at least IP54. Mechanical Strength: protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262.O/L,S/C protection. Insulation Resistance > 1 M $\Omega$ . Cable Length: 7.5 m. RCD having a rated residual operating current not exceeding 30 mA; Separate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1): 2010. OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.	Each	23385
18.1.2	Light EV DC Charger (Mode 4) Power Level 1: Up to 7 kW, Input power supply: 1phase 230 $\pm$ 10% Volt/3phase 415 Volt, Frequency: 50 Hz $\pm$ 5%, output supply: 12/24 Volt DC. Operational temperature range : -25 to 55 $^{\circ}$ C (outdoor), -5 to 55 $^{\circ}$ C (Indoor), RH upto 95%, Charging Device as per IS-17017-25, EV-EVSE Communication:IS-17017-25, one Charge Point Plug/ Socket as per IS-60309 and IS-17017-2, Vehicle Inlet/ Connector As per EV manufacturer, suitable for 2 Wheelers and 4 wheelers. Indoor use: at least IP42; Outdoor use: at least IP54. Mechanical Strength :protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262.O/L,S/C protection. Insulation Resistance > 1 M $\Omega$ . Cable Length: 7.5 m. RCD having a rated residual operating current not exceeding 30 mA;		

	<p>Separate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1) : 2010. OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.</p>	Each	350914
18.1.3	<p>Parkbay AC Charger (Mode -3) Power Level 2: Normal Power ~11kW/ 22 kW, 3 phase 415VAC(-40% to +20%), Frequency:50 Hz +/-5%, output supply: 240 Volt AC, Operational temperature range : -25 to 55 °C (outdoor), -5 to 55 °C (Indoor), RH upto 95%, Charging Device as per IS-17017-1 EV-EVSE ISO-15118 for Smart Charging, Infrastructure Socket as per IS-17017-2-2, Vehicle Connector as per IS-17017-2-2 Vehicle Inlet/ Connector As per EV manufacturer, suitable for 4 wheelers. Indoor use: at least IP42; Outdoor use: at least IP 54. Mechanical Strength : protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262. O/L,S/C protection. Insulation Resistance &gt; 1 M Ω. Cable Length: 7.5 . RCD having a rated residual operating current not exceeding 30 mA; Separate RCD for multiple outputs. Telecommunication port of the EV supply equipment according to IS 13252 (Part 1): 2010. OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.</p>	Each	84219
18.1.4	<p>Parkbay DC Charger (Mode-3) Power Level 2: Normal Power ~24KW and above, 3 phase 415VAC(-40% to +20%), Frequency:50 Hz +/-5%, output supply: DC 12/24 Volt, Operational temperature range : -25 to 55 °C (outdoor), -5 to 55 °C (Indoor), RH upto 95%, Charging Device as per Device/protocol: IS-17017-23, EV-EVSE Communication as per IS-17017-24, ISO-15118, Infrastructure Socket as per IS-17017-2-2/3, Vehicle Connector as per IS-17017-2-3 Vehicle Inlet/ Connector As per EV manufacturer, suitable for 4 wheelers. Indoor use: at least IP42; Outdoor use: at least IP54. Mechanical Strength: protection of the external enclosure against mechanical impact shall be IK08 according to IEC 62262. O/L,S/C protection. Insulation Resistance &gt; 1 M Ω. Cable Length: 7.5 m. RCD having a rated residual operating current not exceeding 30 mA; Separate RCD for multiple outputs.</p>		

Telecommunication port of the EV supply equipment according to IS 13252 (Part 1) : 2010.

OCPP(Open charge point protocol) 1.6J upgradable to ocpp 2.0. Device Should follow 17017 series of IS codes in general and the installation of the system shall comply with relevant IS Codes.

Each 888982





## CHAPTER-19

### FAÇADE LIGHTING

Item No.	Description	Unit	Rate
19.1	<p><b>LED floodlight</b></p> <p>Supplying Installation, Testing and Commissioning of Circular/ Rectangular/square LED RGB/ RGBWW/ RGBNW/RGBA/RGBW (as per site requirement) Facade Floodlight/ Projector luminaire for facade lighting with Pressure Die-cast aluminium housing; powder-coated finish, with inbuilt driver of following wattage as given below. The luminaire bracket shall be made of cold-rolled steel &amp; shall be so designed that the luminaire can be tilted to <math>\pm 90^\circ</math>, the scale shall be provided for rotation degrees. The luminaire shall be IP66 protection also having silicon gasket between optical cover &amp; LED chamber to ensure proper IP66 protection and impact resistance of IK 07. CRI&gt;80, SDCM&lt;5, THD&lt;10%. as per IEC 61000-3-2, under voltage, over voltage protection, driver inbuilt surge protection of 4KV and external surge protection (SPD) of 10 KV common mode/differential mode, Driver Efficiency&gt;85%, EMI/EMC as per CISPR-15. There should be options of beam angles of 5/10/15/20/25/30/40/45/60 degree. Luminaire should have efficacy of minimum 35 lm/W for RGB/RGBNW/RGBWW/TNW and 65 lm/W for mono colour options. Luminaire shall be capable of producing dynamic colour changing light for with 16 million colours by DMX/Ethernet based control. The beam angle of the fitting shall be narrow, medium, wide or asymmetric as per the requirement. Luminaire shall be complete with replaceable driver and capable of operating at line voltage without any separate power supply from 100-270 V AC, 50 Hz with power factor &gt; 0.9. Fixture shall be suitable to operate at an ambient temperature range of <math>-10^\circ\text{C}</math> to <math>+50^\circ\text{C}</math>. Lifetime of complete luminaire(LED ,Driver , Electrical &amp; control circuitry) shall be at least L70:50000 burning hours at <math>50^\circ\text{C}</math>. Luminaire shall be conforming to BIS: (IS 10322) with dully R Number marked and shall be complete with all necessary accessories required for proper working of fixture including connection/inter connection with weather proof ISI Marked copper conductor of minimum size 1.5sqmm connection cables and accessories, Integral male/female water proof connectors IP 68 etc. as required.The successful</p>		

bidder shall submit the following certifications/reports for approval before supply of materials: product data sheets, LM79 report from NABL accredited lab, illuminance diagram, polar curve & LM80 report issued by LED manufacturer, RoHS Compliance.

19.1.1	25W	Each	36027
19.1.2	40W	Each	42765
19.1.3	50W	Each	43888
19.1.4	60W	Each	45759
19.1.5	100W	Each	48627
19.1.6	120W	Each	80196
19.1.7	150W	Each	86372
19.1.8	200W	Each	94933

## 19.2 **LED Linear Profile (AC)**

Supplying Installation, Testing and Commissioning of LED RGB/RGBWW/RGBNW/ RGBA/ RGBW (as per site requirement) Linear Profile / Wall Washer luminaire for Facade lighting with aluminium extruded/ Die Cast housing with inbuilt driver of following wattage as given below. The luminaire bracket shall be made of cold-rolled steel & shall be so designed that the luminaire can be tilted to  $\pm 90^\circ$ , having the rotation degrees scale shall be provided. The luminaire shall be IP66 protection also having silicon gasket between optical cover & LED chamber to ensure proper IP66 protection. CRI>80, SDCM<5, THD<10%. as per IEC 61000-3-2, under voltage, over voltage protection, driver inbuilt surge protection of 4KV and external surge protection (SPD) of 10 KV common mode/differential mode, Driver Efficiency>85%, EMI/EMC as per CISPR-15. There should be options of beam angles of 10/20/30/40/60, asymmetric degree. Luminaire should have efficacy of minimum 40 lm/W for RGB/ RGBNW/ RGBWW/TNW and 65 lm/W for mono colour options. Luminaire shall be capable of producing dynamic colour changing light for with 16 million colours by DMX/Ethernet based control. The beam angle of the fitting shall be narrow, medium, wide or asymmetric as per the requirement. Luminaire shall be complete with replaceable driver and capable of operating at line voltage without any separate power supply from 100-270 V AC, 50 Hz with power factor > 0.9. Fixture shall be suitable to operate at an ambient temperature range of -10°C to +50°C and shall have impact resistance of IK 07. Lifetime of complete luminaire (LED ,Driver , Electrical & control

circuitry) shall be at least L70:50000 burning hours at 50°C. Luminaire shall be conforming to BIS (IS 10322) with dully R Number marked and shall be complete with all necessary accessories required for proper working of fixture including connection/inter connection with weather proof ISI Marked copper conductor of minimum size 1.5sqmm connection cables and accessories , Integral male/female water proof connectors of IP68 etc. as required. The successful bidder shall submit the following certifications/reports for approval before supply of materials: product data sheets, LM79 report from NABL accredited lab, illuminance diagram, polar curve & LM80 report issued by LED manufacturer, Rohs Compliance.

	Wattage per meter		
19.2.1	120W	Each	65878
19.2.2	100W	Each	56408
19.2.3	80W	Each	42783
19.2.4	60W	Each	42307
19.2.5	50W	Each	26613
19.2.6	40W	Each	25631
19.2.7	25W	Each	19715

### 19.3 **LED Linear Profile (DC)**

Supplying Installation, Testing and Commissioning of LED RGB/RGBWW/RG BNW/ RGBA/ RGBW (as per site requirement) Linear Profile / Wall Washer luminaire for Facade lighting with aluminium extruded/ Die Cast housing with inbuilt driver of following wattage as given below. The luminaire bracket shall be made of cold-rolled steel & shall be so designed that the luminaire can be tilted to  $\pm 90^\circ$ , having the rotation degrees scale shall be provided. The luminaire shall be IP66 protection also having silicon gasket between optical cover & LED chamber to ensure proper IP66 protection. CRI>80, SDCM<5, THD<10%. as per IEC 61000-3-2, under voltage, over voltage protection, driver inbuilt surge protection of 4KV and external surge protection (SPD) of 10 KV common mode/differential mode, Driver Efficiency>85%, EMI/ EMC as per CISPR-15. There should be options of beam angles of 10/20/30/40/60, asymmetric degree. Luminaire should have efficacy of minimum 40 lm/W for RGB/RGBNW/RGBWW/TNW and 65 lm/W for mono colour options. Luminaire shall be capable of producing dynamic colour changing light for with 16 million colours by DMX/Ethernet based

control. The beam angle of the fitting shall be narrow, medium, wide or asymmetric as per the requirement. Luminaire shall be complete with replaceable driver and capable of operating at line voltage without any separate power supply from 24 V DC. Fixture shall be suitable to operate at an ambient temperature range of -10°C to +50°C and shall have impact resistance of IK 07. Lifetime of complete luminaire (LED ,Driver , Electrical & control circuitry) shall be at least L70:50000 burning hours at 50°C. Luminaire shall be conforming to BIS (IS 10322) with dully R Number marked and shall be complete with all necessary accessories required for proper working of fixture including connection/inter connection with weather proof ISI Marked copper conductor of minimum size 1.5sqmm connection cables and accessories , Integral male/female water proof connectors of IP68 etc. as required. The successful bidder shall submit the following certifications/reports for approval before supply of materials: product data sheets, LM79 report from NABL accredited lab, illuminance diagram, polar curve & LM80 report issued by LED manufacturer, Rohs Compliance.

Wattage per meter

19.3.1	100W	Each	24162
19.3.2	50W	Each	16362
19.3.3	40W	Each	16507
19.3.4	30W	Each	12012
19.3.5	15W	Each	3426

#### 19.4 **RGB LED Strip**

Supplying Installation, Testing and Commissioning of LED RGB/RGBWW/ RGBNW/ RGBA/RGBW suitable for exterior use having IP68 rating (as per site requirement). Flexible light strip of 5 mtr standard length with 12-15 Watt per meter. Luminaire shall be capable of producing dynamic colour changing light for with 16 million colours by DMX/Ethernet based control. Minimum System lumens 450 lumens/meter and System Lumen Efficacy > 30lm/w. Luminaire light beam spread - 100-110°, The Strip should have IP 68 protection and is offered IP 68 rated connectors to join the LED Strips in continuity. The luminaire must be offered with Aluminium channel for mounting the strip lights. The product should be complete with all accessories and Driver. Lifetime of complete luminaire (LED, Driver, Electrical & control circuitry)

shall be at least L70:50000 burning hours at 50°C. Luminaire shall be conforming to BIS (IS 10322) with dully R Number marked. Luminaire shall be complete with replaceable driver and capable of operating at line voltage without any separate power supply from 24 V DC, Fixture shall be suitable to operate at an ambient temperature range of -10°C to +50°C. The successful bidder shall submit the following certifications/reports for approval before supply of materials: product data sheets, LM79.

report from NABL accredited lab, illuminance diagram, polar curve & LM80 report issued by LED manufacturer & RoHS Compliance along with CE certificate.

Each 9689

19.5 **Controller**

19.5.1 Supplying Installation, Testing and Commissioning of DMX Controller for the system including address writer and programming the DMX controller with the suitable designs as decided by the Engineer-in-charge/client department ( not less than 10 nos designs) and all other accessories required for the running of the system Controller should have Input Power 5-5.5V DC 0.6A and Output Protocol DMX512 with 4 universe, 2 universe should work in Stand Alone Mode and 2 universe should work in live mode with laptop/ tablet / computer. The universe should be expandable from 2 to 4 DMX512 universes. It should be compatible for Programmability with PC, Mac, Tablet, Smartphone by using USB & Ethernet. Dmx controller should have network controllability feature to control the scene remotely through LAN and triggered via UDP packets on port 2430. It's must have Connections Type C USB, XLR3, Ethernet, battery. There should be provision for Memory microSD card. Device should have Intuitive backlit keyboard with 10 presents and also have provision of keypad on device for changing scene manually from device. Device should be capable to work on Extended triggering possibilities (TCA) & also have Smart Upgrade Technology (SUT). It is an IP 20 unit and has an Operating Temperature of 0°C to 50°C.OS Requirements for the controller is Mac OS X 10.8-10.12, Windows 7/8/10/11. Standards should be EC, EMC, ROHS. The controller should have a variety of features including 2048 DMX channels, clock/calendar, iPhone/iPad /Android remote control, Ethernet facilities, dry contact port triggering and multi-zone SD card memory. Network synchronization of one area across hundreds of

	universes with the possibility of 99 scenes across 5 areas with auto clock triggering for sunrise and sunset and as per the festivals for specific occasions. Device should be equipped with meta clamp to mount on wall with data enablers and splitters as required. To be provided with IP 66 enclosure if installed in external environment.	Each	65891
19.6	<b>Splitter</b>		
19.6.1	Supplying Installation, Testing and Commissioning of DMX Splitter with Input Voltage range : 190-240V AC, Power Consumption 5W max. Housing is made of CRCA with powder coated finish Mounting, 19 inch rack mountable, Operation Temperature - 30°C to +55°C, 8 Output with 3pin XLR terminal sockets, Ingress Protection Rating IP20. This unit takes the DMX Signal from DMX Controller & split the signal into 8 separate output channels. The output terminals of Splitters are optically isolated from the input. Splitters should be capable to amplify the DMX signal & allowing the data link to be extended by max. 300 m (1044 ft.) using AWG 22 DMX cable or 150 m (500 ft.) using AWG 24 DMX cable or maximum 20-25 fixture per output channel. To be provided with IP enclosure if installed in external environment etc., complete as required.		6224
19.6.2	Supplying Installation, Testing and Commissioning of RDM-6Wall Splitter, should be able to provide 6-output DMX/RDM splitter with DMX/RDM pass-through supporting bi-directional communications for discovery, addressing and DMX control of Ethernet/DMX products. This unit takes the incoming DMX/RDM signal and splits the signal into six separate output channels allowing for expanding the number of devices controlled from 32 to 6x32. The output terminals are electronically isolated from the input & RDM-through port and share a common ground reference. All six output ports have an independent output driver to boost the DMX/RDM signal. Surface or DIN-rail mountable, Isolated DMX/RDM Input/Outputs, Automatic switching between DMX and RDM mode for auto-discovery, Environment-IP20, Interior applications, Finish/Color-Polycarbonate, Certification: CE Certified. DMX Splitter/Booster etc. as required.	Each	15142
19.7	Signal Amplifier		

19.7.1	Supplying Installation, Testing and Commissioning of Signal Amplifier to boost the Signal, IP 65 rated module to enhance the depleting DMX Signals, should have IP 66/67 rates inbuilt connectors compatible with Luminaires. It should be offered with inbuilt electronic circuit for functioning. No external LED driver needed etc., complete as required.	Each	2519
19.8	DMX decoder		
19.8.1	Supplying, installation, testing and commissioning of high quality DMX decoder, Power Input : DC 24V etc complete as required.	Each	5399
19.9	Connector		
19.9.1	Supplying and Fixing of IP65 "I" power connectors having 3/4 pole cable connector, chuck type strain relief, Current rating 20 A rms continuous, Easy and extremely precise locking system "Quick Lock" High impact materials - long-lasting and reliable etc complete as required.	Each	649
19.9.2	Supplying and Fixing of IP65 "I" DMX connectors having 3/5 pole cable connector, Male/Female connector with improved latch, cage type contacts, "solder stop" for easy soldering, and additional ground contact for best contact integrity between chassis and cable connector. More durable housing for maximum reliability, etc complete as required.	Each	649
19.9.3	Supplying and Fixing of 5 pin XLR Male/Female connectors having 5 pole cable connector, Male/Female connector with improved latch, cage type contacts, "solder stop" for easy soldering, and additional ground contact for best contact integrity between chassis and cable connector. More durable housing for maximum reliability etc as required.	Each	1958
19.10	Processor		
19.10.1	Supplying Installation Testing and Commissioning of push button type keypad with 10 buttons. Each button is programmable up to 16 scenarios. Also has got two dry-contact input to trigger any preset scene, etc as required	Each	10473





## CHAPTER- 20

### FOUNTAIN

Item No.	Description	Unit	Rate
20.1	Supplying, Installation, Testing and Commissioning of Nozzle made with gunmetal Grade Geyser jet 100mm with adjustable nozzle for height adjustment of the fountain etc. Complete as required.	Each	10473.00
20.2	Supplying, Installation Testing Commissioning of Fixing of 40 mm dia Bubbler Jet Nozzles in SS 304 Gr to produce water effect etc. complete as required.	Each	6481.00
20.3	Supplying, Installation, Testing and Commissioning of 40 mm dia SS Difuser Nozzles in SS 304 Gr to produce water effect etc. complete as required.	Each	2954.00
20.4	Supplying, Installation, Testing and Commissioning of Stainless steel 304 gr. Comet effect nozzle with compatible Digitally controlled pump to produce desirable effects with 40 mm dia and 20 mm orifice nozzle etc. complete as required as per direction given by engineer in charge	Each	10335.00
20.5	Supplying, Installation, Testing and Commissioning of Single Jet Crown Nozzles Complete with ball joint for 15 Degree pivoting made of brass with Nickle plating,flow straightner in following size . Height of water stream upto 10 mtrs. etc. complete as required.		
20.5.1	15 mm internal threaded with 6 mm orifice.	Each	2322.00
20.5.2	15 mm internal threaded with 8 mm orifice.	Each	2538.00
20.5.3	15 mm internal threaded with 10 mm orifice.	Each	2764.00
20.5.4	25 mm internal threaded with 12 mm orifice.	Each	3078.00
20.5.5	25 mm internal threaded with 14 mm orifice.	Each	3726.00
20.5.6	40 mm internal threaded with 17 mm orifice.	Each	3078.00
20.5.7	40 mm internal threaded with 20 mm orifice.	Each	7829.00
20.6	Supplying, Installation, Testing and Commissioning of Eco Cluster Nozzle made of stainless steel with inlet dia 40 mm and 21 nos Single jets to create 38 mm dia full jet for height 10 mtr water level in depended etc. complete as required.	Each	37251.00

20.7	Supplying Installation, Testing and Commissioning of Eco Cluster Nozzle made of stainless steel with inlet dia 80 mm and 64 nos Single jets to Create 67 mm dia full jet for fountain height 10 mtr water level in depended etc. complete as required.	Each	63380.00
20.8	Supplying, Installation, Testing and Commissioning of Central hollow jet 65 mm dia for achieving maximum height of 20 mtrs to produce clear full jet stable in wind water level independent etc. complete as required.	Each	50208.00
20.9	Supplying, Installation, Testing and Commissioning of Lava bell nozzle for producing transparent water pattern with adjustable ball dia made out of SS 304 Gr./Brass of following Size etc. complete as required.		
20.9.1	15 mm Dia inlet 290 mm long	Each	4158.00
20.9.2	25 mm Dia inlet 330 mm long	Each	5237.00
20.9.3	25 mm Dia inlet 488 mm long	Each	6317.00
20.9.4	25 mm Dia inlet 636 mm long	Each	7289.00
20.10	Supplying, Installation, Testing and Commissioning of Foam jet High contrast for producing high contrast/foam effect to extensively wind stable, water level independent moc Brass /SS 316L of following size etc. complete as required.		
20.10.1	25 mm Dia inlet 32 mm orifice 160 mm long.	Each	17816.00
20.10.2	25 mm Dia inlet 50 mm orifice 180 mm long.	Each	29801.00
20.10.3	40 mm Dia inlet 50 mm orifice 180 mm long.	Each	41570.00
20.11	Supplying, Installation, Testing and Commissioning of 20 mm nylon rope all the accessories Floater Grit Clamping both sides etc. complete as required.	Meter	69.00
20.12	Supplying, Installation, Testing and Commissioning of fixing of Suction Screen stainer made of ABS to be fitted in suction to protect the pump from enrtty of external materials etc. complete as required.	Each	1971.00
20.13	Supplying, Installation, Testing and Commissioning of 100 mm Dia Debris Collection Strainer in Stainless steel 304 gr etc. complete as reqd.	Each	7685.00

20.14	Supplying, Installation, Testing and Commissioning of 400 mm Dia wide SS Overflow Skimmer in Stainless steel 304 gr with front openable fitted debris trapping mesh with outlet size of 65mm Dia for fixing in wall etc. Complete as reqd.	Each	10420.00
20.15	Supplying, Installation, Testing and Commissioning of 300x300 mm Dia Main Drain in SS 304 Gr with perforations to disallow foreign material with top openable for maintenance etc. complete as required.	Each	7745.00
20.16	Supplying, Installation, Testing and Commissioning of ISI Marked openwell submersible pump set contain with stainless steel shaft and cast iron/SS body, the pump shall be designed to prevent over loading and having dynamically balanced rotating parts etc. the pump capable of delivering following capacities discharge at suitable head and lowering the pumps in water bodies and suitable for operation on 415V(+/-10%), 3-phase AC supply including providing required no's of heavy duty M.S clamps made of flat iron and suitable size top cover made of suitable thick MS sheet including connection, interconnection ,supports etc. as required. suitable for 900LPM at 25 Mtrs Head etc. complete as required.	Each	49514.00
20.17	Supplying, Installation, Testing and Commissioning of ISI Marked vertical Multi Stage submersible pump set contain with stainless steel shaft and cast iron/SS body, the pump shall be designed to prevent over loading and having dynamically balanced rotating parts etc. the pump capable of delivering following capacities discharge at suitable head and lowering the pumps in water bodies and suitable for operation on 415V(+/-10%), 3- phase AC supply including providing required no's of heavy duty M.S clamps made of flat iron and suitable size top cover made of suitable thick MS sheet as required. suitable for 1200LPM at14 mtr. head etc. complete as required.	Each	67966.0
20.18	Supplying, Installation, Testing and Commissioning of three phase open well ISI Marked submersible pumpset of 1.5H.P. capacity suitable for operation on 415V(+/-10%), 3- phase AC supply compatible for operations on dynamic variable frequency / speed having IP 68 Protection including providing required	Each	28535.00

no's of heavy duty M.S clamps made of flat iron and suitable size top cover made of suitable thick MS sheet as required. and making of flexible IP68 cable connections etc. complete of suitable head and discharge etc. complete as required.

20.19	Supplying, Installation, Testing and Commissioning of three phase openwell ISI Marked submersible pump set of 7.5 H.P. capacity suitable for operation on 415V(+/-10%), 3- phase AC supply compatible for operations on dynamic variable frequency / speed having IP 68 Protection including providing required no's of heavy duty M.S clamps made of flat iron and suitable size top cover made of suitable thick MS sheet as required. and making of flexible IP68 cable connections etc. complete as required.	Each	56470.00
20.20	Supplying, Installation, Testing and Commissioning of fixing of following dia. Gun metal gate valve (Screwed type) on the existing pipeline, including testing & Commissioning etc. complete as required..		
20.20.1	80 mm dia	Each	17486.00
20.20.2	50 mm dia	Each	7881.00
20.21	Supplying, Installation, Testing and Commissioning of fixing of following dia. Gun metal Horizontal Non Return valve ( screwed type ) on the existing pipeline, including testing & Commissioning etc. complete as required.		
20.21.1	100 mm dia	Each	36832.00
20.21.2	50 mm dia	Each	8693.00
20.22	Supplying, Installation, Testing and Commissioning of underwater Luminaries surface mounted RGB LED spot light 6 x 3W with IP 68 protection, SS/ aluminum dia casting body with power coated paint, soft rubber gasket along with 2 years free replacement guaranty etc. complete as required..	Each	13659.00
20.23	Supplying, Installation, Testing and Commissioning of underwater Luminaries surface mounted RGB LED spot light 3 x 3W with IP 68 protection, SS/ aluminum dia casting body with power coated paint, soft rubber	Each	7073.00

	gasket along with 2 years free replacement guaranty etc. complete as required.		
20.24	Supplying, Installation, Testing and Commissioning of water proof (IP 68) power supply unit of not less than 200W i/c connection along with 2 years free replacement guaranty etc. complete as required.	Each	7410.00
20.25	Supplying, Installation, Testing and Commissioning of RGB controller with remote Kit wattage not less than 200 watt i/c connection along with 2 years free replacement guaranty etc. complete as required.	Each	107061.00
20.26	Supplying, Installation, Testing and Commissioning of Signal Amplifier of RGB signal as require i/c connection along with 2 years free replacement guaranty etc. complete as required.	Each	16242.00
20.27	Supplying, Installation, Testing and Commissioning of fixing of Power Supply/SMPS for suitable to run LED Lights, Body-Metal input Power-220 V AC/ Output Power-12 V DC etc. complete as required.	Each	7210.00
20.28	Supplying & fixing PVC insulated PVC sheathed copper conductor submersible flat cable ISI Marked in existing metal/ HDPE / PVC/ pipe/ in bore well/ in sump including fixing the cable to GI/HDPE pipe with suitable cable tags of following sizes etc. complete as required.		
20.28.1	3 Core 1.5 Sq mm Flat Cable	Meter	76.00
20.28.2	3 Core 2.5 Sq mm Flat Cable	Meter	124.00
20.28.3	3 Core 4.0 Sq mm Flat Cable	Meter	186.00
20.28.4	3 Core 6 Sq mm Flat Cable	Meter	266.00
20.28.5	3 Core 10 Sq mm Flat Cable	Meter	461.00



# CHAPTER -21 LIFT

## Passenger Lifts

Item No.	Description	Unit	Rate
21.1	<p>Supplying, Installation, Testing &amp; Commissioning of following capacity passenger Machine room less (MRL) lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift &amp; Escalator) 2003, BIS Codes, NBC 2016 as amended upto date having provision for barrier free access as per Harmonised Guidelines &amp; Standards for Universal Accessibility in India - 2021 of MoHUA, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required:-</p> <p>(i) Speed-1 MPS  (ii) Floors-5 (G+4)  (iii) Travel -17 Meters (approx.)  (iv) Stops &amp; opening- 5 stops and 5 openings  (v) Controller: A.C. variable voltage &amp; variable frequency  (vi) Automatic rescue device (ARD) complete with dry maintenance free batteries as required.  vii) Operation: Microprocessor based single automatic push button/simplex selective collective/duplex collective selective with/without attendant  (viii) Power-415 Volts<math>\pm</math>10%, 3 phase, 50 Hz, 4 wires system  (ix) Car Enclosure: Stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish) on all sides and stainless steel decorative ceiling with fans (indirect throw) and LED fitting.  (x) The car flooring should be smooth and antiskid as approved by engineer-in-charge.  (xi) Type of doors  (a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish).  (b) Landing doors: stainless steel scratch proof .  (xii) A hand rail not less than 600mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car.  (xiii) Voice announcement system in the car to</p>		



announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator.

(xiv) Closed loop Control System, protection against power fluctuation, self diagnostic control, Landing doors 2 hours Fire rated, Overload detection and protection, Overspeed Governor, Dot Matrix LED D & P Indicators In Car & Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance Operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup , Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder.

(xv) The lift doors shall have a vision panel to enable persons with hearing impairment to signal for help or assistance in the event of an emergency.

(xvi) An appropriate technological support be provided (Through emergency messaging |services or alarms etc.) to respond to the emergency requirements of person with hearing impairment or deafness.

(xvii) In case of failure of ARD or other electronic devices, a provision of manual rescue be provided

21.1.1	13 passenger (884kg)	Each	1684225.72
21.1.2	16 passenger (1088kg)	Each	2348212.48

#### Goods Lifts

21.2 Supplying, Installation, Testing & Commissioning of 2000kg Machine room less (MRL) goods lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016 as amended upto date, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required :-

- (i) Speed - 0.5 MPS
- (ii) Floors - 5(G+4)
- (iii) Travel - 17 metres(approx)
- (iv) Stops & opening : 5 stops and 5 openings
- (v) Controller: A.C. variable voltage & variable frequency
- (vi) Automatic rescue device (ARD) complete with dry

maintenance free batteries as required.

(vii) Operation: Microprocessor based single automatic push button/simplex selective collective/duplex collective selective with/without attendant

(viii) Power-415 Volts $\pm$ 10%, 3 phase, 50 Hz, 4 wires system

(ix) Car Enclosure: Stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish) on all sides and stainless steel decorative ceiling with fans (indirect throw) and LED fitting.

(x) The car flooring should be strong to take the rated load without any deformation or damage and antiskid as approved by engineer-in-charge.

(xi) Type of doors:-

(a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish).

(b) Landing doors: stainless steel scratch proof .

(xii) A hand rail not less than 600mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car.

(xiii) Voice announcement system in the car to announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator.

(xiv) Closed loop Control System, protection against power fluctuation, self diagnostic control, Landing doors 2 hours Fire rated, Overload detection and protection, Overspeed Governor, Dot Matrix LED D & P Indicators In Car & Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance Operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup , Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder.

(xv) In case of failure of ARD or other electronic

21.2.1	2000 kg	Each 3391945.00
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Hospital Lifts (20 passenger (1360 kg))

21.3 Supplying, Installation, Testing & Commissioning of following capacity passenger cum bed lift Machine room less (MRL) Bed lift with regenerative drive as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016 as amended upto date having provision for barrier free access as per Harmonised Guidelines & Standards for Universal Accessibility in India - 2021 of MoHUA, serving different floors in the lift shaft as per detailed specifications enclosed and as under including all other equipment and accessories complete as required :-

- (i) Speed-1.0 MPS
- (ii) Floors-5(G+4)
- (iii) Travel-17 metres(approx)
- (iv) Stops & opening : 5 stops and 5 openings
- (v) Controller: A.C. variable voltage & variable frequency
- (vi) Automatic rescue device (ARD) complete with dry maintenance free batteries as required.
- (vii) Operation: Microprocessor based single automatic push button/simplex selective collective/duplex collective selective with/without attendant
- (viii) Power-415 Volts $\pm$ 10%, 3 phase, 50 Hz, 4 wires system
- (ix) Car Enclosure: Stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish) on all sides and stainless steel decorative ceiling with fans (indirect throw) and LED fitting.
- (x) The car flooring should be smooth and antiskid as approved by engineer-in-charge.
- (xi) Type of doors:-
  - (a) Car: Power operated, centre opening horizontal sliding stainless steel scratch proof (Moon Rock/Honeycomb/ Hairline Finish).
  - (b) Landing doors: stainless steel scratch proof .
  - (xii) A hand rail not less than 600mm long at 900mm above floor level to be fixed adjacent to control panel in the lift car.
  - (xiii) Voice announcement system in the car to announce the position of the elevator in the hoist way as the car passes or stops at floor served by the elevator.
  - (xiv) Closed loop Control System, protection against power fluctuation, self diagnostic control, Landing

doors 2 hours Fire rated, Overload detection and protection, Overspeed Governor, Dot Matrix LED D & P Indicators In Car & Landings, BMS Compatibility, tamper proof infrared curtain covering almost the entire height of the lift car door, Alarm horn, Anti Nuisance Operation, CCTV camera system with 4 MP IP camera, suitable NVR and HDD for 30 days storage backup, Firemen switch, 2/3 way intercom, Emergency Stop Switch with battery backup for fan and light fitting for 1 hour, pit ladder.

(xv) The lift doors shall have a vision panel to enable persons with hearing impairment to signal for help or assistance in the event of an emergency.

(xvi) An appropriate technological support be provided (Through emergency messaging |services or alarms etc.) to respond to the emergency requirements of person with hearing impairment or deafness.

(xvii) In case of failure of ARD or other electronic devices, a provision of manual rescue be provided.

21.3.1	20 passenger (1360kg)	Each    2581451.00
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## CHAPTER- 22

### HT CABLE LAYING

Item No.	Description	Qty	Rate
22.1	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc as required.		
22.1.1	Upto 120 sq. mm	Meter	628
22.1.2	Above 120 sq. mm and upto 400 sq. mm	Meter	694
22.2	Laying of one number additional PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size direct in ground in the same trench in one tier horizontal formation including excavation, sand cushioning, protective covering and refilling the trench etc as required.		
22.2.1	Upto 120 sq. mm	Meter	432
22.2.2	Above 120 sq. mm and upto 400 sq. mm	Meter	498
22.3	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.		
22.3.1	Upto 120 sq. mm	Meter	98
22.3.2	Above 120 sq. mm and upto 400 sq. mm	Meter	170
22.4	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing masonry open duct as required.		
22.4.1	Upto 120 sq. mm	Meter	80
22.4.2	Above 120 sq. mm and upto 400 sq. mm	Meter	146

22.5	Laying of one number XLPE power cable of 33 KV grade of following size direct in ground including excavation, sand cushioning, protective covering and refilling the trench etc as required.		
22.5.1	Upto 120 sq. mm	Meter	635
22.5.2	Above 120 sq. mm and upto 400 sq. mm	Meter	701
22.6	Laying of one number additional XLPE power cable of 33 KV grade of following size direct in ground in the same trench in one tier horizontal formation including excavation, sand cushioning, protective covering and refilling the trench etc as required.		
22.6.1	Upto 120 sq. mm	Meter	439
22.6.2	Above 120 sq. mm and upto 400 sq. mm	Meter	505
22.7	Laying of one number XLPE power cable of 33 KV grade of following size in the existing RCC/ HUME/ METAL pipe as required.		
22.7.1	Upto 120 sq. mm	Meter	104
22.7.2	Above 120 sq. mm and upto 400 sq. mm	Meter	177
22.8	Laying of one number XLPE power cable of 33 KV grade of following size in the existing masonry open duct as required.		
22.8.1	Upto 120 sq. mm	Meter	86
22.8.2	Above 120 sq. mm and upto 400 sq. mm	Meter	153

## CHAPTER 23

### HV CABLE JOINTING & END TERMINATION

Item No.	Description	Unit	Rate
23.1	Supplying and making indoor cable end jointing with cast resin compound, including lugs and other jointing materials, for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required :		
23.1.1	70 sq. mm	Each	2385
23.1.2	120 sq. mm	Each	3120
23.1.3	240 sq. mm	Each	4144
23.1.4	300 sq. mm	Each	4206
23.2	Supplying and making outdoor cable end jointing with cast resin compound, including lugs and other jointing materials, for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required :		
23.2.1	70 sq. mm	Each	5201
23.2.2	120 sq. mm	Each	5988
23.2.3	240 sq. mm	Each	7010
23.2.4	300 sq. mm	Each	7010
23.3	Supplying and making straight through cable jointing with cast resin compound, including ferrule and other jointing materials, for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required		
23.3.1	70 sq. mm	Each	5077
23.3.2	120 sq. mm	Each	5715
23.3.3	240 sq. mm	Each	8392
23.3.4	300 sq. mm	Each	9491
23.4	supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required:		
23.3	70 sq. mm	Each	12946
23.3.1	120 sq. mm	Each	15989
23.3.2	240 sq. mm	Each	17414
23.3.3	300 sq. mm	Each	17414



23.5	Supplying and making outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required :		
23.5.1	70 sq. mm	Each	19286
23.5.2	120 sq. mm	Each	21351
23.5.3	240 sq. mm	Each	24255
23.5.4	300 sq. mm	Each	24255
23.6	Supplying and making straight through cable jointing with heat shrinkable jointing kit complete with all accessories including ferrules suitable for following size of 3 core, XLPE aluminium conductor cable of 11 KV grade as required :		
23.6.1	70 sq. mm	Each	30799
23.6.2	120 sq. mm	Each	40144
23.6.3	240 sq. mm	Each	44211
23.6.4	300 sq. mm	Each	44211
23.7	Supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 33 KV grade as required :		
23.7.1	70 sq. mm	Each	20950
23.7.2	120 sq. mm	Each	31787
23.7.3	240 sq. mm	Each	36190
23.8	Supplying and making outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminium conductor cable of 33 KV grade as required :		
23.8.1	70 sq. mm	Each	33200
23.8.2	120 sq. mm	Each	43405
23.8.3	240 sq. mm	Each	75301

23.9 Supplying and making straight through cable jointing with heat shrinkable jointing kit complete with all accessories including ferrules suitable for following size of 3 core, XLPE aluminium conductor cable of 33 KV grade as required :

23.9.1	70 sq. mm	Each	57525
23.9.2	120 sq. mm	Each	73107
23.9.3	240 sq. mm	Each	103493



## CHAPTER 24 TRANSFORMER

Item No.	Description	Unit	Rate
	Oil Type		
24.1	<p>33/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor mounting (Mineral oil filled)</p> <p>Supplying installation testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x400 sq.mm XLPE cable of 33 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 dg. C up to 200 KVA and 40 °C for oil and 45 dg. C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness</p>		

for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition: a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm

contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.1.1	500 KVA	Each	1328495
24.1.2	630KVA	Each	1673904
24.1.3	1000KVA	Each	2008307
24.1.4	1250 KVA	Each	2510384
24.1.5	1600KVA	Each	3213291
24.1.6	2000KVA	Each	4016614
24.1.7	2500KVA	Each	5020768

24.2 Supplying installation testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x400 sqmm XLPE cable of 33 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The

maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 dg. C up to 200 KVA and 40 °C for oil and 45 dg. C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers

above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.2.1	500 KVA	Each	1594194
24.2.2	630KVA	Each	2008685
24.2.3	1000KVA	Each	2409969
24.2.4	1250 KVA	Each	3012461
24.2.5	1600KVA	Each	3855950
24.2.6	2000KVA	Each	4819937
24.2.7	2500KVA	Each	6024922

24.3 Supply, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in



range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x400 sq.mm XLPE cable of 33 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 °C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition: a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating

temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.3.1	500KVA	Each	1859893
24.3.2	630KVA	Each	2343466
24.3.3	1000KVA	Each	2811630
24.3.4	1250 KVA	Each	3514538
24.3.5	1600KVA	Each	4498608
24.3.6	2000KVA	Each	5623260
24.3.7	2500 KVA	Each	7029075

11/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor mounting (Mineral oil filled)

- 24.4 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 °C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition: a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running

measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.4.1	1000KVA	Each	1749171
24.4.2	1250 KVA	Each	2186463
24.4.3	1600KVA	Each	2798673
24.4.4	2000KVA	Each	3498342

24.5 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 °C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application

external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve (¾" nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having (1¼" nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x).

Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.5.1	1000KVA	Each	2099005
24.5.2	1250 KVA	Each	2623756
24.5.3	1600KVA	Each	3358408
24.5.4	2000KVA	Each	4198010

24.6 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40

°C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve (¾" nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having (1¼" nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil



temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.6.1	1000KVA	Each	2448839
24.6.2	1250 KVA	Each	3061049
24.6.3	1600KVA	Each	3918143
24.6.4	2000KVA	Each	4897678

24.7 Supply, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( below 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c

supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 °C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve (¾" nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having (1¼" nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device

or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.7.1	200KVA (Offload Tap Changer)	Each	336877
24.7.2	250KVA (Offload Tap Changer)	Each	421097
24.7.3	315KVA (Offload Tap Changer)	Each	530582
24.7.4	400KVA (Offload Tap Changer)	Each	673755
24.7.5	500KVA	Each	842193
24.7.6	630KVA	Each	1061164

24.8 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( below 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic

operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 dg. C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level

at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.8.1	200KVA	Each	377303
24.8.2	250KVA	Each	471628
24.8.3	315KVA	Each	594252
24.8.4	400KVA	Each	754605
24.8.5	500KVA	Each	943257
24.8.6	630KVA	Each	1188503
24.9	Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star		

rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( below 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 dg. C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The

transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.9.1	200KVA	Each	497830
24.9.2	250KVA	Each	622287
24.9.3	315KVA	Each	784082
24.9.4	400KVA	Each	995660
24.9.5	500KVA	Each	1244575
24.9.6	630KVA	Each	1568164

24.10 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 °C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application



external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve (¾" nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having (1¼" nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x).

Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.10.1	63KVA	Each	112012
24.10.2	100KVA	Each	177796
24.10.3	160KVA	Each	284474

24.11 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40°C up to 200 KVA and 40°C for oil and 45°C for above 200 KVA for winding. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS:

1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition: a) air temperature 50°C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for

transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.11.1	63KVA	Nos	125453
24.11.2	100KVA	Nos	199132
24.11.3	160KVA	Nos	318611

24.12 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better, suitable for out door/indoor applications with Offload Tap Changer in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS Code including first filling of filtered dehydrated oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 and as per CPWD specifications complete in all respects etc as required at site . The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with + 12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 35 °C for oil and 40 °C up to 200 KVA and 40 °C for oil and 45 °C for above 200 KVA for winding. Inside of tank

shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred to for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50°C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with

suitable tripping mechanism above permissible limit s)  
 Jacking pads (for transformer above 1 600 kVA); t)  
 Additional Neutral separately brought out on bushing  
 for earthing. u) Magnetic oil level gauge (for  
 transformer above 1600 kVA) with low oil level alarm  
 contact; v) Non return valve (for conducting pressure  
 test); w) Pressure relief device or explosion vent x).  
 Monogram Plate y) Inspection cover z). Detachable  
 type radiators with top and bottom shutoff valve. aa)  
 Oil Conservator with Oil level indicator, minimum level  
 marking and drain plug for all transformers of capacity  
 50 KVA and above. bb) Necessary hardware, clamps,  
 lugs etc. for termination on HV/MV etc. for all  
 transformers.

24.12.1	63KVA	Each	156816
24.12.2	100KVA	Each	248915
24.12.3	160KVA	Each	398264

- 33/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor  
 mounting (Synthetic organic Ester oil filled)
- 24.13 Supplying, installation, testing and commissioning of  
 following capacity (continuous loading) BEE 3 Star  
 rated (Corresponding Level as per BIS amended upto  
 date of receipt of tender) , 33/0.433 KV step down, 3  
 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class  
 insulating liquid) Natural Air Natural] copper wound  
 transformer (Electrolytic grade 99.9% pure copper,  
 Core made of first grade Cold Rolled Grain Oriented  
 (CRGO) Core grade MOH or better), Dielectric material  
 shall be type -A, suitable for out door/indoor  
 applications with On Load Tap Changer (OLTC) on  
 HV side having AVR relay and Remote Tap Changer  
 Control (RTCC) for automatic sensing of incoming  
 voltage, automatic operation of OLTC and facility for  
 remote and manual operation of OLTC HV side in  
 range of +5% to -15% in steps of 2.5%, having cable  
 end boxes on HV side suitable for 3x400 sq.mm XLPE  
 cable of 33 KV grade, including bus trunking  
 arrangement on LV side including supplying and  
 laying of copper conductor multicore control cable  
 from transformer to HT breaker/panel for safety  
 tripping, complete with all accessories and safety  
 provisions as per relevant IS 1180 (Part-3) including  
 first filling of filtered dehydrated Synthetic organic  
 Ester oil, i/c supplying and grouting of suitable M.S.  
 Channel with all accessories and transformer shall be

confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site . The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device

or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.13.1	500 KVA	Each	1476106
24.13.2	630KVA	Each	1859893
24.13.3	1000KVA	Each	2231452
24.13.4	1250 KVA	Each	2789316
24.13.5	1600KVA	Each	3570324
24.13.6	2000KVA	Each	4462905
24.13.7	2500KVA	Each	5578631

24.14 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on



HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x400 sqmm XLPE cable of 33 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.14.1	500 KVA	Each	1771327
24.14.2	630KVA	Each	2231872
24.14.3	1000KVA	Each	2677743
24.14.4	1250 KVA	Each	3347179
24.14.5	1600KVA	Each	4284389
24.14.6	2000KVA	Each	5355486

24.14.7 2500KVA

Each 6694357

24.15 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x400 sqmm XLPE cable of 33 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of

Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable

type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.15.1	500KVA	Each	2066548
24.15.2	630KVA	Each	2603851
24.15.3	1000KVA	Each	3124033
24.15.4	1250 KVA	Each	3905042
24.15.5	1600KVA	Each	4998453
24.15.6	2000KVA	Each	6248067
24.15.7	2500 KVA	Each	7810083

- 24.16 11/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor mounting (Synthetic organic Ester oil filled)  
 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in

all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve (¾" nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having (1¼" nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above

200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.16.1	1000KVA	Each	1943523
24.16.2	1250 KVA	Each	2429404
24.16.3	1600KVA	Each	3109637
24.16.4	2000KVA	Each	3887046

24.17 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE

cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminum/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking



plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.17.1	1000KVA	Each	2332228
24.17.2	1250 KVA	Each	2915285
24.17.3	1600KVA	Each	3731564
24.17.4	2000KVA	Each	4664455
24.18	Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper,		

Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with On Load Tap Changer (OLTC) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized

aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.18.1	1000KVA	Each	2720932
24.18.2	1250 KVA	Each	3401165

24.18.3	1600KVA	Each	4353492
24.18.4	2000KVA	Each	5441865

24.19 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( below 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive

atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminum/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure

test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.19.1	200KVA	Each	374308
24.19.2	250KVA	Each	467885
24.19.3	315KVA	Each	589535
24.19.4	400KVA	Each	748616
24.19.5	500KVA	Each	935770
24.19.6	630KVA	Each	1179071

24.20 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( below 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per

CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminum/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers

above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth);

o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.20.1	200KVA	Each	419225
24.20.2	250KVA	Each	524031
24.20.3	315KVA	Each	660280
24.20.4	400KVA	Each	838450
24.20.5	500KVA	Each	1048063
24.20.6	630KVA	Each	1320559

24.21 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( below 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic



operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sq.mm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40 °C for oil and 45 °C for winding up to 200 KVA and 45 °C for oil and 50 °C dg. C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked. Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level

at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.21.1	200KVA	Each	524031
24.21.2	250KVA	Each	655039
24.21.3	315KVA	Each	825349
24.21.4	400KVA	Each	1048063
24.21.5	500KVA	Each	1310079
24.21.6	630KVA	Each	1650699
24.22	Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 3 Star rated (Corresponding Level as per BIS amended upto		

date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with Offload Tap Changer in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40°C for oil and 45°C for winding up to 200 KVA and 45°C for oil and 50°C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50°C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized

aluminum/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.22.1	63KVA	Each	117907
24.22.2	100KVA	Each	187154
24.22.3	160KVA	Each	299447

- 24.23 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with Offload Tap Changer in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40°C for oil and 45°C for winding up to 200 KVA and 45°C for oil and 50°C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition: a) air temperature 50°C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The

transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminium/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.23.1	63KVA	Each	132056
24.23.2	100KVA	Each	209613
24.23.3	160KVA	Each	335380

24.24 Supplying, installation, testing and commissioning of following capacity (continuous loading) BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better), Dielectric material shall be type -A, suitable for out door/indoor applications with Offload Tap Changer in range of +5% to -15% in steps of 2.5%, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade, including bus trunking arrangement on LV side including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/panel for safety tripping, complete with all accessories and safety provisions as per relevant IS 1180 (Part-3) including first filling of filtered dehydrated Synthetic organic Ester oil, i/c supplying and grouting of suitable M.S. Channel with all accessories and transformer shall be confirming to IS : 2026 (Part 1 to Part 5), IS : 1180 (Part-3) and as per CPWD specifications complete in all respects etc as required at site. The maximum flux density in any part of the core and yoke at rated voltage and frequency shall be such that the flux density with +12.5 percent combined voltage and frequency variation from rated voltage and frequency does not exceed 1.9 Tesla. The permissible temperature-rise shall not exceed 40°C for oil and 45 °C for winding up to 200 KVA and 45°C for oil and 50 °C for winding for above 200 KVA. Inside of tank shall be painted with varnish or liquid resistant paint. For external surfaces one coat of thermo setting powder paint or one coat of epoxy primer followed by two coats of polyurethane base paint shall be used. IS: 1180 (Part 3) shall be referred for paint thickness for normal to medium corrosive atmosphere. For highly polluted atmosphere and special application external paint work shall be as per direction of Engineer-in-Charge. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic

Zone as per location of site, d) Altitude as per location/site. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc. Marking Each transformer shall be provided with rating plate made of anodized aluminum/ stainless steel material securely fixed on the outer body, easily accessible, as per IS: 1180 Part-3. The entries on the rating plate shall be indelibly marked.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Oil level gauge indicating oil level at minimum, 30°C and maximum operating temperature; c) Air release device (for non-sealed type transformers) d) Rating and terminal marking plates; e) Silica gel breather f) Drain-cum-sampling valve ( $\frac{3}{4}$ " nominal size thread, IS 554) preferably steel with plug for three phase transformers; g) Thermometer pocket with cap; h) Oil filling holes having ( $1\frac{1}{4}$ " nominal size thread) with cover (for sealed type transformers without conservator); i) Lifting lugs for the complete transformer as well as for core and winding assembly; j) Pressure relief device or explosion vent above 200 kVA; k) One filter valve on the upper side of the tank (for transformers above 200 kVA); l) Unidirectional flat rollers (for transformers above 200 kVA); m) Inspection hole (for transformers above 200 kVA); n) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); o) Buchholz relay for transformers above 800 kVA. p) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. q) Bird guard; r) Oil temperature indicator and winding temperature indicators for transformers above 200 kVA with suitable tripping mechanism above permissible limit s) Jacking pads (for transformer above 1 600 kVA); t) Additional Neutral separately brought out on bushing for earthing. u) Magnetic oil level gauge (for transformer above 1600 kVA) with low oil level alarm contact; v) Non return valve (for conducting pressure test); w) Pressure relief device or explosion vent x). Monogram Plate y) Inspection cover z). Detachable type radiators with top and bottom shutoff valve. aa) Oil Conservator with Oil level indicator, minimum level



marking and drain plug for all transformers of capacity 50 KVA and above. bb) Necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers.

24.24.1	63KVA	Each	165070
24.24.2	100KVA	Each	262016
24.24.3	160KVA	Each	419225

#### DRY Type

33/0.433 KV, 3 Phase, 50 Hz Indoor mounting

- 24.25 Supplying, installation, testing and commissioning of following capacity (continuous loading) 33/0.433 KV Delta/Star, step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better) AN (air natural) cooled transformer suitable for indoor applications with On Load Tap Changer (OLTC) on HV side having AVS relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote/ manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, insulation class F (minimum), suitable for environment conditions class E4, suitable for fire behaviour class F1, climate class-C1, having cable end boxes on HV side suitable for 3x400 sqmm XLPE cable of 33 KV grade with necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers, bus trunking arrangement on LV side complete with all accessories and safety provisions as per relevant IS Code, The transformer shall be provided with standard fittings/accessories as per relevant IS and mentioned below, protection alarm/trip protection, 3 nos. of Polymeric Zinc Oxide surge Arrestors on HV Side. Winding Temperature scanner (Digital) with alarm/Trip contacts with RTD Sensors per LV winding and space for mounting differential protection CT's in LV chamber with neutral brought out separately including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/HT Panel for safety tripping, complete as confirming to IS-2026 Part-11, i/c supplying and grouting of suitable M.S. Channel

with all accessories ,complete in all respects as required at site as per CPWD specifications. Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. The transformer should have QR code which should contain drawing, test report OEM manual,Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 /NEMAstandard.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Rating and terminal marking plates; c) Thermometer pocket with cap; d) Lifting lugs for the complete transformer as well as for core and winding assembly; e) Bi-directional flat rollers (for transformers above 200 kVA); f) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); g) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. for transformers up to 200 kVA; h) Bird guard; i) Jacking pads (for transformer above 1 600 kVA); j) Name Rating & Diagram Plate. k) Monogram Plate. i) Additional neutral separately brought out on bushing for earthing.

Note : The permissible total losses value shall not exceed by 15% the losses as mentioned below.

#### Level 3

24.25.1	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	2530179
24.25.2	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	3162724
24.25.3	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	4048287
24.25.4	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	5060358
24.25.5	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt)	Each	6325448

#### Level 4

24.25.6	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	2909706
24.25.7	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	3637132

24.25.8	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	4655530
24.25.9	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	5819412
24.25.10	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt) Level 5	Each	7274265
24.25.11	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	3289233
24.25.12	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	4111541
24.25.13	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	5262773
24.25.14	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	6578466
24.25.15	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt) 33/0.433 KV, 3 Phase, 50 Hz Outdoor mounting	Each	8223082
24.26	Supply, installation, testing and commissioning of following capacity (continuous loading) 33/0.433 KV Delta/Star,step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better) AN (air natural) cooled transformer suitable for Outdoor applications with enclosure, On Load Tap Changer (OLTC) on HV side having AVS relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote/manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, insulation class F (minimum), suitable for environment conditions class E4, suitable for fire behaviour class F1,climate class-C1, having cable end boxes on HV side suitable for 3x400 sqmm XLPE cable of 33 KV grade with necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers, bus trunking arrangement on LV side complete with all accessories and safety provisions as per relevant IS Code ,The transformer shall be provided with standard fittings/accessories as per relevant IS and mentioned below, protection alarm/trip protection, 3 nos. of Polymeric Zinc Oxide surge Arrestors on HV Side. Winding Temperature scanner (Digital) with alarm/Trip		

contacts with RTD Sensors per LV winding and space for mounting differential protection CT's in LV chamber with neutral brought out separately including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/HT Panel for safety tripping, complete as confirming to IS-2026 Part-11, i/c supplying and grouting of suitable M.S. Channel with all accessories ,complete in all respects as required at site as per CPWD specifications . Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. The transformer should have QR code which should contain drawing, test report OEM manual,Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The enclosure shall also have Welded Door handle , Danger plate on HV and LV side doors, caution plate for tap links for HT doors, Door limit switch on both HV and LV side doors to be wired up to WTI box terminal for tripping the transformer in case door is opened with the enclosure transformer energized, Phase marking plates on HV and LV doors.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Rating and terminal marking plates; c) Thermometer pocket with cap; d) Lifting lugs for the complete transformer as well as for core and winding assembly; e) Bi-directional flat rollers (for transformers above 200 kVA); f) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); g) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. for transformers up to 200 kVA; h) Bird guard; i) Jacking pads (for transformer above 1 600 kVA); j) Name Rating & Diagram Plate. k) Monogram Plate.i) Additional neutral separately brought out on bushing for earthing. Note : The permissible total losses value shall not exceed by 15% the losses as mentioned below.

Level 3

24.26.1	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	2663346
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24.26.2	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	3329183
24.26.3	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	4261354
24.26.4	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	5326693
24.26.5	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt) Level 4	Each	6658366
24.26.6	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	3062848
24.26.7	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	3828561
24.26.8	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	4900557
24.26.9	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	6125697
24.26.10	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt) Level 5	Each	7657121
24.26.11	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	3462350
24.26.12	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	4327938
24.26.13	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	5539761
24.26.14	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	6924701
24.26.15	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt) 11/0.433 KV, 3 Phase, 50 Hz Indoor mounting	Each	8655876
24.27	Supply, installation, testing and commissioning of following capacity (continuous loading) 11/0.433 KV Delta/Star,step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better) AN (air natural) cooled transformer suitable for indoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( upto 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of		

OLTC HV side in range of +5% to -15% in steps of 2.5%, insulation class F (minimum), suitable for environment conditions class E4, suitable for fire behaviour class F1, climate class-C1, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade with necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers, bus trunking arrangement on LV side complete with all accessories and safety provisions as per relevant IS Code ,The transformer shall be provided with standard fittings/accessories as per relevant IS and mentioned below, protection alarm/trip protection, 3 nos. of Polymeric Zinc Oxide surge Arrestors on HV Side. Winding Temperature scanner (Digital) with alarm/Trip contacts with RTD Sensors per LV winding and space for mounting differential protection CT's in LV chamber with neutral brought out separately including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/HT Panel for safety tripping, complete as confirming to IS-2026 Part-11, i/c supplying and grouting of suitable M.S. Channel with all accessories ,complete in all respects as required at site as per CPWD specifications . Design ambient condition : a) air temperature 50 °C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551/ NEMA Standard.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Rating and terminal marking plates; c) Thermometer pocket with cap; d) Lifting lugs for the complete transformer as well as for core and winding assembly; e) Bi-directional flat rollers (for transformers above 200 kVA); f) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); g) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. for transformers up to 200 kVA; h) Bird guard; i) Jacking pads (for transformer above 1 600 kVA); j) Name Rating & Diagram Plate. k) Monogram Plate.i)

Additional neutral separately brought out on bushing for earthing.

Level 3

24.27.1	63 KVA (losses at 50% loading < 380watt, losses at 100% loading < 1250watt)	Each	146477
24.27.2	100 KVA (losses at 50% loading < 520watt, losses at 100% loading < 1800watt)	Each	232503
24.27.3	160 KVA (losses at 50% loading < 770watt, losses at 100% loading < 2200watt)	Each	372005
24.27.4	200 KVA (losses at 50% loading < 890watt, losses at 100% loading < 2700watt)	Each	465006
24.27.5	250 KVA (losses at 50% loading < 1050watt, losses at 100% loading < 3150watt)	Each	581257
24.27.6	315 KVA (losses at 50% loading < 1100watt, losses at 100% loading < 3275watt)	Each	732384
24.27.7	400 KVA (losses at 50% loading < 1300watt, losses at 100% loading < 3875watt)	Each	930012
24.27.8	500 KVA (losses at 50% loading < 1600watt, losses at 100% loading < 4750watt)	Each	1162515
24.27.9	630 KVA (losses at 50% loading < 2000watt, losses at 100% loading < 5855watt)	Each	1464769
24.27.10	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	2325029
24.27.11	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	2906287
24.27.12	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	3720047
24.27.13	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	4650059
24.27.14	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt)	Each	5812574

Level 4

24.27.15	63 KVA (losses at 50% loading < 340watt, losses at 100% loading < 1140watt)	Each	168448
24.27.16	100 KVA (losses at 50% loading < 475watt, losses at 100% loading < 1650watt)	Each	267378
24.27.17	160 KVA (losses at 50% loading < 670watt, losses at 100% loading < 1950watt)	Each	427805
24.27.18	200 KVA (losses at 50% loading < 780watt, losses at 100% loading < 2300watt)	Each	534757
24.27.19	250 KVA (losses at 50% loading < 980watt, losses at 100% loading < 2930watt)	Each	668446
24.27.20	315 KVA (losses at 50% loading < 1025watt, losses at 100% loading < 3100watt)	Each	842242
24.27.21	400 KVA (losses at 50% loading < 1225watt, losses at 100% loading < 3450watt)	Each	1069514
24.27.22	500 KVA (losses at 50% loading < 1510watt, losses at 100% loading < 4575watt)	Each	1336892

	100% loading < 4300watt)		
24.27.23	630 KVA (losses at 50% loading < 1860watt, losses at 100% loading < 5300watt)	Each	1684484
24.27.24	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	2673784
24.27.25	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	3342230
24.27.26	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	4278054
24.27.27	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	5347568
24.27.28	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt)	Each	6684460
	Level 5		
24.27.29	63 KVA (losses at 50% loading < 300watt, losses at 100% loading < 1050watt)	Each	190420
24.27.30	100 KVA (losses at 50% loading < 435watt, losses at 100% loading < 1500watt)	Each	302254
24.27.31	160 KVA (losses at 50% loading < 570watt, losses at 100% loading < 1700watt)	Each	483606
24.27.32	200 KVA (losses at 50% loading < 670watt, losses at 100% loading < 2100watt)	Each	604508
24.27.33	250 KVA (losses at 50% loading < 920watt, losses at 100% loading < 2700watt)	Each	755635
24.27.34	315 KVA (losses at 50% loading < 955watt, losses at 100% loading < 2750watt)	Each	952100
24.27.35	400 KVA (losses at 50% loading < 1150watt, losses at 100% loading < 3330watt)	Each	1209015
24.27.36	500 KVA (losses at 50% loading < 1430watt, losses at 100% loading < 4100watt)	Each	1511269
24.27.37	630 KVA (losses at 50% loading < 1745watt, losses at 100% loading < 4850watt)	Each	1904199
24.27.38	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	3022538
24.27.39	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	3778173
24.27.40	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	4836061
24.27.41	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	6045077
24.27.42	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt)	Each	7556346
	11/0.433 KV, 3 Phase, 50 Hz Outdoor mounting		
24.28	Supplying, installation, testing and commissioning of following capacity (continuous loading) 11/0.433 KV Delta/Star, step down, 3 Phase, 50 Hz, Dyn 11 vector		



group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer (Electrolytic grade 99.9% pure copper, Core made of first grade Cold Rolled Grain Oriented (CRGO) Core grade MOH or better) AN (air natural) cooled transformer suitable for Outdoor applications with Offload Tap Changer/ On Load Tap Changer (OLTC) ( upto 500 KVA offload and above 500 KVA On Load Tap Changer) on HV side having AVR relay and Remote Tap Changer Control (RTCC) for automatic sensing of incoming voltage, automatic operation of OLTC and facility for remote and manual operation of OLTC HV side in range of +5% to -15% in steps of 2.5%, insulation class F (minimum), suitable for environment conditions Class E-O-3, suitable for fire behaviour class F1, climate class-C1, having cable end boxes on HV side suitable for 3x300 sqmm XLPE cable of 11 KV grade with necessary hardware, clamps, lugs etc. for termination on HV/MV etc. for all transformers, bus trunking arrangement on LV side complete with all accessories and safety provisions as per relevant IS Code ,The transformer shall be provided with standard fittings/accessories as per relevant IS and mentioned below, protection alarm/trip protection, 3 nos. of Polymeric Zinc Oxide surge Arrestors on HV Side. Winding Temperature scanner (Digital) with alarm/Trip contacts with RTD Sensors per LV winding and space for mounting differential protection CT's in LV chamber with neutral brought out separately including supplying and laying of copper conductor multicore control cable from transformer to HT breaker/HT Panel for safety tripping, complete as confirming to IS-2026 Part-11, i/c supplying and grouting of suitable M.S. Channel with all accessories ,complete in all respects as required at site as per CPWD specifications. Design ambient condition : a) air temperature 50<sup>0</sup>C, b) Relative Humidity 90 % Max, c) Seismic Zone as per location of site, d) Altitude as per location/site. The transformer should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. All testing shall as per relevant IS Code. Noise level Shall not exceed limits as per NEMA TR-1 with all accessories running measured as per IEC 551 / NEMA standard. The enclosure shall also have Welded Door handle , Danger plate on HV and LV side doors, caution plate for tap links for HT doors,

Door limit switch on both HV and LV side doors to be wired up to WTI box terminal for tripping the transformer in case door is opened with the enclosure transformer energized, Phase marking plates on HV and LV doors.

