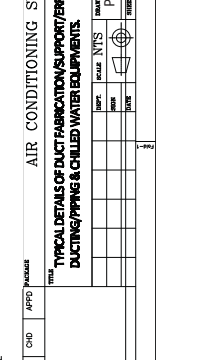
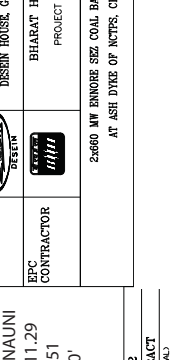
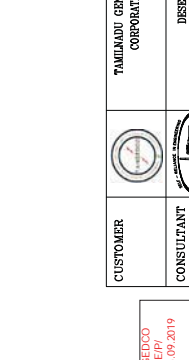
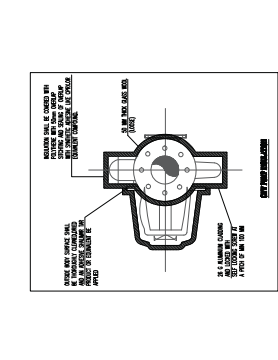
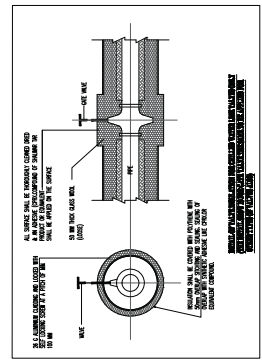
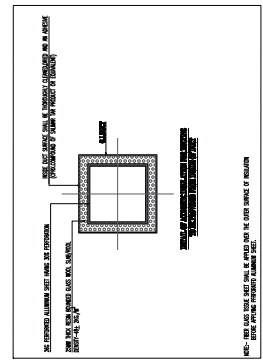
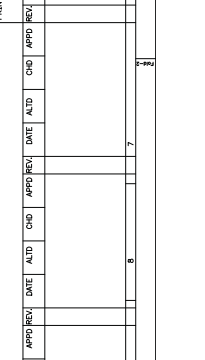
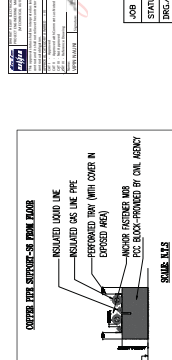
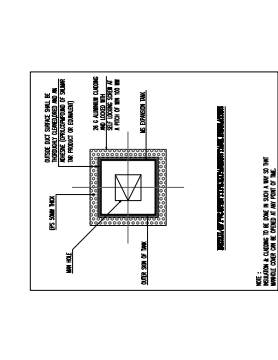
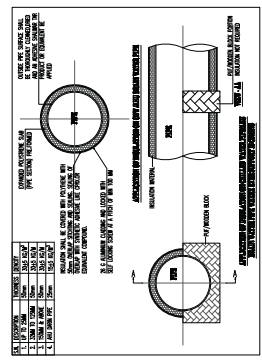
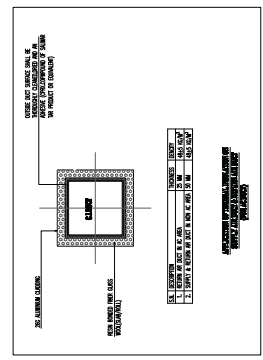
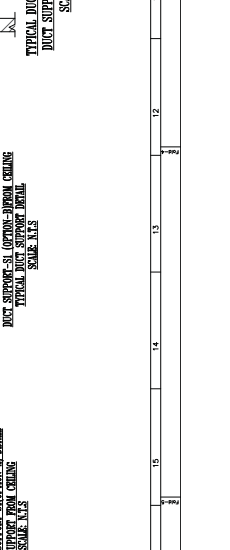
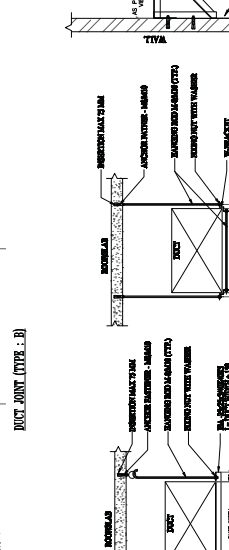
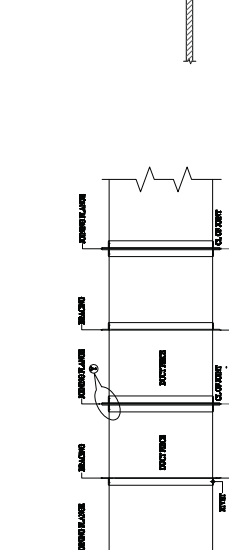
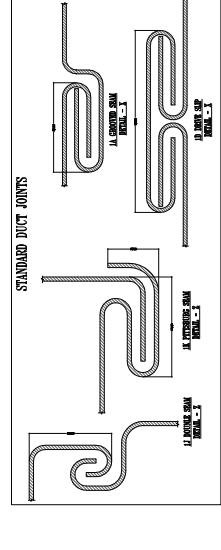
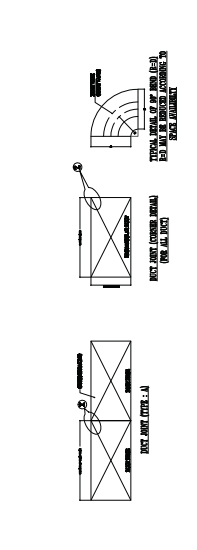


### DUCTING FABRICATION DETAILS

SL. NO.	DESCRIPTION	LENGTH (M)	DIAMETER (MM)	PLATE THICKNESS (MM)	TYPE OF JOINT	TYPE OF END JOINT
1.	DUCT-100	100	100	3	FLANGE	FLANGE
2.	DUCT-150	150	150	3	FLANGE	FLANGE
3.	DUCT-200	200	200	3	FLANGE	FLANGE
4.	DUCT-250	250	250	3	FLANGE	FLANGE
5.	DUCT-300	300	300	3	FLANGE	FLANGE
6.	DUCT-350	350	350	3	FLANGE	FLANGE
7.	DUCT-400	400	400	3	FLANGE	FLANGE
8.	DUCT-450	450	450	3	FLANGE	FLANGE
9.	DUCT-500	500	500	3	FLANGE	FLANGE
10.	DUCT-550	550	550	3	FLANGE	FLANGE
11.	DUCT-600	600	600	3	FLANGE	FLANGE
12.	DUCT-650	650	650	3	FLANGE	FLANGE
13.	DUCT-700	700	700	3	FLANGE	FLANGE
14.	DUCT-750	750	750	3	FLANGE	FLANGE
15.	DUCT-800	800	800	3	FLANGE	FLANGE
16.	DUCT-850	850	850	3	FLANGE	FLANGE
17.	DUCT-900	900	900	3	FLANGE	FLANGE
18.	DUCT-950	950	950	3	FLANGE	FLANGE
19.	DUCT-1000	1000	1000	3	FLANGE	FLANGE