Fitting and Accessories : The following fittings shall be provided:- a) Two earthing terminals with the earthing symbol b) Rating and terminal marking plates; c) Thermometer pocket with cap; d) Lifting lugs for the complete transformer as well as for core and winding assembly; e) Bi-directional flat rollers (for transformers above 200 kVA); f) HV side neutral grounding strip (where one of the HV bushing terminal is connected to earth); g) Arcing horns or suitable rating lightning arrestors for HT side – 3 Nos. for transformers up to 200 kVA; h) Bird guard; i) Jacking pads (for transformer above 1 600 kVA); j) Name Rating & Diagram Plate. k) Monogram Plate.i) Additional neutral separately brought out on bushing for earthing.

### Level 3

24.28.1	63 KVA (losses at 50% loading < 380watt, losses at 100% loading < 1250watt)	Each	154186
24.28.2	100 KVA (losses at 50% loading < 520watt, losses at 100% loading < 1800watt)	Each	244740
24.28.3	160 KVA (losses at 50% loading < 770watt, losses at 100% loading < 2200watt)	Each	391584
24.28.4	200 KVA (losses at 50% loading < 890watt, losses at 100% loading < 2700watt)	Each	489480
24.28.5	250 KVA (losses at 50% loading < 1050watt, losses at 100% loading < 3150watt)	Each	611850
24.28.6	315 KVA (losses at 50% loading < 1100watt, losses at 100% loading < 3275watt)	Each	770931
24.28.7	400 KVA (losses at 50% loading < 1300watt, losses at 100% loading < 3875watt)	Each	978960
24.28.8	500 KVA (losses at 50% loading < 1600watt, losses at 100% loading < 4750watt)	Each	1223700
24.28.9	630 KVA (losses at 50% loading < 2000watt, losses at 100% loading < 5855watt)	Each	1541862
24.28.10	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	2447399
24.28.11	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	3059249
24.28.12	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	3915839

24.28.13	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	4894799
24.28.14	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt) Level 4	Each	6118499
24.28.15	63 KVA (losses at 50% loading < 340watt, losses at 100% loading < 1140watt)	Each	177314
24.28.16	100 KVA (losses at 50% loading < 475watt, losses at 100% loading < 1650watt)	Each	281451
24.28.17	160 KVA (losses at 50% loading < 670watt, losses at 100% loading < 1950watt)	Each	450321
24.28.18	200 KVA (losses at 50% loading < 780watt, losses at 100% loading < 2300watt)	Each	562902
24.28.19	250 KVA (losses at 50% loading < 980watt, losses at 100% loading < 2930watt)	Each	703627
24.28.20	315 KVA (losses at 50% loading < 1025watt, losses at 100% loading < 3100watt)	Each	886570
24.28.21	400 KVA (losses at 50% loading < 1225watt, losses at 100% loading < 3450watt)	Each	1125804
24.28.22	500 KVA (losses at 50% loading < 1510watt, losses at 100% loading < 4300watt)	Each	1407255
24.28.23	630 KVA (losses at 50% loading < 1860watt, losses at 100% loading < 5300watt)	Each	1773141
24.28.24	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	2814509
24.28.25	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	3518137
24.28.26	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	4503215
24.28.27	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	5629019
24.28.28	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt) Level 5	Each	7036273
24.28.29	63 KVA (losses at 50% loading < 300watt, losses at 100% loading < 1050watt)	Each	200442
24.28.30	100 KVA (losses at 50% loading < 435watt, losses at 100% loading < 1500watt)	Each	318162
24.28.31	160 KVA (losses at 50% loading < 570watt, losses at 100% loading < 1700watt)	Each	509059
24.28.32	200 KVA (losses at 50% loading < 670watt, losses at 100% loading < 2100watt)	Each	636324
24.28.33	250 KVA (losses at 50% loading < 920watt, losses at 100% loading < 2700watt)	Each	795405
24.28.34	315 KVA (losses at 50% loading < 955watt, losses at 100% loading < 2750watt)	Each	1002210
24.28.35	400 KVA (losses at 50% loading < 1150watt, losses	Each	1272648

	at 100% loading < 3330watt)		
24.28.36	500 KVA (losses at 50% loading < 1430watt, losses at 100% loading < 4100watt)	Each	1590810
24.28.37	630 KVA (losses at 50% loading < 1745watt, losses at 100% loading < 4850watt)	Each	2004420
24.28.38	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	3181619
24.28.39	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	3977024
24.28.40	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	5090591
24.28.41	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	6363239
24.28.42	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt)	Each	7954048



## CHAPTER 25

### AUTOMATIC POWER FACTOR CORRECTION (APFC) PANEL

Item No.	Description	Unit	Rate
25.1	<p><b>Automatic Power Factor Correction (APFC) System</b></p> <p>Supply, Installation, testing and commissioning of Automatic Power Factor Correction (APFC) panel, indoor type floor mounted free standing totally enclosed, extendable, IP 42, of following capacity for 3 phase, 415 V + 10 %, 50 Hz AC System for Ambient temperature -5°C to +40°C, fabricated in compartmentalised designed made of CRCA sheet steel of 2.0mm thick for framework &amp; covers, 3 mm thick for gland plate i/c cleaning &amp; finishing complete with 9 tank process for powder coated of approved shade ( RAL 7032-Siemens Gray or as approved by Engineer-in-Charge), having front section (switch gear and control accessories) and rear section capacitor and reactor, front and rear access, having suitable current carrying capacity, extensible TPN Aluminium alloy bus bar of high conductivity, DMC/SMC bus bar supports, bottom base channel of MS Section, fabrication shall be done in transportable section, entire panel shall have common copper earth bar of minimum size of 25mm x 5mm with 2 nos. earth studs, the earth terminals provided on the body of capacitor bank shall also be bonded to the main capacitor panel earth bus with 2 nos. 8 SWG or 6 SWG GI earth wires/ equivalent size of copper conductor cable, forced ventilation for maintaining temperature rise not more than 5°C from ambient, interconnections, connections with 14% detuned reactor and heavy duty 525 V ISI marked Impregnated MPP(Metalized Polypropylene) Capacitor (IS 13340 Part -1 &amp; 2) APFC Panel shall be in compliance with IS :16636 &amp; CPWD Specifications etc. as per below details.</p> <p>(A) Incomers</p> <p>Suitable capacity MCCB Microprocessor base with O/C, S/C, E/L release of TPN 50KA breaking capacity (Ics=Icu), ON, OFF, Trip, R, Y, B - LED Indicating Lamp set along with required Instruments and accessories with extended rotary handle and door interlocking arrangement. Current rating of the</p>		

Incomer in ampere shall be APFC Panel rating in KVAR x 1.4 x 1.5 or Nearest higher standards rating.

(B) Instruments & Indications

i) 3-Phase current sensing APFC microprocessor relay/controller , advance 8/12 stages (8 stages for capacity below 100 KVAR and 12 stages 100 KVAR & above) with Communication Ethernet/RS485/SNMP port open protocol for BMS integration as per approved by Engineering in charge and having display of Phase wise V, A, PF, Cos-Phi, Kw, KVA, KVAR, THD-V , THD-I, harmonics up to 31 level. 3 nos of dual core CT's accuracy class 1, 15VA at incomer of PCC Panel for APFC relay.

ii) Auto Manual Selector switch, auxiliary contactors with timer for delay in manual mode.

iii) Digital Multi function meter with LED Display for V, A, PF, KW, KVA, KVAR, THD-V & I, Frequency.

iv) Suitable rating control transformer shall be provided for control and indication circuit.

v) All components like control transformer, meter, relay and indicating lamp shall be protected by using suitable rating individual MCB's.

vi) Wiring of the control circuit shall be done by using 2.5 sq mm, FRLS/HFFR 1100 V grade, PVC insulated multi stranded copper control wire.

(C) Bus Bars 1.3 Amp per Sq.mm, TPN, Electrolytic grade Aluminium bus bar of capacity 1.25 times of incomer rating as per CPWD specification.

(D) Outgoings (APFC Section) Selection of the capacitors combinations shall be for continuous rating and each capacitor bank shall have suitable capacity Heavy Duty ISI Marked Capacitor, capacitor duty contactor, the capacitor shall be mounted on channel with base of perforated M S Powder coated sheet, connections inter connections etc. and other features as per CPWD Specifications and relevant IS Code having following:

(i) Capacitor bank ratings & stages shall be as per the technical specifications sheet of NIT.

(ii) Capacitor will be MPP self healing type with discharge resistor, pressure release mechanism.

(iii) Since Capacitor Voltage is 525 Volts, thus higher KVAR has to be considered to get rated output at 415 Volts.

(iv) 14% Detuned Reactor of class H insulation & 150% linearity in series with Capacitor. (Note: Technical specifications sheet for selection of the capacitors combinations shall be provided by the NIT Approving Authority with due consideration of number of capacitors i.e. 1 KVAR, 2 KVAR, 3 KVAR, 5 KVAR, 10 KVAR.....for smooth correction).

25.1.1	50 KVAR	Each	219906
25.1.2	75 KVAR	Each	271373
25.1.3	100 KVAR	Each	297575
25.1.4	125 KVAR	Each	320033
25.1.5	150 KVAR	Each	374776
25.1.6	175 KVAR	Each	402381
25.1.7	200 KVAR	Each	428583

## 25.2 **HYBRID Power Factor Correction System**

Supply, Installation, testing and commissioning of HYBRID APFC Panel, 3 phase 4 wire, 415 V, 50 Hz AC System for Ambient temperature -5°C to +40°C of following capacity with passive solution of 60% capacity and active solution of 40% capacity, 3Phase 4 wire Hybrid Power Factor Correction Solution (with arrangement for neutral current balance) to achieve >0.99 lag and TDDI/THDV values within IEEE recommended limits. APFC should be designed as per IS 16636 Or IEC 61921. The active section and passive section shall work in sync to give optimized output. The degree of protection of passive section should be IP 42, and of active section should be minimum IP 21. The switching device for APFC passive section should be through capacitor duty contactor and for the active compensation system shall be IGBT based with 3 level topology having 12 IGBT in inverter circuit. The active compensation system should filter harmonics from 2nd to 50th individual harmonic order and shall be selectable for the entire range. The active compensation system should have feature to improve PF correction and harmonic filtration having response time < 100 Micro second. The hybrid panel shall be indoor type floor mounted free standing totally enclosed, extensible, fabricated in compartmentalised designed made of CRCA sheet steel of 2.0mm thick for framework &



covers, 3 mm thick for gland plate i/c cleaning & finishing complete with 9 tank process for powder coated of approved shade ( RAL 7032-Siemens gray or as approved by Engineer-in-Charge), having front section (switch gear and control accessories) and rear section (capacitor and reactor), front and rear access, having suitable current carrying capacity, extensible TPN Aluminium alloy bus bar of high conductivity, DMC/SMC bus bar supports, bottom base channel of MS Section, fabrication shall be done in transportable section, entire panel shall have common copper earth bar of minimum size of 25mm x 5mm with 2 nos. earth studs, the earth terminals provided on the body of capacitor bank shall also be bonded to the main capacitor panel earth bus with 2 nos. 8 SWG or 6 SWG GI earth wires/ equivalent size of copper conductor cable, forced ventilation for maintaining temperature rise not more than 5°C from ambient, interconnections, connections with 14% detuned reactor and heavy duty 525 V ISI marked Impregnated MPP(Metalized Polypropylene) Capacitor (IS 13340 Part -1 & 2) APFC Panel shall be in compliance with IS :16636 & CPWD Specifications etc. as per below details.

#### (A) Incomers

Suitable capacity MCCB/ACB (Upto 300 KVAR, MCCB and above 300 KVAR, ACB ) Microprocessor base with O/C, S/C, E/L release of TPN 50KA breaking capacity ( $I_{cs}=I_{cu}$ ), ON, OFF, Trip, R, Y, B - LED Indicating Lamp set alongwith required Instruments and accessories with extended rotary handel and door interlocking arrangement. Current rating of the Incomer in ampere shall be APFC Panel rating in KVAR x 1.4 x 1.5 or Nearest higher standards rating.

#### (B) Instruments & Indications

##### a) For Passive Section :

i) 3-Phase current sensing APFC microprocessor relay/controller , advance 12/16 stages (12 stages for over all capacity of panel (active + passive) below 500 KVAR and 16 stages 500 KVAR & above) and having display of Phase wise V, A, PF, Cos-Phi, KW, KVA, KVAR, THD-V , THD-I, harmonics up to 31 level.

ii) Auto Manual Selector switch, auxiliary contactors with timer for delay in manual mode.

iii) Digital Multi function meter with LED Display for V,

A, PF, KW, KVA, KVAR, THD-V & I, Frequency.

iv) Suitable rating control transformer shall be provided for control and indication circuit.

v) All components like control transformer, meter, relay and indicating lamp shall be protected by using suitable rating individual MCB's.

vi) Wiring of the control circuit shall be done by using 2.5 sq mm, FRLS/HFFR 1100 V grade, PVC insulated multi stranded copper control wire.

vii) Communication Ethernet/RS485/SNMP port open protocol for BMS integration as per approved by Engineering in charge.

b) For Active Section : Dedicated HMI (Human Machine Interface) (Minimum 7 inch display) for controlling and communication and having display of Phase wise V, A, PF, Cos-Phi, KW, KVA, KVAR, THD-V , THD-I, harmonics up to 50th level. Communication Ethernet/RS485/SNMP port open protocol for BMS integration as per approved by Engineering in charge.

25.2.1	250KVAR	Each	1365289
25.2.2	300KVAR	Each	1624497
25.2.3	350 KVAR	Each	1818202
25.2.4	400 KVAR	Each	2183152
25.2.5	450 KVAR	Each	2350655
25.2.6	500KVAR	Each	2662267
25.2.7	550 KVAR	Each	2853164
25.2.8	600 KVAR	Each	3132023
25.2.9	650KVAR	Each	3314499
25.2.10	700KVAR	Each	3566221
25.2.11	750KVAR	Each	3876897
25.2.12	800KVAR	Each	4067794
25.2.13	850KVAR	Each	4214710
25.2.14	900KVAR	Each	4482340
25.2.15	950KVAR	Each	4741548
25.2.16	1000KVAR	Each	4992335



## CHAPTER 26

### UNINTERRUPTED POWER SUPPLY (UPS)

Item No.	Description	Unit	Rate
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26.1	Online UPS - Input supply: Single Phase, Output Supply: Single Phase.		
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Supplying, installation, Testing & Commissioning of following capacity at full load (Unity Power Factor) ON LINE Uninterrupted Power Supply (UPS) system suitable for Single Phase input, Single Phase output AC Supply. The UPS shall include a Rectifier, inverter, battery bank suitable for 30 minutes back up (Battery VAH capacity shall not be less than 1600 VAH per KVA of UPS rating per Hour backup time) on full load (Battery shall be VRLA, SMF in ABS Container) and Static Bypass switch along with provision for manual bypass, suitable isolation transformer for additional protection against neutral faults etc. The UPS systems shall be Microprocessor based Digital Control, using Insulated Gate Bipolar Transistor (IGBT)'s both for the rectifier & inverter with PWM (Pulse Width Modulation) Technology. The quality of design, manufacturing and inspection process should confirm to the relevant Inter-national standards such as IEC/EN/VDE. The operating efficiency of the UPS systems shall be  $\geq 95\%$  at 100% non-linear loads. Current total harmonic distortion (THD)/ total demand distortion (TDD) on the input grid shall be  $\leq 5\%$  at 100 %load. (The required LC filters shall be included in UPS cost), extreme power factor kit to be include to limit the input pf to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1 ) however UPS shall be suitable to take load at 0.7 lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC single phase 160-270V 50 Hz and delivering output AC supply true sine wave single phase 220/230/240 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120% for 10 mins and 150% for 1 minute. Operating temperature 0 to 40 °C, Relative humidity 0-95% non condensing, noise level less than 60db at 1 meter distance, Protection for Under voltage, over voltage, abnormal output voltage, battery over charging, output over current, short

circuit, battery deep discharge , 10 KV surge. Display for watt/VA,Amp and Voltage power parameters etc. UPS shall comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and Frequency Independent (VFI) type UPS (as per standard IEC 62040-1, 2 & 3) . The UPS should be with IGBT Based Inverter Technology, Communication RS232/ RS485/ SNMP port open protocol for BMS integration as per approved by Engineering in charge. Required battery racks, DC breaker of suitable rating and interconnecting copper conductor cable of suitable size and connectors and all required accessories are inclusive in the cost. The UPS should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc

26.1.1	2KVA	Each	45894
26.1.2	3KVA	Each	55233
26.1.3	6KVA	Each	109793
26.1.4	10KVA	Each	168506

26.2 Online UPS- Input supply: Three Phase, Output supply: Three Phase.

Supplying, installation, Testing & Commissioning of following capacity at full load (Unity Power Factor) at operating temperature 0 to 40 °C, Relative humidity 0 to 95%, Online double conversion true sine wave Uninterrupted hot swappable (allow for the replacement or addition of battery modules without shutting down the entire system) modular Power Supply (UPS) system with N+1 modules (N denotes total number of modules required for rated capacity). The UPS shall include a Rectifier, inverter, battery bank suitable for 30 minutes back up (Battery VAH capacity shall not be less than 1600 VAH per KVA of UPS rating per Hour backup time) on full load (Battery shall be VRLA, SMF in ABS Container) and Static Bypass switch along with provision for manual bypass, suitable isolation transformer for additional protection against neutral faults etc. UPS shall have inbuilt phase sequence correction. The UPS systems offered are to be of the latest technology with Digital Control Microprocessor based for

reliable operation using Insulated Gate Bipolar Transistor (IGBT)'s both for the rectifier & inverter (3 Level) with PWM (Pulse Width Modulation). The quality of design, manufacturing and inspection process should confirm to the relevant Inter-national standards such as IEC/EN/VDE. The operating efficiency of the UPS systems shall be  $\geq 96\%$  while operating on battery mode and delivering quality power to the 100% non-linear loads. Current total harmonic effect (ITHD) on the input grid shall be  $< 5\%$  at 50 %load. (The required LC ( inductor (L) and a capacitor (C)) filters shall be included in UPS cost), extreme power factor kit to be included to limit the input power factor (PF) to 0.99 and output power factor shall be unity (i.e. kw rating of the UPS shall be kva rating x 1 ), however UPS shall be suitable to take load at 0.7 lagging to 0.7 leading power factor loads. UPS shall be suitable for incoming supply AC : 3Phase 400V +/-20%, 50 Hz +/-5 Hz, AC Output voltage: 3Phase 415 Volt, 50 Hz +/- 0.2Hz, Overload capacity of 120% for 10 mins, Sine wave output. Non condensing, noise level less than 60db at 1 meter distance, protections: Input Under voltage over voltage, abnormal out voltage, battery over charging, output over current, short circuit protection, battery deep discharge protection, 10KV surge. UPS must comply with low voltage electromagnetic compatibility (EMC) achieved as per EN 6204, EN6204 Part I and Part 2, it shall be a Voltage and Frequency Independent (VFI)-type UPS. . Communication RS232/RS485/SNMP port open protocol for BMS integration, all hardware & software for IoT Communication as per approved by Engineering in charge. Required battery racks and interconnecting copper conductor cables of suitable size and connectors and all required accessories are inclusive of the cost). This system must provide a means for logging and alarming of all monitored points plus email notification. Forced air-cooling with integral inbuilt fans with redundancy (if one fan fail UPS should be able to handle at least 80% of the load, Noise Level 65 DB at 1 meter distance. The system shall be in compliance IEC 62040- 1,2 & 3, IS: 16242 and CPWD Specification. Display Panel (minimum) (In-build 5 inch or more LC Display / LED) to display : a) Input: Voltage, current, Frequency. b) Bypass: Voltage, Frequency. c) Output: Voltage, frequency, Current. d) Battery:

Voltage, Capacity. e) Load: KVA, KW, Percentage. f) Temperature: STS, Inverter, PFC. g) Event Logging & Statistical Data (On LCD/LED): UPS should capture and display up to 3000 events like: Over temperature / DC Bus Fail / Fan Fail / Fuse Fail / Overload / Short-circuit / Device Fail / Inverter Fail / Rectifier Fail / Bypass Fail, etc. h) Statistical Data: No. of power failures / Transfers to Bypass / Total Running time, etc. i) Mains Mode of Operation / Battery Mode of Operation / Bypass feeding the load / UPS Fault / Battery charging and discharging, overload, battery voltage and battery capacity. j) Audible Alarms : Mains Failure, Battery Low Alarm, UPS Overload, Fault, Shutdown, Input Over, Under Voltage, Output Over, Under Voltage, Battery Over, Under Voltage, Over Load and short circuit, Over Temperature. The UPS should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location etc

26.2.1	10KVA (Each Power module shall be $\leq$ 10 KVA)	Each	208893
26.2.2	20KVA (Each Power module shall be $\leq$ 10 KVA)	Each	341772
26.2.3	30KVA (Each Power module shall be $\leq$ 10 KVA)	Each	505748
26.2.4	40KVA (Each Power module shall be $\leq$ 10 KVA)	Each	599469
26.2.5	60KVA (Each Power module shall be $\leq$ 10 KVA)	Each	913600
26.2.6	80KVA (Each Power module shall be $\leq$ 25 KVA)	Each	1124076
26.2.7	100KVA (Each Power module shall be $\leq$ 25 KVA)	Each	1276967
26.2.8	120KVA (Each Power module shall be $\leq$ 25 KVA)	Each	1464409
26.2.9	160KVA (Each Power module shall be $\leq$ 25 KVA)	Each	1958639
26.2.10	200KVA (Each Power module shall be $\leq$ 50 KVA)	Each	2375417
26.2.11	300KVA (Each Power module shall be $\leq$ 50 KVA)	Each	3963347
26.2.12	400KVA (Each Power module shall be $\leq$ 50 KVA)	Each	5130901
26.2.13	500KVA (Each Power module shall be $\leq$ 50 KVA)	Each	6183283

## CHAPTER 27

### WET RISER & SPRINKLER SYSTEM

Item No.	Description	Unit	Rate
27.1	<p>(a) Supplying, installation, testing and commissioning of Electric driven Main Fire Pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required :</p> <p>(b) Horizontal type, multistage, centrifugal, split casing pump of cast iron body &amp; bronze impeller with stainless steel shaft, mechanical seal as required.</p> <p>(c) Suitable HP Squirrel cage induction motor, TEFC, synchronous speed 1500 RPM, suitable for operation on 415 volts, 3 phase 50 Hz, AC supply with IP 55 protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-12615: 2018.</p> <p>(d) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required.</p> <p>(e) Suitable cement concrete foundation duly plastered with anti vibration pads.</p>		
27.1.1	2850 lpm at 88 m Head	Each	475390.00
27.1.2	2850 lpm at 70 m Head	Each	425556.00
27.1.3	2850 lpm at 56 m Head	Each	424172.00
27.1.4	2280 lpm at 88 m Head	Each	424172.00
27.1.5	2280 lpm at 70 m Head	Each	388181.00
27.1.6	2280 lpm at 56 m Head	Each	349421.00
27.1.7	1620 lpm at 88 m Head	Each	388181.00
27.1.8	1620 lpm at 70 m Head	Each	349421.00
27.1.9	1620 lpm at 56 m Head	Each	299587.00

Note: \*The head of the pump is selected in a manner so as to give a minimum 3.5kgf/cm<sup>2</sup> pressure at the highest/farthest point.

- 27.2 (a) Supplying, installation, testing and commissioning of diesel engine driven main fire pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required : (Diesel Driven Pump)
- (b) Horizontal type, multistage, centrifugal pump of cast of iron body and bronze impeller with stainless steel shaft, mechanical seal as required.



(c) Suitable HP, 1500 RPM water cooled with radiator, diesel engine conforming to relevant IS standard complete with auto starting mechanism, 12 /24 volts electric starting equipment, diesel tank, exhaust pipe extended upto 10 m outside pump house duly insulated with 50 mm thick glass wool with 1.0 mm thick aluminium sheet cladding, residential silencer, instruments and protection as per standard specification, stop solenoid for auto stop in the event of fault with audio indications, painted with post office red colour etc. as required.

(d) M.S fabricated, common base plate, coupling, coupling guard, foundation bolts etc. as required.

(e) Suitable cement concrete foundation duly plastered and with anti vibration pads.

27.2.1	2850 lpm at 88 m Head	Each	718247.00
27.2.2	2850 lpm at 70 m Head	Each	647234.00
27.2.3	2850 lpm at 56 m Head	Each	643496.00
27.2.4	2280 lpm at 88 m Head	Each	667029.00
27.2.5	2280 lpm at 70 m Head	Each	642112.00
27.2.6	2280 lpm at 56 m Head	Each	639343.00
27.2.7	1620 lpm at 88 m Head	Each	660246.00
27.2.8	1620 lpm at 70 m Head	Each	621348.00
27.2.9	1620 lpm at 56 m Head	Each	538291.00

Note: \* The head of the pump is selected in a manner so as to give a minimum 3.5kgf/cm<sup>2</sup> pressure at the highest/farthest point.

- 27.3 (a) Supplying, installation, testing and commissioning of electric driven pressurisation pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required : (Jockey Pump)
- (b) Horizontal type, multistage, centrifugal pump of cast iron body and bronze impeller with stainless steel shaft, mechanical seal as required.
- (c) Suitable HP squirrel cage induction motor TEFC type suitable for operation on 415 volts, 3 phase 50 Hz AC supply with IP 55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-12615: 2018.

(d) M.S. fabricated Common base plate, coupling, coupling guard, foundation bolts etc. as required.

(e) Suitable cement concrete foundation duly plastered and with anti vibration pads.

27.3.1	180 lpm at 88 m Head	Each	134171.00
27.3.2	180 lpm at 70 m Head	Each	109254.00
27.3.3	180 lpm at 56 m Head	Each	87105.00
27.3.4	300 lpm at 88 m Head	Each	175699.00
27.3.5	300 lpm at 70 m Head	Each	134448.00
27.3.6	300 lpm at 56 m Head	Each	121712.00

27.4 (a) Supplying, installation, testing and commissioning of electric driven terrace pump conforming to IS 12469: 2019 suitable for automatic operation and consisting of following, complete in all respects, as required: (Terrace Pump)

(b) Horizontal type, multistage, centrifugal, split casing pump of cast iron body & bronze impeller with stainless steel shaft, mechanical seal as required.

(c) Suitable HP squirell cage induction motor TEFC type suitable for operation on 415 volts, 3 phase, 50 Hz, AC supply with IP55 class of protection for enclosure, horizontal foot mounted type with Class-'F' insulation, conforming to IS-12615: 2018.

(d) M.S.fabricated common base plate, coupling, coupling guard, foundation bolts etc.as required.

(e) Suitable cement concrete foundation duly plastered and with anti vibration pads.

27.4.1	900 lpm at 35 m Head	Each	107744.00
27.4.2	450 lpm at 35 m Head	Each	91384.00

#### CONTROL PANELS

27.5 Fabrication, supplying, Installation testing & commissioning of Electrical control panel of cubical construction, floor mounted type, fabricated out of 2mm thick CRCA sheet, compartmentalised with hinged lockable doors, dust and vermin proof, powder coated of approved shade after 7 tank treatment process, cable alley, inter-connection with suitable size copper conductor cable/solid copper strip, having switchgears and accessories, mountings and internal wiring, earth terminals, numbering etc. complete in all respect, suitable for

main fire pump, pressurisation pump & diesel pump set complete as per CPWD specification with following in coming and Outgoings, suitable for operation on 415V, 3 phase, 50Hz Ac Supply with enclosure protection class IP 42 as required :

#### 27.5.1 INCOMING

250A, 50kA 4 Pole MCCB, Ics=100% Icu rating

Digital Voltmeter 0-500V with selector switch

Digital Ammeter (0-250 A) with selector switch & CTs etc.

LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps

Set of Copper Bus Bar 300A

#### OUTGOING

( Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)

##### Main Fire Pump

125 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 60 HP pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.

##### Jockey Pump

63 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.

##### Diesel Engine Control

Control for diesel engine comprising -

Automatic/Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode

Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication

Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter

	All standard relays and accessories for automatic operation of diesel engine		
	System Controller		
	Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification	Each	256783.00
27.5.2	Incomings		
	400A, 50kA 4 Pole MCCB, Ics=100% Icu rating		
	Digital Voltmeter 0-500V with selector switch		
	Ammeter (0-400 A) with selector switch & CTs etc.		
	LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps		
	Set of Copper Bus Bar 500A		
	Outgoings		
	(Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)		
	Main Fire Pump		
	200 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 75 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.		
	Jockey Pump		
	100 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.		
	Diesel Engine Control		
	Control for diesel engine comprising -		
	Automatic/Manual selector switch & 3 attempt starting device, timers and relays as required, push buttons, start/stop in manual mode		
	Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication		

Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter

All standard relays and accessories for automatic operation of diesel engine

System Controller

Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specifications.

Each 300803.00

### 27.5.3 Incomings

630A, 50kA 4 Pole MCCB, Ics=100% Icu rating

Digital Voltmeter 0-500V with selector switch

Ammeter (0-630 A) with selector switch & CTs etc.

LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps

Set of Copper Bus Bar 800Amps

Outgoings

( Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)

Main Fire Pump

250 A, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 100 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.

Jockey Pump

125 A, 50kA TPN MCCB, Ics=100% Icu, with Suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation.

Diesel Engine Control

Control for diesel engine comprising -

Automatic/Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode

Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication

Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter

All standard relays and accessories for automatic operation of diesel engine

System Controller

Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification

Each 337486.00

#### 27.5.4

Incomings

400A, 50kA 4 Pole MCCB, Ics=100% Icu Rating

Digital Voltmeter 0-500V with selector switch

Ammeter (0-400 A) with selector switch & CTs etc.

LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps

Set of Copper Bus Bar 500Amps

Outgoings

(Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)

Main Fire Pumps

125 Amp, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 60 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation. - 2 sets

Jockey Pump

63 Amp, 50kA TPN MCCB, Ics=100% Icu, with Suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF

operation. - 2 sets

Diesel Engine Control

Control for diesel engine comprising -

Automatic/Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode

Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication

Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter

All standard relays and accessories for automatic operation of diesel engine

System Controller

Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification

Each 388843.00

#### 27.5.5 Incomings

630A, 50kA 4 Pole MCCB, Ics=100% Icu Rating

Digital Voltmeter 0-500V with selector switch

Ammeter (0-630 A) with selector switch & CTs etc.

LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps

Set of Copper Bus Bar 800Amps

Outgoings

(Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)

Main Fire Pump

200 Amp, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 75 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation. - 2 sets

Jockey Pump

100 Amp, 50kA TPN MCCB, Ics=100% Icu, with Suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single

phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation. - 2 sets

Diesel Engine Control

Control for diesel engine comprising -

Automatic/Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode

Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication

Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter

All standard relays and accessories for automatic operation of diesel engine

System Controller

Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specification

Each 469546.00

#### 27.5.6

Incomings

800A, 50kA 4 Pole MCCB, Ics=100% Icu Rating

Digital Voltmeter 0-500V with selector switch

Ammeter (0-800 A) with selector switch & CTs etc.

LED type RYB phase indicating lamps, ON, OFF, trip indicating lamps

Set of Copper Bus Bar 1000Amps

Outgoings

(Note : All outgoing feeders for pumps should have digital Ammeter with selector switches, and LED type ON, OFF, trip indicating lamps)

Main Fire Pump

250 Amp, 50kA TPN MCCB, Ics=100% Icu, with fully automatic Star/Delta starter suitable for 100 hp pump with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation. - 2 sets



### Jockey Pump

125 Amp, 50kA TPN MCCB, Ics=100% Icu, with Suitable HP fully automatic Star/Delta starter with overload protection, current sensing type single phase preventor complete with all accessories and internal wiring required for automatic operation, selector switch for local/remote, auto/manual/OFF operation. - 2 sets

### Diesel Engine Control

Control for diesel engine comprising -

Automatic/Manual selector switch & 3 attempts starting device, timers and relays as required, push buttons, start/stop in manual mode

Indicating lamp for high/ Low Lub. Oil pressure, High Water Temp and Engine on indication

Battery charger suitable for 12V/24 V DC with boost and trickle selector switch, 0-30 V DC volt meter, and 0-20 A DC Ammeter

Each 601606

### PIPES & ACCESSORIES

27.6 Providing laying, testing & commissioning of 'C' class heavy duty MS Pipe conforming to IS 1239/Class -II of IS: 3589 i/c fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. in ground including welding, excavation & providing cement concrete blocks as supports, anticorrosive treatment with coaltar/asphalt tape as per IS 10221, refilling the trench etc. of following sizes complete as required.

27.6.1	200 mm. dia (wall thickness = 6.3 mm)	Meter	7251.00
27.6.2	150 mm. Dia	Meter	5104.00

27.7 Providing, laying, testing & commissioning of 'C' class heavy duty MS pipe conforming to IS 1239/Class -II of IS: 3589 including Welding, fittings like elbows, tees, flanges, tapers, nuts bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :

27.7.1	25 mm dia	Meter	920.00
27.7.2	32 mm dia	Meter	1039.00
27.7.3	40 mm dia	Meter	1259.00
27.7.4	50 mm dia	Meter	1557.00
27.7.5	65 mm dia	Meter	1955.00
27.7.6	80 mm dia	Meter	2277.00

27.7.7	100 mm dia	Meter	3077.00
27.7.8	150 mm dia	Meter	4299.00
27.7.9	200 mm dia (wall thickness 6.3 mm)	Meter	6620.00
27.7.10	250 mm dia (wall thickness 6.3 mm)	Meter	8023.00
27.7.11	300 mm dia (wall thickness 7 mm)	Meter	9556.00
27.8	Providing, laying, testing & commissioning of 'B' class medium duty G.I. pipe conforming to IS 1239 including welding, fittings like elbows, tees, flanges, tapers, nuts, bolts, gaskets etc. and fixing the pipe on the wall/ceiling with suitable clamp/support frame and painting with two or more coats of synthetic enamel paint of required shade complete as required :		
27.8.1	25 mm	Meter	711.00
27.8.2	32 mm	Meter	785.00
27.8.3	40 mm	Meter	966.00
27.8.4	50 mm	Meter	1066.00
27.8.5	65 mm	Meter	1330.00
27.8.6	80 mm	Meter	1514.00
27.8.7	100 mm	Meter	1925.00
27.8.8	150 mm	Meter	2633.00
27.9	Supplying and fixing single headed internal hydrant valve with instantaneous Gunmetal/Stainless Steel coupling of 63 mm dia with cast iron wheel ISI marked conforming to IS 5290 (Type -A) with blank Gunmetal/Stainless Steel cap and chain as required :		
27.9.1	Single headed Gunmetal	Each	8208.00
27.9.2	Single headed Stainless steel	Each	6632.00
27.10	Supplying and fixing Single headed external yard hydrant valve with 1 No. 63 mm dia instantaneous FM Gunmetal/Stainless Steel coupling and cast iron wheel, ISI marked, conforming to IS 5290 (type A) with blank Gunmetal/Stainless Steel cap and chain as required :		
27.10.1	Single headed Gunmetal	Each	8208.00
27.10.2	Single headed Stainless steel	Each	6632.00

27.11	Supplying, fixing, testing and commissioning of butterfly valve of PN 1.6 rating with bronze/gunmetal seat duly ISI marked complete with nuts, bolts, washers, gaskets conforming to IS 13095 of following sizes as required :		
27.11.1	40 mm dia	Each	3870.00
27.11.2	50mm dia	Each	4114.00
27.11.3	65 mm dia	Each	4712.00
27.11.4	80 mm dia	Each	5406.00
27.11.5	100 mm dia	Each	7271.00
27.11.6	150 mm dia	Each	9737.00
27.11.7	200 mm dia	Each	16248.00
27.11.8	250 mm dia	Each	21721.00
27.11.9	300 mm dia	Each	26141.00
27.12	Supplying, fixing, testing & commissioning of double flanged sluice valve of rating PN 1.6 with non rising spindle, bronze/gun metal seat, ISI marked complete with nuts, bolts, washers, gaskets and conforming to IS 780 of following sizes as required :		
27.12.1	40mm dia	Each	6073.00
27.12.2	50 mm dia	Each	7639.00
27.12.3	65mm dia	Each	9797.00
27.12.4	80mm dia	Each	11314.00
27.12.5	100mm dia	Each	15483.00
27.12.6	150mm dia	Each	23968.00
27.12.7	200mm dia	Each	41386.00
27.12.8	250mm dia	Each	48894.00
27.12.9	300mm dia	Each	68961.00
27.13	Supplying and fixing orifice plate made out of 6 mm thick stainless steel (Grade 304) with orifice of required size to be fitted between flange & landing valve of external and internal hydrants to reduce pressure at the outlet to the level of 3.5 kg/cm <sup>2</sup> complete as required.	Each	1436.00
27.14	Providing, installation, testing and commissioning of non-return valve of following sizes confirming to IS: 5312 complete with rubber gasket, GI bolts, nuts, washers etc.as required :		
27.14.1	40mm dia	Each	6257.00
27.14.2	50mm dia	Each	6257.00
27.14.3	65mm dia	Each	6913.00

27.14.4	80mm dia	Each	8255.00
27.14.5	100mm dia	Each	11853.00
27.14.6	125mm dia	Each	16929.00
27.14.7	150mm dia	Each	18884.00
27.14.8	200mm dia	Each	30896.00
27.14.9	250mm dia	Each	47622.00
27.14.10	300mm dia	Each	63466.00
27.15	Providing, installation, testing and commissioning of stainless steel Y-strainer fabricated out of 1.6 mm thick stainless steel, Grade 304, sheet with 3 mm dia holes with stainless steel flange.		
27.15.1	80 mm dia	Each	5117.00
27.15.2	100mm dia	Each	7270.00
27.15.3	150mm dia	Each	11682.00
27.15.4	200mm dia	Each	23571.00
27.15.5	250mm dia	Each	28985.00
27.15.6	300mm dia	Each	38558.00
27.16	Supplying and fixing 63 mm dia, 15 m long RRL hose pipe with 63 mm dia male and female couplings duly bound with GI wire, rivets etc. conforming to IS 636 (type-A) as required :		
27.16.1	Gun Metal	Each	5455.00
27.16.2	Stainless Steel (Grade 304)	Each	4667.00
27.17	Supplying and fixing first-aid Hose Reel with MS construction spray painted in post office red, conforming to IS 884 complete with the following as required. (a) 20 mm nominal internal dia water hose thermoplastic (Textile reinforced) type -2 as per IS: 12585 (b) 20 mm nominal internal dia gun metal globe valve & nozzle. (c) Drum and brackets for fixing the equipments on wall. (d) Connections from riser with 25 mm dia stop gun metal valve & M.S. Pipe and socket.		
27.17.1	30 m	Each	9440.00
27.17.2	40 m	Each	17034.00

27.18	Supplying & fixing 63 mm dia gun metal short branch pipe with 20 mm nominal internal diameter size nozzle conforming to IS 903 suitable for instantaneous connection to interconnect hose pipe coupling as required:		
27.18.1	Gun metal	Each	4977.00
27.18.2	Stainless Steel (Grade 304)	Each	3402.00
27.19	Supplying and fixing of fire brigade connection of cast iron body with gun metal male instantaneous inlet couplings complete with cap and chain as reqd. for suitable dia MS pipe connection conforming to IS 904 as required:		
27.19.1	2 way-100 mm dia M.S. Pipe	Each	7262.00
27.19.2	4 way - 150 mm dia M.S. Pipe	Each	14820.00
27.19.3	3 way - 150 mm dia M.S. Pipe	Each	10097.00
27.20	Supplying and fixing air vessel made of 250 mm dia, 8 mm thick MS sheet, 1200 mm in height with air release valve on top and flanged connection to riser, drain arrangement with 25 mm dia gun metal wheel valve with required accessories, pressure gauge and painting with synthetic enamel paint of approved shade as required.	Each	19402.00
27.21	Providing, fixing, testing & commissioning of 15mm dia quartzoid bulb type sprinklers of rating 68 °C with required accessories :		
27.21.1	Pendent Sprinkler	Each	599.00
27.21.2	Upright Sprinkler	Each	599.00
27.21.3	Horizontal side wall sprinkler	Each	699.00
27.21.4	Concealed sprinkler	Each	1553.00
27.22	Providing & fixing of pressure switch in M.S. pipe line including connection etc. as required.	Each	1670.00
27.23	Providing & fixing flow switch in following sizes M.S. pipe including connection etc as required.		
27.23.1	100mm dia	Each	8069.00

27.23.2	150mm dia	Each	9644.00
27.24	Providing, fixing, testing & commissioning of installation control valve of cast iron body, brass/bronze working parts comprising of water motor alarm, bronze seat clapper, clapper arm and hydraulically driven mechanical gong bell to sound continuous alarm when the wet riser/sprinkler system activates, pressure gauges, emergency releases, strainer, pressure switch, cock valve complete with drain valve and bypass, test control box, ball valves, MS pipe of required size, flanges, orifice plate, gasket etc of following sizes as required:		
27.24.1	80mm dia	Each	45052.00
27.24.2	100mm dia	Each	47460.00
27.24.3	150mm dia	Each	50805.00
27.25	Supplying, installation, testing & commissioning of sprinkler flexible pipe (UL Listed) of stainless steel complete with 15 NPT on reducer thread with maximum working pressure of 175 PSI test pressure of 875 PSI (Burst) with branch line (Inlet) 25mm NPT male thread to sprinkler head (Outlet) 15mm NPT female thread with reducer, nipple, 2 side brackets, center bracket, stockbar of following sizes complete as required.		
27.25.1	700mm	Each	1495.00
27.25.2	1000mm	Each	1703.00
27.25.3	1200mm	Each	1800.00
27.25.4	1500mm	Each	1969.00
27.26	Supplying, installation, testing & commissioning of deluge valve (to be used for water curtains) UL listed with wet pilot basic trim assembly for DVA with test and alarm, drip and drain valve with water motor gong complete as required.		
27.26.1	50 mm dia	Each	87237.00
27.26.2	80 mm dia	Each	87862.00
27.26.3	100mm dia	Each	98253.00
27.26.4	150mm dia	Each	121301.00

27.27	Providing, installation, testing & commissioning of water curtain nozzle 15mm dia nickel chrome plated brass, BSPT, K-factor as per design consideration complete as required.	Each	787.00
27.28	Providing, installation, testing & commissioning of electric release trim assembly for deluge wall with two way solenoid valve, weather proof operation on 24 volts DC supply complete as required.	Each	7755.00
27.29	Providing, installation, testing & commissioning of adjustable rosette plate for 15mm dia in white finish UL Listed or FM approved complete as required.	Each	264.00
Note:	For Cabling, earthing and cable trays please refer to DSR (E&M) For digging of hard & soft soil please refer to DSR (Civil)		

## CHAPTER 28

### FIRE DETECTION AND ALARM SYSTEM

Item No.	Description	Unit	Rate
28.1	<b>FIRE DETECTION AND ALARM SYSTEM (CONVENTIONAL)</b>		
28.1.1	Supplying, installation, testing & commissioning of heat detector operating at 54°C/57°C with rate of rise cum fixed temperature (dual thermistor) type with mounting base complete with all connection etc. as required.	Each	1136.00
28.1.2	Supplying, installation, testing & commissioning of smoke detector with builtin LED and mounting base complete with all connections etc. as required.	Each	1223.00
28.1.3	Supplying, installation, testing & commissioning of manual call boxes of MS construction in surface/recess with stainless steel chain & hammer assembly complete with glass and push button etc. as required.	Each	513.00
28.1.4	Supplying, installation, testing & commissioning of manual call box of ABS type in surface/recess with stainless steel chain & hammer assembly complete with glass and push button etc. as required.	Each	444.00
28.1.5	Supplying, installation, testing & commissioning response indicator on surface/recess MS box having two LEDs metallic cover complete with all connections etc. as required.	Each	222.00
28.1.6	Supplying, installation, testing & commissioning fire alarm sounder with facility to make announcement, mounted in M.S. box (16 SWG) with hinged cover plate & suitable for operation with amplifier i/c line matching transformer etc. complete as required.	Each	600.00
28.1.7	Supplying, installation, testing & commissioning fire alarm sounder with facility to make announcement, mounted in A.B.S. box with hinged cover plate & suitable for operation with amplifier i/c line matching transformer etc. complete as required.	Each	530.00
28.1.8	Supplying, installation, testing & commissioning talk back slave station in surface/recess suitable for operation on simplex mode complete with P.T.T. knob & speaker/microphone enclosed in a M.S.(16 SWG)/ ABS box with break glass in front etc. complete as required.	Each	963.00



28.1.9	Supplying, installation, testing & commissioning sector panel suitable for following zones, complete with visual indications for short circuit fault, open circuit fault, fire condition and all other standard facilities as per IS:2189 with mimic diagram for all area/zone covered, complete with all connections, interconnections as required.		
28.1.9.1	4 Zone	Each	9808.00
28.1.9.2	6 Zone	Each	13269.00
28.1.9.3	10 Zone	Each	17780.00
28.1.10	Supplying, installation, testing & commissioning of main control and indicating panel made out of 16 SWG MS sheet to accommodate the following items duly powder coated in approved colour with louvers for ventilation, locking arrangement, audio and visual indication for fire alarm and public address system, monitoring system including connections, interconnections etc complete as required. 10 Zone panel for fire alarm system 250 Watt amplifier racks suitable for operation on 230V AC/24V DC supply conforming to IEC-268-3 complete with all accessories as required - 2 Nos.(one to act as standby) Talk back master station with LED PTT (press to talk) push button for operation on 230V AC/24 V DC supply conforming to IEC-268 for simplex mode of operation/communication suitable for 20 Nos.talk back unit -1 set. Announcement control desk suitable for selection of different zones selectively and ON ALL CALL switch with visual indication etc. complete as required -1 set. Amplifier change over switch for inter changing amplifier -1 No. Monitor panel for loudspeaker complete with output selector, ON/OFF switch, fuse, visual indications etc. complete as required- 1 No. Gooseneck microphone with stand and ON/OFF switch- 1 No. Main ON/OFF switch, fuse indication lamps, DC and AC voltmeters & ammeters, terminal blocks etc. complete as required -1 set.  Battery charger trickle cum boost to take complete load of fire alarm & PA system complete with all accessories including providing & fixing of 2 nos.12 volt, 60 AH each sealed maintenance free batteries -1 set.	Each	10033.00

28.1.11 Supplying, installation, testing & commissioning of main control and indicating panel made out of 16 SWG MS sheet to accommodate the following items duly powder coated in approved colour with louvers for ventilation, locking arrangement, audio and visual indication for fire alarm and public address system, monitoring system including connections, interconnections etc complete as required.

6 zone panel for fire alarm system

100 watt amplifier racks suitable for operation on 230V AC/24V DC supply conforming to IEC-268-3 complete with all accessories as required- 2 Nos.(one to act as standby)

Talk back master station with LED PTT (press to talk) push button for operation on 230V AC/24 V DC supply conforming to IEC-268 for simplex mode of operation/communication suitable for 20 Nos.talk back unit -1 set.

Announcement control desk suitable for selection of different zones selectively and ON ALL CALL switch with visual indication etc., complete as required- 1 set.

Amplifier change over switch for inter changing amplifier- 1 No.

Monitor panel for loudspeaker complete output selector ON/OFF switch, fuse visual indications etc. complete as required- 1 No.

Gooseneck microphone with stand and ON/OFF switch -1 No.

Mains ON/OFF switch, fuse indication lamps, DC and AC voltmeters & ammeters terminal blocks etc. complete as required -1 set.

Battery charger trickle cum boost to take complete load of fire alarm & PA system complete with all accessories including providing & fixing of 2 nos. 12 volt, 30 AH each sealed maintenance free batteries -1 set.

Each 52258.00

## 28.2 INTELLIGENT FIRE ALARM SYSTEM

28.2.1 Supplying, installation, testing and commissioning of micro processor based intelligent addressable main fire alarm panel, central processing unit with the following loop modules and capable of supporting not less than 240 devices (including detectors) and minimum 120 detectors per loop and loop length up to 2 km, network communication card, minimum 320 character graphics/ LCD display with touch screen or other keypad and minimum 4000 events history log in the non volatile memory (EPROM), power supply unit (230  $\pm$  5 % V, 50 hz), 48 hrs back-up with 24 volt sealed maintenance free batteries with automatic charger.

The panel shall have facility to connect printer to printout log and facility to have seamless integration with analog/digital voice evacuation system (which is part of the schedule of work under SH: PA System) and shall be complete with all accessories . The panel shall be compatible for IBMS system with open protocol BACnet/ Modbus over IP complete as per specifications.

28.2.1.1	Ten Loop Panel.	Each	476893.00
28.2.1.2	Two Loop Panel.	Each	250420.00
28.2.2	Supplying, installation, testing & commissioning of central graphical fire alarm management system to centrally monitor and operate the fire alarm system complete as required.	Each	210264.00
28.2.3	Supplying, installation, testing & commissioning of repeater panel with 320 character/ Touch screen LCD display with inbuilt reset, acknowledge and silence switches complete as required.	Each	113734.00
28.2.4	Supplying, installation, testing & commissioning of intelligent analog addressable photothermal detector complete with mounting base complete as required.	Each	3004.00
28.2.5	Supplying, installation, testing & commissioning of response indicator on surface/recessed MS Box having two LED, metallic cover complete with all connections etc as required.	Each	306.00
28.2.6	Supplying, installation, testing & commissioning of intelligent addressable programmable sounder complete as required.	Each	2787.00
28.2.7	Supplying, installation, testing & commissioning of fault isolator complete with base as required.	Each	3434.00
28.2.8	Supplying, installation, testing & commissioning of intelligent aspiration detector for area coverage of minimum 5000 sq. ft. complete as required.	Each	309044.00
28.2.9	Supplying, installation, testing & commissioning of intelligent addressable thermal detector with rate of rise cum fixed temperature thermistor complete with base as required.	Each	2866.00
28.2.10	Supplying, installation, testing & commissioning of addressable fire control module complete as required.	Each	3156.00

28.2.11	Supplying, installation, testing & commissioning of addressable phone control module complete as required.	Each	3432.00
28.2.12	Supplying, installation, testing & commissioning of addressable beam detector with short circuit isolator (inbuilt or separate) complete with emitter and receiver including connections with remote test features etc complete as required.	Each	78525.00
28.2.13	Supplying, installation, testing & commissioning of intelligent addressable duct detector including suitable Photo detector complete with base as required.	Each	8183.00
28.2.14	Supplying, installation, testing & commissioning of addressable manual call point complete as required.	Each	4063.00
28.2.15	Supplying, installation, testing & commissioning of addressable horn cum strobe complete as required.	Each	3682.00
28.2.16	Supplying, installation, testing & commissioning of addressable strobe complete as required.	Each	3536.00
28.2.17	Supplying, installation, testing & commissioning of fire fighter telephone handset complete as required.	Each	6016.00
28.2.18	Supplying, installation, testing & commissioning of intelligent interface unit BACnet/ Modbus protocol i.e. supplying communication links between building management system and fire alarm control panel complete as required.	Each	196207.00
28.2.19	Supplying, installation, testing & commissioning of fire fighter phone jack complete as required.	Each	1689.00
28.3	<b>PUBLIC ADDRESS SYSTEM</b>		
28.3.1	Supplying, installation, testing & commissioning of 6 zone, voice alarm controller with USB, MP4 player (including 6 zone button paging station) with seamless integration facility with main fire alarm panel for voice evacuation complete as required.	Each	132115.00
28.3.2	Supplying, installation, testing & commissioning of 1.5/3/6W ceiling speaker complete as required.	Each	1025.00
28.3.3	Supplying, installation, testing & commissioning of 1.5/3/6W metal box ceiling/wall speakers complete as required.	Each	1891.00

28.3.4	Supplying, installation, testing & commissioning of ceiling/wall mounted loud speaker, 3/1.5 Watt in ABS enclosure complete as required.	Each	2555.00
28.3.5	Supplying, installation, testing & commissioning of 6 inches dia, 2 watts, 70/100 volts ceiling speaker complete as required.	Each	1939.00
28.3.6	Supplying, installation, testing & commissioning of digital audio amplifier 50 Watt, 25V rms operating at 240 volt AC supply complete as required.	Each	101150.00
28.3.7	Supplying, installation, testing & commissioning of digital audio amplifier 75 Watt, 25V rms operating at 240 Volt AC Supply complete as required.	Each	152368.00
28.3.8	Supplying, installation, testing & commissioning of exit point directional sound speaker with voice and integral audio amplifier with selectable sound pulse patterns complete as required.	Each	10618.00
28.3.9	Supplying, installation, testing & commissioning of Voice command keypad 6 zone, with microphone assembly complete as required.	Each	85450.00
28.4	ASPIRATION DETECTOR ACCESSORIES		
28.4.1	Supply, installation, testing and commissioning of 25 mm Outer dia CPVC PIPE with end caps including making air sampling opening of appropriate dia on appropriate interval and all accessories as required,(rate for area protected in sqm).	sq. m	65.00
28.5	CABLING & WIRING		
28.5.1	Supplying & laying of 2x1.5 sqmm fire survival armoured cable, 600/1000V rated with annealed copper conductor having glass mica fire barrier tape covered by an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath complete as required.	Meter	386.00
28.5.2	Supplying & laying of 2x1.5 sqmm fire alarm armoured cable, 600/1000V rated with annealed copper conductor having XLPE insulation, steel wire armouring & FRLS/HFFR outer sheath complete as required.	Meter	192.00
28.5.3	Supplying and drawing of cable Fire Retardant PVC insulated copper conductor cable in the existing surface / recessed steel conduit of following pairs, cores and size including connections and interconnections etc. as required.		

28.5.3.1	speaker cable Single pair, 2-core, 1.5 sqmm	Meter	61.00
28.5.3.2	speaker cable Two pair, 2-core, 1.5 sqmm	Meter	97.00
28.5.3.3	speaker cable Three pair, 2-core, 1.5 sqmm	Meter	134.00
28.5.3.4	speaker cable Four pair, 2-core, 1.5 sqmm	Meter	171.00
28.5.4	Supplying and fixing 25 mm dia MS flexible pipe with PVC coating along with all ancillaries and accessories like coupler etc. as required.	Meter	60.00
CONDUITING AND WIRING			
Please refer to CPWD Specification for internal electrical works			



## CHAPTER 29

### DIESEL GENERATOR SET

Item No.	Description	Unit	Rate
29.1	<p>Supplying, Installation, Testing &amp; Commissioning of 'Silent Type Diesel Generating set as per CPCB IV + or better norms along with having Prime Power Rating of KVA as below, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system &amp; for 0.85 Load Factor, including testing at factory and site with fuel, load for test and other necessary arrangements Complete as per CPWD specifications, should have QR code which should contain drawing, test report OEM manual, Geo- Tag of manufacturing location, rating plate as per relevant IS Code etc. and consisting of the followings:</p> <p>(A) Diesel Engine:</p> <p>Tourbocharged Diesel engine 4 stroke water cooled, multi cylinder, dynamically balanced fly wheel, electric start of suitable BHP at 1500 RPM suitable for above output of alternator at 40 °C, 50% RH &amp; at 1000 Meter MSL , capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine will be with Electronic governor, Dry type Air filter with service indicator, first filling of engine fuel (after commissioning) lubricating Oil, Coolant and other consumables complete with all the required accessories, the Electronic governor shall be as per ISO 8528. The engine shall comply to the latest CPCB norms (CPCB IV + or better) and Conforming to BS 5514, BS 649, IS 10000, IS 10002, IS 13018 and as per CPWD specifications.</p> <p>(B) Engine mounted Instrument Panel fitted with and having digital dis Plate for following:</p> <p>(i) Start-stop switch with key</p> <p>(ii) Water temperature indication</p> <p>(iii) Lubrication oil pressure indication</p> <p>(iv) Lubrication oil temperature indication</p> <p>(v) Battery charging indication and Voltage indication</p> <p>(vi) RPM indication</p> <p>(vii) Over speed indication</p> <p>(viii) Low lubrication Oil trip indication</p> <p>(ix) Engine Running Hours indication</p> <p>(x) Fuel Level</p>		



(C) Alternator:

Synchronous alternator rated of appropriate KVA, 415 volts at 1500 RPM, 3 phase 50 Hz, AC supply with 0.8 lagging power factor at 40 °C, 50% RH & at 1000 Meter MSL. The alternator shall be having Screen Protected Drip Proof (SPDP) enclosure IP23, brushless, continuous duty, dynamically balanced rotor, capable of taking 10% over loading for one hour after 12 hours of continuous operation, self cooled, self-excited and self-regulated through AVR conforming to IS13364(Part 2)/IS: 4722/BS 2613 suitable for tropical conditions and with class- H insulation.

(D) Base Frame & Foundation:

Both the engine and alternator shall be mounted on suitable base frame made of MS channel with necessary reinforcement which shall be installed on suitable cement concrete foundation and vibration isolation arrangement as per recommendations of manufacturer.

(E) FUEL TANK:

Daily service fuel tank of suitable liters capacity as per CPWD Specifications, fabricated out of 3 mm thick M.S. sheet complete with all standard accessories and fuel piping between fuel tank and diesel engine with MS class 'C' pipes of suitable dia. Complete with valves, level indications & accessories as required as per specifications.

(F) Exhaust System:

Dry exhaust manifold with hospital type exhaust silencer and catalytic convertor.

(G) Starting System:

12V/24V DC starting system comprising of starter motors: voltage regulator and arrangement for initial excitation complete with suitable numbers of batteries (180 AH capacity lead acid SMF type) as required as per specifications. The battery shall be housed inside the acoustic enclosure of DG Set.

(H) Acoustic and weather proof enclosure with arrangement for fresh air intake for cooling of the engine & alternator, extraction, discharging hot air in to the atmosphere and the temperature rise inside the enclosure, noise level outside enclosure. The acoustic enclosure should be suitable for cable connection/connection through bus-trunking. Such arrangements on acoustic enclosure should be water proof & dust-proof conforming to IP-65 protection. The enclosure shall be as per CPCB IV + or better norms etc. and as per CPWD specifications.

(I) **AMF Panel:**

Free standing floor mounted IP 42 automatic mains failure control panel including auto by-pass, suitable for KVA as below for silent type DG set complete with relays, timers, set of CTs for metering & protection and energy analyser to indicate currents, phase and line voltages, frequency, power factor, KWH, Kilo Volt Ampere Reactive Hour (KVARH), KVA (Phase & Total), KW & provision for overload, short circuit, restricted earth fault, under frequency, power (aluminium) and control (copper ) cabling of suitable size upto 15 meter between AMF panel, LT Panel and DG Set including connection interconnection etc. as required, all complete and inter locking and communication/ Ethernet /RS485/SNMP port open protocol for BMS integration including suitable software, the panel shall be of DG Set OEM make etc. as per approved by Engineering in charge and including the following:

1. Suitable numbers and appropriate capacity 4 pole motorised electrically operated draw out with cradle type 3 position ACB/ MCCB with electronic release for O/C & E/F and shunt trip.
2. Auto/Manual/Test/Off selector switch
3. Protection for under and over voltage phase reversal (2 nos Over voltage relay, 2 Nos. reverse power relay and 2 Nos. under voltage relay).
4. 3 Sets of current transformers 15 P 10 accuracy for protection and 15 VA class-I for metering
5. Energy analyser unit to indicate current, Voltage( L-N & L\_L), kW, kVA (Phase & Total), Frequency, KWH, PF.
6. LED Indicating lamps for load on mains and load on set
7. Fuse/ MCB for instruments
8. Battery charger, complete with transformer/ rectifier,

D.C. voltmeter and ammeter, selector switch for trickle, off and boost and current adjustment.

9. Main supply failure monitor

10. Supply failure timer

11. Restoration timer

12. Control unit with three impulse automatic engine start/stop and failure to start lockout.

13. Impulse counter with locking and reset facility.

14. ON/OFF/Control circuit switch with indicator

15. Audio/Video annunciation for

(i) High water temperature

(ii) Low lubricating oil pressure

(iii) Engine over speed

(iv) Engine fails to start

(v) Full load/maximum load warning

16. Protection for over/under Frequency, Loss of AC sensing, Over Current, Unbalancing load with suitable number of relays and accessories

17. Maintenance notification based on Engine Run Hour & due date.

18. Load Management through PLC to achieve auto opening and closing of incomer breakers, bus coupler switching of essential panel , interlocking providing signal to AMF Panel for load status and AMF shall give command to DG Set to auto start / auto stop depending upon load status and requirement etc. and necessary hardware and software required to perform the operation shall be provided by the contractor including all control wiring.

29.1.1	25KVA	Each	403101
29.1.2	35KVA	Each	446290
29.1.3	40KVA	Each	532669
29.1.4	50KVA	Each	565061
29.1.5	62.5KVA	Each	597453
29.1.6	82.5KVA	Each	741418
29.1.7	100KVA	Each	863788
29.1.8	125KVA	Each	885383
29.1.9	160KVA	Each	1249613
29.1.10	200KVA	Each	1547620

29.1.11	250KVA	Each	1871541
29.1.12	320KVA	Each	2447399
29.1.13	380KVA	Each	2843302
29.1.14	400 KVA	Each	2951276
29.1.15	500KVA	Each	3455152
29.1.16	625KVA	Each	5038764
29.1.17	750KVA	Each	6406428



## CHAPTER 30

### HVAC(ONLY PLUMBING,DUCTING & AHU)

Item No.	Description	Unit	Rate
PLUMBING			
	INSULATED CHILLED WATER PIPING (resin bonded fiber glass glass INSULATION)		
30.1	Supplying, laying/ fixing, testing and commissioning of following nominal sizes of chilled water piping inside the building (with necessary clamps, vibration isolators and fittings but excluding valves, strainers, gauges etc.) duly insulated with 80 kg/cum density resin bonded fiber glass or 144 Kg/ cum density mineral wool (non Combustible) pipe section insulation covered with a layer of 120 gm/sqm polythene sheet (vapour barrier) and finally applying 0.63mm aluminium sheet cladding complete with type3 , grade 1 roofing feltstrip(as per IS:1322 as amended up to date ) at joints and repairing of damage to building etc. as per specifications and as required.		
Note: The Pipes of sizes 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.			
30.1.1	400mm dia.(75 mm thick insulation)	Meter	23635
30.1.2	350 mm dia.(75 mm thick insulation)	Meter	14466
30.1.3	300 mm dia.(75 mm thick insulation)	Meter	12973
30.1.4	250mm dia.(75 mm thick insulation)	Meter	10919
30.1.5	200mm dia.(75 mm thick insulation)	Meter	9154
30.1.6	150mm dia. (50mm thick insulation)	Meter	5991
30.1.7	125mm dia.(50mm thick insulation)	Meter	5093
30.1.8	100mm dia. (50mm thick insulation)	Meter	4154
30.1.9	80mm dia. (50mm thick insulation)	Meter	3372
30.1.10	65mm dia.(50mm thick insulation)	Meter	2854
30.1.11	50mm dia.(50mm thick insulation)	Meter	2373
30.1.12	40mm dia. (50mm thick insulation)	Meter	2018
30.1.13	32 mm dia (50mm thick insulation)	Meter	1763
30.1.14	25 mm dia (50mm thick insulation)	Meter	1602

INSULATED CHILLED WATER PIPING (Nitrile rubber insulation)

- 30.2 Supplying, laying/ fixing, testing and commissioning of following nominal sizes of chilled water piping inside the building (with necessary clamps, vibration isolators and fittings but excluding valves, strainers, gauges etc.) duly insulated with following closed cell elastomeric nitrile rubber of minimum 45 Kg / cu m density, thermal conductivity 0.037 W/MK or better at 20 deg mean temperature class 'O' insulation applied by suitable adhesive complete including repairing of damage to building etc. as per specifications and as required complete in all respect.

Note:-The Pipes of sizes 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.

30.2.1	400mm dia.(32 mm thick insulation)	Meter	20819
30.2.2	350mm dia.(32 mm thick insulation)	Meter	11874
30.2.3	300mm dia. (32 mm thick insulation)	Meter	10762
30.2.4	250mm dia.(32 mm thick insulation)	Meter	9167
30.2.5	200mm dia.(32 mm thick insulation)	Meter	7467
30.2.6	150mm dia. (32 mm thick insulation)	Meter	5089
30.2.7	125mm dia.(32 mm thick insulation)	Meter	4456
30.2.8	100mm dia. (32 mm thick insulation)	Meter	3556
30.2.9	80mm dia.(32 mm thick insulation)	Meter	2656
30.2.10	65mm dia(32 mm thick insulation)	Meter	2139
30.2.11	50mm dia(32 mm thick insulation)	Meter	1859
30.2.12	40mm dia. (32 mm thick insulation)	Meter	1510
30.2.13	32 mm dia(19 mm thick insulation)	Meter	1321
30.2.14	25 mm dia(19 mm thick insulation)	Meter	1110

INSULATED CHILLED WATER PIPING (expanded polystyrene insulation)

- 30.3 Supplying, laying/ fixing, testing and commissioning of following nominal sizes of chilled water piping plumbing inside the building (with necessary clamps, vibration isolators and fittings but excluding valves, strainers, gauges etc.) duly insulated with fire retardant quality expanded polystyrene moulded pipe section of density 20 kg/cu.m after a thick coat of cold setting adhesive (CPRX compound) wrapping with 500g polythene faced hessain and finally applying

0.63mm aluminium sheet cladding complete with type3 , grade 1 roofing feltstrip(as per IS:1322 as amended up to date ) at joints repairing of damage to building etc. as per specifications and as required complete in all respect.

Note:-The Pipes of sizes 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.

30.3.1	400mm dia.(75 mm thick insulation)	Meter	22447
30.3.2	350 mm dia.(75 mm thick insulation)	Meter	13344
30.3.3	300 mm dia.(75 mm thick insulation)	Meter	12118
30.3.4	250mm dia.(75 mm thick insulation)	Meter	10182
30.3.5	200mm dia (75 mm thick insulation)	Meter	8549
30.3.6	150mm dia. (75 mm thick insulation)	Meter	5702
30.3.7	125mm dia.(50mm thick insulation)	Meter	4796
30.3.8	100mm dia.(50mm thick insulation)	Meter	4096
30.3.9	80mm dia. (50mm thick insulation)	Meter	3208
30.3.10	65mm dia.(50mm thick insulation)	Meter	2716
30.3.11	50mm dia.((50mm thick insulation)	Meter	2265
30.3.12	40mm dia. (50mm thick insulation)	Meter	1928
30.3.13	32 mm dia (50mm thick insulation)	Meter	1682
30.3.14	25 mm dia (50mm thick insulation)	Meter	1537

#### INSULATION ON EXISTING PIPE

- 30.4 Supplying, laying/ fixing, testing and commissioning of following thickness resin bonded fiber glass pipe section insulation having density 80 kg/cum or mineral wool (non combustible) having density of 144 Kg/ cu m duly covered with a layer of 120 gm/sqm polythene sheet (vapour barrier) on existing pipe and finally applying 0.63mm aluminium sheet cladding complete with type3 , grade 1 roofing feltstrip(as per IS:1322 as amended up to date ) at joints etc. as per specifications and as required.

30.4.1	75mm	sq.m	3240
30.4.2	65 mm	sq.m	2669
30.4.3	50mm	sq.m	2866
30.4.4	40mm	sq.m	2640
30.4.5	25mm	sq.m	2137

- 30.5 Supplying, laying, fixing, testing and commissioning of



	following thickness closed cell elastometric nitrile rubber of class 'O' applied by suitable adhesive , as per specifications and as required complete in all respect.		
30.5.1	32mm	sq.m	1203
30.5.2	19mm	sq.m	724
30.6	Supplying, laying/ fixing of following thickness insulation with fire retardant quality expanded polystyrene moulded pipe section of density 20 kg/cu.m after a thick coat of cold setting adhesive (CPRX compound) wrapping with 500g polythene faced hessain and finally applying 0.63mm aluminium sheet cladding complete with type3 , grade 1 roofing feltstrip(as per IS:1322 as amended up to date ) at joints repairing etc. as per specifications and as required complete in all respect..		
30.6.1	75mm	sq.m	1502
30.6.2	50mm	sq.m	1388
	INSULATED VALVES		
30.7	Supplying, fixing, testing and commissioning of following valves, strainers, gauges in the chilled water plumbing duly insulated to the same specifications as the connected piping and adequately supported as per specifications.		
30.7.1	BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/hot eater circulation as specified		
30.7.1.1	200 mm dia	Each	16887
30.7.1.2	150 mm dia.	Each	9272
30.7.1.3	125 mm dia.	Each	8505
30.7.1.4	100 mm dia.	Each	7482
30.7.1.5	80 mm dia.	Each	5419
30.7.1.6	65 mm dia.	Each	5086
30.7.1.7	50 mm dia.	Each	4627
30.7.1.8	40 mm dia.	Each	3906
30.7.2	BALANCING VALVE WITH BUILT IN MEASURING FACILITY with C I body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating for chilled / hot water circulation as specified.		
30.7.2.1	200 mm dia	Each	73203

30.7.2.2	150 mm dia.	Each	36463
30.7.2.3	125 mm dia.	Each	28121
30.7.2.4	100 mm dia.	Each	21226
30.7.2.5	80 mm dia.	Each	14722
30.7.2.6	65 mm dia	Each	13202
30.7.2.7	50 mm dia.	Each	11524
30.7.2.8	40 mm dia	Each	8200
30.7.3	NON - RETURN VALVE with duel plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating for chilled / hot water circulation including insulation as specified.		
30.7.3.1	200 mm dia	Each	15686
30.7.3.2	150 mm dia.	Each	10155
30.7.3.3	125 mm dia.	Each	8732
30.7.3.4	100 mm dia	Each	6945
30.7.3.5	80 mm dia.	Each	4821
30.7.3.6	65 mm dia	Each	4307
30.7.4	Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer for chilled / hot water circulation including insulation as specified.		
30.7.4.1	200 mm dia	Each	52447
30.7.4.2	150 mm dia.	Each	29234
30.7.4.3	125 mm dia.	Each	23384
30.7.4.4	100 mm dia	Each	15798
30.7.4.5	80 mm dia	Each	10661
30.7.4.6	65 mm dia.	Each	8644
30.7.4.7	50 mm dia.	Each	6459
30.7.4.8	40 mm dia.	Each	4836
30.8	Providing and fixing in position industrial type pressure gauges with gun metal / brass valves complete etc. as required.		Each 1491
30.9	Providing & fixing in position industrial type mercury thermometers complete etc. as required.		Each 1132
30.10	CONDENSER WATER PIPE Supplying, fixing, testing and commissioning of condenser water pipes of following sizes of MS 'C' class along with necessary clamps, vibration isolators and fittings such as bends,tees etc. but excluding		

valves, strainers, gauges etc. adequately supported on rigid supports duly painted/buried in ground excavation and refilling etc. as per specification and as required complete in all respect.

Note:-The Pipes size 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. And from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.

30.10.1	300 mm dia.	Meter	9543
30.10.2	250 mm dia	Meter	8015
30.10.3	200 mm dia.	Meter	6701
30.10.4	150 mm dia.	Meter	4458
30.10.5	125 mm dia.	Meter	3858
30.10.6	100 mm dia.	Meter	3250

#### VALVES WITHOUT INSULATION

30.11 Supplying, fixing, testing and commissioning of following valves, gauges and strainers for condenser water circulation as per specifications.

30.11.1 BUTTERFLY VALVE (MANUAL) with C I body SS disc nitrile sheet & O - ring & PN 16 pressure rating as specified.

30.11.1.1	200 mm dia.	Each	15248
30.11.1.2	150 mm dia.	Each	7651
30.11.1.3	125 mm dia.	Each	6993
30.11.1.4	100 mm dia.	Each	5950
30.11.1.5	80 mm dia.	Each	4431
30.11.1.6	65 mm dia.	Each	4240
30.11.1.7	50 mm dia.	Each	3701
30.11.1.8	40 mm dia.	Each	3103

30.11.2 NON - RETURN VALVE with dual plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating as specified.

30.11.2.1	200 mm dia.	Each	13845
30.11.2.2	150 mm dia.	Each	8521
30.11.2.3	125 mm dia.	Each	7329
30.11.2.4	100 mm dia.	Each	5614
30.11.2.5	80 mm dia.	Each	3839
30.11.2.6	65 mm dia.	Each	3364

30.11.3 Supplying, fixing, testing and commissioning of following sizes Motorized Butter fly Valve with CI

Body, SS Disc, O - ring and minimum PN-16 pressure rating , conforming to BS 5155, IS 13095, with IP-55 actuator, capable of accepting upto 10V DC , and upto 20mA electric signal and providing similar transduced feedback output to control system as required.

30.11.3.1	350 mm dia.	Each	117120
30.11.3.2	300 mm dia.	Each	104953
30.11.3.3	250 mm dia.	Each	75561
30.11.3.4	200 mm dia.	Each	57795
30.11.3.5	150 mm dia.	Each	44806
30.11.3.6	125 mm dia.	Each	44420
30.11.3.7	100 mm dia.	Each	43595
30.11.3.8	80 mm dia.	Each	18641
30.11.3.9	65 mm dia.	Each	18460
30.11.3.10	50 mm dia.	Each	18083

30.11.4 Supplying, Installation, Testing and Commissioning of following sizes electronic, self-balancing, pressure independent type dynamic balancing valve with integrated 2 way modulating control valve in a single body. The actuator shall be capable of accepting upto 10V DC and upto 20mA electric signal and shall provide similar transduced feedback output to control system. Maximum close off pressure shall not be less than 6 Bar for upto 50 mm valves and 7 Bar for 65 mm & above. Valves should have pressure rating of 25 Bar minimum.

30.11.4.1	150 mm dia.	Each	168917
30.11.4.2	125 mm dia.	Each	153790
30.11.4.3	100 mm dia.	Each	121015
30.11.4.4	80 mm dia.	Each	71582
30.11.4.5	65 mm dia.	Each	56243
30.11.4.6	50 mm dia.	Each	36431
30.11.4.7	40 mm dia.	Each	33234
30.11.4.8	32 mm dia.	Each	17895
30.11.4.9	25 mm dia.	Each	16832
30.11.4.10	20 mm dia.	Each	12271

### 30.12 DUCTING, GRILLS,DIFFUSER AND INSULATION

30.12.1 Supplying, installation, balancing and commissioning of factory fabricated GSS sheet metal rectangular/ round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports, bends, transitions, reducers, end caps, collars etc as required complete in all respect in

confirmation to IS : 655 and approved drawings and specifications of following sheet thickness complete as required.

30.12.1.1	Thickness 0.63 mm sheet	sq. m	1191
30.12.1.2	Thickness 0.80 mm sheet	sq. m	1382
30.12.1.3	Thickness 1.00 mm sheet	sq. m	1488
30.12.1.4	Thickness 1.25 mm sheet	sq. m	2013
30.12.2	Supplying, installation, balancing and commissioning of fabricated at site GSS sheet metal rectangular/round ducting complete with neoprene rubber gaskets, elbows, splitter dampers, vanes, hangers, supports, bends, transitions, reducers, end caps, collars etc as required complete in all respect in confirmation with IS : 655 and approved drawings and specifications of following sheet thickness complete as required.		
30.12.2.1	Thickness 0.63 mm sheet	sq. m	1213
30.12.2.2	Thickness 0.80 mm sheet	sq. m	1415
30.12.2.3	Thickness 1.00 mm sheet	sq. m	1851
30.12.2.4	Thickness 1.25 mm sheet	sq. m	2063
30.13	Supplying, installation, testing and commissioning of GI volume control duct damper complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc in confirmation to SMACNA/IS and as per specifications complete etc. as required.	sq. m	7580
30.14	Supply, installation, testing and commissioning of Motorized (ON-OFF Type) duct mounted GI volume control damper with enthalpy sensor and necessary control wire for integration within AHU room complete with neoprene rubber gaskets, nuts, bolts, screws linkages, flanges etc in confirmation to SMACNA/IS and as per specifications complete etc. as required.		
30.14.1	Damper	sq. m	18377
30.14.2	Actuator	Each	9793
30.15	Supplying, Fixing, installation, testing and commissioning of powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers in confirmation to SMACNA/IS and as per specifications complete etc. as required.	sq. m	9623

30.16	Supplying & fixing of powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers complete in confirmation to SMACNA/IS and as per specifications complete etc. as required.	sq. m	6285
30.17	Supplying, Fixing, installation, testing and commissioning of supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core in confirmation to SMACNA/IS and as per specifications complete etc. as required.	sq. m	12841
30.18	Supplying, Fixing, installation, testing and commissioning of Return air diffusers of powder coated aluminium without volume control dampers with anti smudge ring & removable core in confirmation to SMACNA/IS and as per specifications complete etc. as required.	sq. m	8595
30.19	Supplying, Fixing, installation, testing and commissioning of thermal insulated flexible duct of following sizes duly supported at regular interval as per site requirement etc. in confirmation to SMACNA/IS and as per specifications complete etc. as required.		
30.19.1	200 mm dia.	Meter	633
30.20	Supplying, Fixing, testing and commissioning of fire dampers of minimum 90 minutes fire rated in supply air duct/main branch and return air path as and where required of required sizes i/c control wiring, the damper shall be motorized and spring return so as to close the damper in the event of power failure automatically and open the same in case of power being restored. The spring return action shall be inbuilt mechanism and not externally mounted. The damper shall also be closed in the event of fire signal and, in confirmation to IS and as per specifications complete etc. as required..		
30.20.1	Fire damper	sq. m	11355
30.20.2	Actuator	Each	10645
30.21	Supplying and fixing of acoustic lining of supply air duct and plenum with 25 mm thick resin bonded glass wool having density of 32 kg/m <sup>3</sup> , with 25 mm X 25 mm GI section of 1.25 mm thick, at 600 mm centre to		

	centre covered with Reinforced Plastic tissue paper and 0.5 mm thick perforated aluminium sheet fixed to inside surface of ducts with cadmium plated nuts, bolts, stick pins, CPRX compound in confirmation to SMACNA/IS and as per specifications complete etc. as required.	sq.m	890
30.22	Supplying, fixing acoustic lining on wall and ceiling of AHU rooms with 50mm thick, density 32 kg/cu.m resin bonded glass fiber insulation friction fixed in 610mm x 610 mm frame work made of 25X50X50X50X25 mm made out of 0.6mm thick GI sheet U shaped channel and covered with reinforced fiber glass tissue and finished with 0.80 mm perforated aluminium sheet etc. complete as required and as per specifications.	sq.m	1057
30.23	Supplying and fixing of following thickness duly laminated aluminium foil of mat finish closed cell Nitrile rubber (Class "O") insulation on existing duct after applying suitable adhesive for Nitrile rubber. The joints shall be sealed with 50 mm wide and 3 mm thick self adhesive nitrile rubber tape insulation complete as per specifications and as required.		
30.23.1	19mm	sq.m	810
30.23.2	25mm	sq.m	1033
30.24	Supplying and fixing 50 mm thick aluminium foil faced resin bonded fibre glass insulation (on duct ) of density 24 kg/cu.m or mineral wool insulation(non combustible) of density 44 kg/cu m after applying two coats of cold setting adhesive (CPRX compound) sealing all joints with self adhesive aluminium tape & covering with 0.63mmx19mm GI wire mesh netting butting all joints and laced with GI wire complete as per specifications and as required. (for indoor applications).	sq.m	548
30.25	Supplying and fixing Installation, Testing and commissioning of 50mm thick aluminium foil faced resin bonded fibre glass insulation (on duct) of density 24 kg/cu.m or mineral wool insulation(non combustible) of density 44 kg/cu m after applying two coats of cold setting adhesive (CPRX compound) sealing all joints with self adhesive aluminium tape & covering with 0.63mmx19mm GI wire mesh netting & butting all joints and laced with GI wire complete and finally covered with one layer of tar felt stuck with hot bitumen as per specifications and as required. (for outdoor applications)	sq.m	629

## AIR HANDLING UNITS

30.26 Supplying, Installation, Testing and commissioning of factory built floor mounted chilled water double skin type horizontal/vertical air handling units in confirmation to IS 18794 : 2024 made of 25mm thick panels consisting of pre plasticized G.I. casing of thickness 0.8mm outside layer and 0.8 mm inside layer with polyurethane foam (PUF) insulation factory injected between them by injection moulding machine, complete with blower section with blower suitable for static pressure as required, minimum 2 bend GSS/PVC eliminators, cooling coil section with aluminium finned copper tubes (tubes thickness not less than 0.5mm) cooling coil of 6 row deep, filter section with 50mm thick metal viscous/ washable synthetic type air prefilters, belt drive package with TEFC drive motor of efficiency class IE3 suitable for  $415 \pm 10\%$  volts, 50Hz, 3 Phase AC supply suitably designed for variable frequency drive applications, drain connections, stainless steel (18G) drain pan with PUF insulation, 150 mm dia. dial type pressure gauges (2 nos.) and industrial type thermometers (2 nos.) at the inlet and outlet of coil, auto purge valve wherever required, necessary vibration isolation arrangement etc. complete as per specification and of following capacities. (Total static pressure considered is max. 50 mm wg).

30.26.1	4300 CMH	Set	110362
30.26.2	5100 CMH	Set	129837
30.26.3	6800 CMH	Set	145902
30.26.4	8500 CMH	Set	180747
30.26.5	10200 CMH	Set	208449
30.26.6	11900 CMH	Set	236902
30.26.7	13600 CMH	Set	254450
30.26.8	15300 CMH	Set	288419
30.26.9	17000 CMH	Set	305215
30.26.10	18700 CMH	Set	337303
30.26.11	20400 CMH	Set	362372
30.26.12	23800 CMH	Set	397358
30.26.13	28900 CMH	Set	419639
30.26.14	34000 CMH	Set	465104
30.26.15	39100 CMH	Set	644915

30.27 Supplying, Installation, Testing and commissioning of factory built in confirmation to IS 18794 : 2024 floor



mounted chilled water double skin type horizontal/vertical air handling units made of 25mm thick panels consisting of pre plasticized G.I. casing of thickness 0.8mm outside layer and 0.8 mm inside layer with polyurethane foam (PUF) insulation factory injected between them by injection moulding machine complete with blower section with blower suitable for static pressure as required, minimum 2 bend GSS/PVC eliminators, cooling coil section with aluminium finned copper tubes (tubes thickness not less than 0.5mm) cooling coil of 4 row deep, filter section having filters suitable for achieving air quality as per CPWD HVAC Specification 2024 belt drive package with TEFC drive motor of efficiency class IE3 suitable for  $415 \pm 10\%$  volts, 50Hz, 3 Phase AC supply suitably designed for variable frequency drive applications, drain connections, stainless steel (18G) drain pan with PUF insulation, 150 mm dia. dial type pressure gauges (2 nos.) and industrial type thermometers (2 nos.) at the inlet and outlet of coil, auto purge valve wherever required, necessary vibration isolation arrangement etc. complete as per specification and of following capacities. (Total static pressure considered is max. 50 mm wg).

30.27.1	4300 CMH*	Each	97252
30.27.2	5100 CMH*	Each	114150
30.27.3	6800 CMH*	Each	127371
30.27.4	8500 CMH*	Each	157605
30.27.5	10200 CMH*	Each	184382
30.27.6	11900 CMH*	Each	206403
30.27.7	13600 CMH*	Each	223114
30.27.8	15300 CMH*	Each	253573
30.27.9	17000 CMH*	Each	266859
30.27.10	18700 CMH*	Each	291987
30.27.11	20400 CMH*	Each	316621
30.27.12	23800 CMH*	Each	301047
30.27.13	28900 CMH*	Each	384197
30.27.14	34000 CMH*	Each	425772
30.27.15	39100 CMH*	Each	487835

\*NOTE : The item of 4 row colling coil AHUs should be used only for replacement of existing AHUs where hot water generator and hot water lines are not feasible to be provided because of the site constraints.

## CHAPTER-31 VRV/VRF

Item No.	Description	Unit	Rate
31.1	<b>OUTDOOR UNIT</b> Supplying, Installation, Testing & Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating having 100% hermetically sealed inverter type twin Rotary/Scroll Compressor(s), minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver the rated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39 °C. The unit shall be suitable to work on 400V +/- 10%, 3 Phase, 50Hz AC power supply and BMS compatible. The unit shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio (ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, inter connections etc. as required. (For capacity <40 kWr ISEER 5.4, Capacity ≥ 40 and <70 ISEER 5.5, Capacity ≥ 70 ISEER 5.6 for ECSBC Building) For Cooling or Heating or Both		
31.1.1	6 HP to 8 HP	Per HP	20947
31.1.2	10 HP to 12 HP	Per HP	20083
31.1.3	14 HP to 22 HP	Per HP	19111
31.2	Supplying, Installation, Testing & Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating having 100% hermetically sealed inverter type twin Rotary/Scroll Compressor(s), minimum two compressors (with individual separate PCB) for above		

14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver the rated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39 °C. The unit shall be suitable to work on 400V +/- 10%, 3 Phase, 50Hz AC power supply and BMS compatible. The unit shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio (ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, inter connections etc. as required. (For capacity <40 kW ISEER 6.4, Capacity ≥ 40 and <70 ISEER 6.5, Capacity ≥ 70 ISEER 6.6 for ECSBC+ Building)

For Cooling or Heating or Both

31.2.1	6 HP to 8 HP	Per HP	22343
31.2.2	10 HP to 12 HP	Per HP	21422
31.2.3	14 HP to 22 HP	Per HP	20385
31.3	Supplying, Installation, Testing & Commissioning of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating having 100% hermetically sealed inverter type twin Rotary/Scroll Compressor(s), minimum two compressors (with individual separate PCB) for above 14HP modules, microprocessor based Controller, top discharge type condensing unit(s), with R-410-A Refrigerant or equivalent, vibration Isolators with suitable foundation etc. complete as required. To have better efficiency condenser fan shall be capable to operate at different speed with respect to load. The unit shall deliver the rated capacity and in confirmation as per IS 18728:2024 and CPWD Specifications and work even at 50°C ambient temperature without tripping. The system shall be able to deliver 100% of the rated capacity upto 39 °C. The unit shall be suitable to work on 400V +/- 10%, 3		

Phase, 50Hz AC power supply and BMS compatible. The unit shall be filled with first charge of the refrigerant and ready for use as required. The condenser should be coated with a hydrophilic film to prevent water accumulation on the surface of the heat exchanger, enhance water dispersion, and reduce the risk of degradation, thereby improving overall performance and durability. The Indian Seasonal Energy Efficiency Ratio (ISEER) of the unit shall be as per Energy Conservation and Sustainable Building Code (ECSBC) 2024 as below and complete as per CPWD specification, connections, inter connections etc. as required. (For capacity <40 kW<sub>r</sub> ISEER 7.4, Capacity ≥ 40 and <70 ISEER 7.5, Capacity ≥ 70 ISEER 7.6 for Super ECSBC Building)

For Cooling or Heating or Both

31.3.1	6 HP to 8 HP	Per HP	23740
31.3.2	10 HP to 12 HP	Per HP	22761
31.3.3	14 HP to 22 HP	Per HP	21659
31.4	INDOOR UNIT		

Supplying, Installation, Testing and Commissioning of following minimum capacity 4 way Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V ± 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement in auto mode. The cooling capacity of indoor unit will be at air inlet conditions of 27 °C DB and 19 °C WB temperature. (Make will be same as of Outdoor)

31.4.1	0.8 TR	Each	22304
31.4.2	1.0 TR	Each	27880
31.4.3	1.2 TR	Each	38601
31.4.4	1.6 TR	Each	39464
31.4.5	2.0 TR	Each	39734
31.4.6	2.4 TR	Each	40814
31.4.7	2.6 TR	Each	40814
31.4.8	3.6 TR	Each	44269

31.4.9	4.1 TR	Each	45781
31.4.10	4.6TR	Each	52799
31.5	Supplying, Installation, Testing and Commissioning of following minimum capacity 4-way compact VRV/VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V $\pm$ 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a singal from the BMS System/Fire Singnals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 $^{\circ}$ C DB and 19 $^{\circ}$ C WB temperature. (Make will be same as of Outdoor)		
31.5.1	0.6 TR	Each	22610
31.5.2	0.8 TR	Each	25122
31.5.3	1.0 TR	Each	39410
31.5.4	1.2 TR	Each	39950
31.5.5	1.6 TR	Each	39950
31.6	Supplying, Installation, Testing and Commissioning of following minimum capacity Single way wall/corner VRV/VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V $\pm$ 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a singal from the BMS System/Fire Singnals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 $^{\circ}$ C DB and 19 $^{\circ}$ C WB temperature. (Make will be same as of Outdoor)		
31.6.1	0.6 TR	Each	30233
31.6.2	0.8 TR	Each	30880
31.6.3	1.0 TR	Each	32392
31.6.4	1.2 TR	Each	42326
31.6.5	1.6 TR	Each	42326

31.6.6	2.0 TR	Each	43621
31.7	Supplying, Installation, Testing and Commissioning of following minimum capacity Double way VRV/VRF Cassette Type Indoor ceiling mounted unit equipped with synthetic washable media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX Copper coil, electronic expansion valve, outer cabinet, drain pump, grill, necessary supports, vibration Isolation, Corded remote control etc., suitable for operation on single phase 230 V $\pm$ 10%, 50Hz AC supply, complete, as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The cooling capacity of indoor unit will be at air inlet conditions of 27 °C DB and 19 °C WB temperature. (Make will be same as of Outdoor)		
31.7.1	0.6 TR	Each	44053
31.7.2	1.0 TR	Each	46861
31.7.3	2.0 TR	Each	57226
31.7.4	3.3 TR	Each	60541
31.7.5	4.2 TR	Each	64173
31.8	Supplying, Installation, Testing and Commissioning of following minimum capacity High wall type Indoor unit equipped with and comfort washable synthetic media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX copper coil, electronic expansion valve, outer cabinet, cord less remote control, drain pan, necessary accessories etc., suitable for operation on 230 V $\pm$ 10%, 50 Hz, single phase AC supply, complete as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 °C DB and 19 °C WB temperature. (Make will be same as of Outdoor)		
31.8.1	0.6 TR	Each	16790
31.8.2	0.8 TR	Each	17276
31.8.3	1.0 TR	Each	17816
31.8.4	1.2 TR	Each	21595
31.8.5	1.6 TR	Each	22027
31.8.6	2.0 TR	Each	22674

31.9	<p>Supplying, Installation, Testing and Commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted low static ductable type Indoor unit equipped with washable synthetic media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX copper coil, electronic expansion valve, corded remote control, outer cabinet, vibration Isolators, drain pan, drain pump, other necessary supports etc., suitable for operation on single phase AC supply 230 V <math>\pm</math> 10%, 50 Hz complete as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 °C DB and 19 °C WB temperature. (Make will be same as of Outdoor)</p> <p>Low static ductable units (minimum 19 to 29 pascal external static pressure)</p>		
31.9.1	0.5 TR	Each	30233
31.9.2	0.6 TR	Each	30880
31.9.3	0.8 TR	Each	31204
31.9.4	1.03 TR	Each	31636
31.9.5	1.3 TR	Each	34444
31.9.6	1.6 TR	Each	34983
31.9.7	2.0 TR	Each	36063
31.10	<p>Supplying, Installation, Testing and Commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted mid static ductable type Indoor unit equipped with washable synthetic media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX copper coil, electronic expansion valve, corded remote control, outer cabinet, vibration Isolators, drain pan, drain pump, other necessary supports etc., suitable for operation on single phase AC supply 230 V <math>\pm</math> 10%, 50 Hz complete as required. The Indoor units must shut down upon receiving a signal from the BMS System/Fire Signals. The cooling capacity of indoor unit will be at air inlet conditions of 27 °C DB and 19 °C WB temperature. (Make will be same as of Outdoor)</p> <p>Mid static ductable units (minimum 30 to 48 pascal external static pressure)</p>		
31.10.1	1.2 TR	Each	34336
31.10.2	1.6 TR	Each	34983

31.10.3	2.0 TR	Each	36063
31.10.4	2.4 TR	Each	37683
31.10.5	3.2 TR	Each	40166
31.11	<p>Supplying, Installation, Testing and Commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted mid high static ductable type Indoor unit equipped with washable synthetic media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX copper coil, electronic expansion valve, corded remote control, outer cabinet, vibration Isolators, drain pan, drain pump, other necessary supports etc., suitable for operation on single phase AC supply 230 V <math>\pm</math> 10%, 50 Hz complete as required. The Indoor units must shut down upon receiving a singal from the BMS System/Fire Singnals. The system shall be capable to adjust air flow as per room requirement automatically. The cooling capacity of indoor unit will be at air inlet conditions of 27 <math>^{\circ}</math>C DB and 19 <math>^{\circ}</math>C WB temperature. (Make will be same as of Outdoor)</p> <p>High Static Ductable units (minimum 49 to 77 pascal external static pressure)</p>		
31.11.1	0.8 TR	Each	31510
31.11.2	1.03 TR	Each	32730
31.11.3	1.2 TR	Each	34514
31.11.4	1.6 TR	Each	34983
31.11.5	2.0 TR	Each	36063
31.11.6	2.4 TR	Each	37683
31.11.7	3.2 TR	Each	40166
31.11.8	4.0 TR	Each	45997
31.11.9	4.6 TR	Each	64568
31.12	<p>Supplying, Installation, Testing and Commissioning of following minimum capacity and external static pressure VRF/VRV ceiling mounted high ductable type Indoor unit equipped with washable synthetic media pre-filter, fan section with low noise fan/dynamically balanced blower, multispeed motor, coil section with DX copper coil, electronic expansion valve, corded remote control, outer cabinet, vibration Isolators, drain pan, drain pump, other necessary supports etc., suitable for operation on single phase AC supply 230 V <math>\pm</math> 10%, 50 Hz complete as required. The Indoor units must shut down upon receiving a singal from the BMS System/Fire Singnals. The cooling capacity of indoor unit will be at air inlet conditions of 27 <math>^{\circ}</math>C DB and 19 <math>^{\circ}</math>C WB temperature. (Make will be same as of</p>		



Outdoor)

31.12.1	High Static Ductable units (minimum 78 pascal external static pressure)		
31.12.1	5.5 TR	Each	74394
31.12.3	6.6 TR	Each	78065
31.12.4	8.0 TR	Each	85191
31.13	Supplying, Installation, Testing and Commissioning of Y/T/Multi Joints. Joints shall be of same Original Equipment Manufacturer (OEM) make as of ODUs and IDUs		
31.13.1	Indoor Units	Each	4535
31.13.2	Outdoor Multi Joint	Each	8098
	COPPER REFRIGERANT PIPING		
31.14	Supplying, Installation, testing and commissioning including vaccumiazation and Nitrogen testing of following nominal sizes of soft/hard drawn copper refrigerant piping for VRV/VRF system, complete with fittings, with suitable adjustable ring type hanger supports, jointing/brazing including accessories, insulated with XPLE Class-O tubular insulation/with Class-O closed cell elastometric nitrile rubber tubular sleeves sections of 19 mm thick insulation as given below for Suction and Liquid lines, all accessories as per specifications etc. as required :		
31.14.1	6.4 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	Meter	256
31.14.2	9.5 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	Meter	346
31.14.3	12.7 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	Meter	487
31.14.4	15.86 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm	Meter	615
31.14.5	19 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	Meter	739
31.14.6	22.2 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	Meter	904
31.14.7	25.4 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	Meter	1068
31.14.8	28.58 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm	Meter	1157

31.14.9	31.8 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	Meter	1222
31.14.10	34.9 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	Meter	1286
31.14.11	38.1 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	Meter	1322
31.14.12	41.27 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm	Meter	1368



## CHAPTER 32

### UNITARY SYSTEM

Item No.	Description	Unit	Rate
<b>WINDOW AC UNITS</b>			
32.1	Supplying , Installation, Testing and Commissioning of Window type Air conditioners complete with copper power cable upto 3 Mtr, wireless Remote, suitable for working between 180- 260V with low & high voltage cutoff and 50 hz ,1 phase AC supply capable of performing, cooling, dehumidification, air circulation, R-32/R-410A /R-407B Green Refrigerant with Scroll / rotary compressor with min 5 year Original Equipment Manufacturer (OEM) warranty both compressor and Printed Circuit Board (PCB), antifreeze thermostat on the coil as a safety feature, complete with fixing including T&P & labour etc as required complete in all respect as specified of following capacity. Sound level of up to 50dB inside the room is acceptable. The unit shall be in confirmation with IS 1391 Part-I 2023 and CPWD Specification. The system shall be able to deliver 100% of the rated capacity upto 42 °C. The system shall be able to operate up to 50 °C (out door ambient temperature).		
	Non Inverter Type		
32.1.1	1.0 TR with fixed speed 5 Star BEE rating	Each	32848
32.1.2	1.5 TR with fixed speed 5 Star BEE rating	Each	36532
	Inverter Type		
32.1.3	1.0 TR with Inverter 5 Star BEE rating	Each	34407
32.1.4	1.5 TR with Inverter 5 Star BEE rating	Each	40074
<b>HI - WALL SPLIT SYSTEMS</b>			
32.2	Supplying , Installation, Testing and Commissioning of Air Cooled Hi Wall split type Air conditioners complete with Indoor unit(IDU), Out door unit (ODU), surface / concealed copper Refrigerant piping with insulation (closed cell elastomeric nitrile rubber tubular pipe section) upto 3 Mtr (IDU to ODU), copper power cable upto 3.5 Mtr (IDU to ODU) i/c drain pipe R-32/R-410/ R-407 Green Refrigerant, wireless Remote control, suitable for working between 180-260V with low & high voltage cutoff and 50 hz ,1 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll / rotary compressor. The system shall be able to deliver 100% of the rated capacity upto 42 °C. Min 5 year Original		

Equipment Manufacturer (OEM) warranty both compressor and Printed Circuit Board (PCB). Must comply : Electrical cable IS 694 or IS 9968 temperature sensing control IS /International Electrotechnical Commission (IEC) 60730, hermetic compressor IS 10617, heat exchanger IS 11329, capacitor IS 2993 and motor IS 12615. Complete as per CPWD specification and IS : 1391 Part II 2023. The system shall be able to operate up to 50 °C (out door ambient temperature).

#### Inverter Type - Cooling only

32.2.1	0.75 TR with 5 Star BEE Rating	Each	39095
32.2.2	1.0 TR with 5 Star BEE Rating	Each	40580
32.2.3	1.5 TR with 5 Star BEE Rating	Each	43539
32.2.4	2.0 TR with 5 Star BEE Rating	Each	57396

#### Inverter Type - Hot & Cold

32.2.5	1.0 TR with 3 Star BEE Rating	Each	38408
32.2.6	1.5 TR with 3 Star BEE Rating	Each	41768

#### DUCTABLE TYPE SPLIT UNITS

- 32.3 Supplying, Installation, Testing and Commissioning of air cooled ducted split type air conditioning machine with each having a capacity and details as mentioned below suitable for operation on R 32/R-410A /R-407 Green refrigerant comprising of Scroll type compressor hermetically sealed complete with automatic capacity, safety switches, lubrication system with min 5 year (OEM) warranty for both compressor and Printed Circuit Board (PCB) , Suitable capacity squirrel cage induction motor having class 'B' insulation suitable for operation on  $415 \pm 10\%$  volts, 50 Hz, A.C. supply for Blower motor, Necessary drive arrangement for blower motor, Matching Air cooled condenser with necessary fittings for refrigerant piping connections, necessary structural support for mounting condensers, Microprocessor based control panel complete with accessories, machine Isolation / disconnect switch, valves and accessories to inter connect compressor and condenser including pressure testing, vacuum. Necessary starters suitable for Indoor & outdoor unit complete with O/L ,U/V, phase reversal protection, single phase preventors i/c copper conductor control and power cable and drain pipe of suitable size and length etc complete as required. The total cooling capacity/heating capacity of tested unit shall have a capacity as per relevant IS code. The lab testing reports as per IS: 8148 shall be submitted

from National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited as per ISO/International Electrotechnical Commission (IEC) 17025 standards / Central Power Research Institute (CPRI)/Electrical Research and Development Association (ERDA)with Original Equipment Manufacturer (OEM) etc. complete as per CPWD specification as required.

#### Inverter

32.3.1	1.5 TR (BEE 4 Star Rated)	Each	57010
32.3.2	2.2 TR (BEE 4 Star Rated)	Each	64676
32.3.3	3.0 TR (BEE 4 Star Rated)	Each	87998
32.3.4	3.5 TR (3.2 EER)	Each	127031
32.3.5	4.0 TR (3.2 EER)	Each	143821

#### Non Inverter

32.3.6	1.0 TR (BEE 4 Star Rated)	Each	41678
32.3.7	1.5 TR (BEE 4 Star Rated)	Each	43621
32.3.8	2.0 TR (BEE 4 Star Rated)	Each	56837
32.3.9	2.5 TR (BEE 4 Star Rated)	Each	74070
32.3.10	3.0 TR (BEE 4 Star Rated)	Each	80116
32.3.11	3.5 TR (3.2 EER)	Each	88214
32.3.12	4.0 TR (3.2 EER)	Each	97932
32.3.13	4.5 TR (3.2 EER)	Each	113897
32.3.14	5.5 TR (3.2 EER)	Each	124062
32.3.15	8.5 TR (3.2 EER)	Each	164444
32.3.16	11.0 TR (3.2 EER)	Each	211520
32.3.17	16.7 TR (3.2 EER)	Each	327160

#### CASSETTE TYPE SPLIT UNITS

- 32.4 Supplying, Installation, Testing and Commissioning of Air Cooled Cassette type Air conditioners complete with Indoor unit(IDU), Out door unit (ODU), R-32/R410A/R-407 Green Refrigerant, wireless Remote, inbuilt drain pump, suitable for 400/230V, 50 Hz ,1 /3 phase AC supply, including surface / concealed copper Refrigerant piping with insulation (closed cell elastomeric nitrile rubber tubular pipe section) upto 5.5 Mtr (IDU to ODU), copper power and control cable upto 5.5 Mtr (IDU to ODU) including drain

pipe, the system shall be capable of performing cooling, dehumidification, Air circulation, filtration & ventilation of following capacity with Scroll/rotary compressor with min 5 year Original Equipment Manufacturer (OEM) warranty both compressor and Printed Circuit Board (PCB) as specified. The system shall be able to deliver 100% of the rated capacity as per relevant IS Code. The lab testing reports as per IS: 1391 shall be submitted from National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited as per International Electrotechnical Commission (IEC) 17025 standards/Central Power Research Institute (CPRI)/Electrical Research and Development Association (ERDA) with Original Equipment Manufacturer (OEM) etc. complete as per CPWD specification and as per IS: 1391 as required.

#### **Inverter Type- Cooling only**

32.4.1	1.5 TR with 5 Star BEE Rating	Each	77417
32.4.2	2.0 TR with 5 Star BEE Rating	Each	85731
32.4.3	2.5 TR with 5 Star BEE Rating	Each	118123
32.4.4	3.0 TR with 5 Star BEE Rating	Each	123684
32.4.5	3.5 TR with 5 Star BEE Rating	Each	139610
32.4.6	4.0 TR with 5 Star BEE Rating	Each	142201
	Heating & Cooling		
32.4.7	1.5 TR with 3 Star BEE Rating	Each	60141
32.4.8	2.0 TR with 3 Star BEE Rating	Each	67052
32.4.9	2.5 TR with 3 Star BEE Rating	Each	80764

#### **TOWER TYPE SPLIT UNITS**

- 32.5 Supplying, Installation, Testing and Commissioning of Air Cooled Floor standing Tower type split Air conditioners complete with Indoor unit(IDU), Out door unit (ODU), surface / concealed copper Refrigerant piping with insulation (closed cell elastomeric nitrile rubber tubular pipe section) upto 5 Mtr (IDU to ODU), copper power cable upto 5.5 Mtr (IDU to ODU), i/c drain pipe of suitable length and size. R-32/R-410/R-407C Green Refrigerant, wireless Remote control, suitable for working between 180-260V with low & high voltage cutoff and 50 hz ,1 phase AC supply capable of performing cooling, dehumidification, air circulation of following capacity with Scroll / rotary with min 5 year Original Equipment Manufacturer (OEM) warranty

both compressor and Printed Circuit Board (PCB). as specified. The system shall be able to deliver 100% of the rated capacity as per relevant IS Code. The lab testing reports as per IS: 1391 shall be submitted from National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited as per International Electrotechnical Commission (IEC) 17025 standards / Central Power Research Institute (CPRI)/ Electrical Research and Development Association (ERDA) with Original Equipment Manufacturer (OEM) etc. complete as per CPWD specification and as per IS: 1391 as required.

#### Heating & Cooling

32.5.1	3.3 TR BEE 4 Star Rating	Each	131188
32.5.2	3.8 TR BEE 4 Star Rating	Each	138746
32.5.3	4.6 TR BEE 4 Star Rating	Each	146304
Cooling Only			
32.5.4	2.4 TR BEE 5 Star Rating	Each	93613
32.5.5	3.3 TR BEE 5 Star Rating	Each	104086
32.5.6	3.8 TR BEE 5 Star Rating	Each	110025
32.5.7	4.6 TR BEE 5 Star Rating	Each	116287

#### AIR COOLED PACKAGE UNITS

- 32.6 Supplying, installation, testing and commissioning of Air cooled ductable type Packaged air-conditioning units complete with Hermetically sealed Scroll compressors fitted inside the indoor unit & first charge of refrigerant R410A or equivalent permitted green refrigerant & oil, air cooled condenser, fan section with statically/dynamically balanced centrifugal blower driven by a Totally Enclosed Fan Cooled (TEFC) squirrel cage three speed motor, Multi rows cooling coil of copper with aluminium fins etc. The enclosures shall be fabricated of M.S. The Package unit shall be equipped with synthetic fiber filter, insulated drain pan, controls all encased in a unit. The casing shall be factory powder coated. Electrical panel board for Package units shall comprise of control and power panel with including all accessories i/c Voltage scanner, overload, low voltage, high voltage & phase imbalance protection, along with VI Pads complete with all ancillaries including MS painted stand for Outdoor units of suitable size, foundation and allied minor civil works as per instructions of Engineer-in-charge of following ratings including electric control panel & fitting as per CPWD specifications and as per IS: 8148 complete as



required.

**Inverter**

32.6.1	5.0 TR (2.8 EER)	Each	131382
32.6.2	8.0 TR (2.8 EER)	Each	177609
32.6.3	11.0 TR (2.8 EER)	Each	214946
32.6.4	16.5 TR (2.8 EER)	Each	301037
32.6.5	22.0 TR (2.8 EER)	Each	393585

## CHAPTER-33 CHILLERS

Item No.	Description	Unit	Rate
<b>AIR COOLED CHILLERS</b>			
<b>AIR COOLED SCREW CHILLERS</b>			
33.1	<p>Supplying, installation, testing and commissioning of following capacity Air-Cooled (suitable for out door installation) Screw Chiller package complete with VFD (Variable Frequency Drive), hermetic/semi hermetic, screw type compressor each with step less capacity control of 25 % to 100 % of the rated capacity, with microprocessor based control panel compatible for BMS operation, motor, starter panel (VFD), machine mounted, air- cooled condensers with Copper tube and Aluminium fins, factory fitted chiller insulation, water flow switch, vibration spring Isolators, victaulic couplings, integral refrigerant piping and wiring with single/ two circuits, automatic and safety controls mounted in central console panel and all mounted on a steel frame (complete as per specifications) i/c suitable foundation/mounting structure made of RCC/MS Structure i/c anticorrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge. Motor shall be suitable for 415±10% 50 cycles. 3 phase AC supply. Refrigerant gas used shall be R-134A. The chiller shall be Building Management System (BMS) compatible The system shall be in confirmation to IS : 16590, BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.</p> <p>Chilled water Leaving Temp. (6.67 °C)</p> <p>Chilled water Entering Temp. (12.2 °C)</p> <p>Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW</p> <p>Condenser air entering temp. : As per Site Dry Bulb Temperature</p> <p>Suitable for Seismic Zone and Altitude as per location/site.</p> <p>Microprocessor based controller.</p>		
33.1.1	Upto 74 TR BEE 3 Star rated	Per TR	28073
33.1.2	75 TR - 140 TR BEE 3 Star rated	Per TR	27137
33.1.3	141 TR - 200 TR BEE 3 Star rated	Per TR	25734
33.2	Supplying, installation, testing and commissioning of following capacity Air-Cooled Screw Chiller package complete with VFD (Variable Frequency Drive), hermetic/semi hermetic, Mono/multiple screw type		

compressor each with step less capacity control of 25 % to 100 % of the rated capacity, with microprocessor based control panel, motor, starter panel (VFD), machine mounted, air- cooled condensers with Copper tube and Aluminium fins, factory fitted chiller insulation, water flow switch , vibration spring Isolators, victaulic couplings, integral refrigerant piping and wiring with multiple circuits, automatic and safety controls mounted in central console panel and all mounted on a steel frame (complete as per specifications) i/c suitable foundation/mounting structure made of RCC/MS Structure i/c anticorrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge. Motor shall be suitable for  $415 \pm 10\%$  50 cycles. 3 phase AC supply. Refrigerant gas used shall be R-134a. The chiller shall be Building Management System (BMS) compatible The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.

Chilled water Leaving Temp. ( $6.67^{\circ}\text{C}$ )

Chilled water Entering Temp. ( $12.2^{\circ}\text{C}$ )

Evaporator fouling factor =  $0.018 \text{ m}^2. ^{\circ}\text{C}/\text{kW}$

Condenser air entering temp. : As per Site Dry Bulb Temperature

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.2.1	upt to 200 TR - BEE 4 Star Rated	Per TR	29009
33.2.2	201 TR to 250 TR BEE 4 Star Rated	Per TR	26669
33.2.3	251 TR - 300 TR BEE 4 Star Rated	Per TR	25266
33.2.4	301 TR - 350 TR BEE 4 Star Rated	Per TR	24330
33.2.5	351 TR - 400 TR BEE 4 Star Rated	Per TR	23394

#### AIR COOLED SCROLL CHILLERS

- 33.3 Supplying, installation, testing and commissioning of following capacity Air-Cooled , Scroll Chiller package complete with VFD (Variable Frequency Drive), hermetic/semi hermetic, multiple scroll type compressors each with step less capacity control of 25 % to 100 % of the rated capacity, with microprocessor based control panel, motor, starter panel (VFD), machine mounted, air-cooled condensers, factory fitted chiller insulation, water flow switch , vibration spring Isolators, victaulic couplings, integral refrigerant piping and wiring with single/ two

circuits, automatic and safety controls mounted in central console panel and all mounted on a steel frame (complete as per specifications) i/c suitable foundation/mounting structure made of RCC/MS Structure i/c anticorrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge. Motor shall be suitable for 415±10% 50 cycles. 3 phase AC supply. Refrigerant gas used shall be R-410A. The chiller shall be Building Management System (BMS) compatible. The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.

Chilled water Leaving Temp. (6.67 °C)

Chilled water Entering Temp. (12.2 °C)

Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW

Condenser air entering temp. : As per Site Dry Bulb Temperature

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.3.1	Upto 50 TR BEE 4 Star Rated	Per TR	22926
33.3.2	51 TR - 70 TR BEE 4 Star Rated	Per TR	22458
33.3.3	71 TR - 100 TR BEE 4 Star Rated	Per TR	21991
33.4	Supplying, installation, testing and commissioning of following capacity Air-Cooled Scroll Chiller package complete with VFD (Variable Frequency Drive), hermetic/semi hermetic, multiple scroll type compressors each with step less capacity control of 25 % to 100 % of the rated capacity, with microprocessor based control panel, motor, starter panel (VFD), machine mounted, air-cooled condensers, factory fitted chiller insulation, water flow switch , vibration spring Isolators, victaulic couplings, integral refrigerant piping and wiring with single/ two circuits, automatic and safety controls mounted in central console panel and i/c suitable foundation/mounting structure made of RCC/MS Structure i/c anticorrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge. Motor shall be suitable for 415V ±10% 50 cycles. 3 phase AC supply. Refrigerant gas used shall be R-410A. The chiller shall be Building Management System (BMS) compatible The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.		

Chilled water Leaving Temp. (6.67 °C)  
 Chilled water Entering Temp. (12.2 °C)  
 Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/Kw  
 Condenser air entering temp. : As per Site Dry Bulb Temperature  
 Suitable for Seismic Zone and Altitude as per location/site.  
 Microprocessor based controller.

33.4.1	upto 50 TR BEE 3 Star Rated	Per TR	21991
33.4.2	51 TR - 70 TR BEE 3 Star Rated	Per TR	20587
33.4.3	71 TR - 100 TR BEE 3 Star Rated	Per TR	20119

### **WATER COOLED CHILLERS**

#### **WATER COOLED SCREW CHILLERS**

- 33.5 Supplying, installation, testing and commissioning of following capacity floor-mounted water cooled screw-type chiller machine complete with VFD (Variable Frequency Drive), single/multi semi-hermetic mono/multi screw type compressor, water-cooled Shell & Tube type condenser, Shell & Tube horizontal flooded type evaporator with carbon steel shell and seamless copper tubes with 19 mm nitrile rubber insulation i/c suitable foundation/mounting structure made of RCC/MS Structure i/c anticorrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge, interconnected copper refrigerant piping and wiring, vibration Isolators, gauge panel, automatic safety controls, flow switch at evaporator and condenser and ozone friendly Chlorofluorocarbons (CFC)-free refrigerant gas R-134A. The refrigerant flow control shall use an electronic expansion valve. The chiller shall be designed for a Water Side working pressure of 150 PSI and hydraulically tested at 1.3 times of design pressure . A number of properly spaced baffles shall be provided for maintaining optimum water velocity and heat transfer and the tubes shall be adequately supported. The chiller shall be Building Management System (BMS) compatible The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.

Chilled water Leaving Temp. (6.67 °C)  
 Chilled water Entering Temp. (12.2 °C )  
 Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW  
 Condenser water Entering Temp. (32.2 °C)

Condenser water Leaving Temp. (36.4 °C)

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.5.1	Upto 70 TR BEE 3 Star Rated	Per TR	19183
33.5.2	71 TR - 110 TR BEE 3 Star Rated	Per TR	16844
33.5.3	111 TR - 150 TR BEE 3 Star Rated	Per TR	16844
33.5.4	151 TR - 210 TR BEE 3 Star Rated	Per TR	16844
33.5.5	211 TR - 260 TR BEE 3 Star Rated	Per TR	16376
33.5.6	261 TR - 300 TR BEE 3 Star Rated	Per TR	15908
33.5.7	301 TR - 450 TR BEE 3 Star Rated	Per TR	14972
33.5.8	451 TR -600 TR BEE 3 Star Rated	Per TR	14504

33.6 Supplying, Installation, Testing and Commissioning of following capacity floor-mounted VFD (Variable Frequency Drive) Operated water cooled screw-type chiller machine complete with single/multi semi-hermetic mono/multi screw type compressor, with independent circuits, water-cooled Shell & Tube type condenser, Shell & Tube horizontal flooded type evaporator with carbon steel shell and seamless copper tubes with 19 mm nitrile rubber insulation i/c suitable foundation/mounting structure made of RCC/MS Structure i/c anticorrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge, common base frame, interconnected copper refrigerant piping and wiring, vibration Isolators, gauge panel, automatic safety controls, flow switch at evaporator and condenser and ozone friendly Chlorofluorocarbons (CFC)-free refrigerant gas R-134A. The refrigerant flow control shall use an electronic expansion valve. The chiller shall be designed for a Water Side working pressure of 150 psig and hydraulically tested at 1.5 times of design pressure . A number of properly spaced baffles shall be provided for maintaining optimum water velocity and heat transfer and the tubes shall be adequately supported. The chiller shall be Building Management System (BMS) compatible The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.

Chilled water Leaving Temp. (6.67 °C)

Chilled water Entering Temp. (12.2 °C)

Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW

Condenser water Entering Temp. (32.2 °C)

Condenser water Leaving Temp. (36.4 °C)

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.6.1	Upto 74 TR BEE 4 Star Rated	Per TR	20587
33.6.2	75 TR - 150 TR BEE 4 Star Rated	Per TR	19651
33.6.3	151TR - 300 TR BEE 4 Star Rated	Per TR	17780
33.6.4	301TR - 450 TR BEE 4 Star Rated	Per TR	16844
33.6.5	451 TR - 525 TR BEE 4 Star Rated	Per TR	14972
33.6.6	526 TR - 600 TR BEE 4 Star Rated	Per TR	14037

33.7 Supplying, installation, testing and commissioning of following capacity floor-mounted Variable Frequency Drive (VFD) water cooled scroll-type chiller machine complete with hermetic scroll type single/ multi compressors with independent circuits, water-cooled carbon steel shell, seamless copper tubes condenser and evaporator with 19 mm nitrile rubber insulation, i/c suitable foundation/mounting structure made of RCC/MS Structure with anti-corrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge, gauge panel, automatic safety controls, flow switch at evaporator and condenser and ozone friendly Chlorofluorocarbons (CFC)-free refrigerant gas R-410A. The refrigerant flow control shall use an electronic expansion valve. The chiller shall be designed for a Water Side working pressure of 150 psig and hydraulically tested at 1.5 times of design pressure. A number of properly spaced baffles shall be provided for maintaining optimum water velocity and heat transfer and the tubes shall be adequately supported. The chiller shall be Building Management System (BMS) compatible The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.