DOCUMENT IS APPROVED - IDE TANGEDOO  
 LETTER NO. CE/EP/ISE/EP - /AAE/EP/  
 F E S E D A - 00337 / 19 DT 03.09.2019

VIPIN NAUNI  
 2018.11.29  
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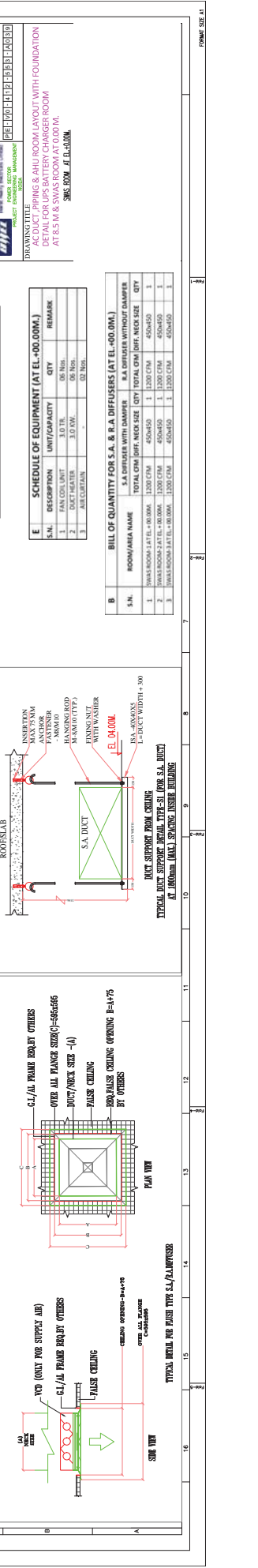
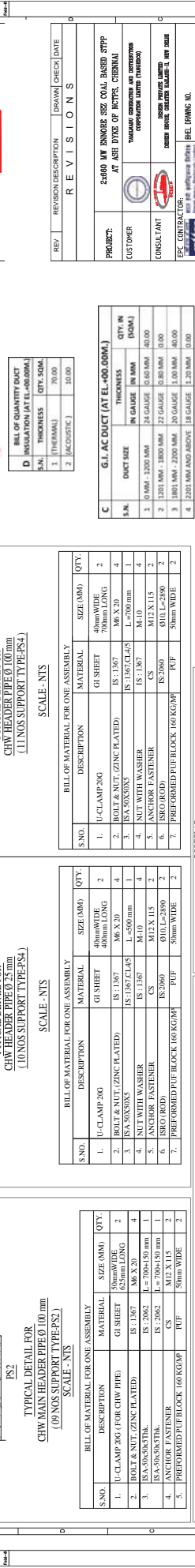
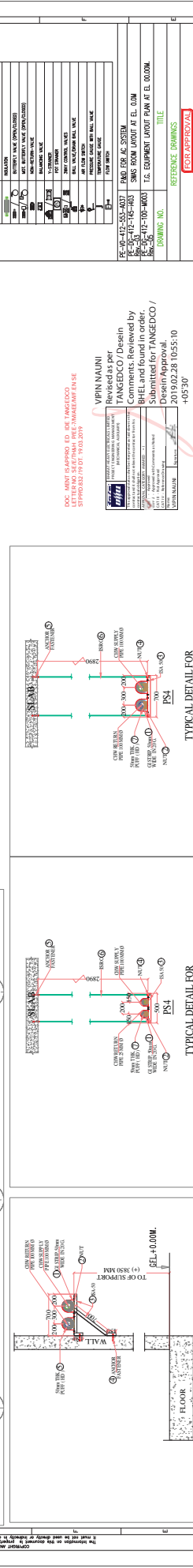
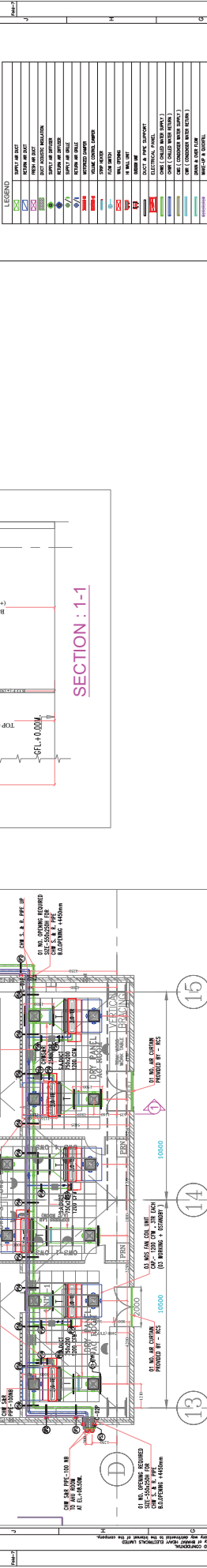
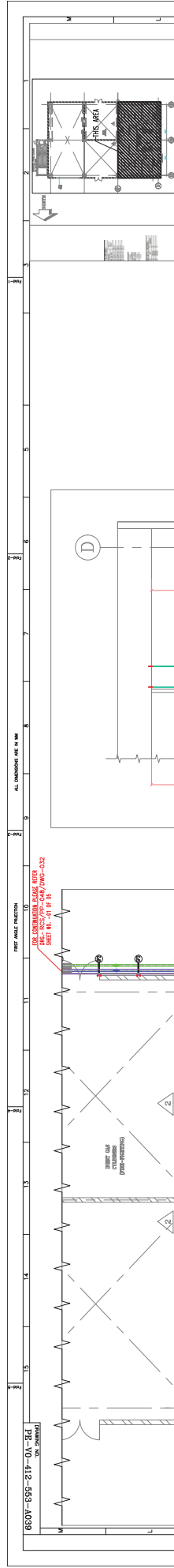
JOB NO. 412  
 CONTRACT  
 DISC/REP/MS/INTERNAL  
 PRINT SCALE IN THE END

REQ	DATE	ALTD	CHG	APPRO	REQ	DATE	ALTD	CHG	APPRO	REQ	DATE	ALTD	CHG	APPRO

CUSTOMER	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)
CONSULTANT	DESIGN PRIVATE LIMITED
CONTRACTOR	DESIGN HOUSE GREATER KAILASH-II, NEW DELHI BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA
	25680 MW ENCORE SIZE COAL BASED STPP AT ASH DYER OF NCTPS, CHENNAI

AIR CONDITIONING SYSTEM	
TYPICAL DETAILS OF DUCT FABRICATION/SUPPORT/ERECTION OF INSULATION OF DUCTING/PIPES & FILLED WATER EQUIPMENTS.	
SCALE	AS PER NTS
DATE	PE-10-412-553-A038
NO.	1 OF 1
FORM	9





1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE INDICATED.
2. EQUIPMENT SIZES ARE AS PER THE MANUFACTURER'S DATA SHEET.
3. ALL WELDS AND FASTENERS SHALL BE EXECUTED AS PER APPROVED.
4. THE AIR FLOW DIRECTION SHALL BE AS INDICATED BY THE ARROWS.
5. THE DAMPER SHALL BE INTERLOCKED WITH FIRE DETECTION SYSTEM.
6. AIR VELOCITY IN MAIN DUCT IS 8 M/S AND BRANCH DUCT 4-8 M/S.
7. ALL SUPPLY AIR DIFFUSERS SHALL BE WITH VOLUME CONTROL DAMPER.
8. ALL EXHAUST AIR SHALL BE EXHAUSTED TO OUTSIDE THROUGH ROOF.
9. ALL ELEVATIONS INDICATED IN THE DRAWING ARE W.R.T. FINISH FLOOR LEVEL.
10. ALL DIMENSIONS ARE TO FACE UNLESS SPECIFIED OTHERWISE.

**LEGEND**

1	REFRIGERANT PIPING
2	CHILLED WATER PIPING
3	CONDENSATE PIPING
4	EXHAUST AIR PIPING
5	RETURN AIR PIPING
6	DIFFUSER
7	DUCT
8	VALVE
9	TELEPHONE
10	WATER
11	WASTE
12	PLUMBING
13	ELECTRICAL
14	MECHANICAL
15	STRUCTURAL
16	FINISH
17	FOUNDATION
18	ROOF
19	WALL
20	FLOOR
21	CEILING
22	DOOR
23	WINDOW
24	STAIR
25	ELEVATOR
26	MECHANICAL ROOM
27	ELECTRICAL ROOM
28	PLUMBING ROOM
29	WATER TOWER
30	WASTE TOWER
31	CONDENSATE TOWER
32	EXHAUST TOWER
33	RETURN TOWER
34	DIFFUSER
35	DUCT
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37	TELEPHONE
38	WATER
39	WASTE
40	PLUMBING
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496	FLOOR
497	CEILING
498	DOOR
499	WINDOW
500	STAIR

**FOR APPROVAL**

REVISED AS PER TANGDCO / DESIGN COMMENTS REVIEWED BY BH-E AND FOUND IN ORDER.

DATE: 2019.02.28 10:55:10

VPIN (NAUNI)

2019.02.28 10:55:10

40530

**BILL OF QUANTITY FOR INSULATION (AT EL.+00.00M.)**

S.N.	THICKNESS	QTY. SQ.M.	REMARK
1	THERMAL	70.00	
2	ACUSTIC	10.00	

**G.I. AC DUCT (AT EL.+00.00M.)**







S.N.	DUCT SIZE	IN GAUGE	THICKNESS	QTY. IN SQ.M.	
1	Ø 1000	1200 MM	24 GAUGE	0.60 MM	40.00
2	Ø 1200	1800 MM	22 GAUGE	0.80 MM	0.00
3	Ø 1200	1800 MM	20 GAUGE	1.00 MM	40.00
4	Ø 1200	1800 MM	18 GAUGE	1.20 MM	0.00

**SCHEDULE OF EQUIPMENT (AT EL.+00.00M.)**




S.N.	DESCRIPTION	UNIT/CAPACITY	QTY.	REMARK
1	FAN COIL UNIT	3.0 TON	06 NOS.	
2	DUCT HEATER	3.0 KW	06 NOS.	
3	DIFFUSER	...	02 NOS.	

**BILL OF QUANTITY FOR S.A. & R.A. DIFFUSERS (AT EL.+00.00M.)**

S.N.	ROOM/AREA NAME	S.A. DIFFUSER WITH DAMPER	R.A. DIFFUSER WITHOUT DAMPER	REMARK
1	MECHANICAL ROOM	1200 CFM	400450	1
2	MECHANICAL ROOM	1200 CFM	400450	1
3	MECHANICAL ROOM	1200 CFM	400450	1
4	MECHANICAL ROOM	1200 CFM	400450	1
5	MECHANICAL ROOM	1200 CFM	400450	1
6	MECHANICAL ROOM	1200 CFM	400450	1
7	MECHANICAL ROOM	1200 CFM	400450	1
8	MECHANICAL ROOM	1200 CFM	400450	1
9	MECHANICAL ROOM	1200 CFM	400450	1
10	MECHANICAL ROOM</			



	<b>BHARAT HEAVY ELECTRICALS LIMITED</b> PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
 - Approved  - Approved with Comments as Noted  - Not Approved  - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
Document is reviewed  
and found in order.  
Submitted for  
customer approval.  
2020.02.13 10:30:16  
+05'30'




<b>PROJECT</b>	<b>2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI</b>
	<b>CUSTOMER</b> <b>TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)</b>
	<b>CONSULTANT</b> <b>DESEIN PRIVATE LIMITED</b> <b>DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI</b>
	<b>EPC CONTRACTOR</b> <b>BHARAT HEAVY ELECTRICALS LTD</b> PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301

<b>PACKAGE</b>	<b>AIR CONDITIONING SYSTEM</b>
<b>TITLE</b>	<b>24 M. AHU ROOM LAYOUT ALONG WITH PIPING &amp; FOUNDATION ARRANGEMENT FOR POWER HOUSE</b>



	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
CAT I - Approved CAT II - Approved with Comments as Noted CAT III - Not Approved CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
 Revised as per TANGEDCO /  
 DESEIN Comments.  
 Reviewed by BHEL and  
 found in order. Submitted  
 for customer approval.  
 2020.02.12 17:01:23 +05'30'

Date	Rev	Description of Revision	ALT	CHD	APPD
<b>PROJECT</b>		<b>2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI</b>			
	<b>CUSTOMER</b>  <b>TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)</b>				
	<b>CONSULTANT</b>  <b>DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI</b>				
	<b>EPC CONTRACTOR</b>  <b>BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301</b>				
<b>STATUS</b>	<b>CONTRACT</b>	<b>DOC. NO: PE-V0-410-553-A040A</b>			<b>Rev: 01</b>
<b>PACKAGE</b>		<b>AIR CONDITIONING SYSTEM</b>			