Chilled water Leaving Temp. (6.67 °C)

Chilled water Entering Temp. (12.2 °C)

Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW

Condenser water Entering Temp. (32.2 °C)

Condenser water Leaving Temp. (36.4 °C)

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.7.1	Upto 40 TR BEE 3 Star Rated	Per TR	22926
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33.7.2	41 TR - 75 TR BEE 3 Star Rated	Per TR	22458
33.7.3	76 TR - 150 TR BEE 3 Star Rated	Per TR	21991

#### WATER COOLED CENTRIFUGAL CHILLERS

- 33.8 Supplying, Installation, Testing & Commissioning of following capacity Centrifugal Water Cooled Chilling Machine complete with factory fitted (unit mounted/ free standing) (Variable Frequency Drive (VFD)) with active harmonic filter with IP54 protection having actual capacity as below. The refrigerant shall be ozone friendly Chlorofluorocarbons (CFC)-free refrigerant gas R-134A. The chiller machine shall be test and performance as per IS : 16590 and BEE star labeling. The scope of work shall include Lifting, shifting & positioning of the equipment at location shown on the drawing. Chiller given hereunder, comprising of following and complete as per specification/drawings and as directed by Engineer-in-charge. - Chilled water inlet temperature of 12.2°C (54°F) & Chilled water outlet temperature 6.7°C (44°F) with chilled water circulation, Evaporator side fouling factor 0.018 m<sup>2</sup>.°C /kW - Condenser water inlet temperature Inlet - 32.2°C (90°F) & condenser water outlet temperature of 36.4°C (97.5°F) with water circulation, Condensor side fouling factor 0.044 m<sup>2</sup>. °C/Kw.

a) Open/ Semi-Hermetic/ Fully hermetic Centrifugal Compressor complete with automatic capacity control system, safety switches, speed increasing mechanism, forced feed lubrication system etc. as per detailed specifications and compressor extended warranty of 1 year for refrigerent leakage & mechanical seal.

b) Suitable capacity TEFC/SPDP Squirrel Cage Induction Motor with enclosure IP 23/ as per Original Equipment Manufacturer (OEM) standard & class 'F' insulation suitable for operation on 415±10% Volt, 3 Phase, 50 HZ, AC Supply. Vendor must provide Junction box along with each set of unit including cable works from junction box to chiller.

c) Unit Mounted/ Free standing IP-54 protection (UL /EN certified) Variable Frequency Drive (VFD) Starter panel with air Cooled/ Refrigerant Cooled or as per Original Equipment Manufacturer (OEM) standard, suitable for compressor motor, complete having over-load protection, under-voltage protection, protection against phase reversal, current sensing independent single phasing protection etc. including multi-function meter and CTs, complete as per detailed specifications. Variable Frequency Drive (VFD)s shall comply with International Electrotechnical Commission (IEC) 61800-3 & have THD



less than 5% at all Loads Active / passive filters must be use to achieve desired THD levels and other parameters as per IEEE - 519. Variable Frequency Drive (VFD)s shall be compatible for Modbus/BACnet Protocols. The power factor shall be  $\geq 0.95$  at all loads. Original Equipment Manufacturer (OEM) shall ensure quality for each set of chiller & Variable Frequency Drive (VFD) before dispatch.

d) Lubrication Device consisting of automatic electric oil pump, oil cooler, head tank, oil strainer, automatic pressure regulating valve, oil heater, thermal switch etc, as per detailed specifications and as required.

e) Matching Shell and Tube Water Cooled Condenser of M.S. Shell and integrally finned Copper Tubes, 2 pass heat exchanger. The Condenser shall have U- stamping / PED Certification.

f) Matching Shell and Tube Flooded type Chiller for centrifugal unit consisting of MS Shell and Copper Tubes, 2 pass Heat Exchanger, duly insulated at factory complete as per specifications and as required. The Evaporator shall have U- stamping.

h) Refrigerant Line Accessories comprising of safety valves, angle valve, liquid line indications, liquid level control, liquid line Isolation valve, etc. OR as per Original Equipment Manufacturer (OEM) design standard complete as per specifications.

i) DP/ Water Flow Switches at inlet and outlet of the condenser & chiller, water drain & air purge valves wherever required, complete as per specifications.

g) Suction Line and Chiller Insulation with minimum 19mm thick elastomeric nitrile rubber insulation complete as required from factory.

h) Foundation Frame Work for mounting the above condenser, chiller, compressor and motor with base plate, panel complete with anti-vibration pads (set of spring type), vibration isolators with Isolation efficiency more than 90%. Numbers shall be as per Original Equipment Manufacturer (OEM) standards.), complete as per specifications.

i) Initial/ First Charge of Refrigerant Gas and Compressor Oil.

j) Chiller shall be factory tested at 25%, 50%, 75% and 100% load at Constant Condenser Water inlet and as per relevant IS.

k) Each chiller shall be provided with set of grooved coupling along with the chiller for cooler and condenser inlet / outlet connection.

l) Chiller Original Equipment Manufacturer (OEM) shall provide undertaking in the name of end user for providing support for maintenance & spare availability for next 7 yrs from the date of Handover.

m) Software Selection Sheet to be as per relevant IS based on latest version.

n) Sound performance shall be as per relevant IS for all loads. This data shall be provided as apart of chiller technical submittal.

o) Suitable for Seismic Zone and Altitude as per location/site.

p) The chiller shall be Building Management System (BMS) compatible and communication/ Ethernet /RS485/SNMP port open protocol for BMS integration including suitable software

q) Microprocessor based controller.

33.8.1	300 TR - 450 TR BEE 3 Star Rated	Per TR	25266
33.8.2	451 TR - 600 TR BEE 3 Star Rated	Per TR	24798
33.8.3	601 TR - 1000 TR BEE 3 Star Rated	Per TR	24330
33.8.4	1001 TR - 1600 TR BEE 3 Star Rated	Per TR	23862
33.8.5	1601 TR - 2000 TR BEE 3 Star Rated	Per TR	23862

#### WATER COOLED MAGNETIC CENTRIFUGAL CHILLERS

33.9 Supplying, installation, testing & commissioning of following capacity water cooled Magnetic centrifugal type chiller machine complete with hermetic single/ multi compressors with independent circuits. The refrigerant shall be ozone friendly Chlorofluorocarbons (CFC)-free refrigerant gas R-134A. The chiller machine shall be test and performance as per IS : 16590 and BEE star labeling. The chiller shall have single Semi/hermetically sealed refrigerant cooled motor of working on  $415V \pm 10\%$ , 3 Phase, 50 Hz AC supply. Shell & tube flooded chiller & condenser with descaling & drain valves, victaulic /Flange coupling on condenser & evaporator, microprocessor panel for multiple start ups, i/c suitable foundation/mounting structure made of RCC/MS Structure with anti-corrosive paint, anti vibration pad, power control cable and connection inter connection etc. as per design approved by engineer-in-charge, electrical termination suitable for aluminium conductors along with thermal insulations anti vibration pads, flow switch and required accessories etc, Movable diffuser, Sight Glass at evaporator, Liquid line Isolation valves, Liquid Crystal Display (LCD) Human Machine Interface (HMI) . complete as per specifications and drawings. Complete with first charge of Refrigerant

(Preferably at factory charge).

Starter shall be Variable Frequency Drive (VFD) type and shall be Unit Mounted/ Floor Mounted  $\geq$ IP42 ( UL Listed / CE/IS Marked). Each Compressor shall be equipped with Suitable capacity Permanent Magnet Motor with class 'F' Insulation suitable for operation on 415 +/- 10% volts, 50 HZ, A.C. Supply. Chillers shall be factory AHRI tested at design conditions at 100%, 75%, 50% and 25% load respectively; test certificates shall be produced for all chillers. The chiller shall be Building Management System (BMS) compatible and shall have RS485/RS232 serial communication protocol; the motor shall be suitable for 3-Phase, 415 V  $\pm$  10%, 50 Hz AC electric supply. The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date. BEE Star labeling and CPWD Specification as amended upto date and tested as per IS 16590.

Chilled water Leaving Temp. (6.67°C)

Chilled water Entering Temp. (12.2 °C)

Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW

Condenser water Entering Temp. (32.2 °C)

Condenser water Leaving Temp. (36.4 °C)

Condenser fouling factor = 0.044 m<sup>2</sup>. °C/kW

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.9.1	121 TR - 150 TR BEE 3 Star Rated	Per TR	27605
33.9.2	151 TR - 300 TR BEE 3 Star Rated	Per TR	22458
33.9.3	301 TR - 450 TR BEE 3 Star Rated	Per TR	21991
33.9.4	451 TR - 600 TR BEE 3 Star Rated	Per TR	20213
33.10	Supplying, installation, testing & commissioning of following capacity water cooled Magnetic centrifugal type chiller machine complete with hermetic single/ multi compressors with independent circuits, The refrigerant shall be ozone friendly Chlorofluorocarbons (CFC)-free refrigerant gas R-134a. The chiller machine shall be test and performance as per IS : 16590 and BEE star labeling. The chiller shall have dual Semi/hermetically sealed refrigerant cooled motor of working on 415V $\pm$ 10%, 3 Phase, 50 Hz AC supply. Shell & tube flooded chiller & condenser with descaling & drain valves, Victaulic/Flange coupling on condenser & evaporator, microprocessor panel for multiple starts, i/c suitable foundation/mounting structure made of RCC/MS Structure with anti-corrosive paint, anti vibration pad, power		

control cable and connection inter connection etc. as per design approved by engineer-in-charge, electrical termination suitable for aluminium conductors along with thermal insulations anti vibration pads, flow switch and required accessories etc, Movable diffuser, Sight Glass at evaporator, Liquid line Isolation valves, Liquid Crystal Display (LCD) Human Machine Interface (HMI). complete as per specifications and drawings. Complete with first charge of Refrigerant (Preferably at factory charge ) . Starter shall be Variable Frequency Drive (VFD) type and shall be Unit Mounted/ Floor Mounted  $\geq$ IP42 ( UL Listed / CE/IS Marked). Each Compressor shall be equipped with Suitable capacity Permanent Magnet Motor with class 'F' Insulation suitable for operation on 415 +/- 10% volts, 50 HZ, A.C. Supply. Chillers shall be factory AHRI tested at design conditions at 100%, 75%, 50% and 25% load respectively; test certificates shall be produced for all chillers. The chiller shall be Building Management System (BMS) compatible and shall have RS485/RS232 serial communication protocol; the motor shall be suitable for 3-Phase, 415 V  $\pm$  10%, 50 Hz AC electric supply. The system shall be in confirmation to IS : 16590 and CPWD Specification as amended upto date.

Chilled water Leaving Temp. (6.67°C)

Chilled water Entering Temp. (12.2 °C)

Evaporator fouling factor = 0.018 m<sup>2</sup>. °C/kW

Condenser water Entering Temp. (32.2 °C)

Condenser water Leaving Temp. (36.4 °C)

Condenser fouling factor = 0.044 m<sup>2</sup>. °C/kW

Suitable for Seismic Zone and Altitude as per location/site.

Microprocessor based controller.

33.10.1	120 TR - 210 TR BEE 4 Star Rated	Per TR	29945
33.10.2	211 TR - 300 TR BEE 4 Star Rated	Per TR	27137
33.10.3	301 TR - 355 TR BEE 4 Star Rated	Per TR	23862
33.10.4	356 TR - 450 TR BEE 4 Star Rated	Per TR	21991
33.10.5	451 TR - 600 TR BEE 4 Star Rated	Per TR	21897



## CHAPTER 34

### COOLING TOWERS

Item No.	Description	Unit	Rate
34.1	<b>COOLING TOWER</b>		
	Supplying, Installation, testing and commissioning of Induced Draft counterflow cooling Towers(CTI approved). The Cooling Tower shall be of Fiber Reinforced Plastic (FRP) Construction. The casing, basin/sump, fan deck and fan cylinder shall be of FRP, with direct driven fans, Galvanised hardware complete with sump and drain connection with suitable valve, PVC Honey comb fill, louvers, drift eliminator complete with spray nozzle having self rotating sprinklers, steel ladder, Isolating switch and other accessories to make it fully operational and maintainance National Accreditation Board for Testing and Calibration Laboratories (NABL) & positioning of cooling tower at Terrace of Building. Propeller Type Fan, weather proof IP 55 and Direct driven.The fan motor shall be premium efficiency IE3 class , as per IS 12615 The Cooling tower shall be capable to communicate effectively with Building Management System (BMS). Range of CT: 6 °C. Designed Duty Conditions :- EWT, LWT , D/WBT Complete as per CPWD specification/drawings and as directed by Engineer-in-charge. ( Note - Cooling tower size depends on the ambient temperature conditions , contractor must check the required design temperature).		
34.1.1	300 GPM	Each	320033
34.1.2	450 GPM	Each	427148
34.1.3	600 GPM	Each	597021
34.1.4	750 GPM	Each	800884
34.1.5	900 GPM	Each	931092
34.1.6	1050 GPM	Each	1021370
34.1.7	1200 GPM	Each	1179071
34.1.8	1350 GPM	Each	1246446
34.1.9	1500 GPM	Each	1373711
34.1.10	1800 GPM	Each	1691873
34.1.11	2100 GPM	Each	1916501
34.1.12	2400 GPM	Each	2276196

34.1.13	2700 GPM	Each	2383197
34.1.14	3000 GPM	Each	2549102

## CHAPTER 35

### AHU & FCU

Item No.	Description	Unit	Rate
35.1	<b>CEILING SUSPENDED AHU</b>		
	Supplying, Installation, testing and commissioning of Factory built ceiling suspended chilled water double skin type horizontal/vertical air handling units of following capacity, made of 25mm thick panels consisting of pre plasticized G.I. casing of thickness 0.8mm outside layer and 0.8 mm inside layer with Polyurethane Foam (PUF) insulation factory injected between them by injection moulding machine, complete with blower section with blower suitable for static pressure as required, minimum 2 bend PVC eliminators, cooling coil section with aluminium finned copper tubes (tubes thickness not less than 0.5mm) cooling coil of 4 row deep, filter section with 50mm thick metal viscous/ washable synthetic type air prefilters, belt drive package with Totally Enclosed Fan Cooled (TEFC) drive motor of efficiency class IE3 suitable for $415 \pm 10\%$ volts, 50Hz, 3 Phase AC supply suitably designed for Variable Frequency Drive (VFD) applications, drain connections, stainless steel (18G) drain pan with PUF insulation, 150 mm dia. dial type pressure gauges (2 nos.) and industrial type thermometres (2 nos.) at the inlet and outlet of coil, auto purge valve wherever required, necessary vibration Isolation arrangement, noise level shall not exceed 70 dB. AHU shall be AHRI/Eurovent certified, fan shall be AMCA certified etc. Complete as per CPWD specification/drawings and as directed by Engineer-in-Charge. (Total static pressure considered is 50 mm WG).		
35.1.1	1000 CFM	Each	64662
35.1.2	1600 CFM	Each	75330
35.1.3	2000 CFM	Each	80476
35.1.4	2500 CFM	Each	91705
35.1.5	3000 CFM	Each	101063
35.1.6	4000 CFM	Each	116036
35.1.7	5000 CFM	Each	142237



35.1.8	6000 CFM	Each	160017
35.1.9	8000 CFM	Each	198383
35.1.10	10000 CFM	Each	254530
35.1.11	12000 CFM	Each	305997

#### **FCU ( FAN COIL UNIT)**

##### **35.2 DUCTABLE FAN COIL UNIT**

Supplying, installation ,testing and commissioning of Ceiling Concealed Fan Coil Unit comprising of 3 rows deep chilled water cooling coil, centrifugal blowers, fractional horse power (FHP) motor, synthetic fibre filters, insulated & extended condensate drain pan along with L-type auxillary tray, casing, coil piping connections, condensate drain piping connections & wiring. Fan coil units shall be suitable for operation on 220  $\pm$  10% Volts, 50Hz, single phase power supply of following sizes & capacities. Complete as per CPWD specification and as directed by Engineer-in-charge.

35.2.1	3.0 TR nominal capacity with 1200 CFM air quantity.	Each	23114
35.2.2	2.5 TR nominal capacity with 1000 CFM air quantity.	Each	21336
35.2.3	2.0 TR nominal capacity with 800 CFM air quantity.	Each	18341
35.2.4	1.5 TR nominal capacity with 600 CFM air quantity.	Each	16002
35.2.5	1.0 TR nominal capacity with 400 CFM air quantity.	Each	14130

##### **35.3 CASSETTE FAN COIL UNIT**

Supplying, installation, testing and commissioning of Chilled Water Ceiling Suspended Hydronic Cassette type fan coil unit, four(4) way directional flow, low noise, each complete with two(2) rows of deep chilled water cooling coil, multi-blade centrifugal fan, test reports from National Accreditation Board for Testing and Calibration Laboratories (NABL)/AHRI accerded lab, electronic air cleaning system, required set of ball valves with & without strainers & 2 way Motorized valve, insulated condensate drain pans with drain pump assembly & drain pump failure alarm, pipe connections through copper pipes, Infra-red remote

	control, Liquid Crystal Display (LCD), four (4) speed motor , fan four(4) direction air flow, auto swing louver, decorative panel etc., condensation drain connections, All units shall be suitable for 220 +/- 10% Volts, 50 Hz, single phase power supply etc. complete as per specification. The wireless Remote temperature control / thermostat shall have memory back up for set point re-store in case of power failure and re-start. Four(4)hanger rods with required anchoring fasteners, hooks, washers etc.complete as per CPWD specification and as directed by Engineer-in-charge.		
35.3.1	4.0 TR nominal capacity with 1600 CFM air quantity.	Each	46817
35.3.2	3.5TR nominal capacity with 1400 CFM air quantity.	Each	43512
35.3.3	3.0 TR nominal capacity with 1200 CFM air quantity.	Each	24049
35.3.4	2.5 TR nominal capacity with 1000 CFM air quantity.	Each	21897
35.3.5	2.0 TR nominal capacity with 800 CFMm air quantity.	Each	16844
35.3.6	1.5 TR nominal capacity with 600 CFM air quantity.	Each	14411
35.3.7	1.0TR nominal capacity with 400 CFM air quantity.	Each	13569
35.4	<b>HIGH WALL FAN COIL UNIT</b> Supplying, installation ,testing and commissioning of High wall Fan Coil Unit comprising of two 2 rows deep chilled water cooling coil, centrifugal blowers, fractional horsepower (FHP) motor , synthetic fibre filters, insulated & extended condensate drain pan, casing, coil piping connections, condensate drain piping connections & wiring. Fan coil units shall be suitable for operation on 220 $\pm$ 10% Volts, 50Hz, single phase power supply of following sizes & capacities. Complete as per CPWD specification and as directed by Engineer-in-charge.		
35.4.1	2.0 TR nominal capacity with 800 Cfm air quantity.	Each	24933
35.4.2	1.5 TR nominal capacity with 600 Cfm air quantity.	Each	21922
35.4.3	1.0 TR nominal capacity with 400 Cfm air quantity.	Each	17889



## CHAPTER 36

### EVAPORATIVE COOLING

Item No.	Description	Unit	Rate
36.1	<p><b>EVAPORATIVE COOLING</b></p> <p>Supplying, Installation, Testing and Commissioning of factory assembled double skin central evaporative cooling plant having following specifications</p> <p>A. Air washer section comprising 50 mm thick pre-air filter made out from washable Aluminium wire mesh filter with 90 % down to 10 microns.</p> <p>B. Humidification section comprising of Wet pads 200 mm thick impregnated cellulose paper media (Celdec pads) with two (2) bend PVC eliminator, internal casing with blank off's of wet section In SS-304 construction.</p> <p>C. Fan Section comprising of belt driven, Double Inlet Double Width (DIDW) backward curved fan with outlet velocity less than or equal to 10 m/s and minimum efficiency of 70% Air Movement &amp; Control Association International (AMCA) certified centrifugal fan suitable for required cfm at 50 mm WC static pressure.</p> <p>D. Totally Enclosed Fan Cooled (TEFC) motor of IE-3 class as required with pulley, belt.</p> <p>E. The unit shall be fabricated with frame work hollow extruded aluminium profile with 0.80 mm precoated GSS on outside and on inside complete with 25 mm thick Chloroflouro Carbon (CFC) free Polyurthane Frame (PUF) insulation of minimum 40 kg/cum density sandwiched in between inner and outer skins, SS -304 (18 SWG) Sump tank, 25mm C-PVC piping, make up, drain &amp; quick fill and drain connection, Butterfly/Gate valves for pumps, make up, drain &amp; quick fill and drain connections of sump, 2 no. Pumps of suitable capacity and necessary fittings, stand, anti vibration pads etc.as required.</p> <p>F. Starter panel DOL/Star-Delta suitable for operation of Blower motor &amp; pump made out of 1.6 mm thick sheet steel powder coated enclosure comprising of over load protection relay, short circuit &amp; single phasing protection, ON / OFF push buttons, ammeter, voltmeter, indicating lamps, MCB, contactor etc. (As per Specification of CPWD &amp; direction of Engineer- in-charge) complete in all respect</p>		

G. All as per pre approved by Engineer-in-charge.

36.1.1	5000 CFM	Each	99192
36.1.2	8000 CFM	Each	131944
36.1.3	10000 CFM	Each	174053
36.1.4	12000 CFM	Each	206337
36.1.5	15000 CFM	Each	246108
36.1.6	20000 CFM	Each	345299
36.1.7	25000 CFM	Each	396767
36.1.8	30000 CFM	Each	483793

## CHAPTER 37

### AIR COOLED HEAT PUMP FOR HOT WATER

Item No.	Description	Unit	Rate
<b>AIR COOLED HEAT PUMP ( FOR HOT WATER )</b>			
37.1	<p>Supplying, installation , testing &amp; commissioning of Heat pumps system for hot water using heat energy source from ambient air to Hot water, of High efficiency and energy saving operation, capable of heating water at 55° to 60° C with silent operation (the sound level should not exceed 65 dB). The Heat Pump shall have LCD display control panel with built in diagnostic and troubleshooting information and an inbuilt cycle for defrosting in case icing occurs on evaporator including all other mounting, fitting and controls, all interconnecting wiring/cabling between heat pump and electric panel etc including hot water storage tank complete in all respect with but not limited to following specifications. Power Supply V/Ph/Hz : 400V~440V, three Phase, 50Hz. Suggested Maximum output water temperature in °C: <math>\geq 55</math> °C, ambient temperature range in °C: -5 °C~45 °C , Type of Fan : Low Noise axial fan , Suggested Noise level: dB <math>\leq 65</math> , COP: 3.0 to 4.0. Hot Water Storage Tank consisting of GI/MS/SS cylindrical shape clarifier tank. (inlet temperature of hot water storage tank <math>\geq 55^{\circ}\text{C}</math>) suitable for minimum 4 Kg /Sq.cm working pressure. Tank shall be provided with water flow meter, inlet / outlet, overflow, drain connection with cover, 6 mm thick tank, pressure relief valves, pressure gauge at inlet / outlet with isolation cock, thermometer at inlet / outlet, ball Valve, safety valve, check valve etc and capacity of the tank shall be for 03 Hr rated output. The complete system to be tested to a pressure of 10 Kg/cm<sup>2</sup> complete in all respects including temperature indicators, thermostat and other required accessories. Tank shall be insulated with 100 mm thick crown 150 grade &amp; 50 mm rock wool pads of approved quality and cladded with 24 SWG aluminium sheet cladding.</p>		
37.1.1	200 L	Each	112292
37.1.2	300 L	Each	149723
37.1.3	500 L	Each	196512



## CHAPTER-38

### IPABX/EPABX System

Item No.	Description	Unit	Rate
38.1	Supplying, installation, testing and Commissioning of IP based voice communication system with 04 Port Voicemail, 04 Port FXS, 04 Port FXO, 1 PRI Trunk lines (30 Channels) Circuit with CLIP Facility, min 100 IP users License with provision for further additions, 100 analog users, 01 Number IP based Operator Console, 100 Party Conference, Speed Dial, Music on Hold, Internal/ External ring difference, Call Barring, Call Pickup, Redundant server in active -Active mode and as per technical specification including supporting accessories etc complete as required. The system should have valid TEC GR approval from DoT.	Each	1578920.00
38.2	Supplying, installation, testing and Commissioning of IP at its core with IP switching technology and 100% non blocking communication system with 04 Port Voicemail, 04 Port FXS, 04 Port FXO, 1 PRI Trunk lines (30 Channels) Circuit with CLIP Facility, min 100 IP users License with provision for further additions, 100 analog users, 01 Number IP based Operator Console, 45 Party Conference, Speed Dial, Music on Hold, Internal/ External ring difference, Call Barring, Call Pickup. The system should be redundant which offer 100% duplication of power supply and CPU card and to match the hybrid IP-PBX as per technical specification including supporting accessories etc complete as required. The system should have valid TEC GR approval from DoT.	Each	1246949.00
38.3	Supplying, Installation, Testing & Commissioning of Type 1 IP Phone having 2 VoIP account, 120 x40 DOT matrix screen with backlight, Full HD duplex speaker phone, IPV6, Gigabit Ethernet, PoE etc. complete as required.	Each	11698.00
38.4	Supplying, Installation, Testing & Commissioning of Analog phones having standard features like 16 digit LCD display, 2 way speaker, caller ID and number storage facility etc. complete as required.	Each	1544.00
38.5	Supplying and drawing 20 Pair 0.5 mm dia FRLS PVC insulated annealed copper conductor, unarmored telephone cable in the existing surface/ recessed steel/ PVC Conduit etc. complete as required.	Meter	344.00





## CHAPTER -39 LAN

Item No.	Description	Unit	Rate
39.1	Supplying, installation, Testing and commissioning of following capacity 8 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: Minimum 8 X RJ-45 Gigabit Ethernet Ports and additional 2 X 1G SFP Ports with non-blocking architecture by having Switching capacity of minimum 20Gbps and packet forwarding rate of 14Mpps or higher, 8K MAC table. Internal dual AC Power supply with operating temperature of -5 °C to +50 °C. Jumbo frame: 10KB or higher, IGMP Snooping, IGMP snooping querier and support for IGMP Snooping Fast Leave, Should create 250 or more MLD groups, MLD Snooping, Per VLAN MLD Snooping C MLD Snooping Fast Leave, STP, RSTP, MSTP, Loopback detection, Multicast filtering, VLAN Tagging, QOS: 8 Que per port, WRR, IPv4/IPv6 Interface : minimum 100 IPv4 static route entries and minimum 50 IPv6 static route entries, 700 Access Control entries, SSH CSSL for IPv4 and IPv6, 802.1x, ARP Spoofing, DHCP Snooping and server screening, IP+MAC+Port Binding, Per Port Bandwidth Control, 802.1X Authentication (Supports local/RADIUS database, Port-based Access Control and EAP, OTP, TLS, TTLS, PEAP Support) Cable Diagnostic feature, LLDP, LLDP-MED, SNTP/NTP, RMON, SNMP v1,v2c, v3 and SNMP Traps. Certifications: UL, CE, FCC, RoHS, MTCTE, OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.		
39.1.1	8 port PoE Layer 2 Network Switch with PoE Support of 130W or higher with each copper port supporting 802.3at PoE+.	Each	35091
39.1.2	8 port Layer 2 Non-PoE Network Switch	Each	28073
39.2	Supplying, installation, Testing and commissioning of following capacity 8 port PoE Layer 2 Industrial Grade outdoor Network Switch having features and specifications etc. as mentioned here under: At least 8 X RJ-45 PoE/PoE+ Gigabit Ethernet Ports and additional 4 X 1G SFP Ports with non-blocking architecture by having Switching capacity of min.		

24Gbps and packet forwarding rate of 17Mpps or higher, console port, 16K MAC table, IPv4 and IPv6 ready, IGMP snooping v1, v2, v3, DHCP, DHCP Relay, NTP/SNTP, SNMPv1, v2 C v3, TELNET/ SSH, LACP, STP, RSTP, MSTP, ERPS. VLAN: Port based, Mac based, IP subnet based, tag based, protocol based. Q-in Q, L2/L3 ACL, 1588v2 Precision Time Protocol HW-Based E2E Transparent clock, SNTP, TFTP, SNMP, Radius, Syslog. Dual DC Power input, IP30 rated, DIN Rail, -5° to 70° C operating temperature. Certificate: UL, CE, FCC, NEMA-TS2, IEC/MIL-STD for Shock , Vibration & Drop Certificate. OEM Should have Certificate for Industrial Cyber Security Capability IEC-62443-4-1:2018, ISO 45001, ISO 27001 and ISO 14001 Certified or Equivelent Indian Certificate. OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.

Each 106678

- 39.3 Supplying, installation, Testing and commissioning of following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10G Base -T with 4 X SFP Ports with non-blocking architecture by having Switching capacity of min. 168Gbps and packet forwarding rate of 125Mpps or higher, 16K MAC table. Console Port, USB port, Stacking support of min. 8 units per stack. Internal dual AC Power supply, STP, RSTP, MSTP, BPDU Filter, BPDU Restriction, Min. 9K Jumbo Frame, LBD, IGMP Snooping V1/V2/V3, MLD Snopping V1/V2. IGMP /MLD Groups 1K or more, IPv4/IPv6 Loopback Interface, 16 L3 IP Interface, Ipv6 ND, VRRPv3, UDP Helper, ECMP. VLAN: 802.1Q, Port based, Q-in-Q, Multicast VLAN, Protocol VLAN, VLAN Trunking, DHCP Snopping, Server, server Screening. RADIUS , TACACS+ Authentication, QoS: 802.1P, 8 queues per port, QoS : WRR, Strict+WRR, WRED, 802.1p. ACL: MAC based, IPv4C IPv6, TCP/UDP Port number, time based ACL, TFTP Client, SNMP V1, v2c, v3, SNMP traps, RMON, DHCP server, relay, client, LLDP, LLDP-MED, OAM, Dying Gasp, 802.3ah, sflow, RIP, OSPF v2/v3, policy based route, SSL, SSH. 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: UL, CE, FCC, RoHS, MTCTE, OEM/Product must be on Trusted Telecom Portal of

	Department of Telecommunication, Government of India etc. complete as required.		
39.3.1	24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each copper port supporting 802.3at PoE+ min.	Each	125393
39.3.2	24 port Layer 2 Non-PoE Network Switch	Each	86163
39.4	Supplying, installation, Testing and commissioning of following capacity 24 port Layer 3 Network Switch having features and specifications etc. as mentioned here under: At least 20 X RJ-45 Gigabit Ethernet Ports and additional 4 combo 10/100/1000 base-t/SFP Ports with additional 4 SFP+ ports non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95Mpps or higher, 16K MAC table. Console Port, USB port, Internal AC Power supply with operating temperature of 0 to +50 °C. Stacking port with stacking support of minimum 8 units per stack. 48K Mac address, 9K or more Jumbo frame, ERPS with enabling ring to converge in less than 50 ms from node or link failure, Static routing, Static, 6to4, ISATAP and GRE, IPv6 Neighbor Discovery (ND), BGP, ISIS, MPLS, VRRP v2, OSPFv2/v3, PBR, Route Redistribution, RIPv1/v2/ng, IP Helper all L3 Protocols should support from day 1 for both IPv6 and IPv4, 802.1x, Port security , Radius C TACACS+ authentication C accounting, DAD, DAI, DoS attack prevention, SSH, Guest VLAN, IP Access List, MAC Access List. Multicast: VLAN, PIM-SM, PIM-DM, PIM- SDM, PIM-SMv6, DVMRP v3 and MSDP, IGMP C MLD Snooping, Flow mirroring, IGMP C MLD Snooping Querier, Per-VLAN IGMP C MLD Snooping. SNMP, Dual configurations, Multiple images, RMON, LLDP/LLDP-MED, sFlow, DHCP/BOOTP Client, IPv4/IPv6, Syslog server, Debug command, 802.3ah Ethernet Link OAM, 802.1ag Connectivity Fault, Y.1731 OAM, 802.1Qbb Priority- based Flow Control (PFC), Dying Gasp, Cable Diagnostics , 6 kV surge protection on all Gigabit Ethernet ports and on all GE RJ-45 access ports. Certifications: UL, CE, FCC, RoHS, MTCTE, OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.	Each	193791
39.5	Supplying, installation, Testing and commissioning of 10 Giga Bandwidth Data Centre Network Switch of 48		

port Layer 3 having features and specifications etc. as mentioned here under: - ToR/EOR/Core Network Switch 48x 10GbE SFP+, 6x 100GbE QSFP28, RPS, with Console Port, Management Port and 1 x USB 2.0 Type A port, The switch must provide a switching capacity of no less than 2.16 Tbps and a forwarding rate of at least 1600 Mpps, ensuring non-blocking performance for high-bandwidth applications. It should support hot-swappable dual power supply modules (AC or DC) for 1+1 redundancy and load sharing, as well as hot-swappable, front-to-back airflow fan trays with N+1 redundancy to ensure continuous availability. IEEE 802.1X support for port-based and MAC-based authentication should be available, along with integration for RADIUS and TACACS+ authentication services. Guest VLANs, DoS prevention, and management access restrictions are essential. SNMP v1/v2c/v3, syslog, sFlow, and support for auto-configuration via DHCP. Support for OpenFlow v1.4, Netconf/YANG, and LLDP is required for modern network automation. Support ONIE (Open Network Install Environment), IEEE 802.1Q bb Priority-based Flow Control (PFC), OpenFlow v1.4, ERPS, IPv6 Tunneling, IP interfaces and supported, VXLAN, Private VLAN, Multicast VLAN, Guest VLAN Double VLAN (Q-in-Q), RoCEv2, PIM-SSM/SM, MSDP. Support High Availability with MLAG/VSS and Layer 2/3 VPNs Critical for Multi-tenant, Virtualized, and Containerized Environments. BGPv4/v6, OSPFv2/v3, IS-IS, RIPng. VRRP, ECMP, BFD, and route redistribution for high-availability routing. Support flexible routing domains and secure inter-segment traffic flow. Certifications: CE, FCC, MTCTE, OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.

Each 1055981

39.6	Supplying, Installation, Testing and commissioning of small form-Pluggable (SFP) for Network Switches. Must be hot Pluggable, RoHS Complaint, etc. complete as required.	
39.6.1	1G SFP Single Mode/Multi Mode	4211
39.6.2	1G Copper SFP	7018
39.6.3	10 G SFP + Single Mode/Multi Mode	14972
39.6.4	40G SFP	42110
39.6.5	100G SFP	126329

- 39.7 Supplying, Installation, Testing and commissioning of indoor Wireless Access Point for Low Density use having features and specifications etc. as mentioned here under - Dual-band Wi-Fi6 (802.11ax) 574Mbps (2.4GHz) + 1200Mbps (5GHz), WI-FI 6 Certified, 1 x RJ45 console port, 1G LAN POE Port, factory reset, WPA/WPA2/WPA3™ Personal/Enterprise, WEP 64/128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server, SNMP, Customizable Captive Portal, Auto Channel, Works as Access Point, WDS, WDS with AP, Wireless Client, Web (HTTP), Secure Socket Layer (SSL), Traffic control, Support ATF/Fast Roaming/Band Steering, Supports enhanced security – WPA-PSK/WPA2-PSK/WPA3-PSK and RADIUS client, and Cipher negotiation, and MAC/ IP ACL for networks, Certifications: MTCTE, CE, FCC. Should also work as Standalone and must be Compatible with S/W & H/W Controller with additional features like - Real-Time Monitoring and Alerts, Rich Advanced Features, Centralized Device Management, Role-Based Administration, Real-Time Monitoring, VLAN and Access Control, Auto RF Management and Bandwidth Optimization, Multi-SSID and Captive Portal Authentication.OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required. Each 22739
- 39.8 Supplying, Installation, Testing and commissioning of indoor Wireless Access Point for High density use having features and specifications etc. as mentioned here under- WiFi6 802.11ax 574Mbps (2.4GHz) + 2402Mbps (5GHz), WIFI 6 Certified, 1 x RJ45 console port, MG 2.5G LAN POE Port, factory reset, WPA/WPA2/WPA3™ Personal/Enterprise, WEP 64/128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server, SNMP, Customizable Captive Portal, Auto Channel, Works as Access Point, WDS, WDS with AP, Wireless Client ., Web (HTTP), Secure Socket Layer (SSL), Traffic control, Support ATF/Fast Roaming/Band Steering, Supports enhanced security – WPA-PSK/WPA2-PSK/WPA3-PSK and RADIUS client, and Cipher negotiation, and MAC/ IP ACL for networks, Certifications: MTCTE, CE, FCC. Works as Standalone, Compatible with S/W & H/W Controller with additional features like - Real-Time

	Monitoring and Alerts, Rich Advanced Features, Centralized Device Management, Role-Based Administration, Real-Time Monitoring, VLAN and Access Control, Auto RF Management and Bandwidth Optimization, Multi-SSID and Captive Portal Authentication.OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required.	Each	35559
39.9	Supplying, Installation, Testing and commissioning of Outdoor Wireless Access Point having features and specifications etc. as mentioned here under - WIFI 6 Certified, 1 x RJ45 console port, MG 2.5G LAN POE Port, factory reset, 4 x internal antennas, the transmission coverage of shall be minimum 80 meters in radius, AP should have transmission power minimum of 22 dBm, The AP shall provide a minimum of 29 dBm EIRP for both 2.4 GHz and 5 GHz frequencies. Feild deployment shall be with EIRP as per regulatory guidelines, AP shall have dual-band Omni-directional Antenna, either internal or external. Feild deployment shall be with EIRP as per the WPC guideline, WPA/WPA2/WPA3™ Personal/Enterprise, WEP 64/128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server, SNMP, Customizable Captive Portal, Auto Channel, Works as Access Point, WDS, WDS with AP, Wireless Client, Web (HTTP), Secure Socket Layer (SSL), Traffic control, Support ATF/Fast Roaming/Band Steering, Supports enhanced security – WPA-PSK/WPA2-PSK/WPA3-PSK and RADIUS client, and Cipher negotiation, and MAC/ IP ACL for networks, IP68 water/dustproof standard, 6KV Surge Protection; 4KV ESD Protection (contact), 6KV (air), Operating ambient temperature (-5~50 °C), Grounding point support, IEC 60601-1-2 EMC Medical Electrical Equipment Testing and Certification, EN50121-1 & EN50121-4 for Wireless Application. Certifications: MTCTE, CE, FCC. Works as Standalone, Compatible with S/W & H/W Controller with addtional features like - Real-Time Monitoring and Alerts, Rich Advanced Features, Centralized Device Management, Role-Based Administration, Real-Time Monitoring, VLAN and Access Control, Auto RF Management and Bandwidth Optimization, Multi-SSID and Captive Portal Authentication.OEM/Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc.	Each	46171

complete as required.

- 39.10 Supplying, Installation, Testing and commissioning of indoor Wireless Controller having features and specifications etc. as mentioned here under- The network controller shall be a dedicated hardware appliance designed for centralized management of wireless access points, It must support the management of up to 500 networking devices, The system should be on-premise, ensuring data privacy and complete control over network configurations. It must include an intuitive user interface for real-time monitoring, device discovery, firmware upgrades, scheduling, and mass configuration deployment. Features such as role-based administration, multi-site management. AP to controller communication shall be use of industry standards-based (IEEE or IETF) CAPWAP or any tunneling protocols as per guidelines of DoT. The controller should support Layer 2 and Layer 3 device discovery, VLAN configuration, MAC ACL groups, IGMP snooping, and bandwidth optimization. Automatic radio frequency (RF) management and access policy enforcement are required for reliable wireless performance. The solution must offer a comprehensive dashboard with network topology, floor plan views, client and device lists, and alert notifications. For authentication, it should support a range of methods including local database, external RADIUS, LDAP, and passcode or MAC-based access. It should provide detailed traffic analytics, logs, and customizable reporting for network visibility and planning. Firmware and configuration backup and restoration functions must be available, with USB-based log storage supported. Physical specifications should include a compact form factor with a minimum of one 2.5G Ethernet port and USB 3.0 port, and it must be MTCTE, CE, FCC, and RoHS certified. The controller should operate reliably within a 0°C to 40°C temperature range and 10–90% non-condensing humidity. /Product must be on Trusted Telecom Portal of Department of Telecommunication, Government of India etc. complete as required. Each 113228
- 39.11 Supplying Installation Testing and Commissioning of 24 port Cat6 Patch Panel loaded. Must be of 1U height with clear label holders and white label with the panel. Each 5278



	24 Ports Cat-6 Patch Panel should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.		
39.12	Supplying, Installation, Testing and commissioning of following CAT6 Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.		
39.12.1	Copper Patch Cords of length 1m (3ft)	Each	151
39.12.2	Copper Patch Cords of length 3m (10ft)	Each	227
39.13	Supplying, Installation, Testing and commissioning of following CAT6A Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D etc. complete as required.		
39.13.1	Copper Patch Cords of length 1m (3ft)	Each	173
39.13.2	Copper Patch Cords of length 3m (10ft)	Each	405
39.14	Supplying, Installation, Testing and commissioning of CAT6 Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability etc. complete as required.	Each	212
39.15	Supplying, Installation, Testing and commissioning of CAT6A Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability etc. complete as required.	Each	302
39.16	Supplying, Installation, Testing and commissioning of RJ45 Connector for CAT 6/6A Cables. RJ45 modular plug supports 4 twisted pairs, 8 positions, 8 connectors. Housing: PC, UL94V-2, transparent color, Use for 24- 26 AWG stranded wires etc. complete as required.	Each	9
39.17	Supplying, drawing, Installation, Testing and commissioning of CAT6 UTP LSZH 23AWG Twisted		

	Pair Cable in existing conduit/ on surface, Category 6 Unshielded Twisted Pair, 4 pair should be complied as per UL/ETL verification program for compliance with ANSI/TIA-568.2-D standard. Outer diameter should be in the range of 6.1mm nominal with Operating Temperature Range : -5° to +60°C, Bending Radius : < 4 X Cable Diameter at -5°C ± 1°C and Pulling Force : 11.5Kg etc. complete as required.		
39.17.1	1 Run of cable	Meter	60
39.17.2	2 Run of cable	Meter	96
39.17.3	3 Run of cable	Meter	131
39.17.4	4 Run of cable	Meter	167
39.18	Supplying, drawing, Testing and commissioning of Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non-Plenum, Horizontal (solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel. The 4 Unshielded Twisted Pairs (UTP) cable with color coded insulation for easy identification should have FLAME PROPERTIES i.e. Flammability Test - IEC 60332-1, Smoke Density - IEC 61034, LSZH standards compliance: ANSI/TIA-568 C.2, ISO/IEC 11801, IEEE 802.3an, RoHS. Delay Skew should be < 45NS. The outer Cable Diameter should be 7.5 + 2 mm. Cable should have been tested and verified by UL/ ETL etc. complete as required.		
39.18.1	1 Run of cable	Meter	74
39.18.2	2 Run of cable	Meter	124
39.18.3	3 Run of cable	Meter	174
39.18.4	4 Run of cable	Meter	224
39.19	Supplying and drawing following core Fiber Optic Cable having corrugated steel armoring. The Fiber should be SM Fiber Central -loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS ) and HDPE- Sheath, Operating ambient Temperature should be – 5 °C to +50 °C and Storage Temperature shall be – 5 °C to +50 °C, Max Attenuation ± 0.36 (db / km) at Operational Wavelength 1310 nm and ± 0.22		

	db / km at Operational Wavelength 1550 nm. type of fiber should be 9/125 / G.652D & Refractive Index should be 1.4670/1.4675. The value for Mode-field, Cladding Diameter $9.2 \pm 0.4 \mu\text{m}$ and $125 \pm 0.7 \mu\text{m}$ correspondingly. The Dispersion value $\leq 3.5 \leq 18$ ps/nm-km and PMD value $\leq 0.2$ ps/km and Cable Cut-off wavelength $\leq 1260$ nm i/c splicing & marking etc complete as required.		
39.19.1	Single Mode 6 Core Optical fiber cable	Meter	64
39.19.2	Single Mode 12 Core Optical fiber cable	Meter	89
39.20	Supplying and drawing following core Multi mode Fiber Optic Cable having corrugated steel armoring, lesser optimize 50/125 $\mu\text{m}$ with HDPE jacket, LSZH (Low smoke Zero Halogen), Tight-buffered or loose tube, maximum attenuation: $\leq 3.5$ dB/km at 850 nm, $\leq 1.5$ dB/km at 1300 nm, bandwidth $\geq 2000$ MHz-km at 850 nm, $\geq 500$ MHz-km at 1300 nm compliance and certifications: ISO/IEC 11801 Ed. 2.2, ANSI/TIA-568-C.3, ITU-T G.651.1 RoHS compliant. Multi Mode Fiber shall be Central-loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core, High quality Electro Chromium Coated Corrugated Steel tape (ECCS ) and HDPE- Sheath, Operating ambient Temperature should be $-5^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ and Storage Temperature should be $-5^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ , Maximum Attenuation $\pm 3.5$ dB/km at Operational Wavelength 850 nm and $\pm 1.5$ dB / km at Operational Wavelength 1300 nm . type of fiber should be 50/125 / G.652D & Refractive Index should be 1.483/1.478, The value for Mode-field, Cladding Diameter $50 \pm 2.5 \mu\text{m}$ and $125 \pm 1 \mu\text{m}$ correspondingly i/c splicing & marking etc complete as required.		
39.20.1	6 Core Multi Mode Optical Fiber Cable	Meter	87
39.20.2	12 Core Multi Mode Optical Fiber Cable	Meter	109
39.21	Supply and fixing following port Rack Mount loaded LIU with pigtail, Front-mounted cable saddles for jumper management, suitable to manage both splices and terminations, Pre-assembled shelves in multiple configurations, Rubber fiber slotted bracket built-in, metal splice shelf to protect the fibers, 2 fiber spools built-in for 900 $\mu\text{m}$ tight buffered fiber storing, Capable of storing up to 3 meters of 900 $\mu\text{m}$ tight buffered fiber		

per adapter, Removable front and rear covers for better access to interior of LIU, Should be Single / Multi mode LC Type fully loaded. Accessory kit consists of cable ties, mounting ear screws, and spiral wrap tube etc complete as required.

39.21.1	6 Port LIU	Each	5471
39.21.2	12Port LIU	Each	7040
39.21.3	24 Port LIU	Each	10049
39.22	Supplying and fixing Patch Cord of Optical Fiber Multi Mode or Single Mode LC to LC Fiber Duplex having high precision ceramic ferrule with good concentricity, Fiber corning single mode G652D, Cable Type 2mm with Mechanical specification Apex Offset $\leq 50 \mu\text{m}$ , Fiber Height $\pm 100 \text{ nm}$ , End-face radius of Curvature $7\text{mm} < R < 25\text{mm}$ , Repeatability $\leq 0.2 \text{ db}$ , Working ambient Temperature $- 5^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ , Storage Temperature $- 10^{\circ}\text{C}$ to $+50^{\circ}\text{C}$ , Length -- 2meter, Type -- LC-LC Duplex etc complete as required.	Each	705
39.23	Supplying and fixing of following size Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm with 'U'Marking, Minimum 2 cable entry/exit provision at Top and bottom with rubber protection, Front 5mm Toughened Glass with lock, wall mounting kit, Powder coated Color- RAL- 7035, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.		
39.23.1	6U Rack	Each	6939
39.23.2	9U Rack	Each	8960
39.23.3	15U Rack	Each	13330
39.24	Supplying and fixing 24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm Powder Coated CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U'Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 5nos two line cable entry/exit provision at top and	Each	21201

	bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.		
39.25	Supplying and fixing 42U Rack with 6 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.6mm CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm with 'U'Marking completely knocked-down condition (CKD) Shape, fitted with 4 number cooling fans, minimum 8nos two line cable entry/exit provision at top and bottom with rubber protection, Front door 5mm Toughened Glass with MS frame or MS perforated with lock, Rear MS vented or perforated door, Powder coated Color- RAL- 7035 or black, complied with UL & RoHS, 2 x 6 sockets 16A power distribution units, 3 numbers closed cable organizer, Hardware mounting screws packet of 20 x 1 number, etc. complete as required.	Each	32954
39.26	Supplying and fixing Outdoor Pole/ Wall mount 6U Rack, IP55, Front Door with Filter, Louver & Unique key Lock. 3 Socket PDU 5Amp - 1 No. Self adhesive thermal foam from inside. Hood For Air Inlet at front side. 1U Cantilever Tray 250mmDepth, Gasket. etc complete as required.	Each	22228

## CHAPTER -40 CCTV CAMERA

Item No.	Description	Unit	Rate
	<b>2 MP IP IR Dome Camera</b>		
40.1	<p>Supplying Installation Testing and Commissioning of 2 MP IP IR Dome Camera having following specifications, type of lens and features etc :-</p> <p>1) Signal System: PAL/NTSC, Signal to Noise Ratio: &gt;50 dB, Camera should display Camera title, Date &amp; Time in live &amp; recorded video</p> <p>2)Image Sensor: 1/2.8" or better progressive Scan CMOS to get color image even at night condition(Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day &amp; Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.</p> <p>3) Compression (Minimum):-Video:- H.265 or better, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723</p> <p>4) Wide Dynamic Range:- WDR (120db or more)</p> <p>5) Digital Noise Reduction:- DNR (3D) On/Off</p> <p>6) Video Streaming &amp; Frame Rates :- Triple streaming , configurable (Main stream: 2MP (1920 ×1080)@25/30 fps,Sub streams minimum: 720P@25/30 fps).</p> <p>7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection</p> <p>8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, syslog, video encryption, IP/MAC filtering, HTTPS, trusted upgrade, trusted boot.</p> <p>9) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.</p>		

- 10) Recording Management: Format SD, overwrite, storage management, video to NAS device
- 11) Alarm Trigger : Motion/tampering detection; audio detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection
- 12) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast
- 13) System Capability: ONVIF, Camera shall support open source VMS
- 14) Ethernet: 1 RJ 45 10/100 Ethernet port
- 15) Audio : It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.
- 16) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source.
- 17) Power Requirement: 12VDC/24 VAC/PoE (802.3af)/ePoE
- 18) Housing/ Enclosure:- IP67 weather proof, IK10, Metallic body
- 19) Operating Condition:- Ambient Temperature:- (-) 05°C to 50°C, humidity 95% (max) (non-condensing)
- 20) IR life: 40000 hours or higher
- 21) Video Bit rate: 32 KBPS - 8 MBPS or better
- 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.1.1	2MP (@ 25/30fps@1080P (1920×1080)) IP IR Dome Camera with 2.8/ 3.6mm fixed lens	Each	8048.00
40.1.2	2MP @ 25/30fps@1080P (1920×1080) Dome Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	19796.00
40.2	<p>2 MP IP IR Outdoor Bullet Camera</p> <p>Supplying Installation Testing and Commissioning of 2MP Fixed Lens IP IR Outdoor Bullet Camera having following specifications and features etc :-</p> <p>1) Signal System: PAL/NTSC, Signal to Noise Ratio: &gt; 50 dB, Camera should display Camera title, Date &amp; Time in live &amp; recorded video</p>		

2) Image Sensor: 1/2.8" or better progressive Scan CMOS to get color image even at night condition (Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt Smart IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.

3) Compression (Minimum):- Video:- H.265 or better, H.264H, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723

4) Wide Dynamic Range:- WDR (120db or more)

5) Digital Noise Reduction:- DNR (3D) On/Off

6) Video Streaming & Frame Rates :- Triple streaming, configurable (Main stream: 2MP (1920 × 1080)@25/30 fps Sub streams minimum: 720P@25/30 fps).

7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection

8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, syslog, video encryption, IP/MAC filtering, HTTPS, trusted upgrade, trusted boot.

9) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.

10) Recording Management: Format SD, overwrite, storage management, video to NAS device,

11) Alarm Trigger : Motion/tampering detection; audio detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection

12) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP- TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,

13) System Capability: ONVIF, Camera shall support open source VMS



- 14) Ethernet: 1 RJ 45 10/100 Ethernet port
- 15) Audio : It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.
- 16) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source.
- 17) Power Requirement: 12VDC/24 VAC/PoE (802.3af)/ePoE
- 18) Housing/ Enclosure:- IP67 weather proof, IK10, Metallic body
- 19) Operating Condition:- Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)
- 20) IR life: 40000 hours or higher
- 21) Video Bit rate: 32 KBPS - 8 MBPS or better
- 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.2.1	2MP @ 25/30fps@1080P (1920×1080) Outdoor Bullet Camera with 2.8/ 3.6mm fixed lens	Each	7760.00
40.2.2	2MP @ 25/30fps@1080P (1920×1080) Outdoor Bullet Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	19796.00

#### 4MP IP IR Dome Camera

- 40.3 Supplying Installation Testing and Commissioning of 4MP IP IR Dome Camera having following specifications and features etc :-

- 1) Signal System: PAL/NTSC, Signal to Noise Ratio: > 50 dB, Camera should display Camera title, Date & Time in live & recorded video
- 2) Image Sensor: 1/2.8" or better progressive Scan CMOS to get color image even at night condition (Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.

- 3) Compression (Minimum): Video:- H.265 or better,  
Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723
- 4) Wide Dynamic Range:- WDR (120dB or more)
- 5) Digital Noise Reduction:- DNR (3D) On/Off
- 6) Video Streaming & Frame Rates :- Triple streaming  
, configurable Main stream: 4MP (2560×1440)25/30fps  
, Sub streams minimum: 720P@25/30 fps
- 7) Image Setting: Rotate Mode, saturation, brightness,  
contrast, sharpness adjustable through client software  
or web browser, Edge Analytics: Tripwire, Intrusion,  
Motion Detection
- 8) Cyber Security: AES 256-bit Encryption,  
Configuration encryption, trusted execution, Digest,  
security logs, account lockout, video encryption,  
IP/MAC filtering, HTTPS, trusted upgrade
- 9) Onboard Storage: Camera should support built-in  
Micro SD/ SDHC/ SDXC Card slot upto 512 GB. It  
should be supplied with minimum 128GB memory  
Card.
- 10) Recording Management: Format SD, overwrite,  
storage management, video to NAS device,
- 11) Alarm Trigger : Motion/tampering detection;  
network disconnection detection; IP conflict detection;  
memory card state detection; memory space detection
- 12) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP,  
NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE,  
NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS,  
unicast,
- 13) System Capability: ONVIF, Camera shall support  
open source VMS
- 14) Ethernet: 1 RJ 45 10/100 Ethernet port
- 15) Audio : It should support 1 x Built-In Mic and 1/1  
Alarm In/ Out for External Mic. and Speakers as per  
site requirement.
- 16) Power Input: The camera should support  
simultaneous dual power input—12 VDC (via power  
adapter) and PoE (802.3af)—to ensure continuous  
operation in the event of a failure in one power source.
- 17) Power Requirement: 12VDC/24 VDC/PoE  
(802.3af)/ePoE
- 18) Housing/ Enclosure:- IP67 weather proof, IK10,  
Metallic body
- 19) Operating Condition:- Ambient Temperature:- (-  
)05°C to 50°C, humidity 95% (max) (non-condensing)

	20) IR life: 40000 hours or higher		
	21) Video Bit rate: 32 KBPS - 8 MBPS or better		
	22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS		
40.3.1	4MP @ 25/30fps@1440P (2560 x 1440) Dome Camera with 2.8/ 3.6/ 6/8/12 mm fixed lens (as per site requirement).	Each	10365.00
40.3.2	4MP @ 25/30fps@1440P (2560x1440) Dome Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	23754.00

#### **4MP IP IR Outdoor Bullet Camera**

40.4 Supplying Installation Testing and Commissioning of 4MP IP IR Outdoor Bullet Camera having following specifications and features etc :-

1) Signal System: PAL/NTSC, Signal to Noise Ratio: > 50 dB, Camera should display Camera title, Date & Time in live & recorded video

2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition (Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better) True Day & Night High Performance Mechanical IR cut filter with auto switch, Integrated IR Source (Auto, Manual)- Inbuilt IR LED's with effective distance upto 50 meter or better and 30 meter for colour view in night, Imaging: 1/3s to 1/30000s electronic shutter support, Auto Gain Control, White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.

3) Compression (Minimum): Video:- H.265-or better, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723

4) Wide Dynamic Range:- WDR (120dB or more)

5) Digital Noise Reduction:- DNR (3D) On/Off

6) Video Streaming & Frame Rates :- Triple streaming, configurable Main stream: 4MP (2560×1440)25/30fps Sub streams minimum: 720P@25/30 fps

7) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser, Edge Analytics: Tripwire, Intrusion, Motion Detection

- 8) Cyber Security: AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade
- 9) Onboard Storage: Camera should support built-in Micro SD/ SDHC/ SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.
- 10) Recording Management: Format SD, overwrite, storage management, video to NAS device,
- 11) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection
- 12) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP –TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,
- 13) System Capability: ONVIF, Camera shall support open source VMS
- 14) Ethernet: 1 RJ 45 10/100 Ethernet port
- 15) Audio : It should support 1 x Built-In Mic and 1/1 Alarm In/ Out for External Mic. and Speakers as per site requirement.
- 16) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source.
- 17) Power Requirement: 12VDC/24 VDC/PoE (802.3af)/ePoE
- 18) Housing/ Enclosure:- IP67 weather proof, IK10, Metallic body
- 19) Operating Condition:- Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)
- 20) IR life: 40000 hours or higher
- 21) Video Bit rate: 32 KBPS - 8 MBPS or better
- 22) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.4.1	4MP @ 25/30fps@1440P (2560 x 1440) Outdoor Bullet Camera with 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement)	Each	10063.00
40.4.2	4MP @ 25/30fps@1440P (2560x1440) Outdoor Bullet Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	23754.00

### **5/6MP IP IR Dome Camera**

40.5 Supplying Installation Testing and Commissioning of 5/6MP IP IR Dome Camera having following specifications and features etc :-

- 1) Type of Camera: Dome Camera
- 2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition
- 3) Signal System: PAL/NTSC
- 4) Minimum Illumination: 0.008Lux@ F1.4, AGC ON, 0 lux with IR or better
- 5) Imaging: 1/3s to 1/30000s Shutter Support, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.
- 6) On Screen Display: Camera should display Camera title, Date & Time in live & recorded video both.
- 7) Signal to Noise Ratio: > 50 dB
- 8) Day & Night: True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source-Inbuilt IR LED's with effective distance upto 50 Mtrs integrated IR 30 Mtrs for colour view in night.
- 9) Video Compression (Minimum): H.265 or better, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723
- 10) Wide Dynamic Range: WDR (120dB or more)
- 11) Digital Noise Reduction: DNR (2D/3D) On/Off
- 12) Streaming: Triple streaming, configurable
- 13) Video Streaming & Frame Rates: Triple streaming  
configurable  
Main stream: 5/6MP @25/30 fps, Sub streams:  
D1@25/30 fps or better
- 14) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser
- 15) Profile Management: User configuration import, export
- 16) Security: User Authentication, Water Marking
- 17) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.
- 18) Recording Management: Format SD, overwrite, storage management, video to NAS device,

- 19) Edge Analytics : Tripwire, Intrusion, Motion Detection
- 20) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection
- 21) Alarm Support: It should have 1/1 Alarm In/ Out Port
- 22) Audio Support: It should have 1x Built-In Mic and 1/1 Audio In/ Out Port for external Mic. and Speaker (As per site requirement) with G.711U/A/ G.711Mu/ AAC/ G.726 audio compression
- 23) Network Protocol: SFTP, IPv6, IPv4, DNS,RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,
- 24) System Capability: ONVIF
- 25) VMS: Camera shall support open source VMS
- 26) Cyber Security: trusted boot, AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, , account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade.
- 27) Ethernet: 1 RJ 45 10/100 Ethernet port
- 28) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE—to ensure continuous operation in the event of a failure in one power source.
- 29) Power Requirement: 12VDC/24VDC/PoE (802.3af)/ePoE
- 30) Enclosure: IP67 weather proof, IK10
- 31) Operating Condition: Ambient Temperature:- (-) 05°C to 50°C, humidity 95% (max) (non-condensing)
- 32) IR life: 40000 hours or higher
- 33) Video Bit rate: 32 KBPS - 8 MBPS or better
- 34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.5.1	5MP/6MP IP IR 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement) Dome Camera.	Each	12800.00
40.5.2	5MP/6MP IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens Dome Camera.	Each	26993.00

### **5MP /6MP IP IR Bullet Camera**

40.6 Supplying Installation Testing and Commissioning of 5MP/6 MP IP IR Bullet Camera having following specifications, type of lens and features etc :-

- 1) Type of Camera: Bullet Camera
- 2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition
- 3) Signal System: PAL/NTSC
- 4) Minimum Illumination: 0.006Lux@ F1.4, AGC ON, 0 lux with IR or better
- 5) Imaging: 1/3s to 1/30000s, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.
- 6) On Screen Display: Camera should display Camera title, Date & Time in live & recorded video both.
- 7) Signal to Noise Ratio: > 50 dB
- 8) Lens Type & Focus: as given below.
- 9) Day & Night: True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source-Inbuilt IR LED's with effective distance upto 50 Mtrs integrated IR and 30 Mtrs for colour view in night.
- 10) Video Compression (Minimum): H.265 or better, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723
- 11) Wide Dynamic Range: WDR (120dB or more)
- 12) Digital Noise Reduction: DNR (2D/3D) On/Off
- 13) Streaming: Triple streaming, configurable
- 14) Video Streaming & Frame Rates: Triple streaming , configurable Main stream: 5MP/6MP @25/30 fps, Sub streams: D1@25/30 fps or better
- 15) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser
- 16) Profile Management: User configuration import, export
- 17) Security: User Authentication, Digital Water Marking
- 18) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.
- 19) Recording Management: Format SD, overwrite, storage management, video to NAS device,

- 20) Edge Analytics: Tripwire, Intrusion, Motion Detection
- 21) Alarm Trigger : Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection
- 22) Alarm Support: It should have 1/1 Alarm In/ Out Port
- 23) Audio Support: It should have 1x Built-In Mic and 1/1 Audio In/ Out Port for external Mic. and Speaker (As per site requirement) with G.711U/A / G.711Mu/ AAC/ G.726 audio compression
- 24) Network Protocol: SFTP, IPv6, IPv4, DNS, RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,
- 25) System Capability: ONVIF
- 26) VMS: Camera shall support open source VMS
- 27) Cyber Security: trusted boot, AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, , video encryption, IP/MAC filtering, HTTPS, trusted upgrade.
- 28) Ethernet: 1 RJ 45 10/100 Ethernet port
- 29) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE—to ensure continuous operation in the event of a failure in one power source.
- 30) Power Requirement: 12VDC/24V DC/PoE (802.3af)/ePoE
- 31) Enclosure: IP67 weather proof, IK10
- 32) Operating Condition: Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)
- 33) IR life: 40000 hours or higher
- 34) Video Bit rate: 32 KBPS - 8 MBPS or better
- 35) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.6.1	5MP/6MP IP IR 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement) outdoor bullet Camera	Each	12525.00
40.6.2	5MP/6MP IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens outdoor Bullet Camera.	Each	26993.00
<b>8 MP IP IR Dome Camera</b>			
40.7	Supplying Installation Testing and Commissioning of 8 MP IP IR Dome Camera having following specifications and features etc :-		



- 1) Type of Camera: Dome Camera
- 2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition
- 3) Signal System: PAL/NTSC
- 4) Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better
- 5) Imaging: 1/3s to 1/30000s, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.
- 6) On Screen Display: Camera should display Camera title, Date & Time in live & recorded video both.
- 7) Signal to Noise Ratio: > 50 dB
- 8) Day & Night: True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source-Inbuilt -IR LED's with effective distance upto 50 Mtrs integrated IR and 30 meter for colour view in night.
- 9) Video Compression (Minimum): H.265 or better, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723
- 10) Wide Dynamic Range: WDR (120dB or more)
- 11) Digital Noise Reduction: DNR (2D/3D) On/Off
- 12) Streaming: Triple streaming, configurable
- 13) Video Streaming & Frame Rates: Triple streaming , configurable Main stream: 8MP (3840 × 2160)@20 fps, Sub streams: 4MP @25/30 fps & D1@25/30 fps;
- 14) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser
- 15) Profile Management: User configuration import, export
- 16) Security: User Authentication, Water Marking
- 17) Onboard Storage: Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.
- 18) Recording Management: Format SD, overwrite, storage management, video to NAS device,
- 19) Edge Analytics: Tripwire, Intrusion, Motion Detection
- 20) Alarm Trigger: Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection

- 21) Alarm Support: It should have 1/1 Alarm In/ Out Port
- 22) Audio Support: It should have 1x Built-In Mic and 1/1 Audio In/ Out Port for external Mic. and Speaker (As per site requirement) with G.711U/A/ G.711Mu/ AAC/ G.726 audio compression
- 23) Network Protocol: SFTP, IPv6, IPv4, DNS,RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,
- 24) System Capability: ONVIF
- 25) VMS: Camera shall support open source VMS
- 26) Cyber Security: trusted boot, AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade.
- 27) Ethernet: 1 RJ 45 10/100 Ethernet port
- 28) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE—to ensure continuous operation in the event of a failure in one power source.
- 29) Power Requirement: 12VDC/24VDC/PoE (802.3af)/ePoE
- 30) Enclosure: IP67 weather proof, IK10
- 31) Operating Condition: Ambient Temperature:- (-) 05°C to 50°C, humidity 95% (max) (non-condensing)
- 32) IR life: 40000 hours or higher
- 33) Video Bit rate: 32 KBPS - 8 MBPS or better
- 34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.7.1	8 MP (3840 × 2160) or better IP IR 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement) Dome Camera,	Each	19435.00
40.7.2	8 MP (3840 × 2160) or better IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens Dome Camera.	Each	28073.00

#### 40.8 **8 MP IP IR Outdoor Bullet Camera**

Supplying Installation Testing and Commissioning of 8 MP IP IR Outdoor Bullet Camera having following specifications and features etc :-

- 1) Type of Camera: Outdoor Bullet Camera
- 2) Image Sensor: 1/2.8" or better progressive Scan CMOS get color image even at night condition
- 3) Signal System: PAL/NTSC

- 4) Minimum Illumination: 0.006 Lux@ F1.4, AGC ON, 0 lux with IR or better
- 5) Imaging: 1/3s to 1/30000s, Auto Gain Control , White Balance- Auto, Back Light Compensation, Multi zone Privacy Masking, HLC, Digital Watermarking.
- 6) On Screen Display: Camera should display Camera title, Date & Time in live & recorded video both.
- 7) Signal to Noise Ratio: > 50 dB
- 8) Day & Night: True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source-Inbuilt Smart IR LED's with effective distance upto 50 Mtrs integrated IR and 30 meter for colour view in night
- 9) Video Compression (Minimum): H.265 or better, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723
- 10) Wide Dynamic Range: WDR (120dB or more)
- 11) Digital Noise Reduction: DNR (2D/3D) On/Off
- 12) Streaming: Triple streaming, configurable
- 13) Video Streaming & Frame Rates: Triple streaming , configurable Main stream: 8MP (3840 × 2160)@20 fps, Sub streams: 4MP @25/30 fps & D1@25/30 fps;
- 14) Image Setting: Rotate Mode, saturation, brightness, contrast, sharpness adjustable through client software or web browser
- 15) Profile Management: User configuration import, export
- 16) Security: User Authentication, Digital Water Marking
- 17) Onboard Storage; Camera should support built-in Micro SD/SDHC/SDXC Card slot upto 512 GB. It should be supplied with minimum 128GB memory Card.
- 18) Recording Management: Format SD, overwrite, storage management, video to NAS device,
- 19) Edge Analytics: Tripwire, Intrusion, Motion Detection
- 20) Alarm Trigger: Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection
- 21) Alarm Support: It should have 1/1 Alarm In/ Out Port

22) Audio Support: It should have 1x Built-In Mic and 1/1 Audio In/ Out Port for external Mic. and Speaker (As per site requirement) with G.711U/A/ G.711Mu/ AAC/ G.726 audio compression

23) Network Protocol: SFTP, IPv6, IPv4, DNS,RTCP, NTP, RTP, HTTP, HTTPS, SNMP TCP/IP, PPPoE, NFS, UDP, ICMP, SSL, DHCP, SMTP, RTSPS, unicast,

24) User Access: Minimum 08 Users

25) System Capability: ONVIF Profile S, G & T. CCTV Camera OEM should be fulltime member of ONVIF and quoted models should be listed on ONVIF official website (All the certifications & Credentials should be valid on the date of technical evaluation).

26) VMS: Camera shall support open source VMS

27) Cyber Security: trusted boot, AES 256-bit Encryption, Configuration encryption, trusted execution, Digest, security logs, account lockout, video encryption, IP/MAC filtering, HTTPS, trusted upgrade.

28) Ethernet: 1 RJ 45 10/100 Ethernet port

29) Power Input: The camera should support simultaneous dual power input—12 VDC (via power adapter) and PoE—to ensure continuous operation in the event of a failure in one power source.

30) Power Requirement: 12VDC/24VDC/PoE (802.3af)/ePoE

31) Enclosure: IP67 weather proof, IK10

32) Operating Condition: Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)

33) IR life: 40000 hours or higher

34) Video Bit rate: 32 KBPS - 8 MBPS or better

35) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS

40.8.1	8 MP (3840 × 2160) or better IP IR 2.8/ 3.6/6/8/12 mm fixed lens	Each	19435.00
40.8.2	8 MP (3840 × 2160) or better IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens outdoor Bullet Camera.	Each	28073.00

**PTZ (Pan. Tilt and Zoom) IP IR Camera**

40.9 Supplying Installation Testing and Commissioning of PTZ (Pan,Tilt and Zoom) IP IR Camera having following specifications and features etc :-

PTZ (Pan,Tilt and Zoom) IP IR Camera having following specifications and features etc :-

1) IP IR PTZ Camera: Motorized PAN TILT ZOOM with IR

2) Image Sensor: 1/2.8" or better progressive Scan CMOS

3)Signal System: PAL/NTSC

4) Minimum Illumination: 0.008 Lux@ F1.6, AGC ON,, 0 lux with IR, or better

5) Imaging: 1/1s to 1/30000s, Auto Gain Control , White Balance- Auto, Back Light Compensation, Image Rotation, Multi zone Privacy Masking (Upto 24 Area), HLC, Defog, Region Of Interest and EIS features.

6) On Screen Display: Camera should display Camera title, Date & Time in live & recorded video both.

7) Signal to Noise Ratio: > 50 dB

8) Event Notification: Through Relays, E-Mails or FTP

9) Day & Night: True Day & Night High Performance Mechanical IR cut filter with auto switch, IR Source-Inbuilt IR LED's with effective distance. The camera should have IR LED's and cover distance up to 300 meter or above

10) Auto Tracking: The camera should be equipped with Deep-learning-based auto tracking function using simultaneously all of the panning, tilting and zooming should be available. When a motion is detected in a registered monitoring area, the camera should track the motion (object) and capture it.

11) Pre/Post Event Buffering: The camera should support atleast of 5 seconds of pre & post event buffering.

12) Presets: 300 Presets

13) Video Compression (Minimum): H.265 or better, H.264, Audio:- G.711U/A, G.711Mu, G.726, AAC, G.723

14) Wide Dynamic Range: WDR (120dB or more), HLC & BLC

15) Digital Noise Reduction: DNR (2D+3D) On/Off

16) Image Setting: Rotate Mode, ROI ,EIS, Defog, saturation, brightness, contrast, sharpness adjustable through client software or web browser

17) Profile Management: User configuration import, export

- 18) Cyber Security: Configuration encryption, AES 256-bit Encryption, Digest, account lockout, video encryption, IP/MAC filtering, trusted boot, trusted upgrade, trusted execution
- 19) Onboard Storage: Camera should support built in Micro SD/SDHC/SDXC Card slot upto 512 GB . It should be supplied with minimum 128GB Memory.
- 20) Recording Management: Format SD, overwrite, storage management, video to NAS device, remote archive access via FTP login
- 21) Edge based Video Analytics & Alarm Trigger: Motion/tampering detection; network disconnection detection; IP conflict detection; memory card state detection; memory space detection, Tripwire, Intrusion, Object Abandon/ Missing, SMD, Face Detection
- 22) Network Protocol: SFTP, IPv6, IPv4, DNS,NTP, HTTP, HTTPS, SNMP, TCP/IP, PPPoE, NFS, ICMP, DHCP, SMTP, RTSPS.
- 23) System Capability: ONVIF Profile S, G & T. CCTV Camera OEM should be fulltime member of ONVIF and quoted models should be listed on ONVIF official website (All the certifications & Credentials should be valid on the date of technical evaluation).
- 24) VMS: Camera shall support open source VMS
- 25) Connectivity: 1x LAN RJ-45 (10/100Base-T)
- 26) Audio Support: Audio Interface : The camera should have 1/1 Audio In/Out to connect External Mic and Speaker Audio Compression : PCM, G.711U/A, G.711MU, G.726, MPEG2-Layer2, G.722.1
- 27) Alarm In/Out : Alarm In/out- 7/2 Ch In/Out
- 28) Power Input: The camera should support simultaneous dual power input—DC/ AC (via power adapter) and PoE (802.3af)—to ensure continuous operation in the event of a failure in one power source.
- 29) Power Requirement: 24 VDC, 2.5 A ( $\pm$  25%), PoE+ (802.3at)
- 30) Enclosure & Weather Proof Standard: IP67 weather proof and IK10, TVS 8000V lightning proof, surge protection, voltage transient protection
- 31) Operating Condition:- Ambient Temperature:- (-)05°C to 50°C, humidity 95% (max) (non-condensing)
- 32) IR life: 40000 hours or higher
- 33) Video Bit rate: 32 KBPS - 8 MBPS or better

	34) Standards: BIS with ER, STQC Certified, CE, FCC and RoHS		
40.9.1	2 MP IP IR motorized PTZ @ 25/30fps or better camera, Triple streaming , configurable on resolution Main stream: 1080p@25/30 fps Sub streams :1080p@25/30 fps & D1@25/30 fps or better, varifocal lens 4.3-137 mm or better with Automatic & manual Focus Adjustment provisions, 32x Optical zoom and 12x Digital zoom with angle of view 57°–2.4° , PAN Travel: Pan: 0° ~ 360° endless,Manual Pan: 260° /s, Preset : 300° /s, Tilt, Travel: Tilt: -20° ~ 90°, auto flip 180°, Manual Tilt: 120° /s, Preset : 200° /s	Each	70111.00
40.9.2	4 MP IP IR motorized PTZ (4MP @25/30fps or better) camera, Triple streaming , configurable on resolution Main stream: 4MP@25/30 fps Sub streams :1080p@25/30 fps & D1@25/30 fps or better, varifocal lens 4.5-135mm or better with Automatic & manual Focus Adjustment provisions, 30x Optical zoom and 12x Digital zoom with angle of viewH : 57°–2.4° , m, PAN Travel: Pan: 0° ~ 360° endless;Manual Pan: 300° /s, Preset : 300° /s, Tilt Travel: Tilt: 0-90°, auto flip 180°, Manual Tilt: 200° /s, Preset : 300° /s	Each	78389.00
40.9.3	5MP IP IR motorized PTZ @25/30fps or better camera, Triple streaming , configurable on resolution:- Main stream: 5MP@25/30 fps Sub streams:1080p@25/30 fps, varifocal lens 3.95mm (±5mm) ~ 177.75mm (±5mm) or better with Automatic & manual Focus Adjustment provisions, 45x Optical zoom and 16x Digital zoom with angle of view H: 65.7°–1.9°V: 39.4°–1.1°D: 73.1°–2.1, PAN Travel: Pan: 0° ~ 360° endless,Manual Pan: 260° /s, Preset : 300° /s, Tilt Travel: Tilt: -20° ~ 90°, auto flip 180°, Manual Tilt: 120° /s, Preset : 200° /s	Each	107974.00
	<b>Network Video Recorder (NVR)</b>		
40.10	Supplying Installation Testing and Commissioning of following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below :  1) Network Video Recorder Embedded/ Installed OS (Linux) along with Camera Licenses for number of channels of NVR to record per NVR and to provide a live view, storage and simultaneously Multi-channel playback of all IP, IR camera or more and must be ONVIF with minimum support of 256Mbps incoming Bandwidth.		

- 2) NVR should support H.265 or better, H.264, MJPEG, MPEG4 support
- 3) Must support 1 channel Input, 1 channel Output, RCA for Two-way Talk
- 4) Intelligent auto power on when power resumes after power outage.
- 5) Storage: It should support minimum 2 SATA Slots with 20TB capacity/ Slot.
- 6) Connectivity Interface : 1 Nos. x 10/100/1000 Mbps Ethernet Ports, 1x RS485, 1x RS232
- 7) Backup Interface : Its should have 2 Nosx USB port (1x USB3.0, 1xUSB2.0)
- 8) Video Output Ports: 1x HDMI and 1 VGA
- 9) Alarm Ports: It should have 4/1 Ch In/ Out ports to connect various type of external sensors and output devices like hooter/ Siren etc.
- 10) Email & SMS Alert options: Option for SMS/ Email Alerts to minimum 5 designated mobile number for power failure, HDD failure, vandalism, tampering, network disconnection and panic
- 11) Web & Mobile Application: Web, Mobile app ( For iPhone, iPad, Android Phone) for alerts and viewing.
- 12) Protocols: HTTP, HTTPS, TCP/IP, IPv4, UDP, NTP, DHCP, DNS, SMTP, UPnP, DDNS, Alarm Server, IP Search, Multicast, Auto Registration, ONVIF (Profile T, Profile S, Profile G), CGI, SDK and OEM Cloud for remote monitoring without any public IP need.
- 13) Standards: CE, FCC, RoHS and BIS Certified
- 14) Power Supply : Should support 12VDC, 4Amp or AC100-240V, 50/60Hz Power supply.
- 15) Operating Condition : Ambient Temperature (-5°C to 50°C), humidity 90% (max) (non-condensing)
- 16) The VMS, NVR application shall support all the features & functionalities of the offered cameras.
- 17) VMS should consist of Base license and Channel Licenses. VMS should be provided with camera Licenses , with no dependency of VMS licenses by binding with the MAC address of the cameras to achieve the functionality.
- 18) The NVR OEM shall be responsible for providing a mobile application compatible with both Android and iOS devices, enabling remote monitoring and playback of cameras/NVR footage.



- 19) The OEM must provide its own DDNS server hosted in India, eliminating the need for a public IP address for remote monitoring over the Internet.
- 20) Must support Resolution: 7680x4320 (8K), 3840\*2160, 1920×1080, 1280×1024, 1280×720, 1024×768
- 21) Must support recording resolution upto 32MP
- 22) Must support Continuous, Alarm, Motion, Instant, Panic Recording Mode
- 23) When alarm recording is enabled and an event occurs, you can click the alarm icon on monitoring page to view the alert details. The snapshot function is supported on monitoring and playback page
- 24) The Network Video Recorder (NVR) shall be configured to send email whenever a system message is created or an alarm event occurs. The email server shall be a valid SMTP server. Each recipient email address shall be configured to receive any combination of critical, warning, or informational messages or alarm notifications. When an alarm occurs, the email message includes the NVR name, time of alarm and a list of camera that is configured to record upon alarm
- 25) It should support Network Support: HTTP, TCP/IP, SMTP, DHCP, DNS, DDNS, FTP, NTP, UPnP, Multi IP Setting. Convert multiple recording files to one avi/MP4 file.
- 26) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection.
- 27) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behavior of fan
- 28) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, presets and email.

29) Built-In Artificial Intelligence: NVR should have built-in AI :-  
 - 2 Channel face detection and recognition, - Minimum 4 Channel perimeter protection, - Minimum 8 Channel Smart Motion Detection

30) Face Recognition Database Capacity: It should support total Blacklist and Whitelist capacity of Minimum 20,000 Faces or more with Face Detection speed of 12 face images/sec.

31) Face & Human Attributes Search: Search Pictures/ Video by Gender, age group, glasses, expressions, face mask, beard, Top color, top type, hat, bag, age, gender and umbrella.

32) ANPR Capability: It should support ANPR Camera with License plate, plate color, vehicle body, vehicle model, vehicle logo, calling, seatbelt, vehicle registration location etc vehicle attributes.

33) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behavior of fan, cybersecurity exception

34) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, presets and email.

35) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection.

36) Smart playback function: Should support smart search for the selected area in the video and smart playback to improve the playback efficiency

37) VCA (Video Content Analytic): Should support multiple video contented analytics based on camera analytics

40.10.1	08 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9, 2nd screen: 1/4/8/9	Each	10078.00
40.10.2	16 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16, 2nd screen: 1/4/8/9/16	Each	12799.00

40.11 Supplying Installation Testing and Commissioning of following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below :

1) Network Video Recorder Embedded/ Installed OS (Linux) along with Camera Licenses to record per NVR and to provide a live view, storage and simultaneously Multi-channel playback of all IP camera or more and must be ONVIF with minimum support of 384 Mbps incoming Bandwidth.

2) NVR should support video compressions : H.265 or better, H.264, MJPEG.

3) Must support 1 channel RCA Input, 2 channel RCA Output for Two-way Talk with G.711U/A, G.711u, PCM, G726 audio compressions.

4) Intelligent auto power on when power resumes after power outage.

5) Storage: It should support minimum 8 SATA Slots with 20TB capacity/ Slot and RAID support of RAID 0/1/5/6/10.

6) Connectivity Interface : 2 Nos. x 10/100/1000 Mbps Ethernet Ports, 1x RS485, 1x RS232, 1x eSATA Port

7) Backup Interface : Its should have 4 Nosx USB port (2x USB3.0, 2xUSB2.0)

8) Video Output Ports: 2x HDMI and 2 VGA

9) Alarm Ports: It should have 16/8 Ch In/ Out ports to connect various type of external sensors and output devices like hooter/ Siren etc.

10) Email & SMS Alert options: Option for SMS/ Email Alerts to minimum 5 designated mobile number for power failure, HDD failure, vandalism, tampering, network disconnection and panic

11) Web & Mobile Application: Web, Mobile app ( For iPhone, iPad, Android Phone) for alerts and viewing.

12) Protocols: HTTP, HTTPS, TCP/IP, IPv4/IPv6, UDP, DHCP, DNS, SMTP, UPnP, IP Filter, PPPoE, FTP, DDNS, Alarm Server, IP Search, Multicast, Auto Registration, ONVIF (Profile T, Profile S, Profile G), CGI, SDK and OEM Cloud for remote monitoring without any public IP need.

13) Standards: CE, FCC, RoHS, BIS Certified

14) Power Supply : Should support AC100-240V, 50/60Hz Power supply.

- 15) Operating Condition : -5°C to 50°C, humidity 90% (max) (non-condensing)
- 16) The VMS application shall support all the features & functionalities of the offered cameras.
- 17) VMS should consist Licenses for all channels to record Cameras with General, motion detection, intelligent, alarm and POS recording modes. VMS should be provided with Camera Licenses , with no dependency of VMS licenses by binding with the MAC address of the cameras to achieve the functionality.
- 18) The NVR OEM shall be responsible for providing a mobile application compatible with both Android and iOS devices, enabling remote monitoring and playback of cameras/NVR footage.
- 19) The OEM must provide its own DDNS server hosted in India, eliminating the need for a public IP address for remote monitoring over the Internet.
- 20) Must support Continuous, Alarm, Motion, Instant, Panic Recording Mode
- 21) It should support Resolution: 32MP; 24MP; 16MP; 12MP; 8MP; 5MP; 4MP; 1080p; 720p; D1; CIF; QCIF
- 22) When alarm recording is enabled and an event occurs, you can click the alarm icon on monitoring page to view the alert details. The snapshot function is supported on monitoring and playback page
- 23) The Network Video Recorder (NVR) shall be configured to send email whenever a system message is created or an alarm event occurs. The email server shall be a valid SMTP server. Each recipient email address shall be configured to receive any combination of critical, warning, or informational messages or alarm notifications. When an alarm occurs, the email message includes the NVR name, time of alarm and a list of camera that is configured to record upon alarm
- 24) It should have Web and GUI interface.
- 25) Built-In Artificial Intelligence: NVR should have built-in AI :-  
- 2 Channel face detection and recognition, - Minimum 4 Channel perimeter protection, - Minimum 8 Channel Smart Motion Detection

26) Face Recognition Database Capacity: It should support total Blacklist and Whitelist capacity of Minimum 20,000 Faces or more with Face Detection speed of 12 face images/sec and facility to add Name, gender, birthday, address, credential type, credential No., countries & regions and state to each face image.

27) Face & Human Attributes Search: Search Pictures/ Video by Gender, age group, glasses, expressions, face mask, beard, Top color, top type, hat, bag, age, gender and umbrella.

28) ANPR Capability: It should support ANPR Camera with License plate, plate color, vehicle body, vehicle model, vehicle logo, calling, seatbelt, vehicle registration location etc vehicle attributes.

29) Alarm Notifications based on: Motion detection, video tampering, video loss, scene changing, PIR alarm, Camera external alarm, Face detection, face recognition, perimeter protection (intrusion and tripwire), ANPR, people counting, stereo analysis, crowd distribution, heat map, Disk Full, Storage Error, IP Conflict and abnormal behavior of fan, cybersecurity exception

30) Alarm Notification should be linked with Recording, snapshots, Camera external alarm output, buzzer, logs, presets and email.

31) General AI Based Search: Search Pictures by channel, time, event type, target classification (Fall Detection, People Approach Detection, People No. Exception Detection, People Staying Detection, Violence Detection.

32) Smart playback function: Should support smart search for the selected area in the video and smart playback to improve the playback efficiency

33) VCA (Video Content Analytic): Should support multiple video contented analytics based on camera analytics

34) Analytics by NVR: Perimeter protection and face recognition

40.11.1	32 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/32(36), 2nd screen: 1/4/8/9/16	Each	64784.00
40.11.2	64 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/36/64, 2nd screen: 1/4/8/9/16	Each	82600.00

	Hard Disk Drive		
40.12	Supplying, Installation, Testing and Commissioning following capacity Surveillance grade Hard Disk with upto 256MB/s Transfer Rate, 256 MB Cache, 7200 RPM Disk Speed, 3.5 inch form factor, SATA Interface, BSMI, ICES-003/NNB-003, CE, FCC, KC, Maghreb, RCM, UKCA, VCCI, CB-Scheme, TUV, UL Certifications.		
40.12.1	4TB (Terabytes)	Each	13943.00
40.12.2	6TB (Terabytes)	Each	16376.00
40.12.3	8TB (Terabytes)	Each	20119.00
40.12.4	10TB (Terabytes)	Each	24798.00



## CHAPTER - 41

### ACCESS CONTROL SYSTEM

Item No.	Description	Unit	Rate
41.1	Access Control System with Face recognition		
	<p>Supplying, Installation, Testing and Commissioning of Access Control System comprising of Face and fingerprint Recognition, Smart Card, QR Code, NFC &amp; PIN Code based Reader, following sizes of 5" IPS TFT Touch Screens, 1GB RAM, 8 GB ROM, Live Face Detection with anti-spoofing against 2D photograph, mobile selfie &amp; video, Fake Fingerprint and face Detection Technology, 30,000 Face storage (1:N) /, 3,000 fingerprint (1:N), QR code 30,000, 30,000 card storage (1:N), 2 lakh transaction storage, 20,000 image logs, onboard dual camera (colour &amp; IR) Primary camera min 2MP, Support Face authentication &amp; verification from up to 1 meters, Communication protocols WiFi, TCP/IP, Wiegand Out, Wiegand IN, USB, MQTT protocol, Blacklist Employee Management, User wise authentication modes; Built in Lock Control, Mask Detection &amp; Alert (configurable), 40 to 30,000 lux illumination, IP65 for Ingress Protection, Certification: CE, FCC, BIS, ROHS, etc. Metal Enclosure with battery backup, suitable for mounting on metal surface/metal frames/ wooden frames/wall/flap barriers including all mounting bracket &amp; accessories complete etc. as required.</p>		
41.1.1	5" IPS TFT Touch Screen	Each	58,306.00
41.2	Access Control System (without Finger Print)		
	<p>Supplying, Installation, Testing and Commissioning of Access Control System comprising of Face Recognition, Smart Card, QR Code, NFC &amp; PIN Code based Reader, following sizes of 5" IPS TFT Touch Screens, 1GB RAM, 8 GB ROM, AES 128 bit encrypted, Live Face Detection with anti-spoofing against 2D photograph, mobile selfie &amp; video, Fake Fingerprint Detection Technology, 10,000 Face storage (1:N) /, 10,000 card storage (1:N), QR code storage 10,000 (1:N), 2 lakh transaction storage, 20,000 image logs, onboard dual camera (colour &amp; IR) Primary camera min 2MP, Support Face authentication &amp; verification from up to 1 meters, Communication protocols WiFi, TCP/IP, Wiegand Out,</p>		



	<p>USB, MQTT protocol, Blacklist Employee Management, User wise authentication modes; Built in Lock Control, Mask Detection &amp; Alert (configurable), 40 to 30,000 lux illumination, IP54 for Ingress Protection,</p> <p>Certification: CE, FCC, BIS, ROHS, WPC etc. Metal enclosure with battery backup, suitable for mounting on metal surface/metal frames/ wooden frames/wall/flap barriers including all mounting bracket &amp; accessories complete etc. as required.</p>	Each	38,870.00
41.3	<p>Access Control System with 2.8" display (without Face Recognition Readers)</p> <p>Supplying, Installation, Testing and Commissioning of Access control system comprising of fingerprint, card, and password authentication and having following specifications:</p> <ul style="list-style-type: none"> <li>· Authentication Methods: Fingerprint, Card &amp; Password with Capacitive Touch screen.</li> <li>· Fingerprint Detection: Fake Fingerprint Detection Technology.</li> <li>· Display: 2.8" TFT touch Screen display.</li> <li>· Capacity: 10,000 Fingerprint storage (1:N).</li> <li>· Logs: 200,000 transaction logs.</li> <li>· Power: 12V DC. (UL listed)</li> <li>· Communication Protocols: TCP/IP, WiFi, USB, Wiegand Out / IN, RS 485.</li> <li>· Additional Features: User-wise authentication modes, Built-in Lock Control.</li> <li>· Certifications: CE, FCC, RoHS, BIS.</li> <li>· Environmental: IP 54 Ingress Protection.</li> <li>· Mounting: Suitable for metal surfaces/frames, wooden frames, walls, and flap barriers.</li> </ul>	Each	32,392.00
41.4	<p>Access Control System with 1.77" display (without Face Recognition Readers)</p> <p>Supplying, Installation, Testing and Commissioning of Access Control System comprising of Fingerprint &amp; Card based Reader with 1.77" LCD Display, Fake Fingerprint Detection Technology, supports ANSI 378 encryption, AES 128 bit encrypted algorithm to protect important info such as personal info transmitted, 5,000 Fingerprint storage (1 :N) / 10,000 Fingerprint storage (1 :1), 50,000 transaction logs, Onboard Camera to capture live images against transactions, Communication protocols like TCP/IP, Wiegand Out / IN, RS 485, OSDP; Supports Mobile Key through</p>		

	Bluetooth, User wise authentication modes; Built in Lock Control; UL Listed Power Supply, Certification: CE, FCC, RoHS, BIS, WPC, Ingress Protection IP 65 etc. suitable for mounting on metal surface/metal frames/ wooden frames / wall / flap barriers including all mounting bracket & accessories complete etc. as required.	Each	28,073.00
41.5	Software for Web based Access Control System Supplying, Installation, Testing and Commissioning of Web based Access Control Enrolment and Device Configuration Software, Should be independent of OS (Windows), Unified Management of Biometric, Card, and Controllers, Import Functionality for bulk user details, Biometric Template Retrieval for Data Recovery, User Management, Logs and Terminal Management, Support for IP-based and USB Biometric Devices, User-specific Access Policies, Different User Policies on the Same Terminal, Assignment of Specific Access Schedules, Pushing Users to Terminals or Groups, Admin Authority Management to define rights of each user to perform, Blacklist User Management, Access Schedule Creation, Real-Time Log Retrieval, Real- Time User Identification, Secure Storage of Biometric/Users Data, Capable to integrate with 3rd party applications over Web API's, MQTT protocol support	Each	97,176.00
41.6	Electromagnetic locks Supplying, Installation, Testing and Commissioning of Electromagnetic locks (fail safe type) for following type of Doors suitable for operation on 12 V DC having holding force 600 lbs for Single Leaf Door and 1200lbs for Double leaf door with suitable feedback i/c connection complete etc. as required.		
41.6.1	Single leaf door	Each	4831.00
41.6.2	Double leaf door (Each leaf 600lbs & Total 1200 lbs)	Each	7,593.00
41.7	Exit Push Button Supplying, Installation, Testing and Commissioning of Heavy Duty SS Finish Exit Push Button for releasing access doors with all necessary installation accessories i/c connection complete etc. as required.	Each	1,173.00

41.8	Door Position Sensor		
	Supplying, Installation Insta, Testing and Commissioning of Door Position Sensor i/e connection complete etc. as required.	Each	622.00

## CHAPTER - 42

### BUILDING MANAGEMENT SYSTEM (BMS)

Item No.	Description	Unit	Rate
42.1	<p><b>CENTRAL CONTROL SERVER</b></p> <p>Supplying Installation Testing Commissioning of Central Control Server System comprising of Intel® Xeon® CPU E5-2640 x64 (or better) compatible with dual and quad core processors, Windows 11 (Professional, Enterprise, Ultimate, 64 bit), Windows Server 2013 R2 (Standard, Enterprise, 64 bit) 16 GB or more, Video card and monitor capable of displaying at 1024 x 768 resolution or better, Latest Microsoft Licence Version Operating System Loaded with MS OFFICE 2019 Professional, Word, EXCEL, Power Point, Outlook Express, Microsoft Team official version lifetime licences suitable for running BMS software complete etc. as required.</p>	Each	186434.00
42.2	<p><b>PC System</b></p> <p>Supplying Installation Testing Commissioning of Client PC System comprising of PC Hardware with minimum 11th Gen Intel® I7 processor CPU E5-2640 x64 (or better), compatible with dual and quad core processors minimum 3.1 Ghz and 8GB or higher RAM, Hard Drive Space of 256 GB SSD or better, Video card and monitor capable of 1920 x 1080 pixel resolution or better with Ethernet adapter (10/100/1000 Mbps with RJ-45 connector) with 2 GB or higher Graphics card suitable for BMS System complete etc. as required.</p>	Each	90698.00
42.3	<p><b>LaserJet printer</b></p> <p>Supplying Installation Testing Commissioning of LaserJet printer having printing resolution 1200 x 1200 dpi, (dot/inch) or better, 21 to 30 ppm printing speed (LaserJet) complete etc. as required</p>	Each	22674.00
42.4	<p><b>LED Display</b></p> <p>Supplying, Installation, Testing and Commissioning of following size LED display (LED monitor) industrial grade with 3840x2160 resolution or better, USB playback, bluetooth and miracast connectivity, 4X HDMI 2.0, DP 1.2, HDR 10/10+, brightness: 500-nits</p>		

or better, Video wall mode should be available, contrast ratio: 1200:1, OPS slot, viewing angle (H/V): 170°/ 170°, response time less than 12ms, Display control shall be on monitor screen and programmable with remote (remote shall be supplied with system), Key Board, Optical Mouse, etc. as required.

42.4.1	32 inch or larger	Each	39590.00
42.4.2	42 inch or larger	Each	51459.00
42.4.3	55 inch or larger	Each	82057.00

42.5 Software for Building Management System :  
 Supplying Installation Testing Commissioning of Necessary Software (UL listed) Packages containing Building Management with Capability of Collection, Storage, Processing and Controlling all the Data. Software shall support Open Standard Protocols like XML, BACnet, Modbus, Lon works etc. and without the use of Proprietary Protocols, with Enterprise Level Database Like MS SQL complete Lifetime Licenced & capable to collect, store & access all points from Fire Alarm Systems, IT Systems, Automation Systems, HVAC System, Lift, Energy management, Water Management System, etc. to create & monitor historical & event data, event management data, alarm management data & reporting data, Email Alerts for Critical alarms for all the systems. The scope includes additional software required by BMS software (to enable a standard Web browser) to be resident on the DDC/client machine (manufacture-specific browsers shall not be acceptable). User log-on identification and password shall be required & a minimum three-layered security system (User interface Level, Application Level and Data Base Level) to be deployed for safety. The supplied computer software shall employ object-oriented technology (OOT) for representation of all data and control devices within the system. This data shall reside on a server for all database access (Systems requiring proprietary database and user interface programs shall not be acceptable). All components and controllers supplied under this contract shall be true "peer-to-peer" communicating devices (Components or controllers requiring "polling" by a Master / Global / Host to pass data shall NOT be acceptable). Physical connection of BACnet/MOD BUS devices shall be via Ethernet at all levels. The License must be provided by default. The BMS

	software shall be complete in all respect to cater the following different numbers of points managed in the installation.		
42.5.1	For Upto 500 point included	Each	97377.00
42.5.2	For Upto 2500 point included	Each	167892.00
42.5.3	For Upto 5000 point included	Each	246899.00
42.6	<p>Touchscreen Color portable operator terminal</p> <p>Supplying Installation Testing Commissioning of following sizes Touchscreen Color portable operator terminal capable of connecting to one of the controllers on the communication bus and view parameters of the complete system. The terminal should be capable of viewing /changing parameters and trends, the specified parameters as per requirement etc. as required.</p>		
42.6.1	4" Touch Screen	Each	62985.00
42.6.2	7" Touch screen	Each	74468.00
42.7	<p>DDC CONTROLLERS</p> <p>Supplying Installation Testing Commissioning of IP Based DDC controller capable of fully "stand- alone" operation i.e. In the event of loss of communication with other DDC's or Control Station, they shall be able to function on their own. The controllers shall consist of dual/quad core 32 bit microprocessors with EPROM based operating system on BACNET. The network Topology shall not allow single point failure. Each DDC on field level shall have embedded TCP/IP (10/100Mbps) connectivity so that it can be hooked into the Local Area Network (LAN) provided by the client or on dedicated network . Each DDC can be accessed from the Graphical User Interface (GUI) or from a standard Web browser (WBI) by connecting the server alongwith inbuilt web browser. All controllers shall accept 230V+/- 10%, 50Hz Uninterrupted power supply provided by end user. Controller shall support DHCP addressing over Local Area Network (LAN) so that the static IP requirements get reduced however a single static IP shall be provided for system so that it can be hosted on to internet in consultation with end user. The microprocessor based DDC's shall be provided with power supply, analoge to Digital and Digital to analoge converters with memory and capacity to accommodate input/output (I/O) hardware points (with or without an expansion board). Each DDC should have own board and shall accept 0-10 V /</p>		

4-20mA input signal having Minimum 20% spare capacity considered for expansion. Each DDC on field level should have minimum 128MB RAM & 64MB Flash memory. Following type of All controllers should be mandatorily BTL approved with B-BC profile complete etc. as required.

42.7.1	DDC Controller-Type-I (Support upto 32 Points)	Each	46861.00
42.7.2	DDC Controller-Type-II (Support upto 64 Points)	Each	66008.00
42.7.3	DDC Controller-Type-III (Support upto 96 Points)	Each	71047.00
42.7.4	DDC Controller-Type-IV (Support upto 128 Points)	Each	74070.00
42.7.5	DDC Controller-Type-V (Support upto 160 Points)	Each	86264.00
42.8	EXPNSION IO MODULE		
	Supplying Installation Testing Commissioning of following type of input output (IO) expansion module complete etc. as required.		
42.8.1	I/O Module with 4 UIO channels	Each	17636.00
42.8.2	I/O Module with 8 UIO channels	Each	18492.00
42.8.3	I/O Module with 8 UI channels	Each	19601.00
42.8.4	I/O Module with 8 DI channels	Each	15580.00
42.8.5	I/O Module with 16 DI channels	Each	18029.00
42.8.6	I/O Module with 8 DO channels	Each	16910.00
42.8.7	I/O Module with 4 DO channels	Each	15721.00
42.9	Enclosure for DDC		
	Supplying Installation Testing Commissioning of following sizes Powder coated wall mounted lockable and secure enclosure for DDC panel made of 16 SWG sheet steel IP -55 rated with proper internal mounting accessories for DDC such as DIN Rails, terminal block for cable terminations, well dressed for all internal cabling, ferruling, tagging etc. The DDC panels shall have power supply and connections for other peripheral equipment, switchgear protections, isolation transformer, earthing, relays, fuses, auxiliary power output socket & lamp etc. as required.		
42.9.1	500mmX500mmX200 mm	Each	10581.00
42.9.2	600mmX600mmX200mm	Each	12657.00
42.9.3	800mmX1000mmX200mm	Each	18643.00
	<b>Integration Unit</b>		

42.10	Supplying Installation Testing Commissioning following type 3rd party Integration unit to provide the interface between Ethernet LAN and the 3rd party field control devices or any other devices which need to be integrated. These shall also provide supervisory capability of functions over the devices connected to it. The purpose of using these units should be limited to integrate the devices only. The Unit must have two onboard Ethernet port, minimum 2/3 on board RS485 ports. The Integration unit should have inbuilt 4GB memory for program storage. The Unit must communicate over TCP/IP with communication speed of 10/100MBPS. The Integration unit should be capable of handling multiple protocol simultaneously such as Bacnet, Modbus, SNMP restricted to single protocol. All integrators should be mandatorily BTL listed. The integration unit shall be housed in suitable size sheet steel enclosure made of 1.6mm thick CRCA sheet, lockable front door with glass, arrangement for cable entry and duly powder coated complete etc as required.		
42.10.1	Integrator for 500 Points	Each	146124.00
42.10.2	Integrator for 1250 Points	Each	176357.00
42.10.3	Integrator for 5000 Points	Each	226744.00
	<b>Field Devices</b>		
42.11	Supplying Installation Testing Commissioning of following Field Devices including connection etc. as required		
42.11.1	Water Differential Pressure (DP) Switch for Pump Status.	Each	9690.00
42.11.2	High/Low Level Switch for Tank Level Monitoring.	Each	7904.00
42.11.3	Air DP Switch for Fan Run Status.	Each	2928.00
42.11.4	Duct CO2 Sensor, 0-2000ppm, 0-10V/4-20mA Output.	Each	9876.00
42.11.5	Outside Temp & Humidity Sensor with radiation shield. Measuring Range: Temp:- -15 to 50 °C & RH 0-100%, Accuracy: +/- 1 °C +/- 3%	Each	9322.00
42.11.6	Immersion Temp Sensor for CHW line. Measuring range: -30 to 110 °C, Accuracy: +/- 1.3 °C	Each	4585.00
42.11.7	Water Pressure Sensor . Accuracy: +/-0.3% FSL	Each	8868.00



42.11.8	Duct type temperature sensor Measuring range: -30 to 110 °C, Accuracy: +/- 1.3 °C	Each	3588.00
42.11.9	Current Sensing Relay	Each	3174.00
42.11.10	Wall Mount Temp. Sensor	Each	6550.00
42.11.11	Wall/Ceiling Mount CO Sensor	Each	8314.00
42.11.12	Differential pressure switch for filters & Blowers	Each	2570.00
42.11.13	Bi-Level Switches (Hi/Low)	Each	5543.00
42.11.14	Water Level Sensor	Each	6621.00
42.11.15	Explosion proof level Switch	Each	7619.00
42.11.16	Water Flow Switch	Each	3779.00
42.11.17	Indoor Air Quality Sensor (CO <sub>2</sub> ,T,H,PM,TVOC)	Each	32752.00
42.11.18	Ultrasonic Water BTU Meter including digital display (Clamp-On) suitable for Pipe sizes dia upto 250mm	Each	357752.00

# **APPENDIX-I** **BASIC RATE OF LABOUR & HIRE** **CHARGES**

Code No.	DESCRIPTION	Unit	Rate
1001	Wireman	day	981.00
1002	Cable jointer	day	981.00
1003	Lineman	day	981.00
1004	Fitter, Grade 1	day	981.00
1005	Fitter, Grade 2	day	893.00
1006	Painter	day	893.00
1007	Khallasi	day	805.00
1008	Carpenter, Grade 1	day	981.00
1009	Blacksmith, Grade 2	day	893.00
1010	Mason, Grade 2	day	893.00
1011	Stone Chiseler	day	893.00
1012	Beldar/ coolie	day	805.00
1013	Bhisti	day	805.00
1014	Excavator	day	805.00
1015	Stone Breaker	day	893.00
1016	Mate	day	805.00
1017	Engineer	day	1500.00
1018	Highly Skilled Worker	day	876.00
1019	Electrician	day	981.00
1020	Electronic Technician	day	981.00
1020	Electronic Technician	day	981.00
1022	Software Engineer	day	2100.00
1081	Hire charges for 5 ton truck	day	4000.00

1082	Hire charges for compressor and spray gun	day	350.00
1083	Drilling of 46 Nos 12 mm dia holes on G.I. pipe	L.S.	300.00
1084	Drilling holes	each	6.00
1085	Solder jointing	each	12.00
1086	Welding charges	mm	0.50
1087	Welder	day	981.00

## APPENDIX-II BASIC RATE OF MATERIAL

Note:- These rates are exclusive of Contractor's profit, Overheads and Carriage and any taxes etc.

Code No.	DESCRIPTION	Unit	Rate
1101	1.5 sq. mm ISI marked, FRLS/HFFR PVC insulated, single core copper conductor cable	Meter	18.00
1102	2.5 sq. mm ISI marked, FRLS/HFFR PVC insulated, single core copper conductor cable	Meter	28.00
1103	4.0 sq. mm ISI marked, FRLS/HFFR PVC insulated, single core copper conductor cable	Meter	42.00
1104	6.0 sq. mm ISI marked, FRLS/HFFR PVC insulated, single core copper conductor cable	Meter	63.00
1105	10 sq. mm ISI marked, FRLS/HFFR PVC insulated, single core copper conductor cable	Meter	106.00
1106	16 sq. mm ISI marked, FRLS/HFFR PVC insulated, single core copper conductor cable	Meter	164.00
1108	16/0.20 mm (0.5 sqmm) twin core FRLS/HFFR PVC sheathed, flat flexible copper cable	Meter	18.98
1109	16/0.20 mm (0.5 sqmm) twin circular, FRLS/HFFRPVC sheathed, workshop flexible copper cable	Meter	17.85
1110	32/0.20 mm (1.0 sqmm) twin circular, FRLS/HFFRPVC sheathed, workshop flexible copper cable	Meter	13.00
1111	1 pair, 0.5 mm dia annealed copper conductor, FRLS/HFFRPVC insulated, unarmoured, telephone cable	Meter	5.50
1112	2 pair, 0.5 mm dia annealed copper conductor, FRLS/HFFRPVC insulated, unarmoured, telephone cable	Meter	9.78
1113	4 pair, 0.5 mm dia annealed copper conductor, FRLS/HFFRPVC insulated, unarmoured, telephone cable	Meter	19.14
1114	Co-axial TV cable RG-6 grade, 0.7 mm solid copper conductor PE insulated, shielded with fine tinned copper braid protected with PVC sheath	Meter	20.00
CONDUIT (STEEL & PVC ) AND ACCESSORIES			
1201	20 mm diA, ISI marked, steel conduit	Meter	73.00
1202	25 mm diA, ISI marked, steel conduit	Meter	93.00
1203	32 mm diA, ISI marked, steel conduit	Meter	130.00
1204	40 mm diA, ISI marked, steel conduit	Meter	218.00
1205	50 mm diA, ISI marked, steel conduit	Meter	285.00

1206	20 mm inspection/ solid bends	Each	24.00
1207	25 mm inspection/ solid bends	Each	28.60
1208	32 mm inspection/ solid bends	Each	47.70
1209	40 mm inspection/ solid bends	Each	85.00
1210	50 mm inspection/ solid bends	Each	160.00
1211	20 mm sockets	Each	8.00
1212	25 mm sockets	Each	9.00
1213	32 mm sockets	Each	13.00
1214	40 mm sockets	Each	20.00
1215	50 mm sockets	Each	36.00
1216	20 mm junction box, one way	Each	34.00
1217	20 mm junction box, two way	Each	34.00
1218	20 mm iron staples/ saddles/ screws	Each	8.00
1219	25 mm iron staples/ saddles/ screws	Each	10.00
1220	32 mm iron staples/ saddles/ screws	Each	16.00
1221	40 mm iron staples/ saddles/ screws	Each	19.00
1222	50 mm iron staples/ saddles/ screws	Each	22.00
1224	20 mm diA, ISI marked, PVC conduit	Meter	21.00
1225	25 mm diA, ISI marked, PVC conduit	Meter	29.00
1226	32 mm diA, ISI marked, PVC conduit	Meter	46.00
1227	40 mm diA, ISI marked, PVC conduit	Meter	64.00
1228	50 mm diA, ISI marked, PVC conduit	Meter	97.00
1229	20 mm PVC bends	Each	8.00
1230	25 mm PVC bends	Each	11.00
1231	32 mm PVC bends	Each	18.00
1232	40 mm PVC bends	Each	28.00
1233	50 mm PVC bends	Each	47.00
1234	20 mm PVC couplers	Each	5.68
1235	25 mm PVC couplers	Each	7.00
1236	32 mm PVC couplers	Each	11.00
1237	40 mm PVC couplers	Each	14.00
1238	50 mm PVC couplers	Each	18.00
1239	20 mm PVC junction box, one way	Each	18.00

1240	20 mm PVC junction box, two way	Each	19.00
1241	75 mm X 75 mm X 50 mm PVC box	Each	22.00
Metal Boxes			
1300	Modular GI box for 2 module	Each	33.00
1301	Modular GI box for 3 module	Each	41.00
1302	Modular GI box for 4 module	Each	48.00
1303	Modular GI box for 6 module	Each	74.00
1304	Modular GI box for 8 module	Each	90.00
1305	Modular GI box for 12 module	Each	114.00
1306	75 mm X 75 mm X 60 mm deep metal box	Each	23.00
1307	100 mm X 100 mm X 60 mm deep metal box	Each	35.00
1308	150 mm X 75 mm X 60 mm deep metal box	Each	37.00
1309	150 mm X 150 mm X 60 mm deep metal box	Each	53.00
1310	180 mm X 100 mm X 60 mm deep metal box	Each	45.00
1311	200 mm X 125 mm X 60 mm deep metal box	Each	56.00
1312	200 mm X 150 mm X 60 mm deep metal box	Each	70.00
1313	200 mm X 250 mm X 60 mm deep metal box	Each	90.00
1314	200 mm X 300 mm X 60 mm deep metal box	Each	112.00
1315	250 mm X 300 mm X 60 mm deep metal box	Each	139.00
1316	200 mm X 150 mm X 75 mm deep metal box	Each	76.00
1317	200 mm X 250 mm X 75 mm deep metal box	Each	105.00
1318	200 mm X 150 mm X 100 mm deep metal box	Each	92.00
1319	200 mm X 250 mm X 100 mm deep metal box	Each	119.00
1320	200 mm X 300 mm X 100 mm deep metal box	Each	139.00
1321	250 mm X 300 mm X 100 mm deep metal box	Each	174.00
WIRING SWITCHES AND ACCESSORIES			
1322	3 mm thick phenolic laminated sheet	sq.cm	0.20
1401	Ceiling rose, 3 pin, 5 A ISI marked	Each	20.00
1402	S.P. 5/6 A, one way modular switch, ISI marked	Each	34.00
1403	S.P. 5/6 A, two way modular switch, ISI marked	Each	68.00
1404	S.P. 15/16 A, one way modular switch, ISI marked	Each	74.00
1405	3 pin 5/6 A modular socket outlet, ISI marked	Each	63.00
1406	6 pin 15/16 A modular socket outlet, ISI marked	Each	105.00

1407	Modular bell push, ISI marked	Each	62.00
1408	Stepped type Modular Fan regulator (2 module)	Each	220.00
1409	Telephone Socket outlet modular type	Each	68.00
1410	T.V. Socket outlet modular type	Each	68.00
1411	Modular blanking plate	Each	16.00
1412	6 pin 25 amp modular type socket	Each	125.00
1420	Modular base & cover plate for 1 module	Each	42.00
1421	Modular base & cover plate for 2 module	Each	42.00
1422	Modular base & cover plate for 3 module	Each	56.00
1423	Modular base & cover plate for 4 module	Each	61.00
1424	Modular base & cover plate for 6 module	Each	79.00
1425	Modular base & cover plate for 8 module	Each	101.00
1426	Modular base & cover plate for 12 module	Each	147.00
1431	S.P. 5/6 A, one way switch, piano type ISI marked	Each	10.00
1432	S.P. 5/6 A, two way switch, piano type ISI marked	Each	19.00
1433	S.P. 15/16 A, one way switch, piano type ISI marked	Each	48.00
1434	3 pin 5/6 A socket outlet, piano type ISI marked	Each	23.00
1435	6 pin 15/16 & 5/6 A socket outlet, piano type ISI marked	Each	60.00
1436	Bell push, piano type	Each	19.00
1437	Telephone Socket outlet piano type	Each	39.00
1438	T.V. Socket outlet piano type	Each	28.00
1441	Brass pendant holder	Each	34.00
1442	Brass batten/ angle holder	Each	38.00
1443	Brass bracket holder 16 mm	Each	47.00
1444	Call bell/ buzzer, single phase	Each	44.00
1445	PIR Occupancy sensor	Each	3183.00
1446	PIR Occupancy sensor With Day light dimming	Each	6632.00
1447	Microwave occupancy Sensor	Each	8687.00
1448	Astronomical time switch suitable for 1 output per phase and suitable for single phase supply	Each	3022.00
1449	Astronomical time switch suitable for 2 output per phase and suitable for single phase supply	Each	6169.00

1450	Astronomical time switch suitable for 3output(1output per phase) and suitable for three phase supply	Each	7709.00
1451	Deleted	Each	
1452	PVC Batten/ Angle Holder	Each	22.00
	RISING MAINS BUS TRUNKING AND OVER HEAD BUS-BAR		
1501	200 A, TPN, rising mains in metal enclosure with aluminium busbar including fixing clamp	Meter	5056.00
1502	300 A, TPN, rising mains in metal enclosure with aluminium busbar including fixing clamp	Meter	5286.00
1503	400 A, TPN, rising mains in metal enclosure with aluminium busbar including fixing clamp	Meter	6550.00
1504	600 A, TPN, rising mains in metal enclosure with aluminium busbar including fixing clamp	Meter	7355.00
1505	800 A, TPN, rising mains in metal enclosure with aluminium busbar including fixing clamp	Meter	8906.00
1511	16 A, TPN, 2 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	9029.00
1512	16 A, TPN, 4 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	20357.00
1513	16 A, TPN, 6 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	23377.00
1514	16 A, TPN, 8 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	40057.00
1515	32 A, TPN, 2 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	11164.00
1516	32 A, TPN, 4 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	21670.00
1517	32 A, TPN, 6 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	28894.00
1518	32 A, TPN, 8 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	40320.00
1519	63 A, TPN, 2 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	12739.00
1520	63 A, TPN, 4 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	22984.00
1521	63 A, TPN, 6 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	30206.00
1522	63 A, TPN, 8 way, distribution tap off box with ISI marked HRC fuses for rising mains	Each	42026.00
1526	200 A, TPN, adaptor box with cable end box, with TPN disconnecter FSU, ISI marked HRC fuses and brass compression gland for rising mains	Each	18124.00
1527	300 A, TPN, adaptor box with cable end box, with TPN disconnecter FSU, ISI marked HRC fuses and brass compression gland for rising mains	Each	19700.00



1528	400 A, TPN, adaptor box with cable end box, with TPN disconnecter FSU, ISI marked HRC fuses and brass compression gland for rising mains	Each	21670.00
1529	600 A, TPN, adaptor box with cable end box, with TPN disconnecter FSU, ISI marked HRC fuses and brass compression gland for rising mains	Each	23377.00
1530	800 A, TPN, adaptor box with cable end box, with TPN disconnecter FSU, ISI marked HRC fuses and brass compression gland for rising mains	Each	26004.00
1531	800 A, TPN, bus trunking with aluminium busbars	Meter	10178.00
1532	1000 A, TPN, bus trunking with aluminium busbars	Meter	12083.00
1533	1250 A, TPN, bus trunking with aluminium busbars	Meter	15498.00
1534	1400 A, TPN, bus trunking with aluminium busbars	Meter	19438.00
1535	1600 A, TPN, bus trunking with aluminium busbars	Meter	19438.00
1536	200 A, TPN, overhead busbars with aluminium busbars	Meter	5779.00
1537	400 A, TPN, overhead busbars with aluminium busbars	Meter	7486.00
1538	32 A, TPN, plug-in-box with TPN disconnecter FSU and ISI marked HRC fuses for overhead busbars	Each	7560.75
1539	63 A, TPN, plug-in-box with TPN disconnecter FSU and ISI marked HRC fuses for overhead busbars	Each	8523.00
1540	100 A, TPN, plug-in-box with TPN disconnecter FSU and ISI marked HRC fuses for overhead busbars	Each	10535.25
1541	16 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	6000.00
1542	32 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	7560.75
1543	63 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	8523.00
1544	100 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	10535.25
1545	200 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	14005.50

1546	315 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	19124.25
1547	400 A, TPN, one way, tap off box with TPN disconnecter FSU and ISI marked HRC fuses for rising mains	Each	21800.25
1551	200 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	5610.00
1552	315 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	6624.00
1553	400 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	7932.00
1554	500 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	7932.00
1555	630 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	9192.00
1556	800 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	13620.00
1557	1000 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	14124.00
1558	1250 A, TPN, compact type rising mains with aluminium busbar including all accessories	Meter	16842.00
1559	200 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	5666.00
1560	315 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	6690.00
1561	400 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	8011.00
1562	500 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	8011.00
1563	630 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	9284.00
1564	800 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	13756.00
1565	1000 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	13756.00
1566	1250 A, TPN, compact type bus trunking with aluminium busbar including elbows and other all accessories	Meter	16065.00

1567	200 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	6252.00
1568	315 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	7566.00
1569	400 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	8358.00
1570	500 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	8358.00
1571	630 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	9900.00
1572	800 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	13260.00
1573	1000 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	13260.00
1574	1250 A, TPN, End Feed Unit for compact rising mains including all accessories	Each	14778.00
1575	125 A, TPN, TAP OFF Box for compact rising mains including all accessories	Each	6400.00
1576	200 A, TPN, TAP OFF Box for compact rising mains including all accessories	Each	6400.00
1577	315 A, TPN, TAP OFF Box for compact rising mains including all accessories	Each	7840.00
1578	400 A, TPN, TAP OFF Box for compact rising mains including all accessories	Each	7840.00
1579	500 A, TPN, TAP OFF Box for compact rising mains including all accessories	Each	11840.00
1580	630 A, TPN, TAP OFF Box for compact rising mains including all accessories	Each	11840.00
	Sandwich Rising Mains with Aluminium bus bar		
1581	400 A, Isc=25 kA for 1 sec	per m	11040.00
1582	500 A, Isc=30 kA for 1 sec	per m	11730.00
1583	630 A, Isc=50 kA for 1 sec	per m	13950.00
1584	800 A, Isc=50 kA for 1 sec	per m	15840.00
1585	1000 A, Isc=50 kA for 1 sec	per m	17700.00
1586	1250 A, Isc=50 kA for 1 sec	per m	19374.00
1587	1600 A, Isc=50 kA for 1 sec	per m	23160.00
1588	2000 A, Isc=50 kA for 1 sec	per m	29760.00
1589	2500 A, Isc=50 kA for 1 sec	per m	33108.00
1590	3200 A, Isc=50 kA for 1 sec	per m	41508.00
1591	4000 A, Isc=50 kA for 1 sec	per m	70839.00
	SWITCH DISCONNECTOR SFU AND MCCB		

1601	32 A, TPN, switch disconnecter fuse unit (Panel mounted type) with ISI marked HRC fuses	Each	1443.00
1602	63 A, TPN, switch disconnecter fuse unit (Panel mounted type) with ISI marked HRC fuses	Each	2127.00
1603	100 A, TPN, switch disconnecter fuse unit (Panel mounted type) with ISI marked HRC fuses	Each	4346.00
1604	125 A, TPN, switch disconnecter fuse unit (Panel mounted type) with ISI marked HRC fuses	Each	5151.00
1605	160 A, TPN, switch disconnecter fuse unit (Panel mounted type) with ISI marked HRC fuses	Each	5851.00
1606	200 A, TPN switch fuse unit with ISI marked HRC fuses	Each	7009.00
1607	315 A, TPN switch fuse unit with ISI marked HRC fuses	Each	10647.00
1608	400 A, TPN switch fuse unit with ISI marked HRC fuses	Each	13025.00
1610	3 pole MCCB, 100A, 16kA lcs=100% lcu and Operational Voltage 690V	Each	2644.00
1611	3 pole MCCB, 125A, 16kA lcs=100% lcu and Operational Voltage 690V	Each	3403.00
1612	3 pole MCCB, 150A, 16kA lcs=100% lcu and Operational Voltage 690V	Each	4287.00
1613	3 pole MCCB, 200A, 16kA lcs=100% lcu and Operational Voltage 690V	Each	5541.00
1614	3 pole MCCB, 200A, 25kA lcs=100% lcu and Operational Voltage 690V	Each	8051.00
1615	3 pole MCCB, 250A, 25kA lcs=100% lcu and Operational Voltage 690V	Each	9522.00
1616	3 pole MCCB, 250A, 35kA lcs=100% lcu and Operational Voltage 690V	Each	10199.00
1617	3 pole MCCB, 315A, 35kA lcs=100% lcu and Operational Voltage 690V	Each	15986.00
1618	3 pole MCCB, 400A, 35kA lcs=100% lcu and Operational Voltage 690V	Each	15986.00
1619	3 pole MCCB, 500A, 35kA lcs=100% lcu and Operational Voltage 690V	Each	18909.00
1620	3 pole MCCB, 630A, 50kA lcs=100% lcu and Operational Voltage 690V	Each	20650.00
1621	3 pole MCCB, 800A, 50kA lcs=100% lcu and Operational Voltage 690V	Each	26915.00
1622	4 pole MCCB, 100A, 30kA lcs=100% lcu and Operational Voltage 690V	Each	5623.00
1623	4 pole MCCB, 125A, 36kA lcs=100% lcu and Operational Voltage 690V	Each	5961.00
1624	4 pole MCCB, 200A, 36kA lcs=100% lcu and Operational Voltage 690V	Each	11243.00

1625	4 pole MCCB,250A, 36kA lcs=100% lcu and Operational Voltage 690V	Each	12953.00
1626	4 pole MCCB,250A, 50kA lcs=100% lcu and Operational Voltage 690V	Each	13633.00
1627	4 pole MCCB,400A, 50kA lcs=100% lcu and Operational Voltage 690V	Each	31928.00
1628	4 pole MCCB,630A, 50kA lcs=100% lcu and Operational Voltage 690V MCB'S,ISOLATORS,RCCB'S AND MCB DB'S	Each	32250.00
1705	25 A modular SPMCB, 'C' curve	Each	161.00
1706	6 A, to 32 A, ratings, SP MCB, "C" curve, 10 KA breaking capacity	Each	135.00
1707	6 A, to 32 A, ratings, SPN MCB, "C" curve, 10 KA breaking capacity	Each	394.00
1708	6 A, to 32 A, ratings, DP MCB, "C" curve, 10 KA breaking capacity	Each	432.00
1709	6 A, to 32 A, ratings, TP MCB, "C" curve, 10 KA breaking capacity	Each	702.00
1710	6 A, to 32 A, ratings, TPN MCB, "C" curve, 10 KA breaking capacity	Each	869.00
1711	Single pole, blanking plate	Each	8.00
1712	40 A, 2 pole isolator	Each	270.00
1713	63 A, 2 pole isolator	Each	340.00
1714	40 A, 4 pole isolator	Each	616.00
1715	63 A, 4 pole isolator	Each	664.00
1716	100 A, 4 pole isolator	Each	810.00
1717	25 A, rating, 2 pole RCCB, 30mA	Each	1458.00
1718	40 A, rating, 2 pole RCCB, 30mA	Each	1726.00
1719	63 A, rating, 2 pole RCCB, 30mA	Each	1982.00
1720	25 A, rating, 4 pole RCCB, 30mA	Each	2125.00
1721	40 A, rating, 4 pole RCCB, 30mA	Each	2352.00
1722	63 A, rating, 4 pole RCCB, 30mA	Each	2457.00
1723	16/25 A, rating, 2 pole RCBO 100mA/ 300mA sensitivity	Each	Deleted
1724	32 A, rating, 2 pole RCBO 100mA/ 300mA sensitivity	Each	Deleted
1725	40 A, rating, 2 pole RCBO 100mA/ 300mA sensitivity	Each	Deleted
1726	16/25 A, rating, 4 pole RCBO 100mA/ 300mA sensitivity	Each	Deleted
1727	32 A, rating, 4 pole RCBO 100mA/ 300mA sensitivity	Each	Deleted