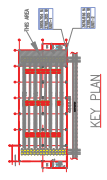




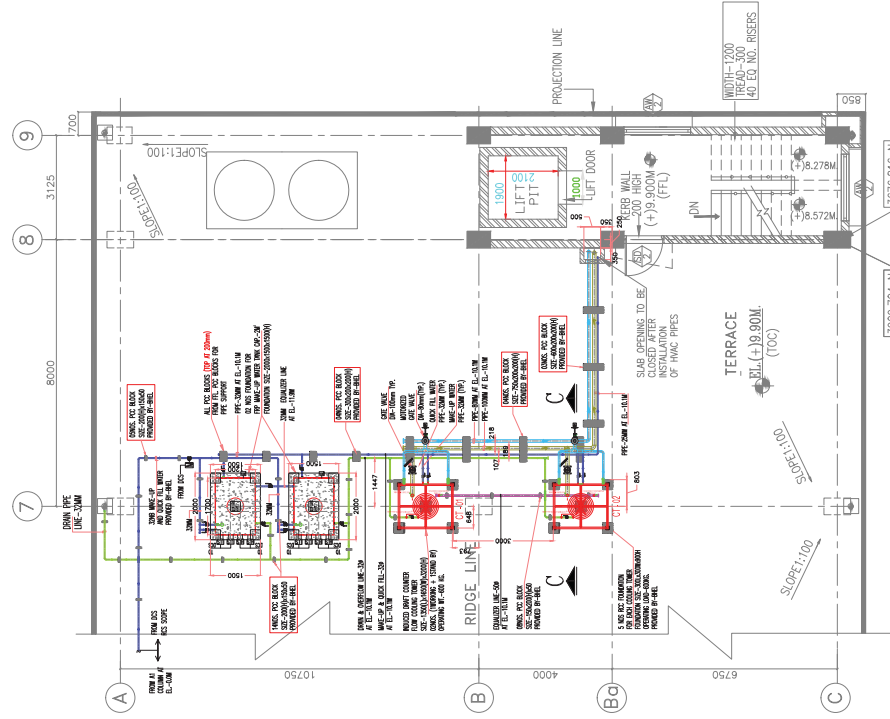
NORTH

AL. HANGING WIRE 20 MM

PIPE WALL FINISH



6 ← 7 → 8



TERRACE PLAN AT EL (+)9.90M (TOC)

INDICATED DRAFT COUNTER FLOW COOLING TOWER (TYPE 1) (SEE DRAWING 20-00000000) (OPERATING W/ 400 KL)

- NOTES:
1. ALL PIPING AND W/ VALVES, EXCEPT FOR PIPING UNDER FLOOR, SHALL BE INSTALLED IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  2. UNDER FLOOR, PIPING, DRAINAGE AND W/ VALVES SHALL BE INSTALLED IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  3. PIPING SHALL BE INSTALLED IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  4. DRAIN CONNECTION FROM ALL EQUIPMENTS SHALL BE CONNECTED AND TERMINATED TO THE DRAINAGE SYSTEM IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  5. ALL CHILLED WATER LINES, CHILLED WATER PUMPS, VALVES AND EXPANSION TANK SHALL BE INSTALLED IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  6. MAKE UP WATER FOR HANDOVER SHALL BE TAKEN FROM MAKE UP WATER TANK.
  7. ALL EQUIPMENT GAUGING AND DATA SHEET SHALL BE SUBMITTED SEPARATELY.
  8. ELEVATION OF FLOOR FINISH SHALL BE IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  9. CONNECTIONS ARE IN ACCORDANCE WITH THE NOTES AND SPECIFICATIONS IN THIS DRAWING.
  10. UNDER FLOOR INSULATION TO BE PROVIDED FOR EXPOSED ROOF.

DO NOT WRITE APPROVAL ID OR TAG NO. (LETTER A) IN THIS DRAWING. APPROVAL ID OR TAG NO. SHALL BE SUBMITTED TO THE CLIENT.

APPROVAL

FOR APPROVAL

DATE: 2019.03.19 19:25:55 +05:30



NO.	DESCRIPTION	DATE
1.	PE-10-412-503-4020 TIS OF CONDENSER & CHILLED WATER PUMP.	
2.	PE-10-412-503-4019 TIS & CO. OF AIR HANDLING UNIT.	
3.	PE-10-412-503-4018 TIS & CO. OF COOLING TOWER.	
4.	PE-10-412-100-0009-0008 ELECTRICAL EQUIPMENT LAYOUT IN ESP CONTROL ROOM.	

NO.	DESCRIPTION	DATE
1.	PE-10-412-100-0001 ELECTRICAL EQUIPMENT LAYOUT IN ESP CONTROL ROOM.	




NO.	DESCRIPTION	DATE
1.	PE-10-412-100-0001 ELECTRICAL EQUIPMENT LAYOUT IN ESP CONTROL ROOM.	





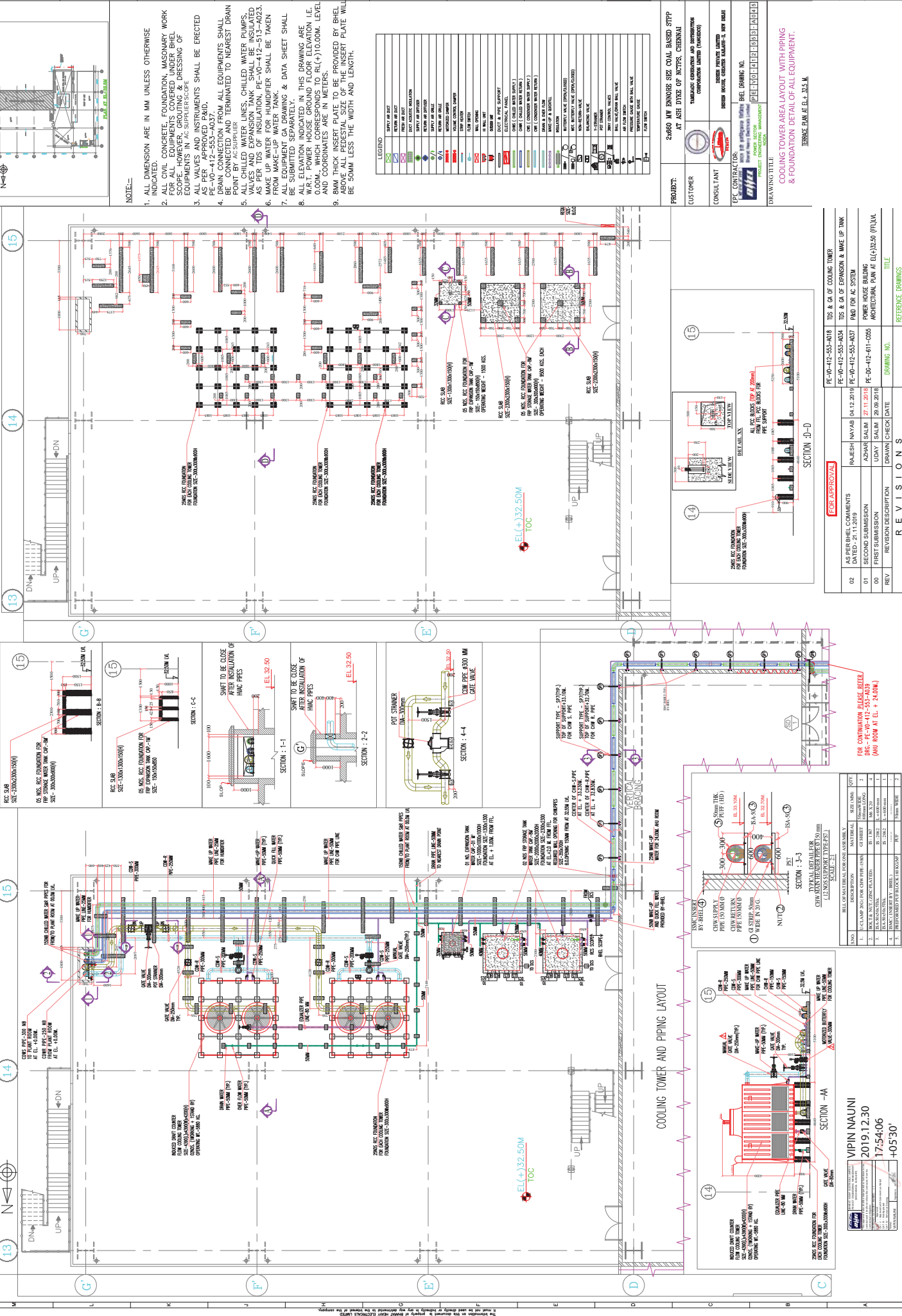
	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
<input checked="" type="checkbox"/> CAT I - Approved <input type="checkbox"/> CAT II - Approved with Comments as Noted <input type="checkbox"/> CAT III - Not Approved <input type="checkbox"/> CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
Document is reviewed  
by BHEL and found in  
order. Submitted for  
customer approval.  
2019.12.30 17:55:49  
+05'30'

Date	Rev	Description of Revision	ALT	CHD	APPD
<b>PROJECT</b>		<b>2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI</b>			
	<b>CUSTOMER</b>  <b>TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)</b>				
	<b>CONSULTANT</b>  <b>DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI</b>				
	<b>EPC CONTRACTOR</b>  <b>BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301</b>				

STATUS	CONTRACT	DOC. NO: PE-V0-410-553-A045	Rev: 02
PACKAGE		AIR CONDITIONING SYSTEM	
TITLE		AC PLANT ROOM LAYOUT & COOLING TOWER AREA LAYOUT WITH COMPLETE WITH PIPING & FOUNDATION DETAIL OF ALL EQUIPMENT.	