1728	40 A, rating, 4 pole RCBO 100mA/ 300mA sensitivity	Each	Deleted
1730	20 A, SPN, industrial type socket outlet, with plug top and metal chained cover in sheet steel enclosure	Each	680.00
1731	20 A, TPN, industrial type socket outlet, with plug top and metal chained cover in sheet steel enclosure	Each	997.00
1732	30 A, TPN, industrial type socket outlet, with plug top and metal chained cover in sheet steel enclosure	Each	2142.00
1734	2+2 way, SPN, single door, MCB DB	Each	820.00
1735	2+4 way, SPN, single door, MCB DB	Each	786.00
1736	2+6 way, SPN, single door, MCB DB	Each	1007.00
1737	2+10 way, SPN, single door, MCB DB	Each	1189.00
1738	6 way, SPN, double door, MCB DB	Each	1347.00
1739	8 way, SPN, double door, MCB DB	Each	1624.00
1740	12 way, SPN, double door, MCB DB	Each	1695.00
1741	16 way, SPN, double door, MCB DB	Each	2053.00
1742	Sheet steel DP MCB enclosure	Each	300.00
1743	Sheet steel TP MCB enclosure	Each	354.00
1751	4 way (4+12), TPN, MCB DB, single door, horizontal type	Each	Deleted
1752	6 way (4+18), TPN, MCB DB, single door, horizontal type	Each	Deleted
1753	8 way (4+24), TPN, MCB DB, single door, horizontal type	Each	Deleted
1754	4 way (4+12), TPN, MCB DB, double door, horizontal type	Each	2712.00
1755	6 way (4+18), TPN, MCB DB, double door, horizontal type	Each	3378.00
1756	8 way (4+24), TPN, MCB DB, double door, horizontal type	Each	4128.00
1757	4 way (4+12), TPN, vertical type, MCB DB, single door	Each	Deleted
1758	8 way (4+24), TPN, vertical type, MCB DB, single door	Each	Deleted
1759	12 way (4+36), TPN, vertical type, MCB DB, single door	Each	Deleted
1760	4 way (4+12), TPN, vertical type, MCB DB, double door	Each	5294.00
1761	8 way (4+24), TPN, vertical type, MCB DB, double door	Each	7297.00

1762	12 way (4+36), TPN, vertical type, MCB DB, double door	Each	9311.00
1763	4 way, TPN, vertical type, single door, MCB DB with provision to mount MCCB as incomer	Each	Deleted
1764	8 way, TPN, vertical type, single door, MCB DB with with provision to mount MCCB as incomer	Each	Deleted
1765	12 way, TPN, vertical type, single door, MCB DB with with provision to mount MCCB as incomer	Each	Deleted
1771	2 + 4 way, SPN, prewired MCB DB with extended loose wire box, single door	Each	2494.16
1772	2 + 8 way, SPN, prewired MCB DB with extended loose wire box, single door	Each	2902.76
1773	2 + 12 way, SPN, prewired MCB DB with extended loose wire box, single door	Each	4298.81
1774	2 + 4 way, SPN, prewired MCB DB with extended loose wire box, double door	Each	2809.13
1775	2 + 8 way, SPN, prewired MCB DB with extended loose wire box, double door	Each	3277.31
1776	2 + 12 way, SPN, prewired MCB DB with extended loose wire box, double door	Each	4864.89
1779	4 way, (4+12) TPN, prewired MCB DB with extended loose wire box, single door	Each	Deleted
1780	6 way, (4+18) TPN, prewired MCB DB with extended loose wire box, single door	Each	Deleted
1781	8 way, (4+24) TPN, prewired MCB DB with extended loose wire box, single door	Each	Deleted
1782	12 way, (4+36) TPN, prewired MCB DB with extended loose wire box, single door	Each	Deleted
1783	4 way, (4+12) TPN, prewired MCB DB with extended loose wire box, double door	Each	6243.92
1784	6 way, (4+18) TPN, prewired MCB DB with extended loose wire box, double door	Each	7520.79
1785	8 way, (4+24) TPN, prewired MCB DB with extended loose wire box, double door	Each	8652.96
1786	12 way, (4+36) TPN, prewired MCB DB with extended loose wire box, double door	Each	10074.54
1787	4 way (4+4), TPN, vertical type, prewired, MCB DB with extended loose wire box, single door	Each	4490.34
1788	6 way (4+6), TPN, vertical type, prewired, MCB DB with extended loose wire box, single door	Each	Deleted
1789	8 way (4+8), TPN, vertical type, prewired, MCB DB with extended loose wire box, single door	Each	Deleted
1790	12 way (4+12), TPN, vertical type, prewired, MCB DB with extended loose wire box, single door	Each	Deleted
1791	4 way (4+4), TPN, vertical type, prewired, MCB DB with extended loose wire box, double door	Each	5924.70
1792	6 way (4+6), TPN, vertical type, prewired, MCB DB with extended loose wire box, double door	Each	Deleted

1793	8 way (4+8), TPN, vertical type, prewired, MCB DB with extended loose wire box, double door	Each	Deleted
1794	12 way (4+12), TPN, vertical type, prewired, MCB DB with extended loose wire box, double door	Each	Deleted
	Cable End Box	Each	
1801	Cable End Boxes for 6 Way SPN DD DB	Each	371.82
1802	Cable End Boxes for 8 Way SPN DD DB	Each	432.42
1803	Cable End Boxes for 10 Way SPN DD DB	Each	415.89
1804	Cable End Boxes for 14 Way SPN DD DB	Each	484.75
1805	Cable End Boxes for 4 Way TPN DD DB	Each	619.70
1806	Cable End Boxes for 6 Way TPN DD DB	Each	652.75
1807	Cable End Boxes for 8 Way TPN DD DB	Each	815.25
1808	Cable End Boxes for Vertical TPN DD DB	Each	687.60
BRASS COMPRESSION GLANDS			
2101	Brass compression gland (19 mm) for 2 X 6 sq. mm 1.1 kV grade cable	set	32.25
2102	Brass compression gland (19 mm) for 2 X 10 sq. mm 1.1 kV grade cable	set	32.25
2103	Brass compression gland for (22 mm) 2 X 16 sq. mm 1.1 kV grade cable	set	42.00
2104	Brass compression gland for (22 mm) 2 X 25 sq. mm 1.1 kV grade cable	set	42.00
2105	Brass compression gland for (25 mm) 2 X 35 sq. mm 1.1 kV grade cable	set	49.50
2106	Brass compression gland for (28 mm) 2 X 50 sq. mm 1.1 kV grade cable	set	75.75
2107	Brass compression gland for (22 mm) 3 X 10 sq. mm 1.1 kV grade cable	set	42.00
2108	Brass compression gland for (25 mm) 3 X 16 sq. mm 1.1 kV grade cable	set	49.50
2109	Brass compression gland for (25 mm) 3 X 25 sq. mm 1.1 kV grade cable	set	49.50
2110	Brass compression gland for (28 mm) 3 X 35 sq. mm 1.1 kV grade cable	set	75.75
2111	Brass compression gland for (32 mm) 3 X 50 sq. mm 1.1 kV grade cable	set	84.75
2112	Brass compression gland for (35 mm) 3 X 70 sq. mm 1.1 kV grade cable	set	111.00
2113	Brass compression gland for (38 mm) 3 X 95 sq. mm 1.1 kV grade cable	set	139.50
2114	Brass compression gland for (45 mm) 3 X 120 sq. mm 1.1 kV grade cable	set	166.50
2115	Brass compression gland for (50 mm) 3 X 150 sq. mm 1.1 kV grade cable	set	213.75



2116	Brass compression gland for (57 mm) 3 X 185 sq. mm 1.1 kV grade cable	set	273.75
2117	Brass compression gland for (62 mm) 3 X 225 sq. mm 1.1 kV grade cable	set	323.25
2118	Brass compression gland for (62 mm) 3 X 240 sq. mm 1.1 kV grade cable	set	323.25
2119	Brass compression gland for (70 mm) 3 X 300 sq. mm 1.1 kV grade cable	set	386.25
2120	Brass compression gland for (28 mm) 3½ X 25 sq. mm 1.1 kV grade cable	set	75.75
2121	Brass compression gland for (32 mm) 3½ X 35 sq. mm 1.1 kV grade cable	set	84.75
2122	Brass compression gland for (35 mm) 3½ X 50 sq. mm 1.1 kV grade cable	set	111.00
2123	Brass compression gland for (38 mm) 3½ X 70 sq. mm 1.1 kV grade cable	set	139.50
2124	Brass compression gland for (45 mm) 3½ X 95 sq. mm 1.1 kV grade cable	set	166.50
2125	Brass compression gland for (45 mm) 3½ X 120 sq. mm 1.1 kV grade cable	set	166.50
2126	Brass compression gland for (50 mm) 3½ X 150 sq. mm 1.1 kV grade cable	set	213.75
2127	Brass compression gland for (57 mm) 3½ X 185 sq. mm 1.1 kV grade cable	set	273.75
2128	Brass compression gland for (62 mm) 3½ X 225 sq. mm 1.1 kV grade cable	set	323.25
2129	Brass compression gland for (62 mm) 3½ X 240 sq. mm 1.1 kV grade cable	set	323.25
2130	Brass compression gland for (70 mm) 3½ X 300 sq. mm 1.1 kV grade cable	set	386.25
2131	Brass compression gland for (82 mm) 3½ X 400 sq. mm 1.1 kV grade cable	set	551.25
2132	Brass compression gland for (25 mm) 4 X 10 sq. mm 1.1 kV grade cable	set	49.50
2133	Brass compression gland for (28 mm) 4 X 16 sq. mm 1.1 kV grade cable	set	75.75
2134	Brass compression gland for (28 mm) 4 X 25 sq. mm 1.1 kV grade cable	set	75.75
2135	Brass compression gland for (32 mm) 4 X 35 sq. mm 1.1 kV grade cable	set	84.75
2136	Brass compression gland for (35 mm) 4 X 50 sq. mm 1.1 kV grade cable	set	111.00

#### ALUMINIUM LUGS

2201	Aluminium lugs for 6 sq. mm cable	Each	1.58
2202	Aluminium lugs for 10 sq. mm cable	Each	2.10
2203	Aluminium lugs for 16 sq. mm cable	Each	3.00

2204	Aluminium lugs for 25 sq. mm cable	Each	4.13
2205	Aluminium lugs for 35 sq. mm cable	Each	4.95
2206	Aluminium lugs for 50 sq. mm cable	Each	7.43
2207	Aluminium lugs for 70 sq. mm cable	Each	11.55
2208	Aluminium lugs for 95 sq. mm cable	Each	12.38
2209	Aluminium lugs for 120 sq. mm cable	Each	17.25
2210	Aluminium lugs for 150 sq. mm cable	Each	22.50
2211	Aluminium lugs for 185 sq. mm cable	Each	27.75
2212	Aluminium lugs for 225 sq. mm cable	Each	39.75
2213	Aluminium lugs for 240 sq. mm cable	Each	48.00
2214	Aluminium lugs for 300 sq. mm cable	Each	67.50
2215	Aluminium lugs for 400 sq. mm cable	Each	97.50
MV CABLE JOINTING KITS			
2300	Outdoor cable jointing kit with cast resin compound with lugs for 2 X 16 sq. mm 1.1 kV grade cable	Set	625.00
2301	Outdoor cable jointing kit with cast resin compound with lugs for 2 X 25 sq. mm 1.1 kV grade cable	Set	701.00
2302	Outdoor cable jointing kit with cast resin compound with lugs for 2 X 35 sq. mm 1.1 kV grade cable	Set	701.00
2303	Outdoor cable jointing kit with cast resin compound with lugs for 2 X 50 sq. mm 1.1 kV grade cable	Set	701.00
2304	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 16 sq. mm 1.1 kV grade cable	Set	701.00
2305	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 25 sq. mm 1.1 kV grade cable	Set	701.00
2306	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 35 sq. mm 1.1 kV grade cable	Set	701.00
2307	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 50 sq. mm 1.1 kV grade cable	Set	771.00
2308	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 70 sq. mm 1.1 kV grade cable	Set	771.00
2309	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 95 sq. mm 1.1 kV	Set	878.00

	grade cable		
2310	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 120 sq. mm 1.1 kV grade cable	Set	878.00
2311	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 150 sq. mm 1.1 kV grade cable	Set	878.00
2312	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 185 sq. mm 1.1 kV grade cable	Set	1326.00
2313	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 225 sq. mm 1.1 kV grade cable	Set	1326.00
2314	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 240 sq. mm 1.1 kV grade cable	Set	1604.00
2315	Outdoor cable jointing kit with cast resin compound with lugs for 3 X 300 sq. mm 1.1 kV grade cable	Set	1604.00
2316	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 25 sq. mm 1.1 kV grade cable	Set	701.00
2317	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 35 sq. mm 1.1 kV grade cable	Set	771.00
2318	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 50 sq. mm 1.1 kV grade cable	Set	771.00
2319	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 70 sq. mm 1.1 kV grade cable	Set	878.00
2320	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 95 sq. mm 1.1 kV grade cable	Set	878.00
2321	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 120 sq. mm 1.1 kV grade cable	Set	878.00
2322	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 150 sq. mm 1.1 kV grade cable	Set	1326.00
2323	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 185 sq. mm 1.1 kV grade cable	Set	946.00
2324	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 225 sq. mm 1.1 kV grade cable	Set	1604.00
2325	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 240 sq. mm 1.1 kV	Set	1604.00

	grade cable		
2326	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 300 sq. mm 1.1 kV grade cable	Set	1604.00
2327	Outdoor cable jointing kit with cast resin compound with lugs for 3½ X 400 sq. mm 1.1 kV grade cable	Set	1931.00
2328	Outdoor cable jointing kit with cast resin compound with lugs for 4 X 16 sq. mm 1.1 kV grade cable	Set	701.00
2329	Outdoor cable jointing kit with cast resin compound with lugs for 4 X 25 sq. mm 1.1 kV grade cable	Set	701.00
2330	Outdoor cable jointing kit with cast resin compound with lugs for 4 X 35 sq. mm 1.1 kV grade cable	Set	771.00
2331	Outdoor cable jointing kit with cast resin compound with lugs for 4 X 50 sq. mm 1.1 kV grade cable	Set	771.00
2332	Straight through cable jointing kit with cast resin compound with ferrules for 2 X 16 sq. mm 1.1 kV grade cable	Set	1654.00
2333	Straight through cable jointing kit with cast resin compound with ferrules for 2 X 25 sq. mm 1.1 kV grade cable	Set	1654.00
2334	Straight through cable jointing kit with cast resin compound with ferrules for 2 X 35 sq. mm 1.1 kV grade cable	Set	1654.00
2335	Straight through cable jointing kit with cast resin compound with ferrules for 2 X 50 sq. mm 1.1 kV grade cable	Set	1931.00
2336	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 16 sq. mm 1.1 kV grade cable	Set	1931.00
2337	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 25 sq. mm 1.1 kV grade cable	Set	1654.00
2338	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 35 sq. mm 1.1 kV grade cable	Set	1654.00
2339	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 50 sq. mm 1.1 kV grade cable	Set	1931.00
2340	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 70 sq. mm 1.1 kV grade cable	Set	2310.00
2341	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 95 sq. mm 1.1 kV	Set	2373.00

	grade cable		
2342	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 120 sq. mm 1.1 kV grade cable	Set	2714.00
2343	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 150 sq. mm 1.1 kV grade cable	Set	2714.00
2344	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 185 sq. mm 1.1 kV grade cable	Set	3307.00
2345	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 225 sq. mm 1.1 kV grade cable	Set	3799.00
2346	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 240 sq. mm 1.1 kV grade cable	Set	3799.00
2347	Straight through cable jointing kit with cast resin compound with ferrules for 3 X 300 sq. mm 1.1 kV grade cable	Set	4783.00
2348	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 25 sq. mm 1.1 kV grade cable	Set	1931.00
2349	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 35 sq. mm 1.1 kV grade cable	Set	1931.00
2350	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 50 sq. mm 1.1 kV grade cable	Set	2310.00
2351	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 70 sq. mm 1.1 kV grade cable	Set	2333.00
2352	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 95 sq. mm 1.1 kV grade cable	Set	2714.00
2353	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 120 sq. mm 1.1 kV grade cable	Set	3307.00
2354	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 150 sq. mm 1.1 kV grade cable	Set	3307.00
2355	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 185 sq. mm 1.1 kV grade cable	Set	3799.00
2356	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 225 sq. mm 1.1 kV grade cable	Set	3875.00
2357	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 240 sq. mm 1.1	Set	4783.00

	kV grade cable		
2358	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 300 sq. mm 1.1 kV grade cable	Set	5730.00
2359	Straight through cable jointing kit with cast resin compound with ferrules for 3½ X 400 sq. mm 1.1 kV grade cable	Set	3076.00
2360	Straight through cable jointing kit with cast resin compound with ferrules for 4 X 16 sq. mm 1.1 kV grade cable	Set	1654.00
2361	Straight through cable jointing kit with cast resin compound with ferrules for 4 X 25 sq. mm 1.1 kV grade cable	Set	1931.00
2362	Straight through cable jointing kit with cast resin compound with ferrules for 4 X 35 sq. mm 1.1 kV grade cable	Set	1931.00
2363	Straight through cable jointing kit with cast resin compound with ferrules for 4 X 50 sq. mm 1.1 kV grade cable	Set	2310.00
2364	Straight through cable jointing kit with heat shrinkable kit with ferrules for 2 X 16 sq. mm 1.1 kV grade cable	Set	1272.75
2365	Straight through cable jointing kit with heat shrinkable kit with ferrules for 2 X 25 sq. mm 1.1 kV grade cable	Set	1506.75
2366	Straight through cable jointing kit with heat shrinkable kit with ferrules for 2 X 35 sq. mm 1.1 kV grade cable	Set	1506.75
2367	Straight through cable jointing kit with heat shrinkable kit with ferrules for 2 X 50 sq. mm 1.1 kV grade cable	Set	1506.75
2368	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 16 sq. mm 1.1 kV grade cable	Set	1272.75
2369	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 25 sq. mm 1.1 kV grade cable	Set	1506.75
2370	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 35 sq. mm 1.1 kV grade cable	Set	1506.75
2371	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 50 sq. mm 1.1 kV grade cable	Set	1506.75
2372	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 70 sq. mm 1.1 kV grade cable	Set	2175.00
2373	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 95 sq. mm 1.1	Set	2175.00

	kV grade cable		
2374	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 120 sq. mm 1.1 kV grade cable	Set	2946.00
2375	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 150 sq. mm 1.1 kV grade cable	Set	2946.00
2376	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 185 sq. mm 1.1 kV grade cable	Set	2946.00
2377	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 225 sq. mm 1.1 kV grade cable	Set	3233.25
2378	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 240 sq. mm 1.1 kV grade cable	Set	3233.25
2379	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3 X 300 sq. mm 1.1 kV grade cable	Set	3882.75
2380	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 25 sq. mm 1.1 kV grade cable	Set	1506.75
2381	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 35 sq. mm 1.1 kV grade cable	Set	1506.75
2382	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 50 sq. mm 1.1 kV grade cable	Set	1506.75
2383	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 70 sq. mm 1.1 kV grade cable	Set	2175.00
2384	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 95 sq. mm 1.1 kV grade cable	Set	2175.00
2385	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 120 sq. mm 1.1 kV grade cable	Set	2946.00
2386	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 150 sq. mm 1.1 kV grade cable	Set	2946.00
2387	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 185 sq. mm 1.1 kV grade cable	Set	2946.00
2388	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 225 sq. mm 1.1 kV grade cable	Set	3233.25
2389	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 240 sq. mm	Set	3233.25

	1.1 kV grade cable		
2390	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 300 sq. mm 1.1 kV grade cable	Set	3882.75
2391	Straight through cable jointing kit with heat shrinkable kit with ferrules for 3½ X 400 sq. mm 1.1 kV grade cable	Set	5286.00
2392	Straight through cable jointing kit with heat shrinkable kit with ferrules for 4 X 16 sq. mm 1.1 kV grade cable	Set	1272.75
2393	Straight through cable jointing kit with heat shrinkable kit with ferrules for 4 X 25 sq. mm 1.1 kV grade cable	Set	1506.75
2394	Straight through cable jointing kit with heat shrinkable kit with ferrules for 4 X 35 sq. mm 1.1 kV grade cable	Set	2175.00
2395	Straight through cable jointing kit with heat shrinkable kit with ferrules for 4 X 50 sq. mm 1.1 kV grade cable	Set	2175.00
	11 kV & 33 kV CABLE JOINTING KITS		
2413	Indoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 70 sq. mm.	Set	839.00
2414	Indoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 120 sq. mm.	Set	839.00
2415	Indoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 240 sq. mm.	Set	1225.00
2416	Indoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 300 sq. mm.	Set	1270.00
2417	Outdoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 70 sq. mm.	Set	2873.00
2418	Outdoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 120 sq. mm.	Set	2911.00
2419	Outdoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 240 sq. mm.	Set	3296.00
2420	Outdoor cable jointing kit with cast resin compound with lugs for 11 kV grade XLPE cable for 3 core 300 sq. mm.	Set	3296.00
2421	Straight through cable jointing kit with cast resin compound with ferrules for 11 kV grade XLPE cable for 3 core 70 sq. mm.	Set	2253.00



2422	Straight through cable jointing kit with cast resin compound with ferrules for 11 kV grade XLPE cable for 3 core 120 sq. mm.	Set	2714.00
2423	Straight through cable jointing kit with cast resin compound with ferrules for 11 kV grade XLPE cable for 3 core 240 sq. mm.	Set	4294.00
2424	Straight through cable jointing kit with cast resin compound with ferrules for 11 kV grade XLPE cable for 3 core 300 sq. mm.	Set	5088.00
2437	Indoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 70 sq. mm.	Set	8468.20
2438	Indoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 120 sq. mm.	Set	10135.45
2439	Indoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 240 sq. mm.	Set	10811.45
2440	Indoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 300 sq. mm.	Set	10811.45
2441	Outdoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 70 sq. mm.	Set	13048.10
2442	Outdoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 120 sq. mm.	Set	14009.45
2443	Outdoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 240 sq. mm.	Set	15753.40
2444	Outdoor heat shrinkable cable jointing kit with lugs for 11 kV grade XLPE cable for 3 core 300 sq. mm.	Set	15753.40
2445	Straight through heat shrinkable cable jointing kit with ferrules for 11 kV grade XLPE cable for 3 core 70 sq. mm.	Set	20834.45
2446	Straight through heat shrinkable cable jointing kit with ferrules for 11 kV grade XLPE cable for 3 core 120 sq. mm.	Set	27585.35
2447	Straight through heat shrinkable cable jointing kit with ferrules for 11 kV grade XLPE cable for 3 core 240 sq. mm.	Set	30169.75
2448	Straight through heat shrinkable cable jointing kit with ferrules for 11 kV grade XLPE cable for 3 core 300 sq. mm.	Set	30169.75
2528	Indoor heat shrinkable cable jointing kit with lugs for 33 kV grade XLPE cable for 3 core 70 sq. mm.	set	14249.95
2529	Indoor heat shrinkable cable jointing kit with lugs for 33 kV grade XLPE cable for 3 core 120 sq. mm.	set	21548.15

mm.

2530	Indoor heat shrinkable cable jointing kit with lugs for 33 kV grade XLPE cable for 3 core 240 sq. mm.	set	24375.00
2531	Outdoor heat shrinkable cable jointing kit with lugs for 33 kV grade XLPE cable for 3 core 70 sq. mm.	set	23099.70
2532	Outdoor heat shrinkable cable jointing kit with lugs for 33 kV grade XLPE cable for 3 core 120 sq. mm.	set	29940.95
2533	Outdoor heat shrinkable cable jointing kit with lugs for 33 kV grade XLPE cable for 3 core 240 sq. mm.	set	52629.20
2534	Straight through heat shrinkable cable jointing kit with ferrules for 33 kV grade XLPE cable for 3 core 70 sq. mm.	set	40671.80
2535	Straight through heat shrinkable cable jointing kit with ferrules for 33 kV grade XLPE cable for 3 core 120 sq. mm.	set	51398.10
2536	Straight through heat shrinkable cable jointing kit with ferrules for 33 kV grade XLPE cable for 3 core 240 sq. mm.	set	72995.00
OVER HEAD LINE ACCESSORIES			
2601	Stay rod (1.8 M long, 19/20 mm diA,) with anchor plate 45 cm X 45 cm X 7.5 mm complete with thimble etc.	set	432.00
2602	Stay wire ( 7/4.00 mm diA,)	kg	37.00
2603	Stay wire ( 7/3.15 mm diA,)	kg	37.00
2604	Turn buckle ( 20 mm X 60 cm )	each	158.00
2605	Strain insulator	each	25.00
2606	Bow tightner	each	16.00
2607	Shackle insulator ( 75 mm X 90 mm ) with G.I. bolts and nuts	set	29.00
2608	Shackle insulator ( 100 mm X 110 mm ) with G.I. bolts and nuts	set	50.00
2609	Pin insulator ( 100 mm X 65 mm ) with G.I. spindle and nuts	set	50.00
2610	Pin insulator ( 100 mm X 80 mm ) with G.I. spindle and nuts	set	50.00
2611	MV horn gap lightning arrestor with pin insulator (100 mm X 65 mm ), spindle and brass metal parts etc.	Set	79.20
2615	15 A aerial fuse complete with porcelain tube as required	Each	13.00

2616	30 A aerial fuse complete with porcelain tube as required	Each	20.00
2618	Stay clamp	Set	50.40
2619	Brace ( 50 mm X 50 mm X 6 mm angle iron )	Meter	169.00
2620	Angle iron bracket ( 50 mm X 50 mm X 6 mm ) 65 cm long	Each	111.60
2623	Eye hook	Each	23.75
2624	Guy clamp	Each	54.00
2635	D' iron clamp (with coach screws)	Each	61.20
2643	Strain insulator 11 kV	Each	18.40
2644	Strain insulator 33 kV	Each	27.20
2645	11 kV pin insulator with pin washers and nuts	Set	90.40
2646	11 kV disc insulator	Set	404.80
2647	Galvanised insulator hardware fitting ball and socket type with strain clamp, bolts, nuts and washers	Set	118.80
2648	33 kV pin insulator with pin washers and nuts	Set	404.80
2649	Galvanised insulator hardware fitting ball and socket type with strain clamp, bolts, nuts and washers for 3 Nos 11 kV disk insulator	Set	347.00
2650	3 piece lightning arrestor set for 11 kV O.H. lines complete with G.I. clamp bolts and nuts with washers	Set	1620.00
2651	Single piece lightning arrestor set for 33 kV O.H. lines complete with G.I. clamp bolts and nuts with washers	Set	12600.00
2665	G.I. strap for shackle insulator	Set	43.20

#### CABLE TRAYS

2701	MS perforated cable tray painted with powder coating 100 X 50 X 1.6 mm	Meter	157.50
2702	MS perforated cable tray painted with powder coating 150 X 50 X 1.6 mm	Meter	196.50
2703	MS perforated cable tray painted with powder coating 225 X 50 X 1.6 mm	Meter	255.50
2704	MS perforated cable tray painted with powder coating 300 X 50 X 1.6 mm	Meter	314.50
2705	MS perforated cable tray painted with powder coating 375 X 50 X 2 mm	Meter	467.00
2706	MS perforated cable tray painted with powder coating 450 X 50 X 2 mm	Meter	540.50
2707	MS perforated cable tray painted with powder coating 600 X 50 X 2 mm	Meter	688.00

2708	MS perforated cable tray painted with powder coating 300 X 62.5 X 2 mm	Meter	417.50
2709	MS perforated cable tray painted with powder coating 375 X 62.5 X 2 mm	Meter	491.50
2710	MS perforated cable tray painted with powder coating 450 X 62.5 X 2 mm	Meter	565.00
2711	MS perforated cable tray painted with powder coating 600 X 62.5 X 2 mm	Meter	712.50
2712	MS perforated cable tray painted with powder coating 750 X 62.5 X 2 mm	Meter	859.50
2713	MS perforated cable tray painted with powder coating 900 X 62.5 X 2 mm	Meter	1007.00
2714	MS perforated cable tray painted with powder coating 600 X 75 X 2 mm	Meter	737.00
2715	MS perforated cable tray painted with powder coating 750 X 75 X 2 mm	Meter	869.50
2716	MS perforated cable tray painted with powder coating 900 X 75 X 2 mm	meter	1032.00
2717	MS perforated cable tray Connector 100 X 50 X 1.6 mm	Each	30.00
2718	MS perforated cable tray Connector 150 X 50 X 1.6 mm	Each	39.00
2719	MS perforated cable tray Connector 225 X 50 X 1.6 mm	Each	40.00
2720	MS perforated cable tray Connector 300 X 50 X 1.6 mm	Each	40.00
2721	MS perforated cable tray Connector 375 X 50 X 2 mm	Each	44.00
2722	MS perforated cable tray Connector 450 X 50 X 2 mm	Each	51.00
2723	MS perforated cable tray Connector 600 X 50 X 2 mm	Each	56.00
2724	MS perforated cable tray Connector 300 X 62.5 X 2 mm	Each	44.00
2725	MS perforated cable tray Connector 375 X 62.5 X 2 mm	Each	50.00
2726	MS perforated cable tray Connector 450 X 62.5 X 2 mm	Each	55.00
2727	MS perforated cable tray Connector 600 X 62.5 X 2 mm	Each	61.00
2728	MS perforated cable tray Connector 750 X 62.5 X 2 mm	Each	67.00
2729	MS perforated cable tray Connector 900 X 62.5 X 2 mm	each	71.00
2733	MS perforated cable tray Bend 100 X 50 X 1.6 mm	Each	409.50
2734	MS perforated cable tray Bend 150 X 50 X 1.6 mm	Each	510.90

2735	MS perforated cable tray Bend 225 X 50 X 1.6 mm	Each	664.30
2736	MS perforated cable tray Bend 300 X 50 X 1.6 mm	Each	817.70
2737	MS perforated cable tray Bend 375 X 50 X 2 mm	Each	1214.20
2738	MS perforated cable tray Bend 450 X 50 X 2 mm	Each	1405.30
2739	MS perforated cable tray Bend 600 X 50 X 2 mm	Each	1788.80
2740	MS perforated cable tray Bend 300 X 62.5 X 2 mm	Each	1085.50
2741	MS perforated cable tray Bend 375 X 62.5 X 2 mm	Each	1277.90
2742	MS perforated cable tray Bend 450 X 62.5 X 2 mm	Each	1469.00
2743	MS perforated cable tray Bend 600 X 62.5 X 2 mm	Each	1852.50
2744	MS perforated cable tray Bend 750 X 62.5 X 2 mm	Each	2234.70
2745	MS perforated cable tray Bend 900 X 62.5 X 2 mm	Each	2618.20
2746	MS perforated cable tray Bend 600 X 75 X 2 mm	Each	1916.20
2747	MS perforated cable tray Bend 750 X 75 X 2 mm	Each	2299.70
2748	MS perforated cable tray Bend 900 X 75 X 2 mm	Each	2683.20
2749	MS perforated cable tray Reducer 100 X 50 X 1.6 mm	Each	511.55
2750	MS perforated cable tray Reducer 150 X 50 X 1.6 mm	Each	638.30
2751	MS perforated cable tray Reducer 225 X 50 X 1.6 mm	Each	830.05
2752	MS perforated cable tray Reducer 300 X 50 X 1.6 mm	Each	1021.80
2753	MS perforated cable tray Reducer 375 X 50 X 2 mm	Each	1517.75
2754	MS perforated cable tray Reducer 450 X 50 X 2 mm	Each	1756.30
2755	MS perforated cable tray Reducer 600 X 50 X 2 mm	Each	2236.00
2756	MS perforated cable tray Reducer 300 X 62.5 X 2 mm	Each	1356.55
2757	MS perforated cable tray Reducer 375 X 62.5 X 2 mm	Each	1597.05
2758	MS perforated cable tray Reducer 450 X 62.5 X 2 mm	Each	1836.25
2759	MS perforated cable tray Reducer 600 X 62.5 X 2 mm	Each	2315.30
2760	MS perforated cable tray Reducer 750 X 62.5 X 2 mm	Each	2793.05

2761	MS perforated cable tray Reducer 900 X 62.5 X 2 mm	Each	3272.75
2762	MS perforated cable tray Reducer 600 X 75 X 2 mm	Each	2395.25
2763	MS perforated cable tray Reducer 750 X 75 X 2 mm	Each	2874.30
2764	MS perforated cable tray Reducer 900 X 75 X 2 mm	Each	3354.00
2765	MS perforated cable tray Tee 100 X 50 X 1.6 mm	Each	511.55
2766	MS perforated cable tray Tee 150 X 50 X 1.6 mm	Each	638.30
2767	MS perforated cable tray Tee 225 X 50 X 1.6 mm	Each	830.05
2768	MS perforated cable tray Tee 300 X 50 X 1.6 mm	Each	1021.80
2769	MS perforated cable tray Tee 375 X 50 X 2 mm	Each	1517.75
2770	MS perforated cable tray Tee 450 X 50 X 2 mm	Each	1756.30
2771	MS perforated cable tray Tee 600 X 50 X 2 mm	Each	2236.00
2772	MS perforated cable tray Tee 300 X 62.5 X 2 mm	Each	1356.55
2773	MS perforated cable tray Tee 375 X 62.5 X 2 mm	Each	1597.05
2774	MS perforated cable tray Tee 450 X 62.5 X 2 mm	Each	1836.25
2775	MS perforated cable tray Tee 600 X 62.5 X 2 mm	Each	2315.30
2776	MS perforated cable tray Tee 750 X 62.5 X 2 mm	Each	2793.05
2777	MS perforated cable tray Tee 900 X 62.5 X 2 mm	Each	3272.75
2778	MS perforated cable tray Tee 600 X 75 X 2 mm	Each	2395.25
2779	MS perforated cable tray Tee 750 X 75 X 2 mm	Each	2874.30
2780	MS perforated cable tray Tee 900 X 75 X 2 mm	Each	3354.00
2781	MS perforated cable tray Cross member 100 X 50 X 1.6 mm	Each	614.25
2782	MS perforated cable tray Cross member 150 X 50 X 1.6 mm	Each	766.35
2783	MS perforated cable tray Cross member 225 X 50 X 1.6 mm	Each	996.45
2784	MS perforated cable tray Cross member 300 X 50 X 1.6 mm	Each	1226.55
2785	MS perforated cable tray Cross member 375 X 50 X 2 mm	Each	1821.30
2786	MS perforated cable tray Cross member 450 X 50 X 2 mm	Each	2107.95
2787	MS perforated cable tray Cross member 600 X 50 X 2 mm	Each	2683.20
2788	MS perforated cable tray Cross member 300 X 62.5 X 2 mm	Each	1628.25
2789	MS perforated cable tray Cross member 375 X	Each	1916.85

	62.5 X 2 mm		
2790	MS perforated cable tray Cross member 450 X 62.5 X 2 mm	Each	2203.50
2791	MS perforated cable tray Cross member 600 X 62.5 X 2 mm	Each	2778.75
2792	MS perforated cable tray Cross member 750 X 62.5 X 2 mm	Each	3352.05
2793	MS perforated cable tray Cross member 900 X 62.5 X 2 mm	Each	3927.30
2794	MS perforated cable tray Cross member 600 X 75 X 2 mm	Each	2874.30
2795	MS perforated cable tray Cross member 750 X 75 X 2 mm	Each	3449.55
2796	MS perforated cable tray Cross member 900 X 75 X 2 mm	Each	4024.80
	ANGLE/FLAT IRON AND STEEL SHEET		
2801	MS Suspender 6 mm dia 0.75m long	Each	23.00
2802	MS Suspender 8 mm dia 0.75m long	Each	28.00
2803	MS Suspender 10 mm dia 0.75m long	Each	40.00
2804	25 mm X 25 mm X 3 mm angle iron	kg	56.00
2805	35 mm X 35 mm X 4 mm angle iron	kg	56.00
2806	35 mm X 35 mm X 5 mm angle iron	kg	56.00
2807	50 mm X 50 mm X 6 mm angle iron	kg	56.00
2808	65 mm X 65 mm X 6 mm angle iron	kg	56.00
2809	20/25 mm X 3 mm flat iron	kg	56.00
2810	25 mm X 4 mm flat iron	kg	56.00
2811	25 mm X 6 mm flat iron	kg	56.00
2812	40 mm X 3 mm flat iron	kg	56.00
2813	50 mm X 6 mm flat iron	kg	56.00
2814	50 mm X 8 mm flat iron	kg	56.00
2815	100 mm X 50 mm X 6 mm channel iron ( 9.56 kg/ mtr)	kg	56.00
2816	75 mm X 40 mm X 6 mm channel iron ( 7.14 kg/ mtr)	kg	56.00
2817	1.6 mm thick M.S. sheet	kg	56.00
2818	3 mm thick M.S. sheet	kg	56.00
	GI AND RCC PIPE		
2819	20 mm dia G.I. Pipe (light class)	Meter	171.60
2820	32 mm dia G.I. Pipe (light class)	Meter	282.60

2821	50 mm dia G.I. Pipe (light class)	Meter	458.80
2822	80 mm dia G.I. Pipe (light class)	Meter	715.80
2823	100 mm dia G.I. Pipe (light class)	Meter	1036.80
2824	15 mm dia, G.I. pipe (medium class)	Meter	151.20
2825	20 mm dia, G.I. pipe (medium class)	Meter	190.20
2826	40 mm dia, G.I. pipe (medium class)	Meter	383.40
2827	15 mm dia, G.I. pipe (heavy class)	Meter	169.20
2828	20 mm dia, G.I. pipe (heavy class)	Meter	213.60
2829	Check nut 20mm	Each	6.30
2831	32 mm dia, G.I. pipe (medium class)	Meter	334.80
2832	50 mm dia, G.I. pipe (medium class)	Meter	538.20
2833	80 mm dia, G.I. pipe (medium class)	Meter	871.20
2834	100 mm dia, G.I. pipe (medium class)	Meter	1260.00
2835	150 mm dia, G.I. pipe (medium class)	Meter	1965.00
2836	40 mm to 20 mm reducer	Each	36.00
2837	Nipple 50 mm dia	Each	67.50
2838	40 mm dia, G.I. bend (medium class)	Each	61.20
2839	50 mm dia, G.I. bend (medium class)	Each	94.35
2841	100 mm dia RCC pipe NP2 class	Meter	210.00
2842	150 mm dia RCC pipe NP2 class	Meter	220.00
2843	250 mm dia RCC pipe NP2 class	Meter	365.00
2844	300 mm dia RCC pipe NP2 class	Meter	450.00
2845	100 mm dia RCC collar NP2 class	Each	31.50
2846	150 mm dia RCC collar NP2 class	Each	33.30
2847	250 mm dia RCC collar NP2 class	Each	49.50
2848	300 mm dia RCC collar NP2 class	Each	63.00
	SCREWS, NUT BOTS AND OTHER ACCESSORIES		
2851	Al. Alloy/ cadmium plated iron screws, 20 mm	Each	0.90
2852	Iron screws, 35 mm X 6 mm	Each	1.80
2853	Iron screws, 40 mm X 6 mm	Each	1.80
2854	Iron screws, 45 mm X 6 mm	Each	1.80
2855	Steel fastener 6 mm X 75 mm	Each	7.20
2856	Steel fastener 8 mm X 75 mm	Each	10.80



2857	PVC fastener 40mm long	Each	0.90
2858	PVC clip for fixing cable	Each	0.45
2859	Rubber/ PVC bushes	Each	0.90
2860	6 mm dia rivet/ stud/ bolts and nuts	Each	4.50
2861	25mm X 3mm bolts & nuts	Each	3.60
2862	32mm X 8mm bolts & nuts	Each	5.40
2863	38mm X 10mm bolts & nuts	Each	9.00
2864	38 mm X 7 mm, bolts and nuts	Each	7.20
2865	15 mm long X 6 mm dia G.I. bolts and nuts	Each	5.40
2866	10 mm X 25 mm long G.I. bolt with nut etc	Each	10.80
2867	16 mm X 50 mm bolts and nuts with washers	Set	9.00
2868	16 mm X 40 mm bolts and nuts with washers	Set	9.00
2869	16 mm X 125 mm bolts and nuts with washers	Set	21.60
2870	16 mm X 150 mm bolts and nuts with washers	Set	25.20
2871	10 mm X 25 mm long tinned brass bolt with nut etc.	Each	31.50
2881	GI saddles 19mm x 0.55mm for conduit	Each	1.80
2882	GI saddles 25mm x 0.90mm for conduit above 25mm	Each	1.80
HDPE Pipe			
2891	63 mm dia	Meter	78.00
2892	90 mm dia	Meter	108.00
2893	120 mm dia	Meter	156.00
2894	160 mm dia	Meter	228.00
2895	200 mm dia	Meter	360.00
HDPE Pipe Coupler			
2896	63 mm dia	Each	16.00
2897	90 mm dia	Each	72.00
2898	120 mm dia	Each	84.00
2899	160 mm dia	Each	168.00
2900	200 mm dia	Each	234.00
2901	20 mm X 3 mm copper tape ( 0.533 kg/mtr)	kg	612.00
2902	25 mm X 5 mm copper tape (1.15 kg/mtr)	kg	612.00
2903	32 mm X 6 mm copper tape ( 1.705 kg/mtr)	kg	612.00
2904	8 SWG copper wire (4.0 mm dia)	kg	630.00

2905	600 mm X 600 mm X 3 mm thick copper plate (10.5 kg)	Each	6426.00
2906	Copper saddle	Each	36.00
2907	50 mm X 5mm copper strip (2.30 kg/mtr)	kg	612.00
2908	Brass nipple	Each	13.50
2909	Lightning finial, 25 mm dia X 300 mm long, copper	Each	585.00
2910	Lightning finial, 25 mm dia X 300 mm long, G.I.	Each	135.00
2911	20 mm X 3 mm G.I. Tape ( 0.461 kg/mtr)	kg	72.00
2912	25 mm X 5 mm G.I. strip (1.0 kg/mtr)	kg	63.00
2913	25 mm X 6 mm G.I. strip (1.2 kg/mtr)	kg	58.50
2914	32 mm X 6 mm G.I. Tape ( 1.475 kg/mtr)	kg	58.50
2915	600 mm X 600 mm X 6 mm thick G.I. plate	Each	1620.00
2916	6 SWG G.I. wire	kg	63.00
2917	GI saddle 20mm x 3mm	Each	3.60
2918	Funnel	Each	22.50
2919	G.I. nuts and through bolts with washer	Each	31.50
2920	Washers	Each	0.00
2921	G.I. Hooks made of 8 SWG GI wire/ GI clip	Each	3.60
2922	CI/MS cover plate hinged to FRLSame with Locking arrangement	Each	315.00
2923	Pulley of 50 mm dia	Each	90.00
2924	Clamp, bolts, nuts etc.	Each	117.00
2925	Flat iron clamp (50 mm X 6 mm) for G.I. pipe	Each	45.00
2926	G.I. plate ( 10 cm X 10 cm X 5 mm )	kg	67.50
2927	Ball and socket	Each	22.50
2928	Back plate	Each	9.00
2929	Check nut 20mm	Each	5.40
2930	Rubber reel, nut & bolts with washers and safety pin	Each	67.50
2931	PVC sleeve	meter	7.20
2932	250 mm X 200 mm H.T. danger notice plate	Each	72.00
2933	200 mm X 150 mm M.V. danger notice plate	Each	54.00
2934	Earthing thimbles and solder	L.S.	18.00
2935	Cement, paint, sand etc.	L.S.	7.20
2936	Painting with primer and finish paint	L.S.	7.20

2937	Diesel	litre	81.00
2938	Cotton waste, cleaning cloth etc.	kg	49.50
2939	Cleaning materials like soap/ detergent	kg	54.00
2940	Tin solder etc.	L.S.	7.20
2941	Charcoal	kg	9.00
2942	Coke	kg	13.50
2943	Salt	kg	10.80
2944	Paint	litre	180.00
2945	Common burnt clay F.P.S. (non modular) bricks class designation 7.5	Each	5.40
2946	Fine sand	cum	900.00
2947	Bricks ballast	cum	675.00
2948	Cement	ton	7200.00
2949	Stone aggregate (single size) 40mm nominal size	cum	1350.00
2950	Stone aggregate (single size) 20mm nominal size	cum	1620.00
2951	Stone aggregate (single size) 10mm nominal size	cum	1620.00
2952	Coarse sand (Zone III)	cum	1710.00
9999	Sundries/bending charges	L.S.	2.70

#### HVAC Items

Pipes of sizes 150mm & below shall be M.S. 'C' class as per IS : 1239 and pipes size above 150mm shall be welded black steel pipe heavy class as per IS: 3589, from minimum 6.35mm thick M.S. Sheet for pipes upto 350 mm dia. and from minimum 7mm thick MS sheet for pipes of 400 mm dia and above.

3001	M.S. Pipe 400 mm dia	Meter	10852.00
3002	M.S. Pipe 350 mm dia	Meter	5596.20
3003	M.S. Pipe 300 mm dia	Meter	5026.50
3004	M.S. Pipe 250mm dia	Meter	4217.40
3005	M.S. Pipe 200mm dia	Meter	3378.60
3006	M.S. Pipe 150mm dia	Meter	2062.80
3007	M.S. Pipe 125mm dia	Meter	1736.10
3008	M.S. Pipe 100mm dia	Meter	1403.10
3009	M.S. Pipe 80mm dia	Meter	961.20
3010	M.S. Pipe 65mm dia	Meter	768.60

3011	M.S. Pipe 50 mm dia	Meter	603.90
3012	M.S. Pipe 40 mm dia	Meter	425.70
3013	M.S. Pipe 32 mm dia	Meter	367.20
3014	M.S. Pipe 25 mm dia	Meter	296.10
3023	Pipe aluminium Cladding 0.63mm	sq. m	360.00
	BUTTERFLY VALVE (MANUAL) with C I body SS Disc, Nitrile Rubber Seal & O- Ring PN 16 pressure rating for chilled water/hot water circulation as specified		
3024	200 mm dia	Each	9777.00
3025	150mm dia	Each	4306.80
3026	125mm dia	Each	3814.20
3027	100mm dia	Each	3060.60
3028	80mm dia	Each	2387.40
3029	65mm dia	Each	2178.60
3030	50mm dia	Each	2019.60
3031	40mm dia	Each	1764.00
	BALANCING VALVE WITH BUILT IN MEASURING FACILITY with C I body flanged construction with EPDM coated disc with long pitch with protected out pipe insulation & PN 16 pressure rating for chilled / hot water circulation as specified.		
3032	200 mm dia	Each	50680.00
3033	150mm dia	Each	24320.00
3034	125mm dia	Each	18280.00
3035	100mm dia	Each	13320.00
3036	80mm dia	Each	9200.00
3037	65 mm dia	Each	8120.00
3038	50mm dia	Each	7040.00
3039	40 mm dia	Each	4880.00
	NON - RETURN VALVE with dual plate of C I body SS plates vulcanized NBR seal flanged end & PN 16 pressure rating for chilled / hot water circulation including insulation as specified.		
3040	200 mm dia	Each	8834.40
3041	150mm dia	Each	4988.80
3042	125mm dia	Each	4074.40

3043	100 mm dia	Each	2817.60
3044	80mm dia	Each	1942.40
3045	65 mm dia	Each	1599.20
	Y - STRAINER of Ductile CI Body flanged ends with stainless steel strainer for chilled / hot water circulation including insulation as specified.		
3046	200mm dia	Each	35614.00
3047	150mm dia	Each	18992.00
3048	125mm dia	Each	14769.00
3049	100 mm dia	Each	9325.00
3050	80 mm dia	Each	6237.00
3051	65mm dia	Each	4804.00
3052	50mm dia	Each	3375.00
3053	40mm dia	Each	2471.00
3054	Industrial type pressure gauges with gun metal / brass valves	Each	811.53
3055	Industrial type thermometers.	Each	640.68
	Factory fabricated GSS sheet metal rectangular/round ducting of following sheet thickness		
3056	Thickness 0.63 mm sheet	sq. m	500.34
3057	Thickness 0.80 mm sheet	sq. m	614.75
3058	Thickness 1.00 mm sheet	sq. m	739.83
3059	Thickness 1.25 mm sheet	sq. m	886.27
	Fabricated at site GSS sheet metal of following sheet thickness		
			0.00
3060	Thickness 0.63 mm sheet	sq. m	398.14
3061	Thickness 0.80 mm sheet	sq. m	530.85
3062	Thickness 1.00 mm sheet	sq. m	664.32
3063	Thickness 1.25 mm sheet	sq. m	803.14
3064(a)	GI volume control duct damper	sq. m	4591.53
3064(b)	Motorized (ON-OFF Type) duct mounted GI volume control damper with enthalpy sensor and necessary control wire (minimum 1.5 sqmm) for integration within AHU room	sq. m	10800.00
3065	Actuator	sq. m	4599.15
3066	powder coated extruded aluminium Supply Air Grills with aluminium volume control dampers	sq. m	6483.81

3067	Powder coated extruded aluminium Return Air Grills with louvers but without volume control dampers	sq. m	4072.12
3068	Supply air diffusers of powder coated aluminium with aluminium volume control dampers with anti smudge ring & removable core.	sq. m	8809.32
3069	Return air diffusers of powder coated aluminium without volume control dampers with anti smudge ring & removable core.	sq. m	5742.46
3070	Thermal insulated flexible duct- 200 mm dia	sq. m	351.61
	Fire dampers in supply air duct/main branch and return air path with inbuilt mechanism of spring return action		
3071	Fire damper	sq. m	7318.98
3072	Actuator	sq. m	6734.75
3073	25 mm thick resin bonded glass wool having density of 32 kg/m <sup>3</sup> ,	sq. m	117.46
3074	50mm thick, density 32 kg/cu.m resin bonded glass fiber insulation.	sq. m	234.15
	Duly laminated aluminum foil of mat finish closed cell Nitrile rubber (class "O") insulation for use on existing duct		
3076	19mmthickness	sq. m	451.53
3077	25mmthickness	sq. m	597.97

#### AIR HANDLING UNITS

	Factory built floor mounted chilled water double skin type horizontal/vertical air handling units details and specifications as in the item with cooling coil of 6 row deep etc. complete as per specification and of following capacities.		
3078	4300 CMH	Each	75212.54
3079	5100 CMH	Each	88485.25
3080	6800 CMH	Each	99433.22
3081	8500 CMH	Each	123181.02
3082	10200 CMH	Each	142059.66
3083	11900 CMH	Each	161450.85
3084	13600 CMH	Each	173410.17
3085	15300 CMH	Each	196560.00
3086	17000 CMH	Each	208006.78
3087	18700 CMH	Each	229875.25
3088	20400 CMH	Each	246960.00

	Factory built floor mounted chilled water double skin type horizontal/vertical air handling units details and specifications as in the item with cooling coil of 4 row deep etc. complete as per specification and of following capacities.		
3089	4300 CMH	Each	66278.14
3090	5100 CMH	Each	77794.32
3091	6800 CMH	Each	86804.24
3092	8500 CMH	Each	107408.90
3093	10200 CMH	Each	125658.31
3094	11900 CMH	Each	140665.42
3095	13600 CMH	Each	152054.24
3096	15300 CMH	Each	172812.20
3097	17000 CMH	Each	181867.12
3098	18700 CMH	Each	198991.53
3099	20400 CMH	Each	215780.34
	Motorized Butter fly Valves with CI Body, SS Disc,O - ring and minimum PN-16 pressure rating , conforming to BS 5155, IS 13095, with IP-55 actuator as specified.		
3101	350 mm	Each	79862.80
3102	300 mm	Each	71566.78
3103	250 mm	Each	51524.24
3104	200 mm	Each	38864.75
3105	150 mm	Each	30130.17
3106	125 mm	Each	29870.85
3107	100 mm	Each	29316.36
3108	80 mm	Each	12535.17
3109	65 mm	Each	12413.90
3110	50 mm	Each	12159.92
	Electronic, self-balancing, pressure independent type dynamic balancing valve with integrated 2 way modualating control valves in a single body, alongwith actuator as specified		
3111	150 mm	Each	115183.22

3112	125 mm	Each	104868.31
3113	100 mm	Each	82519.32
3114	80 mm	Each	48136.27
3115	65 mm	Each	37821.36
3116	50 mm	Each	24498.31
3117	40 mm	Each	22348.98
3118	32 mm	Each	12034.07
3119	25 mm	Each	11318.64
3120	20 mm	Each	8251.78
<b>AIR HANDLING UNIT</b>			
Factory built floor mounted chilled water double skin type horizontal/vertical air handling units details and specifications as in the item with cooling coil of 6 row deep etc. complete as per specification and of following capacities.			
3142	23800 CMH	Each	270803.14
3143	28900 CMH	Each	285987.97
3144	34000 CMH	Each	316972.37
3145	39100 CMH	Each	439515.00
Factory built floor mounted chilled water double skin type horizontal/vertical air handling units details and specifications as in the item with cooling coil of 4 row deep etc. complete as per specification and of following capacities.			
3162	23800 CMH	Each	205166.44
3163	28900 CMH	Each	261833.64
3164	34000 CMH	Each	290167.63
3165	39100 CMH	Each	332463.81
3201	Resin bonded fiber glass insulation of density 80 kg/cu m of thickness 65 mm on existing pipe Hot Dipped Galvanized CABLE TRAYS	sq. m	990.76
3701	MS perforated cable tray Hot Dipped Galvanized 100 X 50 X 1.6 mm	Meter	255.51
3702	MS perforated cable tray Hot Dipped Galvanized 150 X 50 X 1.6 mm	Meter	286.02
3703	MS perforated cable tray Hot Dipped Galvanized 225 X 50 X 1.6 mm	Meter	412.63
3704	MS perforated cable tray Hot Dipped Galvanized 300 X 50 X 1.6 mm	Meter	458.39



3705	MS perforated cable tray Hot Dipped Galvanized 375 X 50 X 2 mm	Meter	623.90
3706	MS perforated cable tray Hot Dipped Galvanized 450 X 50 X 2 mm	Meter	693.31
3707	MS perforated cable tray Hot Dipped Galvanized 600 X 50 X 2 mm	Meter	1014.41
3708	MS perforated cable tray Hot Dipped Galvanized 300 X 62.5 X 2 mm	Meter	617.03
3709	MS perforated cable tray Hot Dipped Galvanized 375 X 62.5 X 2 mm	Meter	726.10
3710	MS perforated cable tray Hot Dipped Galvanized 450 X 62.5 X 2 mm	Meter	835.17
3711	MS perforated cable tray Hot Dipped Galvanized 600 X 62.5 X 2 mm	Meter	1056.36
3712	MS perforated cable tray Hot Dipped Galvanized 750 X 62.5 X 2 mm	Meter	1298.14
3713	MS perforated cable tray Hot Dipped Galvanized 900 X 62.5 X 2 mm	Meter	1520.85
3714	MS perforated cable tray Hot Dipped Galvanized 600 X 75 X 2 mm	Meter	1089.15
3715	MS perforated cable tray Hot Dipped Galvanized 750 X 75 X 2 mm	Meter	1307.29
3716	MS perforated cable tray Hot Dipped Galvanized 900 X 75 X 2 mm	Meter	1524.66
3717	MS perforated Hot Dipped Galvanized cable tray Connector 100 X 50 X 1.6 mm	Each	32.03
3718	MS perforated Hot Dipped Galvanized cable tray Connector 150 X 50 X 1.6 mm	Each	38.14
3719	MS perforated Hot Dipped Galvanized cable tray Connector 225 X 50 X 1.6 mm	Each	40.42
3720	MS perforated Hot Dipped Galvanized cable tray Connector 300 X 50 X 1.6 mm	Each	40.42
3721	MS perforated Hot Dipped Galvanized cable tray Connector 375 X 50 X 2 mm	Each	40.42
3722	MS perforated Hot Dipped Galvanized cable tray Connector 450 X 50 X 2 mm	Each	40.42
3723	MS perforated Hot Dipped Galvanized cable tray Connector 600 X 50 X 2 mm	Each	40.42
3724	MS perforated Hot Dipped Galvanized cable tray Connector 300 X 62.5 X 2 mm	Each	40.42
3725	MS perforated Hot Dipped Galvanized cable tray Connector 375 X 62.5 X 2 mm	Each	40.42
3726	MS perforated Hot Dipped Galvanized cable tray Connector 450 X 62.5 X 2 mm	Each	40.42
3727	MS perforated Hot Dipped Galvanized cable tray Connector 600 X 62.5 X 2 mm	Each	40.42
3728	MS perforated Hot Dipped Galvanized cable tray Connector 750 X 62.5 X 2 mm	Each	40.42

3729	MS perforated Hot Dipped Galvanized cable tray Connector 900 X 62.5 X 2 mm	Each	40.42
3733	MS perforated Hot Dipped Galvanized cable tray Bend 100 X 50 X 1.6 mm	Each	639.92
3734	MS perforated Hot Dipped Galvanized cable tray Bend 150 X 50 X 1.6 mm	Each	715.42
3735	MS perforated Hot Dipped Galvanized cable tray Bend 225 X 50 X 1.6 mm	Each	1030.42
3736	MS perforated Hot Dipped Galvanized cable tray Bend 300 X 50 X 1.6 mm	Each	1145.59
3737	MS perforated Hot Dipped Galvanized cable tray Bend 375 X 50 X 2 mm	Each	1558.98
3738	MS perforated Hot Dipped Galvanized cable tray Bend 450 X 50 X 2 mm	Each	1732.88
3739	MS perforated Hot Dipped Galvanized cable tray Bend 600 X 50 X 2 mm	Each	2536.02
3740	MS perforated Hot Dipped Galvanized cable tray Bend 300 X 62.5 X 2 mm	Each	1542.97
3741	MS perforated Hot Dipped Galvanized cable tray Bend 375 X 62.5 X 2 mm	Each	1816.02
3742	MS perforated Hot Dipped Galvanized cable tray Bend 450 X 62.5 X 2 mm	Each	2087.54
3743	MS perforated Hot Dipped Galvanized cable tray Bend 600 X 62.5 X 2 mm	Each	2421.61
3744	MS perforated Hot Dipped Galvanized cable tray Bend 750 X 62.5 X 2 mm	Each	3243.05
3745	MS perforated Hot Dipped Galvanized cable tray Bend 900 X 62.5 X 2 mm	Each	3793.73
3746	MS perforated Hot Dipped Galvanized cable tray Bend 600 X 75 X 2 mm	Each	2722.88
3747	MS perforated Hot Dipped Galvanized cable tray Bend 750 X 75 X 2 mm	Each	3267.46
3748	MS perforated Hot Dipped Galvanized cable tray Bend 900 X 75 X 2 mm	Each	3812.03
3749	MS perforated Hot Dipped Galvanized cable tray Reducer 100 X 50 X 1.6 mm	Each	1014.41
3750	MS perforated Hot Dipped Galvanized cable tray Reducer 150 X 50 X 1.6 mm	Each	1207.37
3751	MS perforated Hot Dipped Galvanized cable tray Reducer 225 X 50 X 1.6 mm	Each	1572.71
3752	MS perforated Hot Dipped Galvanized cable tray Reducer 300 X 50 X 1.6 mm	Each	1870.93
3753	MS perforated Hot Dipped Galvanized cable tray Reducer 375 X 50 X 2 mm	Each	2305.68

3754	MS perforated Hot Dipped Galvanized cable tray Reducer 450 X 50 X 2 mm	Each	2509.32
3755	MS perforated Hot Dipped Galvanized cable tray Reducer 600 X 50 X 2 mm	Each	3571.02
3756	MS perforated Hot Dipped Galvanized cable tray Reducer 300 X 62.5 X 2 mm	Each	2298.81
3757	MS perforated Hot Dipped Galvanized cable tray Reducer 375 X 62.5 X 2 mm	Each	2706.10
3758	MS perforated Hot Dipped Galvanized cable tray Reducer 450 X 62.5 X 2 mm	Each	3199.58
3759	MS perforated Hot Dipped Galvanized cable tray Reducer 600 X 62.5 X 2 mm	Each	3577.88
3760	MS perforated Hot Dipped Galvanized cable tray Reducer 750 X 62.5 X 2 mm	Each	4425.25
3761	MS perforated Hot Dipped Galvanized cable tray Reducer 900 X 62.5 X 2 mm	Each	5162.03
3762	MS perforated Hot Dipped Galvanized cable tray Reducer 600 X 75 X 2 mm	Each	4101.10
3763	MS perforated Hot Dipped Galvanized cable tray Reducer 750 X 75 X 2 mm	Each	4485.51
3764	MS perforated Hot Dipped Galvanized cable tray Reducer 900 X 75 X 2 mm	Each	5224.58
3765	MS perforated Hot Dipped Galvanized cable tray Tee 100 X 50 X 1.6 mm	Each	766.53
3766	MS perforated Hot Dipped Galvanized cable tray Tee 150 X 50 X 1.6 mm	Each	800.85
3767	MS perforated Hot Dipped Galvanized cable tray Tee 225 X 50 X 1.6 mm	Each	1237.12
3768	MS perforated Hot Dipped Galvanized cable tray Tee 300 X 50 X 1.6 mm	Each	1374.41
3769	MS perforated Hot Dipped Galvanized cable tray Tee 375 X 50 X 2 mm	Each	1870.93
3770	MS perforated Hot Dipped Galvanized cable tray Tee 450 X 50 X 2 mm	Each	2079.15
3771	MS perforated Hot Dipped Galvanized cable tray Tee 600 X 50 X 2 mm	Each	3043.22
3772	MS perforated Hot Dipped Galvanized cable tray Tee 300 X 62.5 X 2 mm	Each	1851.86
3773	MS perforated Hot Dipped Galvanized cable tray Tee 375 X 62.5 X 2 mm	Each	2220.25
3774	MS perforated Hot Dipped Galvanized cable tray Tee 450 X 62.5 X 2 mm	Each	2504.75
3775	MS perforated Hot Dipped Galvanized cable tray Tee 600 X 62.5 X 2 mm	Each	3229.32

3776	MS perforated Hot Dipped Galvanized cable tray Tee 750 X 62.5 X 2 mm	Each	3887.54
3777	MS perforated Hot Dipped Galvanized cable tray Tee 900 X 62.5 X 2 mm	Each	4554.15
3778	MS perforated Hot Dipped Galvanized cable tray Tee 600 X 75 X 2 mm	Each	3267.46
3779	MS perforated Hot Dipped Galvanized cable tray Tee 750 X 75 X 2 mm	Each	3921.10
3780	MS perforated Hot Dipped Galvanized cable tray Tee 900 X 75 X 2 mm	Each	4574.75
3781	MS perforated Hot Dipped Galvanized cable tray Cross member 100 X 50 X 1.6 mm	Each	766.53
3782	MS perforated Hot Dipped Galvanized cable tray Cross member 150 X 50 X 1.6 mm	Each	800.85
3783	MS perforated Hot Dipped Galvanized cable tray Cross member 225 X 50 X 1.6 mm	Each	1251.61
3784	MS perforated Hot Dipped Galvanized cable tray Cross member 300 X 50 X 1.6 mm	Each	1533.05
3785	MS perforated Hot Dipped Galvanized cable tray Cross member 375 X 50 X 2 mm	Each	2071.53
3786	MS perforated Hot Dipped Galvanized cable tray Cross member 450 X 50 X 2 mm	Each	2401.78
3787	MS perforated Hot Dipped Galvanized cable tray Cross member 600 X 50 X 2 mm	Each	3053.90
3788	MS perforated Hot Dipped Galvanized cable tray Cross member 300 X 62.5 X 2 mm	Each	1857.20
3789	MS perforated Hot Dipped Galvanized cable tray Cross member 375 X 62.5 X 2 mm	Each	2179.07
3790	MS perforated Hot Dipped Galvanized cable tray Cross member 450 X 62.5 X 2 mm	Each	2509.32
3791	MS perforated Hot Dipped Galvanized cable tray Cross member 600 X 62.5 X 2 mm	Each	3168.31
3792	MS perforated Hot Dipped Galvanized cable tray Cross member 750 X 62.5 X 2 mm	Each	2797.63
3793	MS perforated Hot Dipped Galvanized cable tray Cross member 900 X 62.5 X 2 mm	Each	3262.00
3794	MS perforated Hot Dipped Galvanized cable tray Cross member 600 X 75 X 2 mm	Each	3269.75
3795	MS perforated Hot Dipped Galvanized cable tray Cross member 750 X 75 X 2 mm	Each	3887.54
3796	MS perforated Hot Dipped Galvanized cable tray Cross member 900 X 75 X 2 mm	Each	4554.15
3801	GI Suspender 6 mm dia 0.75m long	Each	21.36

3802	GI Suspender 8 mm dia 0.75m long	Each	26.69
3803	GI Suspender 10 mm dia 0.75m long	Each	32.03
3804	25 mm X 25 mm X 3 mm Galvannised slotted/angle iron/ channel	kg	43.47
3805	35 mm X 55 mm X 4 mm Galvannised slotted/angle iron/ channel	kg	43.47
3806	35mm X 35 mm X 5 mm Galvannised slotted/angle iron/ channel	kg	43.47
4001	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-75 mm thickness for 400 mm dia pipe	Meter	1850.34
4002	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-75 mm thickness for 350 mm dia pipe	Meter	1654.32
4003	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-75 mm thickness for 300 mm dia pipe	Meter	1356.10
4004	Resin bonded fiber glass pipe section 250mm insulation having density 80 kg/cum-75 mm thickness for 250 mm dia pipe	Meter	1184.49
4005	Resin bonded fiber glass pipe section 200 mm insulation having density 80 kg/cum-75 mm thickness for 200 mm dia pipe	Meter	1002.97
4006	Resin bonded fiber glass pipe section 150 mm insulation having density 80 kg/cum-50 mm thickness for 150 mm dia pipe	Meter	507.20
4007	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 125mm dia pipe	Meter	447.71
4008	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 100 mm dia pipe	Meter	200.59
4009	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 80 mm dia pipe	Meter	331.02
4010	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 65 mm dia pipe	Meter	299.75
4011	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 50 mm dia pipe	Meter	261.61
4012	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50mm thickness for 40 mm dia pipe	Meter	235.68

4013	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 32 mm dia pipe	Meter	221.95
4014	Resin bonded fiber glass pipe section insulation having density 80 kg/cum-50 mm thickness for 25 mm dia pipe	Meter	202.12
4015	Nitrile rubber ( closed cell elastometric nitrile rubber of class 'O' ) Insulation -32 mm thickness	sq.m	669.66
4016	Nitrile rubber (closed cell elastometric nitrile rubber of class 'O' ) Insulation -19 mm thickness	sq.m	370.68
4017	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -75mm thickness for 400 mm dia pipe	Meter	1047.20
4018	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -75mm thickness for 350 mm dia pipe	Meter	895.42
4019	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -75mm thickness for 300mm dia pipe	Meter	771.86
4020	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -75mm thickness for 250 mm dia pipe	Meter	644.49
4021	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -75 mm thickness for 200 mm dia pipe	Meter	549.15
4022	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 150 mm dia pipe	Meter	260.85
4023	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation - 50 mm thickness for 125 mm dia pipe	Meter	229.58
4024	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 100 mm dia pipe	Meter	202.12
4025	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 80 mm dia pipe	Meter	167.03
4026	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 65 mm dia pipe	Meter	152.54
4027	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 50 mm dia pipe	Meter	134.24
4028	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 40 mm dia pipe	Meter	119.75

4029	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 32 mm dia pipe	Meter	112.12
4030	Expanded polystyrene moulded pipe section of density 20kg/cum Insulation -50 mm thickness for 25 mm dia pipe	Meter	102.97
4031	Resin bonded fiber glass insulation of thickness 75 mm on existing pipe	sq.m	1366.02
4032	Resin bonded fiber glass insulation of density 80 kg/cu.mt. of thickness 50 mm on existing pipe	sq.m	1120.42
4033	Resin bonded fiber glass insulation of density 80 kg/cu.mt. Of thickness 40 mm on existing pipe	sq.m	971.69
4034	Resin bonded fiber glass insulation of thickness 25 mm on existing pipe	sq.m	641.44
4037	Expanded polystyrene insulation of thickness 75 mm on existing pipe	sq.m	224.24
4038	Expanded polystyrene insulation of thickness 50 mm on existing pipe	sq.m	149.49
4069	Acoustic lining of supply air duct with 25mm thick resin bonded glass wool having density of 32kg/m3	sq.m	117.46
4070	Reinforced fiber glass tissue and 0.08mm perforated aluminium sheet	sq.m	319.58
4071	50 mm thick resin bonded glass wool having density of 32kg/m3	sq.m	234.15
4072	50 mm thick resin bonded glass wool having density of 24 kg/m3 with factory laminated aluminium foil	sq.m	173.14
4073	Resin bonded fiber glass insulation of thickness 65 mm on existing pipe	sq.m	1238.64

#### FIRE DETECTION AND ALARM SYSTEM

4101	Heat Detectors of electronic Rate of Rise cum fixed temperature (Dual Thermistor) type with mounting base complete with all connection etc.	Each	750.00
4102	Smoke Detector with built in LED, mounting base complete with all connection etc.	Each	812.50
4103	Manual call boxes of MS Type in surface/recess with stainless steel chain & hammer assembly complete with glass and push button etc.	Each	300.00
4104	Manual call boxes of ABS Type in surface/recess with stainless steel chain & hammer assembly complete with glass and push button etc.	Each	250.00

4105	Response indicator on surface/recessed MS Box having two LED's metallic covers complete with all connections etc.	Each	90.00
4106	Fire alarm sounders (electronic) with facility to make announcement, mounted in M.S. Box (16 SWG) with hinged cover plate & suitable for operation with amplifier i/c line matching transformer etc.	Each	362.50
4107	Fire alarm sounders (electronic) with facility to make announcement, mounted in A,B.S. Box with hinged cover plate & suitable for operation with amplifier i/c line matching transformer etc.	Each	312.50
4108	Talk back slave station in surface/recess suitable for operation on simplex mode complete with P.T.T. Knob & speaker/microphone enclosed in a M.S (16 SWG)/ABS.Box, break glass in front etc. Sector panels suitable for following zones, complete with visual indications for short circuit fault, open circuit fault fire conditions and all other standard facilities as per IS:2189, mimic diagram for all area/zone covered complete with all connections, interconnections	Each	625.00
4109	4 Zone fire alarm control panel as per IS: 2189 with backlit LCD Display	Each	4875.00
4110	6 Zone fire alarm control panel as per IS: 2189 with backlit LCD Display	Each	7375.00
4111	10 Zone fire alarm control panel as per IS: 2189 with backlit LCD Display Main control and indication panel made out of 16 SGW MS sheet to accommodate the following items duly stove anameled painted in approved colour with louvers for ventilation's locking arrangement including audio and visual indication for fire alarm and public address system, monitoring system including providing and fixing the following connections, interconnections etc.	Each	9750.00
4112	10 zone control panel for fire alarm system with all accessories and specification mentioned in the item	Each	47177.00
4113	6 zone control panel for fire alarm system with following:-	Each	32272.00



Micro processor based. Intelligent Addressable Main Fire alarm panel , Central Processing Unit ,with the following loop module and with each loop capacity of 120 detector per loop with total of 240 detectors and devices with loop length up to 2 kmtr, network communication card, minimum 320 character graphics, LCD display with touch screen or other keypad and 1000 event history logs in the non volatile memory (EEPROM) power supply unit at 230+ 5 % V, 48 Hrs back-up with 24 volt sealed maintenance free batteries with automatic charger. The panel shall have facility to connect printer to printout logs and facility to have integration with analog voice evacuation system( which is part of the schedule of work under SH: PA System) and shall be complete with all accessories . The panel should be compatible for integration with IBMS system with open protocol Bacnet/IP, complete as per specs and as required for following loops.

4114	10 Loop Control Panel having CPU with 640 character display including backlite LCD display qwerty programming and operating manuals, supporting 1 to 10 signaling line circuits (upto 5 extendable cards & supporting 103 network modes) complete as required.	Each	338000.00
4115	Two Loop Control Panel having CPU with 640 character display including backlite LCD display qwerty programming and operating manuals, supporting 1 to 10 signaling line circuits (upto 5 extendable cards & supporting 103 network modes) complete as required.	Each	177650.00
4116	Central graphical fire alarm management system i/c software	Each	147250.00
4117	320 character LCD display repeater panel.	Each	81000.00
4118	Intelligent photothermal detector	Each	2099.50
4119	Response indicator on surface/recessed MS Box having two LED's metallic covers complete with all connections etc.	Each	150.00
4120	Intelligent addressable programmable sounder.	Each	1824.00
4121	Cost of fault isolator complete with base	Each	2291.40
4122	Cost of intelligent aspiration detector	Each	220000.00
4123	Cost of intelligent addressable thermal detector	Each	1881.00

4124	Cost of control module	Each	2090.00
4125	Cost of addressable fire phone control module	Each	2289.50
4126	Cost of addressable beam detector with remote test features	Each	55100.00
4127	Cost of intelligent duct detector unit with photothermal detector complete with base	Each	5721.85
4128	Cost of manual call point	Each	2745.50
4129	Cost of Horn cum strobe	Each	2470.00
4130	Cost of Strobe.	Each	2364.55
4131	Cost of fire fighter telephone handset	Each	4275.00
4132	Intelligent interface unit BACnet protocol for communication link between building management system and fire alarm control panel.	Each	141550.00
4133	Cost of fire fighter phone jack	Each	1149.50
4134	6 Zone, voice alarm controller with USB, MP3, AM/FM player (including zone button paging station).	Each	95250.00
4135	Cost of 1.5/3/6W Ceiling Speaker	Each	670.00
4136	Cost of 1.5/3/6W Metal Ceiling Speakers.	Each	1295.00
4137	Cost of wall mounted loud speaker, 3/1.5 Watt in ABS enclosure	Each	1775.00
4138	Cost of 2 watt, 70 Volts ceiling speaker.	Each	1330.00
4139	Cost of Digital audio amplifier 50 Watt 25VRMS operating of 240 Volt AC Supply.	Each	73000.00
4140	Digital audio amplifier 75 Watt 25VRMS operating of 240 Volt AC Supply.	Each	110000.00
4141	Cost of Exit point directional sound speaker with voice and integral audio amplifier with selectable sound pulse patterns	Each	7600.00
4142	Cost of Digital voice command keypad	Each	37082.50
4143 (A)	Micro phone assembly	Each	24576.00
4143 (B)	Cost of 25 mm Outer dia PVC/ABS Pipe with end caps including making air sampling opening of appropriate dia on appropriate interval.	Meter	78.00
4144	Cost of Fire Survival armoured cable, Fibre glass tape wrapped, ZH inner, outer sheath 2x1.5 Sq. mm cable.	Meter	196.20
4145	Cost of Fire alarm armoured FRLS/HFFR cable 2 x 1.5 sqmm	Meter	58.20

	Speaker cable of following pairs ,cores and size of PVC insulated FRLS/HFFRcopper conductor cable with LHC in the existing surface / recessed steel conduit / PVC casing and capping including connections etc.		
4146	Cost of single pair 2-core 48/0.2 mm, speaker cable	Meter	24.64
4147	Cost of 25 mm dia MS flexible pipe with PVC coating along with all ancillaries & accessories like coupler etc.	Meter	25.00
4148	Two pair 0.5 Sq. mm copper twisted cable for talk back system.	Meter	8.16
4149	Addressable beam detector	Each	55100.00
4150	Cost of two pair 2-core 48/0.2 mm for PA System.(wastage 5%)	Meter	49.28
4151	Cost of three pair 2-core 48/0.2 mm Speaker Cable for PA System.(wastage 5%)	Meter	73.92
4152	Cost of four pair 2-core 48/0.2 mm Speaker Cable for PA System. (wastage 5%)	Meter	98.56
	WET RISER & SPRINKLER SYSTEM		
	Fire Hydrant single outlet gunmetal NB inlet brass spindle 63mm female instantaneous/outlet with PVC blank cap and GI chain as per IS:5290 (ISI Marked)		
4201	Single head gunmetal hydrant valve	Each	4685.00
	Short stainless steel branch pipe 63mm male instantaneous inlet male threaded outlet fitted with 15mm bore nosle as per IS:903 (ISI Marked)		
4202	Single Head Stainless Steel Hydrant Valve	Each	3547.00
	Short gunmetal pipe 63mm male instantaneous inlet male threaded outlet fitted with 15mm bore nozzle as per IS:903 (ISI Marked)		
4203	Gunmetal short branch pipe	Each	1758.00
4204	Short stainless steel branch pipe	Each	1189.00
	FBC CI Body having two nos. gunmetal 63mm male instantaneous inlet coupling confirming to IS:903 fitted with non return valve flange outlet of 100mm dia complete with 25mm size gunmetal drain valve, two nos. rubber blank caps and chain		

4205	Two way gunmetal FBC connection	Each	4002.00
4206	Three way gunmetal FBC connection	Each	6050.00
4207	Four way gunmetal FBC connection	Each	9462.00
	Sythetic fibre circular woven jackated rubber lined fire hose delivery having 38Kg. Per Cm. Sq. burst pressure, 28Kg. Per Cm. proof pressure, 14Kg. Per Cm. working pressure as per IS:636 (ISI Marked) Type A in 15 Meters length, 63mm dia duly copper via bounded two coupling pair of male female parts any duly intantanous type, 63mm size as per IS:903 (ISI Marked)		
4208	RRL Hose with male female gunmetal coupling	Each	3861.00
4209	RRL Hose with male female stainless steel coupling	Each	3292.00
	19mm swinging hose reel complete reinforced braided thermoplastic red/black hose		
4210	Swinging type hose reel complete with 19mm x 30 Mtrs. Thermolastic hoseType-II	Each	2043.00
4211	Swinging type hose reel complete with 19mm x 40 Mtrs. Thermolastic hose Type-II	Each	3232.00
4212	Hose reel drum	Each	2350.00
4213	25mm dia gun metal globe valve & nozzle.	Each	691.00
	Sprinkler operating at 68 <sup>0</sup> centigrade standard response, standard coverage 15mm BPST, K56 UL listed and FM approved		
4214	68 <sup>0</sup> centigrade Pendant Sprinkler	Each	168.00
4215	68 <sup>0</sup> centigrade Upright Sprinkler	Each	168.00
4216	68 <sup>0</sup> centigrade Sidewall Sprinkler	Each	240.00
4217	68 <sup>0</sup> centigrade Concealed Sprinkler	Each	857.00
	Sprinkler flexible drops stainless steel complete with 15 NPT on reducer thread with maximum working pressure of 175 PSI test pressure of 875 PSI (Burst) with branch line (Inlet) 25mm NPT male thread to sprinkler head (Outlet) 15mm NPT female thread 1 No. reducer + 1 No. Nipple + 2 Side Brackets + 1 Center Bracket + 625 mm stockbar		
4218	700mm flexible drop	Each	795.00
4219	1000mm flexible drop	Each	945.00
4220	1200mm flexible drop	Each	1015.00

4221	1500mm flexible drop	Each	1137.50
4222	Water flow switch for 100mm dia pipe	Each	4945.00
4223	Water flow switch for 150mm dia pipe	Each	6083.00
	hydraulic alarm valve with water motor gong bell and constant pressure trim assembly complete as required		
4224	150mm dia hydraulic alarm valve with water motor gong	Each	34933.00
4225	100mm dia hydraulic alarm valve with water motor gong	Each	32517.00
4226	80mm dia hydraulic alarm valve with water motor gong	Each	30777.00
	Deluge valve with wet pilot basic trim assembly with test and alarm, drip and drain valve with water motor gong		
4227	150mm dia deluge valve	Each	84888.00
4228	100mm dia deluge valve	Each	68238.00
4229	80mm dia deluge valve	Each	60732.00
4230	50mm dia deluge valve	Each	60280.00
	Water curtain nozzle, 15mm dia BPST K-Factor as per design consideration		
4231	Water curtain nozzle, nickel chrome plated brass	Each	313.20
4232	Electric release trim assembly for deluge valve with two way solenoid valve, weather proof operation on 24 volts DC	Each	5382.00
4233	Adjustable rosette plate for 15mm dia (Powder Coated)	Each	80.00
	BUTTERFLY VALVE PN 1.6 rating		
4234	40mm dia butterfly valve	Each	1948.00
4235	50mm dia butterfly valve	Each	1948.00
4236	65mm dia butterfly valve	Each	2150.00
4237	80mm dia butterfly valve	Each	2382.00
4238	100mm dia butterfly valve	Each	3305.00
4239	125mm dia butterfly valve	Each	4175.00
4240	150mm dia butterfly valve	Each	4803.00
4241	200mm dia butterfly valve	Each	9188.00
4242	250mm dia butterfly valve	Each	12912.00
4243	300mm dia butterfly valve	Each	16105.00
	MS pipe as per IS/1239 ISI MARKED C Class		

	(heavy )		
4244	25mm dia MS Pipe	Meter	296.10
4245	32mm dia MS Pipe	Meter	367.20
4246	40mm dia MS Pipe	Meter	425.70
4247	50mm dia MS Pipe	Meter	603.90
4248	65mm dia MS Pipe	Meter	768.60
4249	80mm dia MS Pipe	Meter	961.20
4250	100mm dia MS Pipe	Meter	1403.10
4251	125mm dia MS Pipe	Meter	1736.10
4252	150mm dia MS Pipe	Meter	2062.80
4253	200mm dia MS Pipe (6.3 mm thick)	Meter	3378.60
4254	250mm dia MS Pipe (6.3 mm thick)	Meter	4217.40
4255	300mm dia MS Pipe (7 mm thick)	Meter	5026.50
	GI pipe as par IS/1239 ISI MARKED C Class (heavy)		
4256	25mm dia G.I. Pipe	Meter	171.00
4257	32mm dia G.I. Pipe	Meter	215.00
4258	40mm dia G.I. Pipe	Meter	250.00
4259	50mm dia G.I. Pipe	Meter	310.00
4260	65mm dia G.I. Pipe	Meter	395.00
4261	80mm dia G.I. Pipe	Meter	505.00
4262	100mm dia G.I. Pipe	Meter	714.00
4263	150mm dia G.I. Pipe	Meter	1066.00
	NON RETURN VALVE cast Iron double flange as per IS/5312 PN 1.6 rating complete with Bronze body & wedge Stainless Steel spindle, Gland packing, Rubber gasket		
4264	40mm dia Non Return Valve	Each	3311.00
4265	50mm dia Non Return Valve	Each	3311.00
4266	65mm dia Non Return Valve	Each	3785.00
4267	80mm dia Non Return Valve	Each	4366.00
4268	100mm dia Non Return Valve	Each	6607.00
4269	125mm dia Non Return Valve	Each	10290.00
4270	150mm dia Non Return Valve	Each	11718.00
4271	200mm dia Non Return Valve	Each	20013.00

4272	250mm dia Non Return Valve	Each	31946.00
4273	300mm dia Non Return Valve	Each	43392.00
	NON RISING cast Iron double flange SLUICE Valve as per ISI/14846 PN 1.6 rating complete with Bronze body & wedge Stainless Steel spindle, Gland packing, Rubber gasket		
4274	40mm DIA Sluice Valve	Each	3540.00
4275	50mm DIA Sluice Valve	Each	4532.00
4276	65mm DIA Sluice Valve	Each	5875.00
4277	80mm DIA Sluice Valve	Each	6663.00
4278	100mm DIA Sluice Valve	Each	9324.00
4279	125mm DIA Sluice Valve	Each	12511.00
4280	150mm DIA Sluice Valve	Each	15461.00
4281	200mm DIA Sluice Valve	Each	27639.00
4282	250mm DIA Sluice Valve	Each	32913.00
4283	300mm DIA Sluice Valve	Each	47409.00
	Cast iron double flange strainer with stainless steel mesh, PN 1.6 rating complete with accessories as required.		
4284	80mm dia CIDF SS mesh Strainer	Each	2530.80
4285	100mm dia CIDF SS mesh Strainer	Each	3636.00
4286	150mm dia CIDF SS mesh Strainer	Each	6791.40
4287	200mm dia CIDF SS mesh Strainer	Each	14689.80
4288	250mm dia CIDF SS mesh Strainer	Each	18450.90
4289	300mm dia CIDF SS mesh Strainer	Each	25366.50
4290	25mm Air release valve as per IS:14845 ISI Marked	Each	1350.00
	electric driven main fire pump with motor, base plate coupling, coupling guard, foundation bolts and anti vibration pads		
4291	2850 lpm at 88 m Head	Each	331000.00
4292	2850 lpm at 70 m Head	Each	295000.00
4293	2850 lpm at 56 m Head	Each	294000.00
4294	2280 lpm at 88 m Head	Each	294000.00
4295	2280 lpm at 70 m Head	Each	268000.00
4296	2280 lpm at 56 m Head	Each	240000.00
4297	1620 lpm at 88 m Head	Each	268000.00

4298	1620 lpm at 70 m Head	Each	240000.00
4299	1620 lpm at 56 m Head	Each	204000.00
	diesel engine driven main fire pump, tank, exhaust, foundation bolts, anti vibration pads etc.		
4300	2850 lpm at 88 m Head	Each	505000.00
4301	2850 lpm at 70 m Head	Each	453700.00
4302	2850 lpm at 56 m Head	Each	451000.00
4303	2280 lpm at 88 m Head	Each	468000.00
4304	2280 lpm at 70 m Head	Each	450000.00
4305	2280 lpm at 56 m Head	Each	448000.00
4306	1620 lpm at 88 m Head	Each	463100.00
4307	1620 lpm at 70 m Head	Each	435000.00
4308	1620 lpm at 56 m Head	Each	375000.00
	electric driven pressurisation pump (Jockey pump)		
4309	180 lpm at 88 m Head	Each	90000.00
4310	180 lpm at 70 m Head	Each	72000.00
4311	180 lpm at 56 m Head	Each	56000.00
4312	300 lpm at 88 m Head	Each	120000.00
4313	300 lpm at 70 m Head	Each	90200.00
4314	300 lpm at 56 m Head	Each	81000.00
	electric driven pressurisation pump (Terrace pump)		
4315	900 lpm at 35 m Head	Each	70909.00
4316	450 lpm at 35 m Head	Each	59091.00
4317	Air Vessel 250 mm	Each	12646.00
4318	Pressure switch	Each	986.00
4319	Orifice plate made of 6 mm. thick stainless steel with orifice of required size in between flange & landing valve of external and internal hydrant to reduce pressure to working pressure of 3.5 kg/cm <sup>2</sup>	Each	802.00
4320	Cost of Cement concrete foundation with 35x35x5 mm angle frame on edges duly plastered Cum with inertia blocks.	Cum	4500.00



4321	Control Panel having Incomer of 250A, 50kA 4 Pole MCCB, Ics=100% Icu rating, Ammeter, Voltmeter, phase indicating lamps, ON, OFF, trip indicating lamps, Copper Bus Bar 300A. OUTGOING for main fire pump (125A, 50 KA TPN MCCB with Starter etc. Jockey Pump (63 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter). DIESEL ENGINE CONTROL etc. as per details in items. i/c System Controller to control operation of all pumps, relays, timers Sensors etc. as detail in item.	Each	175000.00
4322	Control Panel having Incomer of 400A, 50kA 4 Pole MCCB, Ics=100% Icu rating, Ammeter, Voltmeter, phase indicating lamps, ON, OFF, trip indicating lamps, Copper Bus Bar 500A. OUTGOING for main fire pump (200A, 50 KA TPN MCCB with Starter etc. Jockey Pump (100 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter). DIESEL ENGINE CONTROL etc. as per details in items. Designing, Supply, Installation, Testing and commissioning of system controller to control operation of main electric fire pump, diesel pump, Pressurization pump, Terrace pump in sequence as per specification consisting of relays, timers. Sensors, annunciation window for fault indication, complete as per specifications.	Each	205000.00
4323	Control Panel having Incomer of 630A, 50kA 4 Pole MCCB, Ics=100% Icu rating, Ammeter, Voltmeter, phase indicating lamps, ON, OFF, trip indicating lamps, Copper Bus Bar 800A. OUTGOING for main fire pump (250A, 50 KA TPN MCCB with Starter etc. Jockey Pump (125 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter). DIESEL ENGINE CONTROL etc. as per details in items i/c System Controller to control operation of all pumps, relays, timers Sensors etc. as detail in item.	Each	230000.00
4324	Control Panel having Incomer of 400A, 50kA 4 Pole MCCB, Ics=100% Icu rating, Ammeter, Voltmeter, phase indicating lamps, ON, OFF, trip indicating lamps, Copper Bus Bar 500A. OUTGOING 2 nos. for main fire pump (250A, 50 KA TPN MCCB with Starter etc. and 2 nos. for Jockey Pump (125 A, 50kA TPN MCCB,	Each	265000.00

	Ics=100% Icu, with suitable HP fully automatic Star/Delta starter). DIESEL ENGINE CONTROL etc. as per details in items i/c System Controller to control operation of all pumps, relays, timers Sensors etc. as detail in item.		
4325	Control Panel having Incomer of 630A, 50kA 4 Pole MCCB, Ics=100% Icu rating, Ammeter, Voltmeter, phase indicating lamps, ON, OFF, trip indicating lamps, Copper Bus Bar 800A. OUTGOING 2 nos. for main fire pump (200A, 50 KA TPN MCCB with Starter etc. and 2 nos. for Jockey Pump (100 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter). DIESEL ENGINE CONTROL etc. as per details in items i/c System Controller to control operation of all pumps, relays, timers Sensors etc. as detail in item.	Each	320000.00
4326	Control Panel having Incomer of 800A, 50kA 4 Pole MCCB, Ics=100% Icu rating, Ammeter, Voltmeter, phase indicating lamps, ON, OFF, trip indicating lamps, Copper Bus Bar 1000A. OUTGOING 2 nos. for main fire pump (250A, 50 KA TPN MCCB with Starter etc. and 2 nos. for Jockey Pump (125 A, 50kA TPN MCCB, Ics=100% Icu, with suitable HP fully automatic Star/Delta starter). DIESEL ENGINE CONTROL etc. as per details in items i/c System Controller to control operation of all pumps, relays, timers Sensors etc. as detail in item.	Each	410000.00
4327	Basic cost of 4 mm thick Anti Corrosive Pipe Protection Bituminous Tape,	sq m	210.00
4328	Basic cost of anticorrosive Black paint	Litre	110.00
4329	Cost of 4 Nos. Nuts bolts and washers	Set	50.00
4330	Cost of 1 No. 3 mm thick rubber gasket	Each	70.00
4331	Cost of 1 No. MS flange as per IS drilling 16 mm thick LS	Set	200.00
4332	Cost of Welding rod	Job	40.00
4333	Cost of 40 mm dia Flange	Each	110.00
4334	Cost of 8 Nos. Nut bolt fastner and packing gaskets	Each	90.00
4335	Cost of Welding rod LS	Each	60.00
4336	Cost of 50 mm dia butterfly valve	Each	110.00

4337	Cost of 50mm dia Flange	Each	110.00
4338	Cost of 65 mm dia Flange	Each	110.00
4339	Cost of 65 mm dia butterfly valve	Each	110.00
4340	Cost of 80 mm dia Flange	Each	220.00
4341	Cost of 8 Nos. Nut bolt fastner and packing gaskets	Each	180.00
4342	Cost of Welding rod LS	Each	90.00
4343	Cost of 100 mm dia Flange	Each	220.00
4344	Cost of 150 mm dia Flange	Each	220.00
4345	Cost of 200 mm dia Flange	Each	340.00
4346	Cost of 8 Nos. Nut bolt fastner and packing gaskets	Each	300.00
4347	Cost of Welding rod LS	Each	120.00
4348	Cost of 250 mm dia Flange	Each	340.00
4349	Cost of 300 mm dia Flange	Each	340.00
4350	Cost of packing gaskets	LS	50.00
4351	Cost of 125 mm dia Flange	Each	220.00
4352	Cost of 80 mm dia Flange	Each	110.00
4353	Cost of 100 mm dia Flange	Each	110.00
4354	Cost of 150 mm dia Flange	Each	110.00
4355	Cost of 25mm dia socket, union, nipples (Lumpsum)	Each	210.00
4356	Cost of 25mm dia gunmetel gate valve	Each	770.00
4357	Cost of 250mm dia air vessel wit air release valve and 25mm dia gunmetel wheel valve for drainage	Each	1400.00
4358	Cost of 15mm dia MS Socket & teflon tape (Lumpsum)	Each	45.00
4359	Cot of teflon tape	Each	20.00
4360	25mm dia MS Socket	Each	45.00
4361	Cost of MS Socket 15mm dia	Each	35.00
4362	Cost of water flow switch	Each	6500.00

4363	Cost of Packing gaskets	LS	50.00
4364	Cost of 4 Nos. Nut Bolt fastner & packing gaskets	LS	90.00
4365	Cost of 12 Nos. Nut bolt fastner and packing gaskets	Each	450.00

#### LED LIGHTS

Code no	Description	Unit	Rate
	LED Down lighter (SMD Type) (System lumen efficacy $\geq 105 < 120$ lm/Watt ) of following body materials. Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector		
4401	5 - 7 watt	Each	204.15
4402	8 - 10 watt	Each	263.35
4403	12 -15 watt	Each	329.07
4404	18 watt	Each	477.75
4405	22 watt	Each	493.60
4406	30 watt	Each	852.50
	LED Down lighter (SMD Type) (System lumen efficacy $\geq 120 < 135$ lm/Watt ) of following body materials. Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector		
4407	5 - 7 watt	Each	204.15
4408	8 - 10 watt	Each	263.35
4409	12 -15 watt	Each	329.07
4410	18 watt	Each	493.60
4411	22 watt	Each	511.55
4412	30 watt	Each	925.00
	LED Down lighter (SMD Type) (System lumen efficacy $> 135$ lm/Watt) of following body materials. Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector		
4413	5 - 7 watt	Each	222.71
4414	8 - 10 watt	Each	287.29
4415	12 -15 watt	Each	358.98

4416	18 watt	Each	538.47
4417	22 watt	Each	556.42
4418	30 watt	Each	953.39
	LED Down lighter (COB Type) (System lumen efficacy $\geq 105 < 120$ lm/Watt ) of following body materials. Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector		
4419	5 - 7 watt	Each	409.50
4420	8 - 10 watt	Each	447.29
4421	12 -15 watt	Each	565.50
4422	18 watt	Each	666.25
4423	22 watt	Each	773.50
4424	30 watt	Each	1007.50
	LED Down lighter (COB Type) (System lumen efficacy $\geq 120$ lm/Watt ) of following body materials. Powder coated die cast /Extruded aluminium Body including trim with Aluminium Reflector		
4425	5 - 7 watt	Each	481.69
4426	8 - 10 watt	Each	495.46
4427	12 -15 watt	Each	670.34
4428	18 watt	Each	875.00
4429	22 watt	Each	900.51
4430	30 watt	Each	1295.00
	LED Panel light 2x2 ft. (System lumen efficacy $\geq 105 < 120$ lm/Watt) of following body materials. Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)		
4431	15 watt	Each	902.54
4432	18 watt	Each	1300.85
4433	22 watt	Each	1525.00
4434	36 watt	Each	1625.00
4435	40 watt	Each	1750.00
4436	45 watt	Each	2100.00
	CRCA Sheet Body (Thickness > 0.50 mm)		
4437	15 watt	Each	815.68
4438	18 watt	Each	1050.00

4439	22 watt	Each	1220.00
4440	36 watt	Each	1300.00
4441	40 watt	Each	1400.00
4442	45 watt	Each	1638.31
	Panel Down light 2x2 ft.		
	LED Panel light 2x2 ft. (System lumen efficacy ≥120 <135 lm/Watt) of following body materials.		
	Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)		
4443	15 watt	Each	992.80
4444	18 watt	Each	1430.93
4445	22 watt	Each	1760.00
4446	36 watt	Each	1952.50
4447	40 watt	Each	2475.00
4448	45 watt	Each	2640.00
	CRCA Sheet Body (Thickness > 0.50 mm)		
4449	15 watt	Each	932.20
4450	18 watt	Each	1200.00
4451	22 watt	Each	1280.00
4452	36 watt	Each	1420.00
4453	40 watt	Each	1638.31
4454	45 watt	Each	1679.26
	LED Panel light 2x2 ft., (System lumen efficacy >135 lm/Watt) of following body materials.		
	Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)		
4455	15 watt	Each	1083.05
4456	18 watt	Each	1561.02
4457	22 watt	Each	2400.00
4458	36 watt	Each	2700.00
4459	40 watt	Each	2880.00
4460	45 watt	Each	3300.00
	CRCA Sheet Body (Thickness > 0.50 mm)		
4461	15 watt	Each	1002.12
4462	18 watt	Each	1274.83

4463	22 watt	Each	1830.51
4464	36 watt	Each	1868.64
4465	40 watt	Each	1884.05
4466	45 watt	Each	1925.01
	LED Batten light		
	LED Batten light (System lumen efficacy $\geq 105$ <120 lm/Watt) of following body materials.		
	Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)		
4467	18- 22 Watt	Each	305.08
4468	24 -26watt	Each	312.71
4469	36 watt	Each	322.03
4470	40 watt	Each	333.90
	CRCA Sheet Body (Thickness > 0.50 mm)		
4471	18- 22 Watt	Each	266.95
4472	24 -26watt	Each	274.58
4473	36 watt	Each	281.78
4474	40 watt	Each	292.16
	LED Batten light (System lumen efficacy $\geq 120$ <135 lm/Watt) of following body materials.		
	Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)		
4475	18- 22 Watt	Each	343.22
4476	24 -26watt	Each	350.85
4477	36 watt	Each	362.29
4478	40 watt	Each	375.64
	CRCA Sheet Body (Thickness > 0.50 mm)		
4479	18- 22 Watt	Each	305.08
4480	24 -26watt	Each	312.71
4481	36 watt	Each	322.03
4482	40 watt	Each	333.90
	LED Batten light (System lumen efficacy >135 lm/Watt) of following body materials.		
	Powder coated die cast /Extruded aluminium Body (Thickness > 1.20 mm)		

4483	18- 22 Watt	Each	381.36
4484	24 -26watt	Each	388.98
4485	36 watt	Each	402.54
4486	40 watt	Each	417.37
	CRCA Sheet Body (Thickness > 0.50 mm)		
4487	18- 22 Watt	Each	343.22
4488	24 -26watt	Each	350.85
4489	36 watt	Each	362.29
4490	40 watt	Each	375.64
	LED Street light fixture, powder coated pressure die cast aluminium body (System lumen efficacy $\geq 105 < 120$ lm/Watt) of following body materials.		
4491	10 watt	Each	375.00
4492	14 watt	Each	475.00
4493	15 watt	Each	484.50
4494	18 watt	Each	516.00
4495	20 watt	Each	522.50
4496	24 watt	Each	525.00
4497	25 watt	Each	535.50
4498	30 watt	Each	550.00
4499	36 watt	Each	700.00
4500	40 watt	Each	750.00
4501	45 watt	Each	800.00
4502	50 watt	Each	1100.00
4503	72 watt	Each	1200.00
4504	90 watt	Each	1375.00
4505	100 watt	Each	1650.00
4506	120 watt	Each	1700.00
4507	150 watt	Each	2250.00
4508	180 watt	Each	3100.00
4509	200 watt	Each	3200.00
	LED Street light fixture, powder coated pressure die cast aluminium body (System lumen efficacy $\geq 120 < 135$ lm/Watt) of following body materials.		
4510	10 watt	Each	412.50



4511	14 watt	Each	522.50
4512	15 watt	Each	543.40
4513	18 watt	Each	660.00
4514	20 watt	Each	750.00
4515	24 watt	Each	880.00
4516	25 watt	Each	915.20
4517	30 watt	Each	935.00
4518	36 watt	Each	990.00
4519	40 watt	Each	1000.00
4520	45 watt	Each	1072.50
4521	50 watt	Each	1210.00
4522	72 watt	Each	1350.00
4523	90 watt	Each	1500.00
4524	100 watt	Each	1750.00
4525	120 watt	Each	1950.00
4526	150 watt	Each	2300.00
4527	180 watt	Each	3300.00
4528	200 watt	Each	3450.00

LED Street light fixture, powder coated pressure die cast aluminium body (System lumen efficacy >135 lm/Watt) of following body materials.

4529	10 watt	Each	474.38
4530	14 watt	Each	575.00
4531	15 watt	Each	598.00
4532	18 watt	Each	675.00
4533	20 watt	Each	700.00
4534	24 watt	Each	925.00
4535	25 watt	Each	962.00
4536	30 watt	Each	1025.00
4537	36 watt	Each	1075.00
4538	40 watt	Each	1175.00
4539	45 watt	Each	1233.38
4540	50 watt	Each	1391.50
4541	72 watt	Each	1675.00

4542	90 watt	Each	1850.00
4543	100 watt	Each	2250.00
4544	120 watt	Each	2750.00
4545	150 watt	Each	3490.00
4546	180 watt	Each	3750.00
4547	200 watt	Each	4250.00

LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy 105 <120 lm/Watt) of following body materials.

4548	50 watt	Each	850.00
4549	70 watt	Each	1340.00
4550	100 watt	Each	1450.00
4551	150 watt	Each	2100.00
4552	200 watt	Each	3100.00
4553	250 watt	Each	3750.00

LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy  $\geq 120$  and <135 lm/Watt) of following body materials.

4554	50 watt	Each	1264.50
4555	70 watt	Each	1474.00
4556	100 watt	Each	1595.00
4557	150 watt	Each	2310.00
4558	200 watt	Each	3200.00
4559	250 watt	Each	4125.00

LED Flood Light, powder coated pressure die cast aluminium (System lumen efficacy >135 lm/Watt) of following body materials.

4560	50 watt	Each	1321.93
4561	70 watt	Each	1541.00
4562	100 watt	Each	1667.50
4563	150 watt	Each	2415.00
4564	200 watt	Each	3789.25
4565	250 watt	Each	4312.50

	LED Smart Street light fixture, powder coated pressure die cast aluminium (System. System lumen efficacy $\geq 105$ and $< 120$ lm/Watt) as details in items.		
4566	45 watt	Each	3483.38
4567	50 watt	Each	3641.50
4568	72 watt	Each	4021.00
4569	90 watt	Each	4210.75
4570	100 watt	Each	5033.00
4571	120 watt	Each	5286.00
4572	150 watt	Each	6664.85
4573	180 watt	Each	6791.35
4574	200 watt	Each	8005.75
	LED Smart Street light fixture, powder coated pressure die cast aluminium (System. System lumen efficacy $\geq 120$ and $< 135$ lm/Watt) as details in items.		
4575	45 watt	Each	3831.71
4576	50 watt	Each	4005.65
4577	72 watt	Each	4423.10
4578	90 watt	Each	4631.83
4579	100 watt	Each	5536.30
4580	120 watt	Each	5814.60
4581	150 watt	Each	7331.34
4582	180 watt	Each	7470.49
4583	200 watt	Each	8806.33
	LED Smart Street light fixture, powder coated pressure die cast aluminium (System. System lumen efficacy $> 135$ lm/Watt) as details in items.		
4584	45 watt	Each	4005.88
4585	50 watt	Each	4187.73
4586	72 watt	Each	4624.15
4587	90 watt	Each	4842.36
4588	100 watt	Each	5787.95
4589	120 watt	Each	6078.90
4590	150 watt	Each	7664.58
4591	180 watt	Each	7810.05

4592	200 watt Solar outdoor light	Each	9206.61
4593	Integrated type solar PV lighting system on the existing pole structure, comprising of 20 watt, 6V Mono Passivated Emitter and Rear Contact as detail in item.	Each	13250.00
4594	Supplying of the integrated type solar PV lighting system on the existing pole structure, comprising of 30 watt, 6V Mono Passivated Emitter and Rear Contact (PERC) as details in items.	Each	16500.00
4595	Supplying of the integrated type solar PV lighting system on the existing pole structure, comprising of 35 watt, 6V Mono Passivated Emitter and Rear Contact (PERC) as details in items.	Each	21000.00
BLDC FAN			
Code no.	Description	Unit	Rate
	ceiling fan with Brush Less Direct Current (BLDC) Motor, etc. complete as req		
4596	900mm, BEE 5 star rating, service value $\geq 5.1$ CM/Min/Watt, air delivery 130 CM/Min (Minimum)	Each	1785.00
4597	1050mm, BEE 5 star rating, service value $\geq 5.1$ CM/Min/Watt, air delivery 150 CM/Min (Minimum)	Each	1806.00
4598	1200mm, BEE 5 star rating, service value $\geq 6.0$ CM/Min/Watt, air delivery 210 CM/Min (Minimum)	Each	1890.00
4599	1400mm, BEE 5 star rating, service value $\geq 6.0$ CM/Min/Watt, air delivery 245 CM/Min (Minimum)	Each	1912.50
	ceiling fan with Brush Less Direct Current (BLDC) Motor, etc. complete as req		
4600	900mm, service value $\geq 5.1$ CM/Min/Watt, air delivery 130 CM/Min (Minimum)	Each	1657.50
4601	1050mm, service value $\geq 5.1$ CM/Min/Watt, air delivery 150 CM/Min (Minimum)	Each	1677.00
4602	1200mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 210 CM/Min (Minimum)	Each	1755.00
4603	1400mm, service value $\geq 6.0$ CM/Min/Watt, air delivery 245 CM/Min (Minimum)	Each	1785.00
TRANSFORMER			
Code no.	Description	Unit	
	Oil Type		
	33/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor mounting(Mineral oil filled) ONAN copper wound transformer BEE 3 Star rated		
4604	500 KVA	Each	922792.50
4605	630KVA	Each	1162718.55

4606	1000KVA	Each	1395000.00
4607	1250 KVA	Each	1743750.00
4608	1600KVA	Each	2232000.00
4609	2000KVA	Each	2790000.00
4610	2500KVA	Each	3487500.00
BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer.			
4611	500 KVA	Each	1107351.00
4612	630KVA	Each	1395262.26
4613	1000KVA	Each	1674000.00
4614	1250 KVA	Each	2092500.00
4615	1600KVA	Each	2678400.00
4616	2000KVA	Each	3348000.00
4617	2500KVA	Each	4185000.00
BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer.			
4618	500KVA	Each	1291909.50
4619	630KVA	Each	1627805.97
4620	1000KVA	Each	1953000.00
4621	1250 KVA	Each	2441250.00
4622	1600KVA	Each	3124800.00
4623	2000KVA	Each	3906000.00
4624	2500 KVA	Each	4882500.00
11/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor mounting(Mineral oil filled) BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) outdoor/ indoor mounting(Mineral oil filled) copper wound transformer			
4625	1000KVA	Each	1215000.00
4626	1250 KVA	Each	1518750.00

4627	1600KVA	Each	1944000.00
4628	2000KVA	Each	2430000.00
	BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) outdoor/ indoor mounting(Mineral oil filled) copper wound transformer.		
4629	1000KVA	Each	1458000.00
4630	1250 KVA	Each	1822500.00
4631	1600KVA	Each	2332800.00
4632	2000KVA	Each	2916000.00
	BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) outdoor/ indoor mounting(Mineral oil filled) copper wound transformer.		
4633	1000KVA	Each	1701000.00
4634	1250 KVA	Each	2126250.00
4635	1600KVA	Each	2721600.00
4636	2000KVA	Each	3402000.00
	BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) outdoor/ indoor mounting(Mineral oil filled) copper wound transformer.		
4637	200KVA	Each	234000.00
4638	250KVA	Each	292500.00
4639	315KVA	Each	368550.00
4640	400KVA	Each	468000.00
4641	500KVA	Each	585000.00
4642	630KVA	Each	737100.00
	BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) outdoor/ indoor mounting(Mineral oil filled) copper wound transformer.		
4643	200KVA	Each	262080.00
4644	250KVA	Each	327600.00

4645	315KVA	Each	412776.00
4646	400KVA	Each	524160.00
4647	500KVA	Each	655200.00
4648	630KVA	Each	825552.00
	BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) outdoor/ indoor mounting(Mineral oil filled) copper wound transformer.		
4649	200KVA	Each	345800.00
4650	250KVA	Each	432250.00
4651	315KVA	Each	544635.00
4652	400KVA	Each	691600.00
4653	500KVA	Each	864500.00
4654	630KVA	Each	1089270.00
	BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer.		
4655	63KVA	Each	77805.00
4656	100KVA	Each	123500.00
4657	160KVA	Each	197600.00
	BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer.		
4658	63KVA	Each	87141.60
4659	100KVA	Each	138320.00
4660	160KVA	Each	221312.00
	BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, ONAN (Oil Natural Air Natural) copper wound transformer.		
4661	63KVA	Each	108927.00
4662	100KVA	Each	172900.00
4663	160KVA	Each	276640.00

33/0.433 KV, 3 Phase, 50 Hz outdoor/ indoor mounting (Synthetic Organic Ester Oil Filled)

BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.

4664	500 KVA	Each	1025325.00
4665	630KVA	Each	1291909.50
4666	1000KVA	Each	1550000.00
4667	1250 KVA	Each	1937500.00
4668	1600KVA	Each	2480000.00
4669	2000KVA	Each	3100000.00
4670	2500KVA	Each	3875000.00

BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.

4671	500 KVA	Each	1230390.00
4672	630KVA	Each	1550291.40
4673	1000KVA	Each	1860000.00
4674	1250 KVA	Each	2325000.00
4675	1600KVA	Each	2976000.00
4676	2000KVA	Each	3720000.00
4677	2500KVA	Each	4650000.00

BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 33/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.

4678	500KVA	Each	1435455.00
4679	630KVA	Each	1808673.30
4680	1000KVA	Each	2170000.00
4681	1250 KVA	Each	2712500.00
4682	1600KVA	Each	3472000.00
4683	2000KVA	Each	4340000.00
4684	2500 KVA	Each	5425000.00

11/0.433 KV, 3 Phase, 50 Hz Outdoor/ Indoor mounting (Synthetic Organic Ester Oil Filled)



	BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.		
4685	1000KVA	Each	1350000.00
4686	1250 KVA	Each	1687500.00
4687	1600KVA	Each	2160000.00
4688	2000KVA	Each	2700000.00
	BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.		
4689	1000KVA	Each	1620000.00
4690	1250 KVA	Each	2025000.00
4691	1600KVA	Each	2592000.00
4692	2000KVA	Each	3240000.00
	BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.		
4693	1000KVA	Each	1890000.00
4694	1250 KVA	Each	2362500.00
4695	1600KVA	Each	3024000.00
4696	2000KVA	Each	3780000.00
	BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.		
4697	200KVA	Each	260000.00
4698	250KVA	Each	325000.00
4699	315KVA	Each	409500.00
4700	400KVA	Each	520000.00
4701	500KVA	Each	650000.00
4702	630KVA	Each	819000.00

BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.			
4703	200KVA	Each	291200.00
4704	250KVA	Each	364000.00
4705	315KVA	Each	458640.00
4706	400KVA	Each	582400.00
4707	500KVA	Each	728000.00
4708	630KVA	Each	917280.00
BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.			
4709	200KVA	Each	364000.00
4710	250KVA	Each	455000.00
4711	315KVA	Each	573300.00
4712	400KVA	Each	728000.00
4713	500KVA	Each	910000.00
4714	630KVA	Each	1146600.00
BEE 3 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.			
4715	63KVA	Each	81900.00
4716	100KVA	Each	130000.00
4717	160KVA	Each	208000.00
BEE 4 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.			
4718	63KVA	Each	91728.00
4719	100KVA	Each	145600.00
4720	160KVA	Each	232960.00

	BEE 5 Star rated (Corresponding Level as per BIS amended upto date of receipt of tender) , 11/0.433 KV step down, 3 Phase, 50 Hz, Dyn 11 vector group, KNAN [K(K-Class insulating liquid) Natural Air Natural] copper wound transformer.		
4721	63KVA	Each	114660.00
4722	100KVA	Each	182000.00
4723	160KVA	Each	291200.00
	DRY TYPE		
	33/0.433 KV, 3 Phase, 50 Hz Indoor mounting		
	33/0.433 KV Delta/Star,step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer.		
	Level 3		
4724	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	1757500.00
4725	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	2196875.00
4726	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	2812000.00
4727	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	3515000.00
4728	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt)	Each	4393750.00
	Level 4		
4729	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	2021125.00
4730	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	2526406.25
4731	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	3233800.00
4732	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	4042250.00
4733	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt)	Each	5052812.50
	Level 5		
4734	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	2284750.00
4735	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	2855937.50
4736	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	3655600.00
4737	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	4569500.00

4738	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt) 33/0.433 KV, 3 Phase, 50 Hz Outdoor mounting 33/0.433 KV Delta/Star,step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer. Level 3	Each	5711875.00
4739	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	1850000.00
4740	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	2312500.00
4741	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	2960000.00
4742	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	3700000.00
4743	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt) Level 4	Each	4625000.00
4744	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	2127500.00
4745	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	2659375.00
4746	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	3404000.00
4747	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	4255000.00
4748	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt) Level 5	Each	5318750.00
4749	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	2405000.00
4750	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	3006250.00
4751	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	3848000.00
4752	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	4810000.00
4753	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt) 11/0.433 KV, 3 Phase, 50 Hz Indoor mounting 11/0.433 KV Delta/Star,step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer. Level 3	Each	6012500.00

4754	63 KVA (losses at 50% loading < 380watt, losses at 100% loading < 1250watt)	Each	101745.00
4755	100 KVA (losses at 50% loading < 520watt, losses at 100% loading < 1800watt)	Each	161500.00
4756	160 KVA (losses at 50% loading < 770watt, losses at 100% loading < 2200watt)	Each	258400.00
4757	200 KVA (losses at 50% loading < 890watt, losses at 100% loading < 2700watt)	Each	323000.00
4758	250 KVA (losses at 50% loading < 1050watt, losses at 100% loading < 3150watt)	Each	403750.00
4759	315 KVA (losses at 50% loading < 1100watt, losses at 100% loading < 3275watt)	Each	508725.00
4760	400 KVA (losses at 50% loading < 1300watt, losses at 100% loading < 3875watt)	Each	646000.00
4761	500 KVA (losses at 50% loading < 1600watt, losses at 100% loading < 4750watt)	Each	807500.00
4762	630 KVA (losses at 50% loading < 2000watt, losses at 100% loading < 5855watt)	Each	1017450.00
4763	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	1615000.00
4764	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	2018750.00
4765	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	2584000.00
4766	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	3230000.00
4767	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt)	Each	4037500.00
Level 4			
4768	63 KVA (losses at 50% loading < 340watt, losses at 100% loading < 1140watt)	Each	117006.75
4769	100 KVA (losses at 50% loading < 475watt, losses at 100% loading < 1650watt)	Each	185725.00
4770	160 KVA (losses at 50% loading < 670watt, losses at 100% loading < 1950watt)	Each	297160.00
4771	200 KVA (losses at 50% loading < 780watt, losses at 100% loading < 2300watt)	Each	371450.00
4772	250 KVA (losses at 50% loading < 980watt, losses at 100% loading < 2930watt)	Each	464312.50
4773	315 KVA (losses at 50% loading < 1025watt, losses at 100% loading < 3100watt)	Each	585033.75
4774	400 KVA (losses at 50% loading < 1225watt, losses at 100% loading < 3450watt)	Each	742900.00
4775	500 KVA (losses at 50% loading < 1510watt, losses at 100% loading < 4300watt)	Each	928625.00
4776	630 KVA (losses at 50% loading < 1860watt, losses at 100% loading < 5300watt)	Each	1170067.50

4777	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	1857250.00
4778	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	2321562.50
4779	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	2971600.00
4780	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	3714500.00
4781	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt)	Each	4643125.00
Level 5			
4782	63 KVA (losses at 50% loading < 300watt, losses at 100% loading < 1050watt)	Each	132268.50
4783	100 KVA (losses at 50% loading < 435watt, losses at 100% loading < 1500watt)	Each	209950.00
4784	160 KVA (losses at 50% loading < 570watt, losses at 100% loading < 1700watt)	Each	335920.00
4785	200 KVA (losses at 50% loading < 670watt, losses at 100% loading < 2100watt)	Each	419900.00
4786	250 KVA (losses at 50% loading < 920watt, losses at 100% loading < 2700watt)	Each	524875.00
4787	315 KVA (losses at 50% loading < 955watt, losses at 100% loading < 2750watt)	Each	661342.50
4788	400 KVA (losses at 50% loading < 1150watt, losses at 100% loading < 3330watt)	Each	839800.00
4789	500 KVA (losses at 50% loading < 1430watt, losses at 100% loading < 4100watt)	Each	1049750.00
4790	630 KVA (losses at 50% loading < 1745watt, losses at 100% loading < 4850watt)	Each	1322685.00
4791	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	2099500.00
4792	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	2624375.00
4793	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	3359200.00
4794	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	4199000.00
4795	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt)	Each	5248750.00
11/0.433 KV, 3 Phase, 50 Hz Outdoor mounting			
11/0.433 KV Delta/Star, step down, 3 Phase, 50 Hz, Dyn 11 vector group, Cast Resin / VPI (vacuum pressure impregnated) Dry Type, copper wound transformer.			
Level 3			
4796	63 KVA (losses at 50% loading < 380watt, losses at 100% loading < 1250watt)	Each	107100.00

4797	100 KVA (losses at 50% loading < 520watt, losses at 100% loading < 1800watt)	Each	170000.00
4798	160 KVA (losses at 50% loading <770watt, losses at 100% loading < 2200watt)	Each	272000.00
4799	200 KVA (losses at 50% loading < 890watt, losses at 100% loading < 2700watt)	Each	340000.00
4800	250 KVA (losses at 50% loading < 1050watt, losses at 100% loading < 3150watt)	Each	425000.00
4801	315 KVA (losses at 50% loading < 1100watt, losses at 100% loading < 3275watt)	Each	535500.00
4802	400 KVA (losses at 50% loading < 1300watt, losses at 100% loading < 3875watt)	Each	680000.00
4803	500 KVA (losses at 50% loading < 1600watt, losses at 100% loading < 4750watt)	Each	850000.00
4804	630 KVA (losses at 50% loading < 2000watt, losses at 100% loading < 5855watt)	Each	1071000.00
4805	1000 KVA (losses at 50% loading < 3000watt, losses at 100% loading < 9000watt)	Each	1700000.00
4806	1250 KVA (losses at 50% loading < 3600watt, losses at 100% loading < 10750watt)	Each	2125000.00
4807	1600 KVA (losses at 50% loading < 4500watt, losses at 100% loading < 13500watt)	Each	2720000.00
4808	2000 KVA (losses at 50% loading < 5400watt, losses at 100% loading < 17000watt)	Each	3400000.00
4809	2500 KVA (losses at 50% loading < 6500watt, losses at 100% loading < 20000watt)	Each	4250000.00
Level 4			
4810	63 KVA (losses at 50% loading < 340watt, losses at 100% loading < 1140watt)	Each	123165.00
4811	100 KVA (losses at 50% loading <475watt, losses at 100% loading <1650watt)	Each	195500.00
4812	160 KVA (losses at 50% loading < 670watt, losses at 100% loading < 1950watt)	Each	312800.00
4813	200 KVA (losses at 50% loading < 780watt, losses at 100% loading <2300watt)	Each	391000.00
4814	250 KVA (losses at 50% loading < 980watt, losses at 100% loading < 2930watt)	Each	488750.00
4815	315 KVA (losses at 50% loading < 1025watt, losses at 100% loading < 3100watt)	Each	615825.00
4816	400 KVA (losses at 50% loading < 1225watt, losses at 100% loading < 3450watt)	Each	782000.00
4817	500 KVA (losses at 50% loading <1510watt, losses at 100% loading < 4300watt)	Each	977500.00
4818	630 KVA (losses at 50% loading < 1860watt, losses at 100% loading < 5300watt)	Each	1231650.00
4819	1000 KVA (losses at 50% loading < 2790watt, losses at 100% loading < 7700watt)	Each	1955000.00

4820	1250 KVA (losses at 50% loading < 3300watt, losses at 100% loading < 9200watt)	Each	2443750.00
4821	1600 KVA (losses at 50% loading < 4200watt, losses at 100% loading < 11800watt)	Each	3128000.00
4822	2000 KVA (losses at 50% loading < 5050watt, losses at 100% loading < 15000watt)	Each	3910000.00
4823	2500 KVA (losses at 50% loading < 6150watt, losses at 100% loading < 18500watt)	Each	4887500.00
	Level 5		
4824	63 KVA (losses at 50% loading < 300watt, losses at 100% loading < 1050watt)	Each	139230.00
4825	100 KVA (losses at 50% loading < 435watt, losses at 100% loading < 1500watt)	Each	221000.00
4826	160 KVA (losses at 50% loading < 570watt, losses at 100% loading < 1700watt)	Each	353600.00
4827	200 KVA (losses at 50% loading < 670watt, losses at 100% loading < 2100watt)	Each	442000.00
4828	250 KVA (losses at 50% loading < 920watt, losses at 100% loading < 2700watt)	Each	552500.00
4829	315 KVA (losses at 50% loading < 955watt, losses at 100% loading < 2750watt)	Each	696150.00
4830	400 KVA (losses at 50% loading < 1150watt, losses at 100% loading < 3330watt)	Each	884000.00
4831	500 KVA (losses at 50% loading < 1430watt, losses at 100% loading < 4100watt)	Each	1105000.00
4832	630 KVA (losses at 50% loading < 1745watt, losses at 100% loading < 4850watt)	Each	1392300.00
4833	1000 KVA (losses at 50% loading < 2620watt, losses at 100% loading < 7000watt)	Each	2210000.00
4834	1250 KVA (losses at 50% loading < 3220watt, losses at 100% loading < 8400watt)	Each	2762500.00
4835	1600 KVA (losses at 50% loading < 3970watt, losses at 100% loading < 11300watt)	Each	3536000.00
4836	2000 KVA (losses at 50% loading < 4790watt, losses at 100% loading < 14100watt)	Each	4420000.00
4837	2500 KVA (losses at 50% loading < 5900watt, losses at 100% loading < 17500watt)	Each	5525000.00

#### APFC PANEL

Code	Description	Unit	Rate (₹)
	Automatic Power Factor Correction (APFC) System		
	Automatic Power Factor Correction (APFC) panel, indoor type floor mounted free standing totally enclosed, extendable of following capacity.		
4838	50 KVAR	Set	152750.00



4839	75 KVAR	Set	188500.00
4840	100 KVAR	Set	206700.00
4841	125 KVAR	Set	222300.00
4842	150 KVAR	Set	260325.00
4843	175 KVAR	Set	279500.00
4844	200 KVAR	Set	297700.00

#### HYBRID Power Factor Correction System

HYBRID APFC Panel, 3 phase 4 wire, 415 V, 50 Hz AC System for Ambient temperature -5°C to +40°C of following capacity.