- NOTE:-**
1. ALL DIMENSION ARE IN MM UNLESS OTHERWISE INDICATED.
  2. ALL CIVIL CONCRETE, FOUNDATION, MASONRY WORK FOR ALL EQUIPMENTS COVERED UNDER BHEL CONTRACT SHALL BE PROVIDED BY SUPPLIER.
  3. ALL VALVES AND INSTRUMENTS SHALL BE ERCTED AS PER APPROVED P&ID.
  4. PE-V0-412-553-0377 ON ALL EQUIPMENTS SHALL BE CONNECTED AND TERMINATED TO NEAREST DRAIN POINT BY AS SUPPLIER.
  5. ALL CHILLED WATER LINES, CHILLED WATER PUMPS, CONDENSER WATER PUMPS, CONDENSER WATER TANKS AS PER TDG OF INSULATION, PE-V0-412-513-A023.
  6. MAKE UP WATER FOR HUMIDIFIER SHALL BE TAKEN FROM MAKE-UP WATER TANK.
  7. ALL EQUIPMENT CA DRAWING & DATA SHEET SHALL BE PROVIDED TO SUPPLIER.
  8. ALL ELEVATION INDICATED IN THIS DRAWING ARE W.R.T. POWER HOUSE GROUND FLOOR ELEVATION I.E. 0.00M, WHICH CORRESPONDS TO RL(+10.00M. LEVEL AND COORDINATES ARE IN METERS.
  9. 8MM THICK INSERT PLATE TO BE PROVIDED BY BHEL FOR ALL EQUIPMENTS UNDER BHEL CONTRACT. INSERT PLATE BE 50MM LESS THE WIDTH AND LENGTH.

**LEGEND**

SHIELD	PIPE	VALVE	FLANGE	WELD	INSULATION	PAINT	MARKING	GROUNDING	WATER TIGHTNESS
...	...	...	...	...	...	...	...	...	...

**PROJECT:** 2460 MW RANIBES SIZ. COAL BASED STPP AT ASH DYKE OF NCTCS, CHENNAI

**CUSTOMER:** TAMILNADU ELECTRICITY GENERATION CORPORATION LIMITED (TANGEDCO)

**CONSULTANT:** M/S. SRI SRI ENGINEERING CONSULTANTS

**DESIGNER:** M/S. SRI SRI ENGINEERING CONSULTANTS

**DATE:** 2019.12.30

**DRAWING TITLE:** COOLING TOWER AREA LAYOUT WITH PIPING & FOUNDATION DETAIL OF ALL EQUIPMENT.

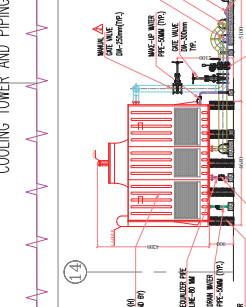
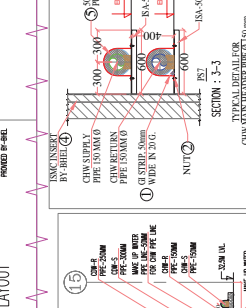
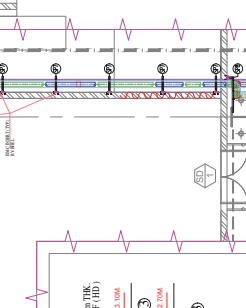
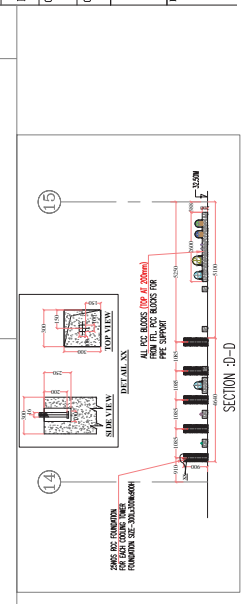
**SCALE:** AS SHOWN

**REVISIONS**

REV	REVISION DESCRIPTION	DRAWN/CHECKED	DATE
02	AS PER BHEL COMMENTS DATED: 20.11.2019	RAJESH MAYAL	04.12.2019
01	SECOND SUBMISSION	AZAHAR SALLAM	27.11.2019
00	FIRST SUBMISSION	LUDAY SALLAM	20.09.2019

**FOR APPROVAL**

NO.	DESIGNER'S SIGNATURES	DATE	NO.	DESIGNER'S SIGNATURES	DATE
02	RAJESH MAYAL	04.12.2019	02	...	...
01	AZAHAR SALLAM	27.11.2019	01	...	...
00	LUDAY SALLAM	20.09.2019	00	...	...

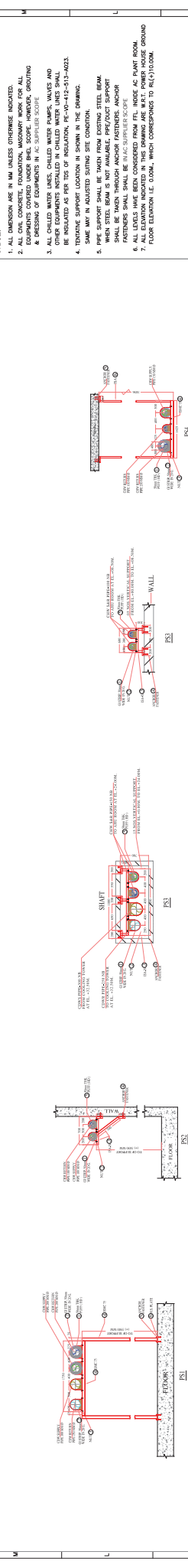


**BILL OF MATERIALS FOR CHILLED WATER PIPE ASSEMBLY**

NO.	DESCRIPTION	MATERIAL	SIZE (MM)	QTY
1	CLAMP FOR COND. WTR. PIPE	MS-304	150x150x10	2
2	INSULATION FOR COND. WTR. PIPE	MS-304	100	1
3	INSULATION FOR COND. WTR. PIPE	MS-304	100	1
4	INSULATION FOR COND. WTR. PIPE	MS-304	100	1
5	INSULATION FOR COND. WTR. PIPE	MS-304	100	1

**VIPIN NAUNI**  
 2019.12.30  
 17:54:06  
 +05'30'

**FOR CONTINUATION PLEASE REFER:**  
 (A)U ROOM AT EL. + 24.00M



**NOTE:**

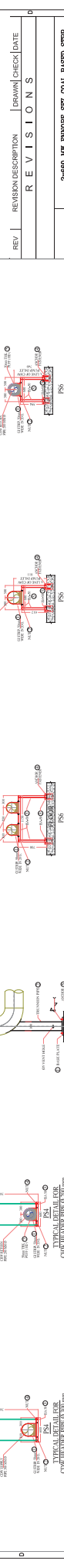
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE INDICATED.
2. ALL CIVIL CONCRETE, FOUNDATION, MASONRY WORK FOR ALL EQUIPMENTS COVERED UNDER BREL SCOPE, HOWEVER, GRouting & Dressing of Equipments in AC SUPPORTS SCOPE.
3. ALL EQUIPMENTS COVERED UNDER BREL SCOPE, HOWEVER, GRouting & Dressing of Equipments in AC SUPPORTS SCOPE AND OTHER EQUIPMENTS INSTALLED IN CHILLED WATER LINES SHALL BE INSULATED AS PER ITS OF INSULATION, PE-10-412-513-4022.
4. TENTATIVE SUPPORT LOCATION IN SHOWN IN THE DRAWING. SAME MAY IN ADJUSTED DURING SITE CONDITION.
5. WHEN STEEL BEAM IS NOT AVAILABLE PIPE/DUCT SUPPORT SHALL BE TAKEN THROUGH ANCHOR FASTENERS, ANCHOR FASTENERS SHALL BE IN AC SUPPLIER SCOPE.
6. ALL ELEVATION INDICATED IN THIS DRAWING ARE TAKE POWER HOUSE GROUND FLOOR ELEVATION I.E. 0.00M, WHICH CORRESPONDS TO RL(+10.00M).

**VIPIN NAUNI**  
2019.12.30  
17:54:53  
+05'30'

SNO	DESCRIPTION	MATERIAL	SIZE (MM)	QTY
1	CLAMP 200 (FOR CWP PIPES)	GI SHEET	200x100x6	2
2	ROCK NUT / ZINC PLATED	IS 1702	20x10x10	4
3	WASHERS	IS 1702	20x10x10	4
4	ANCHOR FASTENERS	CS	M12 X 115	4
5	PREFORMED FIBRE BLOCK (FOR CWP)	PEF	200x100x6	2
6	ANCHOR FASTENERS	CS	M12 X 115	2



SNO	DESCRIPTION	MATERIAL	SIZE (MM)	QTY
1	CLAMP 200 (FOR CWP PIPES)	GI SHEET	200x100x6	2
2	ROCK NUT / ZINC PLATED	IS 1702	20x10x10	4
3	WASHERS	IS 1702	20x10x10	4
4	ANCHOR FASTENERS	CS	M12 X 115	4
5	PREFORMED FIBRE BLOCK (FOR CWP)	PEF	200x100x6	2
6	ANCHOR FASTENERS	CS	M12 X 115	2



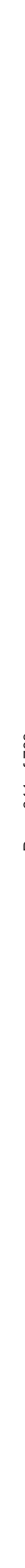
SNO	DESCRIPTION	MATERIAL	SIZE (MM)	QTY
1	CLAMP 200 (FOR CWP PIPES)	GI SHEET	200x100x6	2
2	ROCK NUT / ZINC PLATED	IS 1702	20x10x10	4
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SNO	DESCRIPTION	MATERIAL	SIZE (MM)	QTY
1	CLAMP 200 (FOR CWP PIPES)	GI SHEET	200x100x6	2
2	ROCK NUT / ZINC PLATED	IS 1702	20x10x10	4
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SNO	DESCRIPTION	MATERIAL	SIZE (MM)	QTY
1	CLAMP 200 (FOR CWP PIPES)	GI SHEET	200x100x6	2
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3	WASHERS	IS 1702	20x10x10	4
4	ANCHOR FASTENERS	CS	M12 X 115	4
5	PREFORMED FIBRE BLOCK (FOR CWP)	PEF	200x100x6	2
6	ANCHOR FASTENERS	CS	M12 X 115	2