4845	250 KVAR	Set	948350.00
4846	300 KVAR	Set	1128400.00
4847	350 KVAR	Set	1262950.00
4848	400 KVAR	Set	1516450.00
4849	450 KVAR	Set	1632800.00
4850	500 KVAR	Set	1849250.00
4851	550 KVAR	Set	1981850.00
4852	600 KVAR	Set	2175550.00
4853	650KVAR	Set	2302300.00
4854	700KVAR	Set	2477150.00
4855	750KVAR	Set	2692950.00
4856	800KVAR	Set	2825550.00
4857	850KVAR	Set	2927600.00
4858	900KVAR	Set	3113500.00
4859	950KVAR	Set	3293550.00
4860	1000KVAR	Set	3467750.00

#### UPS

Code	Description	Unit	
	ON LINE Uninterrupted Power Supply (UPS) system suitable for Single Phase input, Single Phase output AC Supply. with 30 minute backup.		
4861	2KVA	Each	21603.81
4862	3KVA	Each	23510.59
4863	6KVA	Each	45438.56
4864	10 KVA	Each	75947.03

Online UPS- Input supply: Three Phase, Output supply: Three Phase

Online double conversion true sine wave Uninterrupted hot swapable (allow for the replacement or addition of battery modules without shutting down the entire system) modular Power Supply (UPS) system with N+1 modules (N denotes total number of modules required for rated capacity) with 30 minute backup.

4865	10KVA	Each	104000.00
4866	20KVA	Each	155200.00
4867	30KVA	Each	228000.00
4868	40KVA	Each	252000.00
4869	60KVA	Each	388000.00
4870	80KVA	Each	452000.00
4871	100KVA	Each	476000.00
4872	120KVA	Each	524000.00
4873	160KVA	Each	744000.00
4874	200KVA	Each	828000.00
4875	300KVA	Each	1520000.00
4876	400KVA	Each	1920000.00
4877	500KVA	Each	2240000.00
	Battery type AMF VRLA , ABS container, maintenance free,		
4878	Battery 12V/65 AH	Each	4080.00
4879	Battery 12V/120 AH	Each	7565.00
4880	Battery 12V/150AH	Each	9775.00

**GENERATOR CPCB IV +**

Supply of 'Silent Type Diesel Generating set as per CPCB IV + or better norms along with having Prime Power Rating of KVA as below, 415 volts at 1500 RPM, 0.8 lagging power factor at 415 V suitable for 50 Hz, 3 phase system with AMF Panel of following capacity.

4881	25KVA	SET	280000.00
4882	35KVA	SET	310000.00
4883	40KVA	SET	370000.00
4884	50KVA	SET	392500.00
4885	62.5KVA as obsolete (58.5 KVA considered)	SET	415000.00

4886	82.5KVA	SET	515000.00
4887	100KVA	SET	600000.00
4888	125KVA	SET	615000.00
4889	160KVA	SET	868000.00
4890	200KVA	SET	1075000.00
4891	250KVA	SET	1300000.00
4892	320KVA	SET	1700000.00
4893	380KVA	SET	1975000.00
4894	400KVA	SET	2050000.00
4895	500KVA	SET	2400000.00
4896	625KVA	SET	3500000.00
4897	750KVA	SET	4450000.00

#### VRV/VRF

Code No.	DESCRIPTION	UNIT	RATE
	<b>OUTDOOR UNIT</b>		
	Supply of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating (For capacity <40 kW <sub>r</sub> ISEER 5.4, Capacity ≥ 40 and <70 ISEER 5.5, Capacity ≥ 70 ISEER 5.6 for ECSBC Building) of following capacity For Cooling or Heating or both		
4898	6 HP to 8 HP	Per HP	14550.00
4899	10 HP to 12 HP	Per HP	13950.00
4900	14 HP to 22 HP	Per HP	13275.00
	Supply of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating. (For capacity <40 kW <sub>r</sub> ISEER 6.4, Capacity ≥ 40 and <70 ISEER 6.5, Capacity ≥ 70 ISEER 6.6 for ECSBC+ Building) of following capacity For Cooling or Heating or both		
4901	6 HP to 8 HP	Per HP	15520.00
4902	10 HP to 12 HP	Per HP	14880.00
4903	14 HP to 22 HP	Per HP	14160.00
	Supply of Modular type Variable Refrigerant Flow/Variable Refrigerant Volume air cooled Outdoor units suitable for cooling/heating (For capacity <40 kW <sub>r</sub> ISEER 7.4, Capacity ≥ 40 and <70 ISEER 7.5, Capacity ≥ 70 ISEER 7.6 for		

Super ECSBC Building) of following capacity.

For Cooling or Heating or both

4904	6 HP to 8 HP	Per HP	16490.00
4905	10 HP to 12 HP	Per HP	15810.00
4906	14 HP to 22 HP	Per HP	15045.00

INDOOR UNIT

4 way Cassette Type Indoor ceiling mounted unit of following capacity.

4907	0.8 TR	Each	15492.60
4908	1.0 TR	Each	19365.75
4909	1.2 TR	Each	26812.50
4910	1.6 TR	Each	27412.50
4911	2.0 TR	Each	27600.00
4912	2.4 TR	Each	28350.00
4913	2.6 TR	Each	28350.00
4914	3.6 TR	Each	30750.00
4915	4.1 TR	Each	31800.00
4916	4.6TR	Each	36675.00

4-way compact VRV/VRF Cassette Type Indoor ceiling mounted unit equipped of following capacity

4917	0.6 TR	Each	15705.00
4918	0.8 TR	Each	17450.00
4919	1.0 TR	Each	27375.00
4920	1.2 TR	Each	27750.00
4921	1.6 TR	Each	27750.00

Single way wall/corner VRV/VRF Cassette Type Indoor ceiling mounted unit of following capacity

4922	0.6 TR	Each	21000.00
4923	0.8 TR	Each	21450.00
4924	1.0 TR	Each	22500.00
4925	1.2 TR	Each	29400.00
4926	1.6 TR	Each	29400.00
4927	2.0 TR	Each	30300.00

Double way VRV/VRF Cassette Type Indoor ceiling mounted unit of following capacity

4928	0.6 TR	Each	30600.00
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4929	1.0 TR	Each	32550.00
4930	2.0 TR	Each	39750.00
4931	3.3 TR	Each	42052.50
4932	4.2 TR	Each	44575.50
	High wall type Indoor unit of following capacity		
4933	0.6 TR	Each	11662.50
4934	0.8 TR	Each	12000.00
4935	1.0 TR	Each	12375.00
4936	1.2 TR	Each	15000.00
4937	1.6 TR	Each	15300.00
4938	2.0 TR	Each	15750.00
	External static pressure VRF/VRV ceiling mounted low static ductable type Indoor unit of following capacity Low static ductable units (minimum 19 to 29 pascal external static pressure)		
4939	0.5 TR	Each	21000.00
4940	0.6 TR	Each	21450.00
4941	0.8 TR	Each	21675.00
4942	1.03 TR	Each	21975.00
4943	1.3 TR	Each	23925.00
4944	1.6 TR	Each	24300.00
4945	2.0 TR	Each	25050.00
	External static pressure VRF/VRV ceiling mounted mid static ductable type Indoor unit of following capacity Mid static ductable units (minimum 30 to 48 pascal external static pressure)		
4946	1.2 TR	Each	23850.00
4947	1.6 TR	Each	24300.00
4948	2.0 TR	Each	25050.00
4949	2.4 TR	Each	26175.00
4950	3.2 TR	Each	27900.00
	external static pressure VRF/VRV ceiling mounted mid high static ductable type Indoor unit of following capacity High Static Ductable units (minimum 49 to 77 pascal external static pressure)		
4951	0.8 TR	Each	21887.25

4952	1.03 TR	Each	22734.75
4953	1.2 TR	Each	23973.75
4954	1.6 TR	Each	24300.00
4955	2.0 TR	Each	25050.00
4956	2.4 TR	Each	26175.00
4957	3.2 TR	Each	27900.00
4958	4.0 TR	Each	31950.00
4959	4.6 TR	Each	44850.00
	External static pressure VRF/VRV ceiling mounted high ductable type Indoor unit of following capacity High Static Ductable units (minimum 78 pascal external static pressure)		
4960	5.5 TR	Each	51675.00
4961	6.6 TR	Each	54225.00
4962	8.0 TR	Each	59175.00
	Supply of Y/T/Multi Joints. Joints shall be of same Original Equipment Manufacturer (OEM) make as of ODUs and IDUs		
4963	Indoor Units	Each	3150.00
4964	Outdoor Multi Joint	Each	5625.00
	COOPER REFRIGERANT PIPING		
	Soft/hard drawn copper refrigerant piping for VRV/VRF system, complete with fittings of following capacity.		
4965	6.4 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	178.00
4966	9.5 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	240.00
4967	12.7 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	338.00
4968	15.86 mm dia (OD) (Soft drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	427.00
4969	19 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	513.00
4970	22.2 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	628.00
4971	25.4 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	742.00
4972	28.58 mm dia (OD) (Hard drawn) with tube thickness 1.2 mm with 19 mm thick insulation	Meter	804.00
4973	31.8 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm with 19 mm thick insulation	Meter	849.00

4974	34.9 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm with 19 mm thick insulation	Meter	893.00
4975	38.1 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm with 19 mm thick insulation	Meter	918.00
4976	41.27 mm dia (OD) (Hard drawn) with tube thickness 1.62 mm with 19 mm thick insulation	Meter	950.00
UNITARY SYSTEMS			
Code No.	DESCRIPTION	UNIT	RATE
WINDOW AC UNITS			
Window type Air conditioners complete with copper power cable upto 3 Mtr, wireless Remote, suitable for working between 180- 260V of following capacity.			
Non Inverter Type			
4977	1.0 TR with fixed speed 5 Star BEE rating .	Each	22816.80
4978	1.5 TR with fixed speed 5 Star BEE rating .	Each	25375.50
Inverter Type			
4979	1.0 TR with Inverter 5 Star BEE rating.	Each	23899.50
4980	1.5 TR with Inverter 5 Star BEE rating .	Each	27835.83
HI WALL SPLIT SYSTEMS			
Air Cooled Hi Wall split type Air conditioners complete with Indoor unit(IDU), Out door unit (ODU) of following capacity.			
Inverter Type - Cooling only			
4981	0.75 TR with 5 Star BEE Rating .	Each	27155.92
4982	1.0 TR with 5 Star BEE Rating .	Each	28187.28
4983	1.5 TR with 5 Star BEE Rating .	Each	30242.96
4984	2.0 TR with 5 Star BEE Rating .	Each	39868.40
Inverter Type - Hot & Cold			
4985	1.0 TR with 3 Star BEE Rating .	Each	26678.99
4986	1.5 TR with 3 Star BEE Rating.	Each	29012.67
DUCTABLE TYPE SPLIT UNITS			
Air cooled ducted split type air conditioning machine of following capacity.			
Inverter			
4987	1.5 TR (BEE 4 Star Rated)	Each	39600.00
4988	2.2 TR (BEE 4 Star Rated)	Each	44925.00
4989	3.0 TR (BEE 4 Star Rated)	Each	61125.00
4990	3.5 TR (3.2 EER)	Each	88237.50

4991	4.0 TR (3.2 EER) Non Inverter	Each	99900.00
4992	1.0 TR (BEE 4 Star Rated)	Each	28950.00
4993	1.5 TR (BEE 4 Star Rated)	Each	30300.00
4994	2.0 TR (BEE 4 Star Rated)	Each	39480.00
4995	2.5 TR (BEE 4 Star Rated)	Each	51450.00
4996	3.0 TR (BEE 4 Star Rated)	Each	55650.00
4997	3.5 TR (3.2 EER)	Each	61275.00
4998	4.0 TR (3.2 EER)	Each	68025.00
4999	4.5 TR (3.2 EER)	Each	79114.50
5000	5.5 TR (3.2 EER)	Each	86175.00
5001	8.5 TR (3.2 EER)	Each	114225.00
5002	11.0 TR (3.2 EER)	Each	146925.00
5003	16.7 TR (3.2 EER)	Each	227250.00
CASSETTE TYPE SPLIT UNITS			
Air Cooled Cassette type Air conditioners of following capacity.			
Inverter Type- Cooling only			
5004	1.5 TR with 5 Star BEE Rating	Each	53775.00
5005	2.0 TR with 5 Star BEE Rating	Each	59550.00
5006	2.5 TR with 5 Star BEE Rating	Each	82050.00
5007	3.0 TR with 5 Star BEE Rating	Each	85912.50
5008	3.5 TR with 5 Star BEE Rating	Each	96975.00
5009	4.0 TR with 5 Star BEE Rating	Each	98775.00
Heating & Cooling			
5010	1.5 TR with 3 Star BEE Rating	Each	41775.00
5011	2.0 TR with 3 Star BEE Rating	Each	46575.00
5012	2.5 TR with 3 Star BEE Rating	Each	56100.00
TOWER TYPE SPLIT UNITS			
Air Cooled Floor standing Tower type split Air conditioners of following capacity.			
Heat Pump (Heating & Cooling)			
5013	3.3 TR BEE 4 Star Rating	Each	91125.00
5014	3.8 TR BEE 4 Star Rating	Each	96375.00
5015	4.6 TR BEE 4 Star Rating	Each	101625.00
Cooling Only			



5016	2.4 TR BEE 5 Star Rating	Each	65025.00
5017	3.3 TR BEE 5 Star Rating	Each	72300.00
5018	3.8 TR BEE 5 Star Rating	Each	76425.00
5019	4.6 TR BEE 5 Star Rating	Each	80775.00
AIR COOLED PACKAGE UNITS			
Air cooled ductable type Packaged air-conditioning units complete with Hermetically sealed Scroll compressors fitted inside the indoor unit of following capacity.			
Inverter			
5020	5.0 TR (2.8 EER)	Each	91260.00
5021	8.0 TR (2.8 EER)	Each	123370.00
5022	11.0 TR (2.8 EER)	Each	149305.00
5023	16.5 TR (2.8 EER)	Each	209105.00
5024	22.0 TR (2.8 EER)	Each	273390.00
CHILLERS			
Code No.	DESCRIPTION	UNIT	RATE
AIR COOLED CHILLERS			
AIR COOLED SCREW CHILLERS COMPLETE WITH Variable Frequency Drive (VFD) of following capacity.			
5025	Upto 74 TR BEE 3 Star rated	Per TR	19500.00
5026	75 TR - 140 TR BEE 3 Star rated	Per TR	18850.00
5027	141 TR - 200 TR BEE 3 Star rated	Per TR	17875.00
AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified Air-Cooled Screw Chiller package complete with VFD (Variable Frequency Drive) of following capacity.			
5028	upt to 200 TR - BEE 4 Star Rated	Per TR	20150.00
5029	201 TR to 250 TR BEE 4 Star Rated	Per TR	18525.00
5030	251 TR - 300 TR BEE 4 Star Rated	Per TR	17550.00
5031	301 TR - 350 TR BEE 4 Star Rated	Per TR	16900.00
5032	351 TR - 400 TR BEE 4 Star Rated	Per TR	16250.00
AIR COOLED SCROLL CHILLERS			
AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified Air-Cooled , Scroll Chiller package complete with VFD (Variable Frequency Drive) of following capacity.			
5033	Upto 50 TR BEE 4 Star Rated	Per TR	15925.00

5034	51 TR - 70 TR BEE 4 Star Rated	Per TR	15600.00
5035	71 TR - 100 TR BEE 4 Star Rated	Per TR	15275.00
	AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified Air-Cooled Scroll Chiller package complete with VFD (Variable Frequency Drive) of following capacity.		
5036	upto 50 TR BEE 3 Star Rated	Per TR	15275.00
5037	51 TR - 70 TR BEE 3 Star Rated	Per TR	14300.00
5038	71 TR - 100 TR BEE 3 Star Rated	Per TR	13975.00
	WATER COOLED CHILLERS		
	WATER COOLED SCREW CHILLERS		
	Floor-mounted AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified water cooled screw-type chiller machine complete with VFD (Variable Frequency Drive) of following capacity.		
5039	Upto 70 TR BEE 3 Star Rated	Per TR	13325.00
5040	71 TR - 110 TR BEE 3 Star Rated	Per TR	11700.00
5041	111 TR - 150 TR BEE 3 Star Rated	Per TR	11700.00
5042	151 TR - 210 TR BEE 3 Star Rated	Per TR	11700.00
5043	211 TR - 260 TR BEE 3 Star Rated	Per TR	11375.00
5044	261 TR - 300 TR BEE 3 Star Rated	Per TR	11050.00
5045	301 TR - 450 TR BEE 3 Star Rated	Per TR	10400.00
5046	451 TR -600 TR BEE 3 Star Rated	Per TR	10075.00
	Floor-mounted AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified VFD (Variable Frequency Drive) Operated water cooled screw-type chiller machine of following capacity		
5047	Upto 74 TR BEE 4 Star Rated	Per TR	14300.00
5048	75 TR - 150 TR BEE 4 Star Rated	Per TR	13650.00
5049	151TR - 300 TR BEE 4 Star Rated	Per TR	12350.00
5050	301TR - 450 TR BEE 4 Star Rated	Per TR	11700.00
5051	451 TR - 525 TR BEE 4 Star Rated	Per TR	10400.00
5052	526 TR - 600 TR BEE 4 Star Rated	Per TR	9750.00
	Water cooled scroll-type chiller with Variable Frequency Drive (VFD) of following capacity.		
5053	Upto 40 TR BEE 3 Star Rated	Per TR	15925.00
5054	41 TR - 75 TR BEE 3 Star Rated	Per TR	15600.00
5055	76 TR - 150 TR BEE 3 Star Rated	Per TR	15275.00

## WATER COOLED CENTRIFUGAL CHILLERS

Centrifugal Water Cooled Chilling Machine Air-Conditioning, Heating, and Refrigeration Institute (AHRI) certified of following capacity.

5056	300 TR - 450 TR BEE 3 Star Rated	Per TR	17550.00
5057	451 TR - 600 TR BEE 3 Star Rated	Per TR	17225.00
5058	601 TR - 1000 TR BEE 3 Star Rated	Per TR	16900.00
5059	1001 TR - 1600 TR BEE 3 Star Rated	Per TR	16575.00
5060	1601 TR - 2000 TR BEE 3 Star Rated	Per TR	16575.00

## WATER COOLED MAGNETIC CENTRIFUGAL CHILLERS

AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified water cooled Magnetic centrifugal type chiller machine of following capacity.

5061	121 TR - 150 TR BEE 3 Star Rated	Per TR	19175.00
5062	151 TR - 300 TR BEE 3 Star Rated	Per TR	15600.00
5063	301 TR - 450 TR BEE 3 Star Rated	Per TR	15275.00
5064	451 TR - 600 TR BEE 3 Star Rated	Per TR	14040.00

AHRI (Air-Conditioning, Heating, and Refrigeration Institute) Certified water cooled Magnetic centrifugal type chiller machine of following capacity.

5065	150 TR - 205 TR BEE 4 Star Rated	Per TR	20800.00
5066	210 TR - 300 TR BEE 4 Star Rated	Per TR	18850.00
5067	301 TR - 355 TR BEE 4 Star Rated	Per TR	16575.00
5068	356 TR - 450 TR BEE 4 Star Rated	Per TR	15275.00
5069	451 TR - 600 TR BEE 4 Star Rated	Per TR	15210.00

## Cooling Towers

Code No.	DESCRIPTION	UNIT	RATE
	COOLING TOWER		
	Induced Draft counterflow cooling Towers(CTI approved) of following capacity.		
5070	300 GPM	Each	222300.00
5071	450 GPM	Each	296703.55
5072	600 GPM	Each	414700.00
5073	750 GPM	Each	556305.75
5074	900 GPM	Each	646750.00
5075	1050 GPM	Each	709458.75

5076	1200 GPM	Each	819000.00
5077	1350 GPM	Each	865800.00
5078	1500 GPM	Each	954200.00
5079	1800 GPM	Each	1175200.00
5080	2100 GPM	Each	1331229.90
5081	2400 GPM	Each	1581079.50
5082	2700 GPM	Each	1655403.75
5083	3000 GPM	Each	1770644.20
AHU & FCU			
Code No.	DESCRIPTION	UNIT	RATE
	CEILING SUSPENDED AHU		
35.1	Factory built ceiling suspended chilled water double skin type horizontal/vertical air handling units having cooling coil of 4 row deep, of following capacity (as detailed item no. 35.1).		
5084	1000 CFM	Each	44915.00
5085	1600 CFM	Each	52325.00
5086	2000 CFM	Each	55900.00
5087	2500 CFM	Each	63700.00
5088	3000 CFM	Each	70200.00
5089	4000 CFM	Each	80600.00
5090	5000 CFM	Each	98800.00
5091	6000 CFM	Each	111150.00
5092	8000 CFM	Each	137800.00
5093	10000 CFM	Each	176800.00
5094	12000 CFM	Each	212550.00
	FCU ( FAN COIL UNIT)		
	DUCTABLE FAN COIL UNIT		
	Ceiling Concealed Fan Coil Unit comprising of 3 rows deep chilled water cooling coil of following capacity.		
5095	3.0 TR nominal capacity with 1200 Cfm air quantity.	Each	16055.00
5096	2.5 TR nominal capacity with 1000 Cfm air quantity.	Each	14820.00
5097	2.0 TR nominal capacity with 800 Cfm air quantity.	Each	12740.00
5098	1.5 TR nominal capacity with 600 Cfm air quantity.	Each	11115.00

5099	1.0 TR nominal capacity with 400 Cfm air quantity. CASSETTE FAN COIL UNIT Chilled Water Ceiling Suspended Hydronic Cassette type fan coil unit, four(4) way directional flow of following capacity.	Each	9815.00
5100	4.0 TR nominal capacity with 1600 Cfm air quantity.	Each	32519.50
5101	3.5TR nominal capacity with 1400 Cfm air quantity.	Each	30224.35
5102	3.0 TR nominal capacity with 1200 Cfm air quantity.	Each	16705.00
5103	2.5 TR nominal capacity with 1000 Cfm air quantity.	Each	15210.00
5104	2.0 TR nominal capacity with 800 Cfm air quantity.	Each	11700.00
5105	1.5 TR nominal capacity with 600 Cfm air quantity.	Each	10010.00
5106	1.0TR nominal capacity with 400 Cfm air quantity. HIGH WALL FAN COIL UNIT High wall Fan Coil Unit comprising of two 2 rows deep chilled water cooling coil of following capacity.	Each	9425.00
5107	2.0 TR nominal capacity with 800 Cfm air quantity.	Each	17318.60
5108	1.5 TR nominal capacity with 600 Cfm air quantity.	Each	15227.55
5109	1.0 TR nominal capacity with 400 Cfm air quantity.	Each	12426.05
Evaporative Cooling			
Code No.	DESCRIPTION	UNIT	RATE
EVAPORATIVE COOLING			
Factory assembled double skin central evaporative cooling plant of following capacity.			
5110	5000 CFM	Each	68900.00
5111	8000 CFM	Each	91650.00
5112	10000 CFM	Each	120900.00
5113	12000 CFM	Each	143325.00
5114	15000 CFM	Each	170950.00
5115	20000 CFM	Each	239850.00
5116	25000 CFM	Each	275600.00
5117	30000 CFM	Each	336050.00

## AIR COOLED HEAT PUMP FOR HOT WATER

Code No.	DESCRIPTION	UNIT	RATE
	AIR COOLED HEAT PUMP ( FOR HOT WATER ) Supply of Heat pumps system for hot water using heat energy source from ambient air to Hot water of following capacity.		
5118	200 L	Each	78000.00
5119	300 L	Each	104000.00
5120	500 L	Each	136500.00

## SOLAR WATER HEATING SYSTEM

Code no.	DESCRIPTION	UNIT	RATE
	SOLAR WATER HEATING SYSTEM (Evacuated Tube Collector) Evacuated Tube Collector (ETC) Solar Water Heating System comprising of all glass ETC tube absorber of following capacity.		
5121	100 LPD	Each	14250.00
5122	200 LPD	Each	28500.00
5123	300 LPD	Each	42750.00
5124	500 LPD	Each	57000.00
	SOLAR WATER HEATER (FLAT PLATE TYPE COLLECTOR) Flat Plate collector (FPC) Solar Water Heating System comprising of solar flat plate collector ISI Marked of following capacity.		
5125	100 LPD	Each	21204.95
5126	200 LPD	Each	42410.85
5127	250 LPD	Each	49400.00
5128	300 LPD	Each	63615.80
5129	500 LPD	Each	106026.65

## EV CHARGER

Code No.	Description	Unit	Rate
	Supply of EV charging station As per specifications and in Compliance to relevant IS codes etc.		

5130	Light EV AC Charger (Mode-3) Power : 7 kW, Input power supply: 1phase 230 +10% Volt, output supply: 230 Volt AC, Frequency:50 Hz +/-3%.	Each	16243.50
5131	Light EV DC Charger (Mode 4) Power Level 1: Up to 7 kW, Input power supply: 1phase 230 +10% Volt/3phase 415 Volt, Frequency: 50 Hz +/-5%.	Each	243750.00
5132	Parkbay AC Charger (Mode -3) Power Level 2: Normal Power ~11kW/ 22 kW, 3 phase 415VAC(-40% to +20%), Frequency:50 Hz +/-5%.	Each	58500.00
5133	Parkbay DC Charger (Mode-3) Power Level 2: Normal Power ~24KW and above, 3 phase 415VAC(-40% to +20%), Frequency:50 Hz +/-5%.	Each	617500.00
Solar Photovoltaic Power Plant			
5134	On-grid Solar Photovoltaic Power Plant conforming to various applicable standards BIS, IEC, MNRE guidelines, the Central Electricity Authority Regulations and CPWD Specifications.	kWp	40000.00
Façade Lighting			
LED floodlight			
Circular/ Rectangular/square LED RGB/RGBWW/RGBNW/RGBA /RGBW, Facade Floodlight/ Projector luminaire for facade lighting with Pressure Die-cast aluminium housing, powder-coated finish, with inbuilt driver, of following wattage.			
5135	25W	Each	25025.00
5136	40W	Each	29705.00
5137	50W	Each	30485.00
5138	60W	Each	31785.00
5139	100W	Each	33777.00
5140	120W	Each	55705.00
5141	150W	Each	59995.00
5142	200W	Each	65942.00
19.2	LED Linear Profile (AC) LED RGB/RGBWW/ RGBNW/RGBA/RGBW, Linear Profile / Wall Washer luminaire for Facade lighting with aluminium extruded/ Die Cast housing with inbuilt driver of following wattage.		
Wattage per meter			
5143	120W	Each	45760.00

5144	100W	Each	39182.00
5145	80W	Each	29718.00
5146	60W	Each	29387.00
5147	50W	Each	18486.00
5148	40W	Each	17804.00
5149	25W	Each	13694.00
<b>19.3</b>	<b>LED Linear Profile (DC)</b>		
	LED RGB/RGBWW/ RGBNW/RGBA/RGBW, Linear Profile / Wall Washer luminaire for Facade lighting with aluminium extruded/ Die Cast housing with inbuilt driver of following wattage.		
	Wattage per meter		
5150	100W	Each	16783.00
5151	50W	Each	11365.00
5152	40W	Each	11466.00
5153	30W	Each	8344.00
5154	15W	Each	2380.00
	<b>RGB LED Strip</b>		
5155	Exterior IP68 LED RGB/RGBWW/RGBNW/RGBA/RGBW. Flexible light strip of 5 mtr standard length with 12-15 Watt per meter. Controller	Each	6730.00
5156	DMX Controller for the system including address writer and programming, Controller should have Input Power 5-5.5V DC 0.6A and Output Protocol DMX512 with 4 universe, 2 universe etc. as required.	Each	45769.00
5157	DMX Splitter with Input Voltage range : 190-240V AC, Power Consumption 5W max. Housing is made of CRCA with powder coated finish Mounting complete as required.		4323.00
5158	RDM-6Wall Splitter, should be able to provide 6-output DMX/RDM splitter with DMX/RDM pass-through supporting bi-directional communications for discovery, addressing and DMX control of Ethernet/DMX products complete as required.	Each	10518.00
5159	Signal Amplifier to boost the Signal, IP 65 rated module to enhance the depleting DMX Signals, should have IP 66/67 rates inbuilt connectors compatible with Luminaires.	Each	1750.00
5160	High quality DMX decoder, Power Input : DC 24V etc complete as required.	Each	3750.00
5161	IP65 "I" power connectors having 3/4 pole cable connector, chuck type strain relief, Current rating 20 A rms continuous.	Each	451.00



5162	IP65 "I" DMX connectors having 3/5 pole cable connector, Male/Female connector with improved latch, cage type contacts.	Each	451.00
5163	5 pin XLR Male/Female connectors having 5 pole cable connector, Male/Female connector with improved latch, cage type contacts.	Each	1360.00
5164	Push button type keypad with 10 buttons. Each button is programmable up to 16 scenerios.	Each	6225.00
FOUNTAIN			
Code No.	Description	Unit	Rate
5165	Nozzle made with gunmetal Grade Geyser jet 100mm with adjustable nozzle for height adjustment of the fountain etc., Complete as required.	Each	7275.00
5166	40 mm dia Bubbler Jet Nozzles in SS 304 Gr to produce water effect complete as required.	Each	4502.00
5167	40 mm dia SS Difuser Nozzles in SS 304 Gr to produce water effect complete as required.	Each	2052.00
5168	Stainless steel 304 gr. Comet effect nozzle with compatible Digitally controlled pump to produce desirable effects with 40 mm dia and 20 mm orifice nozzle. Single Jet Crown Nozzles Complete with ball joint for 15 Degree pivoting made of brass with Nickle plating,flow straightner in following size .	Each	7179.00
5169	15 mm internal threaded with 6 mm orifice.	Each	1613.00
5170	15 mm internal threaded with 8 mm orifice.	Each	1763.00
5171	15 mm internal threaded with 10 mm orifice.	Each	1920.00
5172	25 mm internal threaded with 12 mm orifice.	Each	2138.00
5173	25 mm internal threaded with 14 mm orifice.	Each	2588.00
5174	40 mm internal threaded with 17 mm orifice.	Each	2138.00
5175	40 mm internal threaded with 20 mm orifice.	Each	5438.00
5176	Eco Cluster Nozzle made of stainless steel with inlet dia 40 mm and 21 nos Single jets to create 38 mm dia full jet for height 10 mtr water level independed.	Each	25875.00
5177	Eco Cluster Nozzle made of stainless steel with inlet dia 80 mm and 64 nos Single jets to Create 67 mm dia full jet for fountain height 10 mtr water level independed.	Each	44025.00
5178	Central hollow jet 65 mm dia for achieving maximum height of 20 mtrs to produce clear full jet stable in wind water level independent	Each	34875.00

	Lava bell nozzle for produving transparent water pattern with adjustable ball dia made out of SS 304 Gr./Brass of following Size.		
5179	15 mm Dia inlet 290 mm long	Each	2888.00
5180	25 mm Dia inlet 330 mm long	Each	3638.00
5181	25 mm Dia inlet 488 mm long	Each	4388.00
5182	25 mm Dia inlet 636 mm long	Each	5063.00
	Foam jet High contrast for producing high contrast/foam effect to extensively wind stable, water level independent moc Brass /SS 316L of following size.		
5183	25 mm Dia inlet 32 mm orifice 160 mm long.	Each	12375.00
5184	25 mm Dia inlet 50 mm orifice 180 mm long.	Each	20700.00
5185	40 mm Dia inlet 50 mm orifice 180 mm long.	Each	28875.00
5186	20 mm nylon rope all the accessories Floater Grit Clamping both sides etc., Complete as required.	Mtrs.	48.00
5187	Suction Screen stainer made of ABS to be fitted in suction to protect the pump from enrty of external materials.	Each	1369.00
5188	100 mm Dia Debris Collection Strainer in Stainless steel 304 gr Complete as reqd. All fixing to be done as per direction instruction and entire satisfaction of Engineer-in-charge.	Each	5338.00
5189	400 mm Dia wide SS Overflow Skimmer in Stainless steel 304 gr with front openable fitted debris trapping mesh with outlet size of 65mm Dia for fixing in wall.	Each	7238.00
5190	300x300 mm Dia Main Drain in SS 304 Gr with perforations to disallow foreign material with top openable for maintenance.	Each	5380.00
5191	ISI Marked openwell submersible pump set contain with stainless steel shaft and cast iron/SS body, suitable for 900LPM at 25 Mtrs Head	Each	34393.00
5192	ISI Marked vertical Multi Stage submersible pump set contain with stainless steel shaft and cast iron/SS body, suitable for 1200LPM at 14 mtr. head.	Each	47210.00
5193	Three phase openwell ISI Marked submersible pumpset of 1.5H.P. capacity suitable for operation on 415V(+/-10%), 3- phase AC supply complete as required.	Each	19821.00
5194	Three phase openwell ISI Marked submersible pumpset of 7.5 H.P. capacity suitable for operation on 415V(+/-10%), 3- phase AC supply complete as required.	Each	39225.00

	Gun metal gate valve ( Screwed type ) on the existing pipeline, including testing & Commissioning etc. as required.		
5195	80 mm dia	Each	12146.00
5196	50 mm dia	Each	5474.00
	Gun metal Horizontal Non Return valve ( screwed type ) on the existing pipeline, including testing & Commissioning etc. As required.		
5197	100 mm dia	Each	25584.00
5198	50 mm dia	Each	6038.00
5199	Underwater Luminaries surface mounted RGB LED spot light 6 x 3W with IP 68 protection, SS/ aluminium dia casting body with power coated paint, soft rubber gasket.	Each	9488.00
5200	Underwater Luminaries surface mounted RGB LED spot light 3 x 3W with IP 68 protection, SS/ aluminium dia casting body with power coated paint, soft rubber gasket .	Each	4913.00
5201	Water proof (IP 68) power supply unit of not less than 200W i/c connection .	Each	5147.00
5202	RGB controller with remote Kit wattage not less than 200 watt i/c connection.	Each	74366.00
5203	Signal Amplifier of RGB signal as require i/c connection.	Each	11282.00
5204	Power Supply/SMPS for suitable to run LED Lights, Body-Metal input Power-220 V AC/ Output Power-12 V DC. PVC insulated PVC sheathed copper conductor submersible flat cable ISI Marked in existing metal/ HDPE / PVC/ pipe/ in bore well/ in sump .	Each	5008.00
5205	3 Core 1.5 Sq mm Flat Cable	Meter	53.00
5206	3 Core 2.5 Sq mm Flat Cable	Meter	86.00
5207	3 Core 4.0 Sq mm Flat Cable	Meter	129.00
5208	3 Core 6 Sq mm Flat Cable	Meter	185.00
5209	3 Core 10 Sq mm Flat Cable	Meter	320.00
Passenger Lifts			
Code No.	Description	Qty	Rate
	Machine room less (MRL) lift with regenerative drive duly compliant with barrier free access as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016, as Amended upto date.		
5210	13 passenger (884kg)	Each	1169888.20
5211	16 passenger (1088kg)	Each	1631103.27

Goods Lifts			
	2000kg Machine room less (MRL) goods lift with regenerative drive duly compliant as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016, as Amended upto date.		
5212	2000 kg Hospital Lifts (20 passenger (1360 kg)) Machine room less (MRL) Bed lift with regenerative drive duly compliant with barrier free access as per CPWD General Specification for Electrical Works (Part-III Lift & Escalator) 2003, BIS Codes, NBC 2016, as Amended upto date.	Each	2356095.38
5213	20 passenger (1360kg)	Each	1793114.38
IP-PBX System			
Code No.	Description	Unit	Code No.
5214	IP based voice communication system with 04 Port Voicemail ,04 Port FXS ,04 Port FXO ,1 PRI Trunk lines (30 Channels) Circuit with CLIP Facility ,min 100 IP users License with provision for further additions ,100 analog users ,01 Nos. IP based Operator Console, 100 Party Conference.	Each	1096741.10
5214(1)	IP at its core with IP switching technology and 100% non blocking communication system with 04 Port Voicemail, 04 Port FXS, 04 Port FXO, 1 PRI Trunk lines (30 Channels) Circuit with CLIP Facility, min 100 IP users License with provision for further additions, 100 analog users, 01 Number IP based Operator Console, 45 Party Conference.	Each	866149.05
5215	Type 1 IP Phone 2 VoIP account, 120 x40 DOT matrix screen with backlight , Full HD duplex speaker phone, IPV6, Gigabit Ethernet , PoE complete as required.	Each	8125.65
5216	Analog phones having standard features like 16 digit LCD display , 2 way speaker , caller ID and number storage facility etc complete as required.	Each	1072.50
5217	20 Pair PVC Telephone cables with Conductor Diameter:05mm Nominal, Insulation Material: High-Density Polyethylene(HDPE), Insulation Thickness:02 mm Nominal, Certification:BIS(Bureau of Indian Standards) in the existing surface/recessed steel/ PVC conduit as required.	Each	239.00

LAN SYSTEM			
Code No.	Description	Qty.	Rate
	following capacity 8 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 8 X RJ-45 Gigabit Ethernet Ports and additional 2 X 1G SFP Ports with non-blocking architecture by having Switching capacity of minimum 20Gbps and packet forwarding rate of 14Mpps or higher, 8K MAC table.		
5218	8 port PoE Layer 2 Network Switch with PoE Support of 130W or higher with each copper port supporting 802.3at PoE+.	Each	24375.00
5219	8 port Layer 2 Non-PoE Network Switch	Each	19500.00
5220	capacity 8 port PoE Layer 2 Industrial Grade outdoor Network Switch having features and specifications etc. as mentioned here under: At least 8 X RJ-45 PoE/PoE+ Gigabit Ethernet Ports and additional 4 X 1G SFP Ports with non-blocking architecture by having Switching capacity of min. 24Gbps and packet forwarding rate of 17Mpps or higher, console port, 16K MAC table, IPv4 and IPv6 ready, IGMP snooping v1, v2, v3.	Each	74100.00
	following capacity 24 port Layer 2 indoor Network Switch having features and specifications etc. as mentioned here under: At least 24 X RJ-45 Gigabit Ethernet Ports and additional 2 X 10G Base -T with 4 X SFP Ports		
5221	24 port PoE Layer 2 Network Switch with PoE Support of 370W or higher with each cooper port supporting 802.3at PoE+ min.	Each	87100.00
5222	24 port Layer 2 Non-PoE Network Switch	Each	59850.00
5223	following capacity 24 port Layer 3 Network Switch having features and specifications etc. as mentioned here under: At least 20 X RJ-45 Gigabit Ethernet Ports and additional 4 combo 10/100/1000 base-t/SFP Ports with additional 4 SFP+ ports non-blocking architecture by having Switching capacity of min. 128Gbps and packet forwarding rate of 95Mpps or higher, 16K MAC table. Console Port, USB port, Internal AC Power supply	Each	134610.00

5224	10 Giga Bandwidth Data Centre Network Switch of 48 port Layer 3 having features and specifications etc. as mentioned here under: - ToR/EOR/Core Network Switch 48x 10GbE SFP+, 6x 100GbE QSFP28, RPS, with Console Port, Management Port and 1 x USB 2.0 Type A port, The switch must provide a switching capacity of no less than 2.16 Tbps and a forwarding rate of at least 1600 Mpps. Supplying, Installation, Testing and commissioning of small form-Pluggable (SFP) for Network Switches. Must be hot Pluggable, RoHS Complaint, etc. complete as required.	Each	733500.00
5225	1G SFP Single Mode/Multi Mode	Each	2925.00
5226	1G Copper SFP	Each	4875.00
5227	10 G SFP + Single Mode/Multi Mode	Each	10400.00
5228	40G SFP	Each	29250.00
5229	100G SFP	Each	87750.00
5230	indoor Wireless Access Point for Low Density use having features and specifications etc. as mentioned here under - Dual-band Wi-Fi6 (802.11ax) 574Mbps (2.4GHz) + 1200Mbps (5GHz), WI-FI 6 Certified, 1 x RJ45 console port, 1G LAN POE Port, factory reset, WPA/WPA2/WPA3™ Personal/Enterprise, WEP 64/128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server.	Each	15795.00
5231	indoor Wireless Access Point for High density use having features and specifications etc. as mentioned here under- WiFi6 802.11ax 574Mbps (2.4GHz) + 2402Mbps (5GHz), WIFI 6 Certified, 1 x RJ45 console port, MG 2.5G LAN POE Port, factory reset, WPA/WPA2/WPA3™ Personal/Enterprise, WEP 64/128-bit, SSID broadcast disable, MAC address access control, Internal RADIUS server.	Each	24700.00
5232	Outdoor Wireless Access Point having features and specifications etc. as mentioned here under - WIFI 6 Certified, 1 x RJ45 console port, MG 2.5G LAN POE Port, factory reset, 4 x internal antennas, the transmission coverage of shall be minimum 80 meters in radius, AP should have transmission power minimum of 22 dBm, The AP shall provide a minimum of 29 dBm EIRP for both 2.4 GHz and 5 GHz frequencies. Feild deployment shall be with EIRP as per regulatory guidelines.	Each	32071.00

5233	indoor Wireless Controller having features and specifications etc. as mentioned here under- The network controller shall be a dedicated hardware appliance designed for centralized management of wireless access points, It must support the management of up to 500 networking devices,	Each	78650.00
5234	24 port Cat6 Patch Panel loaded. Must be of 1U height with clear label holders and white label with the panel. 24 Ports Cat-6 Patch Panel should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D following CAT6 Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D	Each	3666.00
5235	Copper Patch Cords of length 1m (3ft)	Each	105.00
5236	Copper Patch Cords of length 3m (10ft) following CAT6A Patch Cord should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D	Each	157.50
5237	Copper Patch Cords of length 1m (3ft)	Each	120.00
5238	Copper Patch Cords of length 3m (10ft)	Each	281.25
5239	CAT6 Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability.	Each	105.00
5240	CAT6A Copper Information Outlet (IO) with face plate of color as per site requirement, should have ETL/UL verification program certificate for compliance with ANSI/TIA-568.2-D. All copper Cable and Components should be from same OEM to maintain compatibility and interoperability.	Each	210.00
5241	RJ45 Connector for CAT 6/6A Cables. RJ45 modular plug supports 4 twisted pairs, 8 positions, 8 connectors. Housing: PC, UL94V-2, transparent color. Use for 24- 26 AWG stranded wires. CAT6 UTP LSZH 23AWG Twisted Pair Cable in existing conduit/ on surface, Category 6 Unshielded Twisted Pair.	Each	6.38
5242	1 Run of cable	Meter	25.00
5243	2 Run of cable	Meter	50.00
5244	3 Run of cable	Meter	75.00
5245	4 Run of cable	Meter	100.00

	Cat6A UTP 4 pair, 23 AWG solid copper cable in existing conduit/ on surface, U/FTP, LSZH, Non-Plenum, Horizontal (solid) Cable suitable for high speed data networking application supporting upto 10Gbps over a 100 meter channel.		
5246	1 Run of cable	Meter	35.00
5247	2 Run of cable	Meter	70.00
5248	3 Run of cable	Meter	105.00
5249	4 Run of cable	Meter	140.00
	Fiber Optic Cable having corrugated steel armoring. The Fiber should be SM Fiber Central - loose tube filled with Thixotropic jelly, duly following Standards: ISO 11801, IEC 60793-1/60794-1-2, ITU-T-REC G.652D and Telecordia GR-20-core.		
5250	Single Mode 6 Core Optical fiber cable	Meter	28.00
5251	Single Mode Optical 12 Core fiber cable	Meter	45.00
	Multi mode Fiber Optic Cable having corrugated steel armoring, lesser optimize 50/125 µm with HDPE jacket, LSZH (Low smoke Zero Halogen), Tight-buffered or loose tube, maximum attenuation: ≤ 3.5 dB/km at 850 nm, ≤ 1.5 dB/km at 1300 nm, bandwidth ≥ 2000 MHz-km at 850 nm, ≥ 500 MHz-km at 1300 nm.		
5252	6 Core Multi Mode Optical Fiber Cable	Meter	44.00
5253	12 Core Multi Mode Optical Fiber Cable	Meter	59.00
	Rack Mount loaded LIU with pigtail, Front-mounted cable saddles for jumper management, suitable to manage both splices and terminations.		
5254	6 Port LIU	Each	3800.00
5255	12Port LIU	Each	4890.00
5256	24 Port LIU	Each	6980.00
5257	Patch Cord of Optical Fiber Multi Mode or Single Mode LC to LC Fiber Duplex having high precision ceramic ferrule with good concentricity, Fiber corning single mode G652D, Cable Type 2mm.	Each	490.00
	Wall Mount Rack having Fixed Structure with 0.8mm CRCA Sheet, completely knocked-down condition (CKD) Shape, Vertical Mounting Rail 1.6 mm.		
5258	6U Rack	Each	4820.00
5259	9U Rack	Each	6224.00
5260	15U Rack	Each	9259.20



5261	24U Rack with 4 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.25mm CRCA Sheet with removable side panels, L- Shape adjustable Vertical Mounting Rail of 2mm.	Each	14726.40
5262	42U Rack with 6 inch Castor wheels and front brake Floor Standing Rack with Main Frame Pillar of 1.6mm.	Each	22890.40
5263	Outdoor Pole/ Wall mount 6U Rack, IP55, Front Door with Filter, Louver & Unique key Lock. 3 Socket PDU 5Amp.	Each	15440.00
CCTV CAMERA			
Code No.	Description	Qty.	Rate
	2 MP IP IR Dome Camera		
5264	2MP (@ 25/30fps@1080P (1920×1080)) IP IR Dome Camera with 2.8/ 3.6mm fixed lens	Each	5590.50
5265	2MP @ 25/30fps@1080P (1920×1080) Dome Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	13750.50
5266	2MP @ 25/30fps@1080P (1920×1080) Outdoor Bullet Camera with 2.8/ 3.6mm fixed lens	Each	5390.25
5267	2MP @ 25/30fps@1080P (1920×1080) Outdoor Bullet Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	13750.50
	4MP IP IR Dome Camera		
	4MP IP IR Dome Camera having following specifications and features etc :-		
5268	4MP @ 25/30fps@1440P (2560 x 1440) Dome Camera with 2.8/ 3.6/ 6/8/12 mm fixed lens (as per site requirement).	Each	7200.00
5269	4MP @ 25/30fps@1440P (2560x1440) Dome Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	16500.00
	4MP IP IR Outdoor Bullet Camera		
	4MP IP IR Outdoor Bullet Camera having following specifications and features etc :-		

5270	4MP @ 25/30fps@1440P (2560 x 1440) Outdoor Bullet Camera with 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement)	Each	6990.00
5271	4MP @ 25/30fps@1440P (2560x1440) Outdoor Bullet Camera with 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens.	Each	16500.00
	5MP/6MP IP IR Dome Camera		
	5MP/6MP IP IR Dome Camera having following specifications and features etc :-		
5272	5MP/6MP IP IR 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement) Dome Camera.	Each	8891.25
5273	5MP/6MP @20 fps or better) IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens Dome Camera.	Each	18750.00
	5MP/6MP IP IR Bullet Camera		
	5MP/6MP IP IR Bullet Camera having following specifications and features etc :-		
5274	5MP/6MP IP IR 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement) outdoor bullet Camera	Each	8700.00
5275	5MP/6MP IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens outdoor Bullet Camera.	Each	18750.00
	8 MP IP IR Dome Camera		
	8MP IP IR Dome Camera having following specifications and features etc :-		
5276	8 MP (3840 × 2160) or better IP IR 2.8/ 3.6/6/8/12 mm fixed lens (as per site requirement) Dome Camera,	Each	13500.00
5277	8 MP (3840 × 2160) or better IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens Dome Camera.	Each	19500.00
	8 MP IP IR Outdoor Bullet Camera		

5278	8MP IP IR Outdoor Bullet Camera having following specifications and features etc :- 8 MP (3840 × 2160) or better IP IR 2.8/ 3.6/6/8/12 mm fixed lens outdoor Bullet Camera.	Each	13500.00
5279	8 MP (3840 × 2160) or better IP IR 2.7 to 4 mm ~12 to 13.5mm or better Varifocal Motorized lens outdoor Bullet Camera.	Each	19500.00
5280	PTZ (Pan. Tilt and Zoom) IP IR Camera PTZ (Pan,Tilt and Zoom) IP IR Camera having following specifications and features etc :- 2 MP IP IR motorized PTZ @ 25/30fps or better camera, Triple streaming , configurable on resolution Main stream: 1080p@25/30 fps Sub streams :1080p@25/30 fps & D1@25/30 fps or better, varifocal lens 4.3-137 mm or better with Automatic & manual Focus Adjustment provisions, 32x Optical zoom and 12x Digital zoom with angle of view 57°–2.4° , PAN Travel: Pan: 0° ~ 360° endless,Manual Pan: 260° /s, Preset : 300° /s, Tilt, Travel: Tilt: -20° ~ 90°, auto flip 180°, Manual Tilt: 120° /s, Preset : 200° /s	Each	48700.00
5281	4 MP IP IR motorized PTZ (4MP @25/30fps or better) camera, Triple streaming , configurable on resolution Main stream: 4MP@25/30 fps Sub streams :1080p@25/30 fps & D1@25/30 fps or better, varifocal lens 4.5-135mm or better with Automatic & manual Focus Adjustment provisions, 30x Optical zoom and 12x Digital zoom with angle of viewH : 57°–2.4° , m, PAN Travel: Pan: 0° ~ 360° endless;Manual Pan: 300° /s, Preset : 300° /s, Tilt Travel: Tilt: 0-90°, auto flip 180°, Manual Tilt: 200° /s, Preset : 300° /s	Each	54450.00

5282	5MP IP IR motorized PTZ @25/30fps or better camera, Triple streaming , configurable on resolution:- Main stream: 5MP@25/30 fps Sub streams:1080p@25/30 fps, varifocal lens 3.95mm (±5mm) ~ 177.75mm (±5mm) or better with Automatic & manual Focus Adjustment provisions, 45x Optical zoom and 16x Digital zoom with angle of view H: 65.7°–1.9°V: 39.4°–1.1°D: 73.1°–2.1, PAN Travel: Pan: 0° ~ 360° endless,Manual Pan: 260° /s, Preset : 300° /s, Tilt Travel: Tilt: -20° ~ 90°, auto flip 180°, Manual Tilt: 120° /s, Preset : 200° /s	Each	75000.00
	Network Video Recorder (NVR) Following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below :		
5283	08 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9, 2nd screen: 1/4/8/9	Each	7000.50
5284	16 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16, 2nd screen: 1/4/8/9/16 Following Channel Network Video Recorder (NVR) with camera licenses to record for all channels having specifications and features etc as mentioned below :	Each	8890.50
5285	32 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/32(36), 2nd screen: 1/4/8/9/16	Each	45000.00
5286	64 Channel Network Video Recorder (NVR) having display split :- Main screen: 1/4/8/9/16/25/36/64, 2nd screen: 1/4/8/9/16 Hard Disk Drive Following capacity Surveillance grade Hard Disk with upto 256MB/s Transfer Rate, 256 MB Cache, 7200 RPM Disk Speed, 3.5 inch form factor, SATA Interface, BSMI, ICES-003/NNB-003, CE, FCC, KC, Maghreb, RCM, UKCA, VCCI, CB-Scheme, TUV, UL Certifications.	Each	57375.00
5287	4TB (Terabytes)	Each	9685.00
5288	6TB (Terabytes)	Each	11375.00
5289	8TB (Terabytes)	Each	13975.00
5290	10TB (Terabytes)	Each	17225.00

Access Control System			
Code no.	Description	Qty.	Rate
	Access Control System with Face recognition Access Control System comprising of Face Recognition, Fingerprint, Smart Card, PIN & QR Code based Reader, following sizes of IPS TFT Touch Screens.		
5291	Deleted	Each	0.00
5292	5" IPS TFT Touch Screen	Each	40500.00
	Access Control System (without Face Recognition)		
5293	Access Control System comprising of Fingerprint, Smart Card & Password based Reader, 5" Touch Screen LCD Display.	Each	27000.00
	Access Control System with 2.8" display (without Face Recognition Readers)		
5294	Access Control System comprising of Fingerprint, Card & Password based Reader with Capacitive Touch Keypad, Fake Fingerprint Detection Technology, supports ANSI 378 encryption, AES 128 bit encrypted algorithm to protect important info such as personal info transmitted, 2.8" LCD display.	Each	22500.00
	Access Control System with 1.77" display (without Face Recognition Readers)		
5295	Access Control System comprising of Fingerprint & Card based Reader with 1.77" LCD Display.	Each	19500.00
	Software for Web based Access Control System		
5296	Web based Access Control Enrolment and Device Configuration Software.	Each	67500.00
	Electromagnetic locks		
	Electromagnetic locks (fail safe type) for following type of Doors suitable for operation on 12 V DC having holding force 600 lbs for Single Leaf Door and 1200lbs for Double leaf door with suitable feedback i/c connection complete etc. as required.		
5297	Single leaf door	Each	3356.00
5298	Double leaf door (Each leaf 600lbs & Total 1200 lbs)	Each	5274.00
	Exit Push Button		
5299	Heavy Duty SS Finish Exit Push Button for releasing access doors with all necessary installation accessories i/c connection complete etc. as required.	Each	815.00
	Door Position Sensor		
5300	Door Position Sensor i/c connection complete	Each	432.00

etc. as required.

# Building Management System (BMS)

Code no.	Description	Qty.	Rate
	CENTRAL CONTROL SERVER		
5301	Central Control Server System comprising of Intel® Xeon® CPU E5-2640 x64 (or better) compatible with dual and quad core processors, Windows 11 (Professional, Enterprise, Ultimate, 64 bit). PC System	Each	129500.00
5302	Client PC System comprising of PC Hardware with minimum 11th Gen Intel® I7 processor CPU E5-2640 x64 (or better), compatible with dual and quad core processors minimum 3.1 Ghz and 8GB or higher RAM. LaserJet printer	Each	63000.00
5303	LaserJet printer having printing resolution 1200 x 1200 dpi, (dot/inch) or better, 21 to 30 ppm printing speed (LaserJet) complete etc. as required LED Display	Each	15750.00
	LED display (LED monitor) industrial grade with 3840x2160 resolution or better, USB playback, bluetooth and miracast connectivity.		
5304	32 inch or larger	Each	27500.00
5305	42 inch or larger	Each	35744.00
5306	55 inch or larger	Each	56998.00
	Software for Building Management System : Necessary Software (UL listed) Packages containing Building Management with Capability of Collection, Storage, Processing and Controlling all the Data. Software shall support Open Standard Protocols like XML, BACnet, Modbus, Lon works etc.		
5307	For Upto 500 point included	Each	67639.60
5308	For Upto 2500 point included	Each	116620.00
5309	For Upto 5000 point included	Each	171500.00
	Touchscreen Color portable operator terminal Touchscreen Color portable operator terminal capable of connecting to one of the controllers on the communication bus and view parameters of the complete system.		
5310	4" Touch Screen	Each	43750.00
5311	7" Touch screen	Each	51726.50
	DDC CONTROLLERS		

IP Based DDC controller capable of fully “stand-alone” operation i.e. In the event of loss of communication with other DDC’s or Control Station, they shall be able to function on their own.

5312	DDC Controller-Type-I (Support upto 32 Points)	Each	32550.00
5313	DDC Controller-Type-II (Support upto 64 Points)	Each	45850.00
5314	DDC Controller-Type-III (Support upto 96 Points)	Each	49350.00
5315	DDC Controller-Type-IV (Support upto 128 Points)	Each	51450.00
5316	DDC Controller-Type-V (Support upto 160 Points)	Each	59920.00

#### EXPNSION IO MODULE

Input output (IO) expansion module.

5317	I/O Module with 4 UIO channels	Each	12250.00
5318	I/O Module with 8 UIO channels	Each	12845.00
5319	I/O Module with 8 UI channels	Each	13615.00
5320	I/O Module with 8 DI channels	Each	10822.00
5321	I/O Module with 16 DI channels	Each	12523.00
5322	I/O Module with 8 DO channels	Each	11746.00
5323	I/O Module with 4 DO channels	Each	10920.00

#### Enclosure for DDC

Powder coated wall mounted lockable and secure enclosure for DDC panel made of 16 SWG sheet steel IP -55 rated with proper internal mounting accessories.

5324	500X500X200 mm	Each	7350.00
5325	600mmX600mmX200mm	Each	8792.00
5326	800mmX1000mmX200mm	Each	12950.00

#### Integration Unit

3rd party Integration unit to provide the interface between Ethernet LAN and the 3rd party field control devices or any other devices which need to be integrated.

5327	Integrator for 500 Points	Each	101500.00
5328	Integrator for 1250 Points	Each	122500.00
5329	Integrator for 5000 Points	Each	157500.00

#### Field Devices

following Field Devices including connection etc. as required

5330	Water Differential Pressure (DP) Switch for Pump Status.	Each	6731.00
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5331	High/Low Level Switch for Tank Level Monitoring.	Each	5490.00
5332	Air DP Switch for Fan Run Status.	Each	2034.00
5333	Duct CO2 Sensor, 0-2000ppm, 0-10V/4-20mA Output.	Each	6860.00
5334	Outside Temp & Humidity Sensor with radiation shield. Measuring Range: Temp:- -15 to 50 °C & RH 0-100%, Accuracy: +/- 1 °C +/- 3%	Each	6475.00
5335	Immersion Temp Sensor for CHW line. Measuring range: -30 to 110 °C, Accuracy: +/- 1.3 °C	Each	3185.00
5336	Water Pressure Sensor. Accuracy: +/-0.3% FSL	Each	6160.00
5337	Duct type temperature sensor Measuring range: -30 to 110 °C, Accuracy: +/- 1.3 °C	Each	2492.00
5338	Current Sensing Relay	Each	2205.00
5339	Wall Mount Temp. Sensor	Each	4550.00
5340	Wall/Ceiling Mount CO Sensor	Each	5775.00
5341	Differential pressure switch for filters & Blowers	Each	1785.00
5342	Bi-Level Switches (Hi/Low)	Each	3850.00
5343	Water Level Sensor	Each	4599.00
5344	Explosion proof level Switch	Each	5292.00
5345	Water Flow Switch	Each	2625.00
5346	Indoor Air Quality Sensor (CO2,T,H,PM,TVOC)	Each	22750.00
5347	Ultrasonic Water BTU Meter including digital display (Clamp-On) suitable for Pipe sizes dia upto 250mm	Each	248500.00





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## Central Public Works Department (CPWD) In the Service of the nation since 171 Years

Under the Ministry of Housing and Urban Affairs, Government of India, CPWD provides single window services for all facets of the government built environment in India and abroad.

With its huge resources of skilled and competent engineers, architects and horticulturists, CPWD's strength is its country wide presence, with proven ability to undertake a whole range of complex constructions under difficult terrains. The department has the capacity to undertake a range of work varying from the smallest works in the remotest of places to mega projects in metro cities. These works include the construction and maintenance of government structures such as residential complexes, offices, schools, laboratories, hospitals, sport facilities, stadia, gymnasias, auditoria, storages, highways, flyovers, tunnels, bridges, jetties, airports, runways and border road its fencing and flood lighting, high altitude roads, Intra-campus facilities such as water and electric supply. Sewerage and treatment plants are also provided.

CPWD also discharges other functions such as the custody of estates, valuation, rent assessment, technical advice to government, consultancy services, standardization and benchmarking, State Ceremonies (Republic Day, Samadhis, etc.), processing of DPRs for development of urban infrastructure under JNNURM, North Eastern region and works of other Ministries for centrally funded works. CPWD also assists in organizing public and ceremonial functions, and upkeep of historical and important monuments.

### *Delhi Schedules of Rates (E&M) 2025*

The Delhi Schedule of Rates (E&M) 2025 is a revision and amalgamation of CPWD Delhi Schedule of Rates (E&M) 2022, DSR (E&M) for Solar Photovoltaic Power Plant-2019, DSR (E&M) for Façade Lighting- 2019 and Delhi Schedule of Rates (E&M) (Energy efficient materials) Vo.-II-2025. It takes into account the increased labour and material cost, including the effect of GST of Work Contracts. In addition, new chapters for Low Voltage E&M services (CCTV Camera System, EPABX/IP-PBX, LAN, Access Control System & BMS), Fountains and Lifts have also been added.



**CENTRAL PUBLIC WORKS DEPARTMENT**  
**Ministry of Housing and Urban Affairs.**  
**Government of India**  
**[www.cpwd.gov.in](http://www.cpwd.gov.in)**