FOR PIPING LAYOUT PLEASE REFER AC PLANT ROOM  
BREL-PE-10-412-508-00002 (04-01-2019)

	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARED = I	
CAT I - Approved CAT II - Approved with Comments as Noted CAT III - Not Approved CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

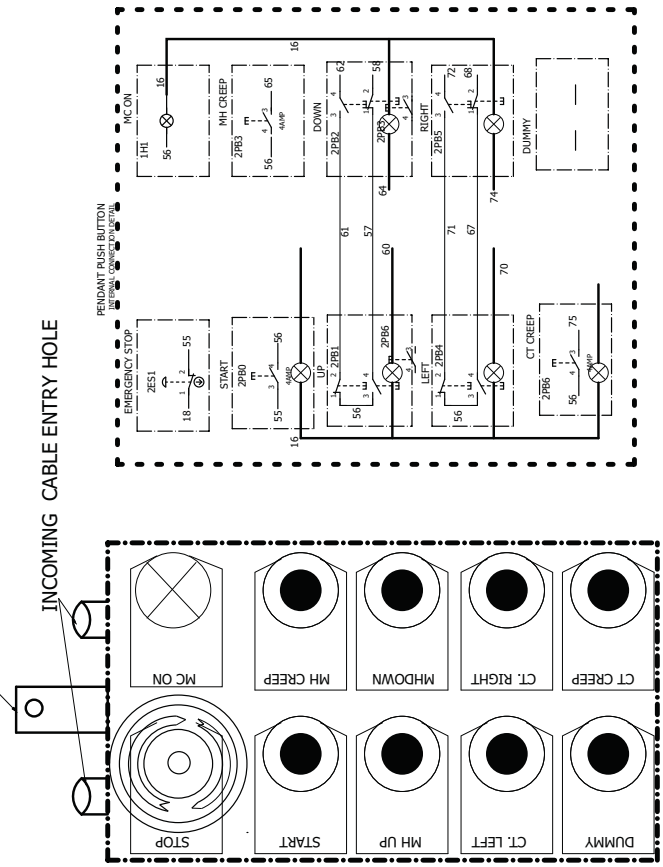
VIPIN NAUNI  
Reviewed by BHEL and  
found in order. Submitted  
for TANGEDCO / Desein  
Approval.  
2019.06.24 14:35:44  
+05'30'

PROJECT		2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI	
		CUSTOMER  TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)	
		CONSULTANT  DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI	
		EPC CONTRACTOR  BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A. PLOT NO. 25. NOIDA-201301	
STATUS	CONTRACT	DOC. NO: PE-V0-412-553-A048	Rev: 00
PACKAGE		AIR CONDITIONING SYSTEM	
TITLE		TDS OF LIFTING EQUIPMENT FOR AC SYSTEM	





SUPPORT WIRE PVC COATED STEEL WIRE ROPE MINIMUM 2 MM.  
SUPPORT WIRE HOLE



**PENDANT DETAIL : -**

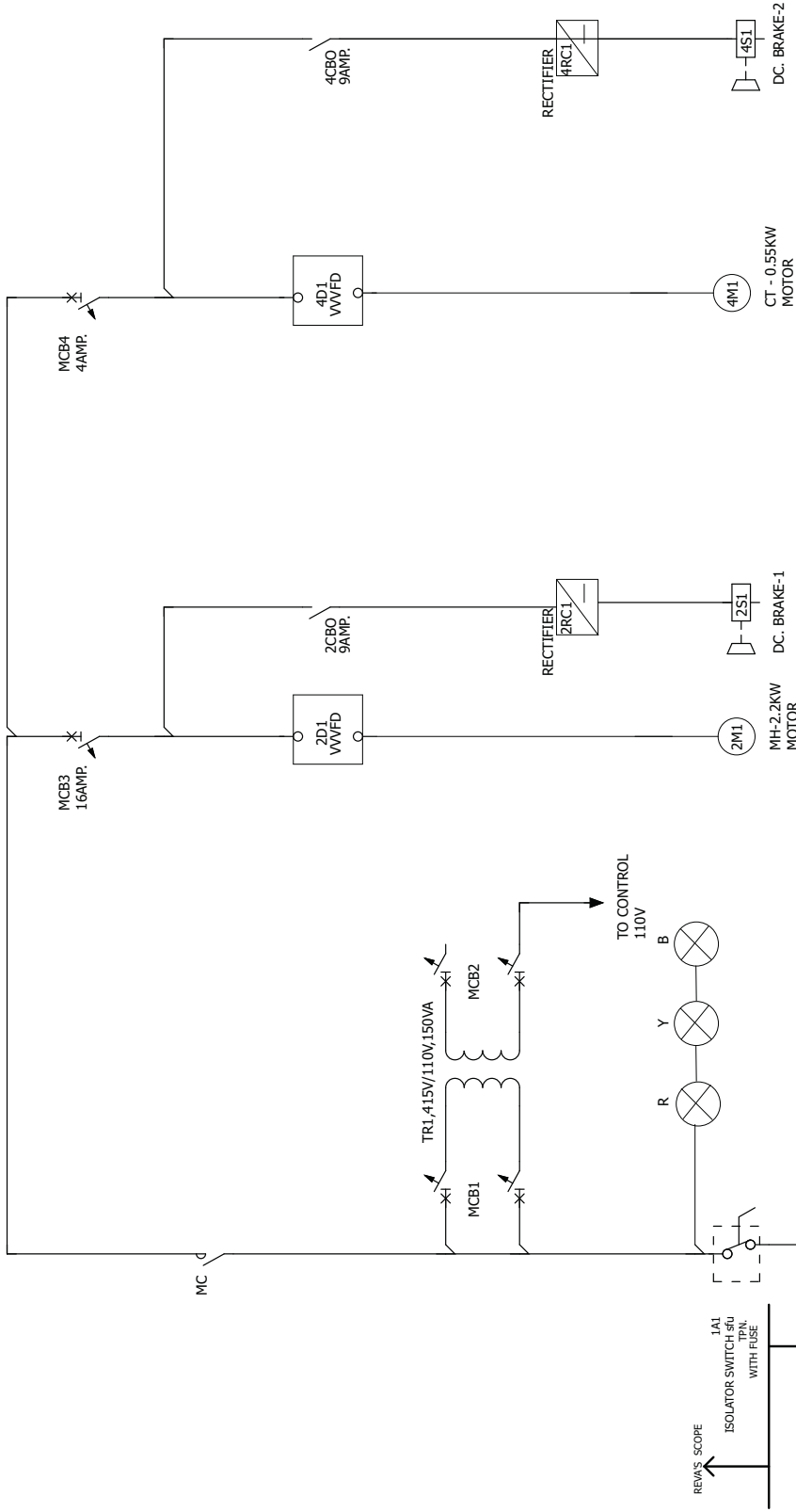
1. DEGREE OF PROTECTION IP:55
2. PAINT SHADE : 7035
3. PENDANT ENCLOSURE: - MINIMUM 2MM. AND PENDANT MATERIAL OF M.S CRCA SHEET / DIE CAST ALUMINIUM
4. ALL PUSH BUTTON SHALL BE SPRING RETURN AND GLOW TYPE
5. STOP - EMERGENCY SWITCH MUSHROOM HEAD LOCKABLE TYPE
6. MC ON - INDICATING LIGHT ( HEALTHY INDICATING )
7. START - START PUSH BUTTON SPRING TYPE
8. MH UP - MH UP PUSH BUTTON SPRING TYPE
9. MH DOWN - MH DOWN PUSH BUTTON SPRING TYPE
10. MH CREEP - MH CREEP PUSH BUTTON SPRING TYPE
11. CT LEFT - CT LEFT PUSH BUTTON SPRING TYPE
12. CT RIGHT - CT RIGHT PUSH BUTTON SPRING TYPE
13. CT CREEP - MH CREEP PUSH BUTTON SPRING TYPE
14. SUPPORT WIRE SHALL BE PVC COATED STEEL WIRE ROPE MINIMUM 2 MM.
15. AMBIENT TEM. ( -25 TO 60 DEG. )
16. CBLE ENTRY SUITABLE FOR 1.5 X 16.
17. PENDANT CABLE SHALL BE MULTICORE EPR FLEXIBLE.

PROJECT : -	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI
	OWNER
	CONSULTANT
	EPC CONTRACTOR:-
TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED	
DESEIN PRIVATE LIMITED, DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI	
BHEL-PS PEM, NOIDA	

JOB NO.	423
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	
REV.	DATE   ALTD   CHD   APPD

SUB-CONTRACTOR	REVA INDUSTRIES LTD FARIDABAD-121004
TITLE	SCHEMATIC CIRCUIT DIAGRAM FOR ELECTRIC HOIST CAP. 2T, 3T, 5TON
DEPT.	SCALE: NTS
SIGN	DRAWING NO.
DATE	PE-V0-412-553-A048
	SHEET : - 2 OF 8
	REV/R3

# SINGLE LINE DIAGRAM



MH-2.2KW MOTOR

CT - 0.55KW MOTOR

Supply  
INCOMING POWER SUPPLY  
(415V±10%,3PH,50HZ±5%)

**LOCATION :- AND INCOMING CABLE SIZE**  
**1. INSTALLATION AREA ( 3cX25sqmm Al, XLPE, armoured )**

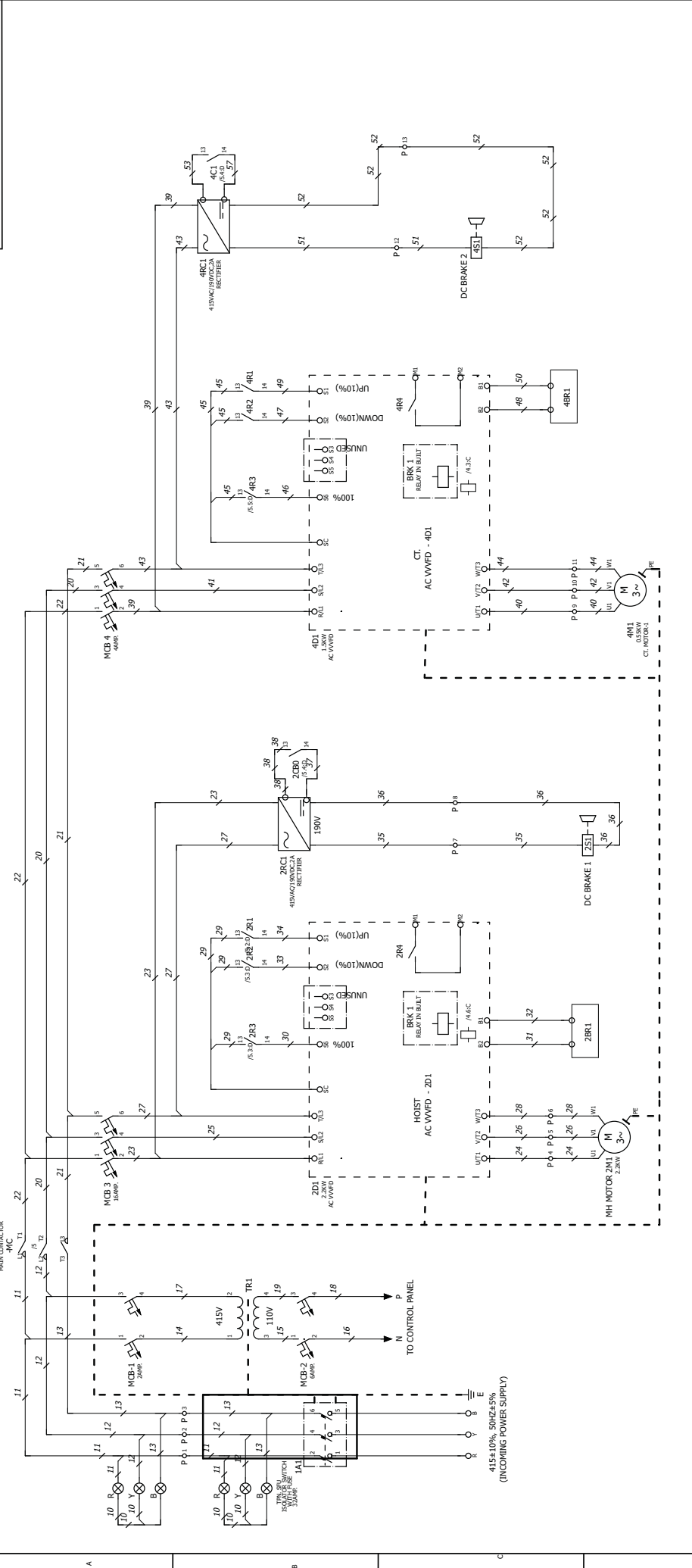
PROJECT :-	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI		
	OWNER	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED	
	CONSULTANT	DESEIN PRIVATE LIMITED, DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI	
	EPC CONTRACTOR:-	BHEL-PS PEM, NOIDA	

JOB NO.	423
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	
REV.	DATE   ALTD   CHD   APPD

SUB-CONTRACTOR			
TITLE		SCHEMATIC CIRCUIT DIAGRAM FOR ELECTRIC HOIST CAP. 2T, 3T, 5TON	
DEPT.	SCALE: NTS	DRAWING NO.	
SIGN		PE-V0-412-553-A048	
DATE		SHEET :- 3	OF 8
		REV/R3	

REVA INDUSTRIES LTD  
FARIDABAD-121004

DWG-5440.1

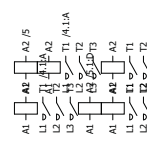
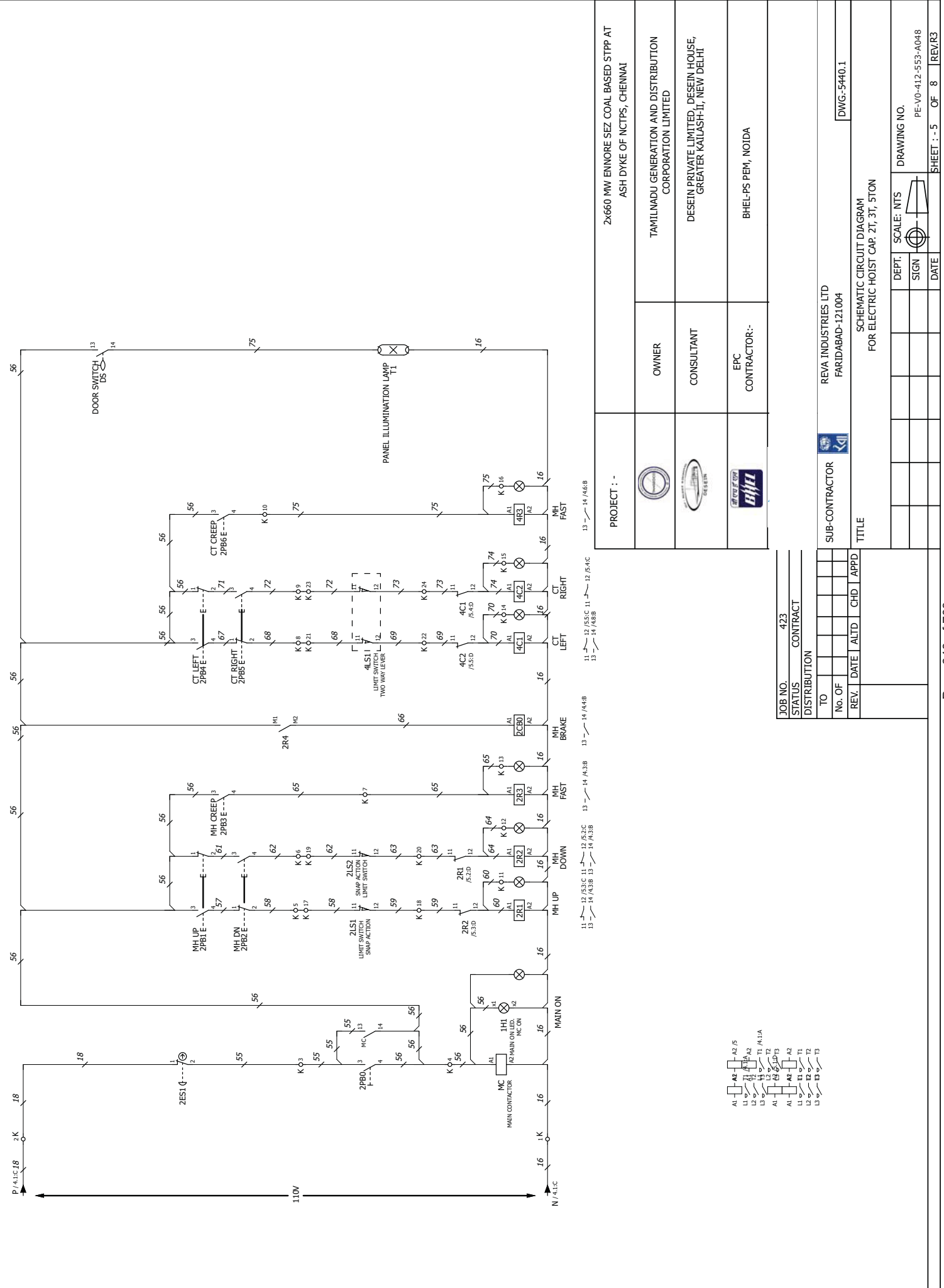


**LOCATION :- AND INCOMING CABLE SIZE**  
**1. INSTALLATION AREA ( 3cX25sqmm Al, XLPE, armoured )**

PROJECT :-	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI
OWNER	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED
CONSULTANT	DESEIN PRIVATE LIMITED, DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI
EPC CONTRACTOR:-	BHEL-PS PEM, NOIDA

JOB NO.	423
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	
REV.	DATE   ALTD   CHD   APPD

SUB-CONTRACTOR		REVA INDUSTRIES LTD FARIDABAD-121004
TITLE		SCHEMATIC CIRCUIT DIAGRAM FOR ELECTRIC HOIST CAP. 2T, 3T, 5TON
DEPT.	SCALE: NTS	DRAWING NO.
SIGN		PE-V0-412-553-A048
DATE		SHEET :- 4 OF 8
		REV/R3



PROJECT :-	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI
OWNER	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED
CONSULTANT	DESEIN PRIVATE LIMITED, DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI
EPC CONTRACTOR:-	BHEL-PS PEM, NOIDA

JOB NO.	423
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	
REV.	DATE   ALTD   CHD   APPD

SUB-CONTRACTOR		REVA INDUSTRIES LTD FARIDABAD-121004
TITLE		SCHEMATIC CIRCUIT DIAGRAM FOR ELECTRIC HOIST CAP. 2T, 3T, 5TON
DEPT.		SCALE: NTS
SIGN		DRAWING NO.
DATE		PE-V0-412-553-A048
SHEET :- 5		OF 8
REV./R3		

ELECTRICAL BILL OF MATERIAL

MOTORS

CABLE(CU)SIZE

CAPACITY: 3T CONT NO: 5440.1

MH: 2.2KW  
CT: 0.55KW

MH: 3CX2.5SQMM  
CT: 3CX2.5SQMM

CONTROL: 1CX1.5SQMM  
PENDENT: 12CX1.5SQMM

LT: NA

ISOLATING SWITCH TO DSL :- 4C X 2.5SQMM.

S.NO	ITEM CODE	DESCRIPTION	RATING	QTY	MAKE
1	1A1	AIR BREAK TYPE TPN ISOLATOR SWITCH ( SFU )	32AMP	1	
2	2ES1	EMERGENCY SWITCH	4AMP	1	
3	1H1	INDICATING LIGHT	2.6W/110V	1	
4	MCB-3	MCB TP FOR MH	16AMP.	1	
5	MCB-4	MCB TP FOR CT	4AMP.	1	
6	MCB-1	MCB DP FOR PRI OF XMER	2AMP	1	
7	MCB-2	MCB DP FOR SEC OF XMER	6AMP.	1	
8	MC	AIR BREAK TYPE TP MAIN CONTACTOR	18AMP/110V	1	
9	2D1	DRIVE FOR MH ( MODEL - A1000 )	2.2KW	1	
10	4D1	DRIVE FOR CT ( MODEL - A1000 )	1.5KW	1	
11	2LS1, 2LS2	LIMIT SWITCH SNAP ACTION SELF RESET TYPE	3 AMP	2	
12	4LS1,	LIMIT SWITCH TWO WAY LEVER TYPE SELF RESET TYPE	3 AMP	1	
13	2PB0-6	PUSH BUTTON GLOW TYPE	4 AMP	7	
14	TR1	CONTROL TRANSFORMER	415V/110V/150VA	1	
15	2R1-3, 4R1-4	RELAY 3C0/11 PIN	110V	6	
16	2CB0,4CB0	AIR BREAK TYPE TP CONTACTOR FOR BRAKE	9 AMP 110V	2	
17	2BR1	BRAKING RESISTANCE	200 OHM -660W	1	
18	4BR1	BRAKING RESISTANCE	560 OHM - 210W	1	
19	PENDENT	PUSH BUTTON PENDENT(PBS)	10 WAY	1	
20	2RC1,4RC1,	RECTIFIER 415VAC/190VDC	2A	2	
21	R,Y,B	INDICATING LIGHT	230V. AC.	6	
22	T1	PANEL ILLUMINATION LAMP	MINIMUM 9W.	1	
23	DS	DOOR SWITCH	MINIMUM 5AMP	1	

NOTE :- ALL MAKE SHALL BE QAP APPROVED VENDOR LIST.

PROJECT :-	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI
OWNER	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED
CONSULTANT	DESEIN PRIVATE LIMITED, DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI
EPC CONTRACTOR:-	BHEL-PS PEM, NOIDA

JOB NO.	423
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	
REV.	DATE   ALTD   CHD   APPD

NOTE :- 1. ALL CONTACTORS AC 4 DUTY  
2.ALL CABLE SHALL BE 1.1KV GRADE, FLAME RETARDANT LOW SMOKE  
( FRLS ) TYPE: XLPE INSULATED / PVC INSULATED

SUB-CONTRACTOR  
REVA INDUSTRIES LTD  
FARIDABAD-121004

DWG-5440.1

TITLE  
SCHEMATIC CIRCUIT DIAGRAM  
FOR ELECTRIC HOIST CAP. 3TON

DEPT.	SCALE: NTS	DRAWING NO.
SIGN		PE-V0-412-553-A048
DATE		SHEET :- 7 OF 8 REV/R3

# Terminal diagram

F13\_003 - Copy

Strip  
= +-K

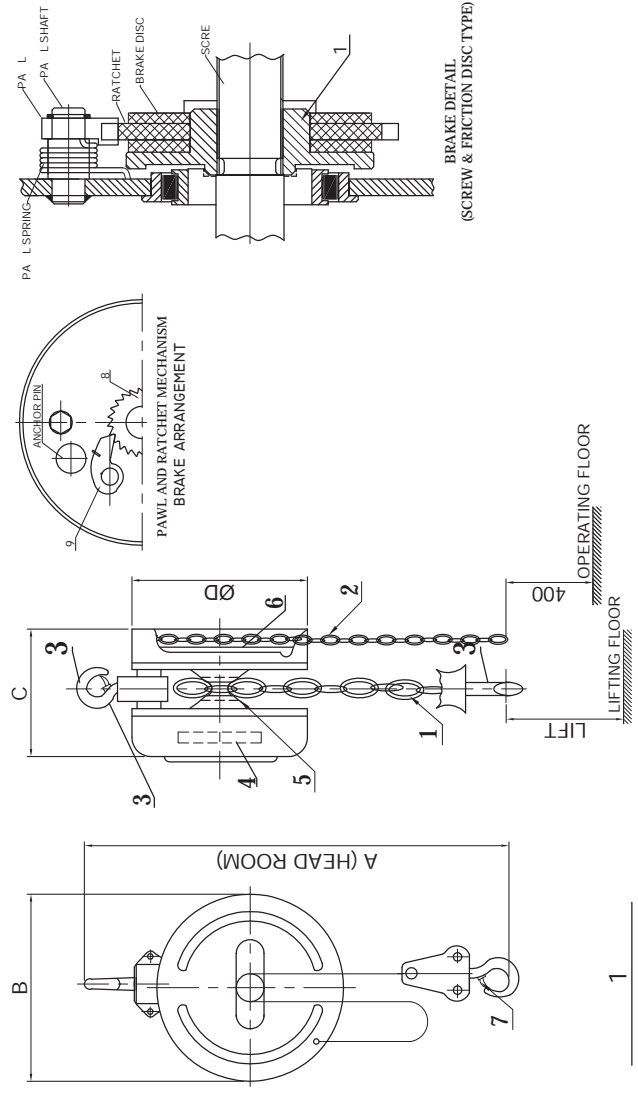
Internal targets

External targets

Target designation	Wire No	Jumper	Target Designation	Jumper	Wire No	Placement
-MC:2	16	1	-MCB-2:2	.	16	/4.1B
-2ES1:1	18	2	-MCB-2:4	.	18	/4.1B
-2PB0:3	55	3	-2ES1:2	.	55	/5.1B
-MC:A1	56	4	-2PB0:4	.	56	/5.1C
			-2PB0:14		56	/5.1C
			-2PB2:2	.	58	/5.2B
			-2PB2:4	.	62	/5.3B
-2R3:A1	65	7	-2PB3:4	.	65	/5.3B
			-2PB5:2	.	68	/5.4B
			-2PB5:4	.	72	/5.5B
-4R3:A1	75	10	-2PB6:4	.	75	/5.5B
-2R1		11	-2R1:A1	.	60	/5.2D
-2R2		12	-2R2:A1	.	64	/5.3D
-2R3		13	-2R3:A1	.	65	/5.3D
-4C1		14	-4C1:A1	.	70	/5.4D
-4C2		15	-4C2:A1	.	74	/5.5D
-4R3		16	-4R3:A1	.	75	/5.5D
-2LS1:11	58	17		.		
-2R2:11	59	18	-2LS1:12	.	59	/5.2C
-2LS2:11	62	19		.		
-2R1:11	63	20	-2LS2:12	.	63	/5.3C
-4LS1:11	68	21		.		
-4C2:11	69	22	-4LS1:12	.	69	/5.4C
11	72	23		.		
-4C1:11	73	24	12	.	73	/5.5C

PROJECT :-	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI	
	OWNER	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED
	CONSULTANT	DESEIN PRIVATE LIMITED, DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI
	EPC CONTRACTOR:-	BHEL-PS PEM, NOIDA
JOB NO: 423 STATUS: CONTRACT DISTRIBUTION		
TO: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
No. OF: <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>		
REV. DATE   ALTD   CHD   APPD		
SUB-CONTRACTOR: REVA INDUSTRIES LTD FARIDABAD-121004		
TITLE: SCHEMATIC CIRCUIT DIAGRAM FOR ELECTRIC HOIST CAP. 2T, 3T, 5TON		
DWG-5440.1		
DEPT. SIGN	SCALE: NTS	DRAWING NO.
DATE		PE-V0-412-553-A048
		SHEET :- 8 OF 8 REV/R3





Sl.No.	Size of Chain		CAP. (Ton.)	LIFT (Mtr.)	MANUAL HOIST WEIGHT (KG)	QTY. (Nos.)
	Cap. (T)	Size (mm)				
1	1.0	8	1	6	27	7

Sl. No.	REVA EQUIPMENTS No.	CAP. (TON)	A (HEAD ROOM)	B	C	ØD	EFFORT IN KG	VELOCITY		NO. OF FALLS
								C.P.B.	RATIO	
1	5440.2	1.0	390	170	150	170	25	1:60	1	

1						6216 1 2
2		3				242 1 1 7 2 3
3			1 1			1556 2 5
4		62	1			
5		23 45	1			1 3 1
6			1			513 1 4
7			1 1			
1			3 3 1			3 32 5
			3 4 1			3 32 5
			41 1			

- 1
- 2
- 3
- 4
- 5
- 6
- 7

±5% DURING ACTUAL CALCULATION.

**Reva Industries Ltd.**  
-121004

DATE: 23.05.19  
DRAWN: MANGAL  
CHECKED: AR IND  
APPD: ROHIT

**TITLE:** GA DRAWING OF CHAIN PULLEY BLOCK

**CLIENT:** M/S TANGEDCO.

**PROJECTION:**

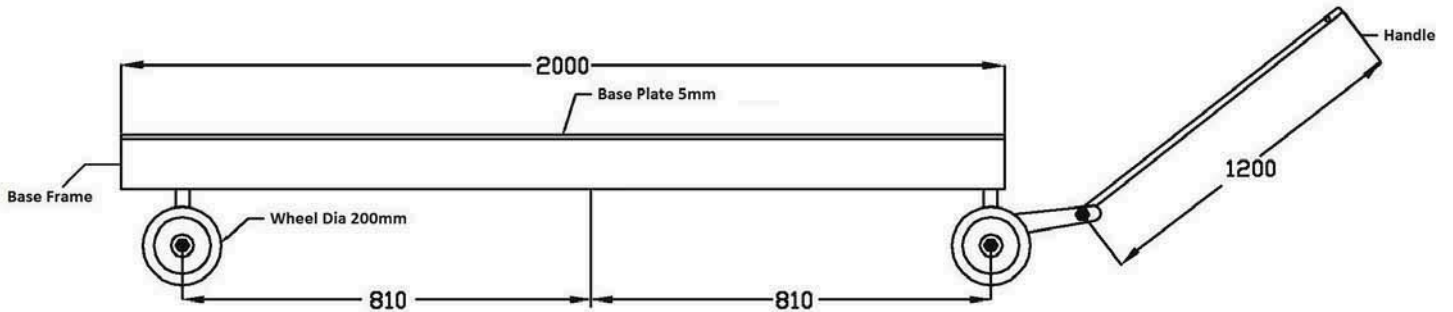
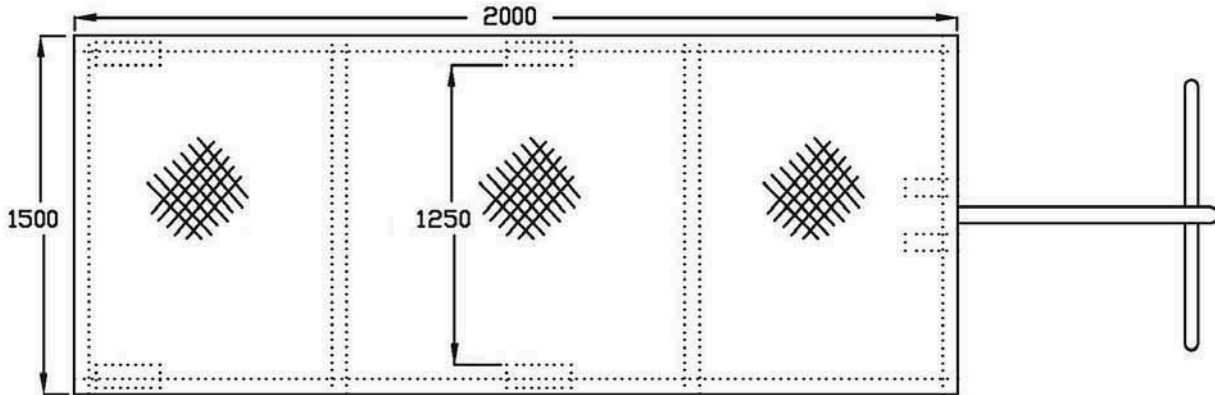
**DRG. NO.:** PE-V0-412-553-A048

**SHEET No:** 1 of 1 R0

REV	DESCRIPTION	DATE	DRAWN	CHECKED	APPD.
1	2nd SUBMISSION FOR APPROVAL	21.06.19	B.K.	B.K.	B.K.
0	1st SUBMISSION AS PER P.O. & HOIST SCHEDULE	23.05.19	B.K.	B.K.	B.K.

**Tractel Tirfor India Pvt. Ltd.**  
Kalyani, Nadia, W.B. -741235 DRG NO.: 05-005-4772, Rev. 01

MANUALLY OPERATED, PLATFORM TROLLEY OF 1 TON CAPACITY  
WITH BASE AREA 2M X 1.5M



DRG.	CHD	APPD	DATE	DOCUMENT NO.	
SALIM	SALIM	SALIM	12/02/19	PE-V0-412-553-A048	

PROJECT : 2X660 MW ENNORE TPS

CUSTOMER : TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED



CONSULTANT : DESEIN

EPC CONTRACTOR : BHARAT HEAVY ELECTRICAL LIMITED

**Manually Operated, Platform Trolley of 1.0 Ton capacity with Base Area 2m x 1.5m  
Wheel: 200 mm Dia, Tube: 40 mm Sq. Tube, Painting : Epoxy paint - 150 Mic.**



DOC MENT IS APPRO ED IDE TANGEDCO LETTER NO. CE/E/P1/SE/E/  
T&H(P)/EE-6/AEE/E/P/F.ENNORE SE DRG. APPL./D.72/19 DT. 30.04.2019

	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARED = I	
CAT I - Approved CAT II - Approved with Comments as Noted CAT III - Not Approved CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
Reviewed by BHEL and  
found in order. Submitted  
for TANGEDCO / Desein  
Approval.  
2019.03.02 11:48:48  
+05'30'

Date	Rev	Description of Revision	ALT	CHD	APPD	
PROJECT		2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI				
		<b>CUSTOMER</b>  TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)				
		<b>CONSULTANT</b>  DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI				
		<b>EPC CONTRACTOR</b>  BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301				
STATUS		CONTRACT			DOC. NO: PE-V0-412-553-A049	Rev: 00
PACKAGE		AIR CONDITIONING SYSTEM				
TITLE		TDS OF AIR CURTAIN FOR AC SYSTEM				

## TECHNICAL DATA SHEET OF AIR CURTAIN

S.No.		DESCRIPTION	SPECIFICATION			
<b>A</b>		<b>GENERAL</b>				
1	Item	Air Curtain	Air Curtain	Air Curtain	Air Curtain	Air Curtain
2	Make	SAM	SAM	SAM	SAM	SAM
3	Model No.	SCM33	SCM34	SCM36	SCM32	SCM32
4	Type	Non-Circulatory type	Non-Circulatory type	Non-Circulatory type	Non-Circulatory type	Non-Circulatory type
5	Overall dimension (WxDxH)	900 x 200 x 255	1200 x 200 x 255	1800 x 200 x 255	2000 x 200 x 255	2000 x 200 x 255
6	Quantity	As Per Air curtain Schedule				
7	Cabinet Material	Mild Steel sheet 18SWG (CRC Iron Sheet)	Mild Steel sheet 18SWG (CRC Iron Sheet)	Mild Steel sheet 18SWG (CRC Iron Sheet)	Mild Steel sheet 18SWG (CRC Iron Sheet)	Mild Steel sheet 18SWG (CRC Iron Sheet)
8	Product Image (Indicative)					
9	Paint	Powder Coated - White	Powder Coated - White	Powder Coated - White	Powder Coated - White	Powder Coated - White
10	Nozzle Width	Full width of Air curtain	Full width of Air curtain	Full width of Air curtain	Full width of Air curtain	Full width of Air curtain
11	Adjustable Nozzle angle	Static Nozzle	Static Nozzle	Static Nozzle	Static Nozzle	Static Nozzle
12	Air Suction	From top surface & side wall of Air curtain	From top surface & side wall of Air curtain	From top surface & side wall of Air curtain	From top surface & side wall of Air curtain	From top surface & side wall of Air curtain
13	Air discharge	From Bottom	From Bottom	From Bottom	From Bottom	From Bottom
14	Number of blowers	2 blower per piece	4 blower per piece	5 blower per piece	6 blower per piece	6 blower per piece
15	Material of blower	PVC balanced	PVC balanced	PVC balanced	PVC balanced	PVC balanced
16	Type of blower	Centrifugal forward curved blades, Double Inlet	Centrifugal forward curved blades, Double Inlet	Centrifugal forward curved blades, Double Inlet	Centrifugal forward curved blades, Double Inlet	Centrifugal forward curved blades, Double Inlet
17	No. of motors/Pcs	01 motor/Pc	02 motor/Pc	03 motor/Pc	03 motor/Pc	03 motor/Pc
18	Motor	1440 RPM 0.5 HP	1440 RPM 0.5 HP	1440 RPM 0.5 HP	1440 RPM 0.5 HP	1440 RPM 0.5 HP

**REVIEWED**

By VIPIN NAUNI at 11:46 am, Mar 02, 2019

## TECHNICAL DATA SHEET OF AIR CURTAIN

<b>REVIEWED</b> By VIPIN NAUNI at 11:46 am, Mar 02, 2019					
<b>S.No.</b>	<b>DESCRIPTION</b>	<b>SPECIFICATION</b>			
<b>A</b>	<b>GENERAL</b>	17-19 m/s at Nozzle.	17-19 m/s at Nozzle.	17-19 m/s at Nozzle.	17-19 m/s at Nozzle.
19	Air Velocity	17-19 m/s at Nozzle.	17-19 m/s at Nozzle.	17-19 m/s at Nozzle.	17-19 m/s at Nozzle.
20	Electric supply	220 +/- 10% v AC Single Phase 4Pole, Wire at end.	220 +/- 10% v AC Single Phase 4Pole, Wire at end.	220 +/- 10% v AC Single Phase 4Pole, Wire at end.	220 +/- 10% v AC Single Phase 4Pole, Wire at end.
21	Incoming Power supply	Single Power supply shall be provided upto each Air Curtain further internal distribution to multiple motors is provided.	Single Power supply shall be provided upto each Air Curtain further internal distribution to multiple motors is provided.	Single Power supply shall be provided upto each Air Curtain further internal distribution to multiple motors is provided.	Single Power supply shall be provided upto each Air Curtain further internal distribution to multiple motors is provided.
22	Installation	Horizontal Install.	Horizontal Install.	Horizontal Install.	Horizontal Install.
23	Suggested Air flow required for Air suction	150mm Free Space for Air Flow from Top & Sides	150mm Free Space for Air Flow from Top & Sides	150mm Free Space for Air Flow from Top & Sides	150mm Free Space for Air Flow from Top & Sides
24	Suggested space required for maintenance	800mm Free Space for Maint from Front of Air Curtain	800mm Free Space for Maint from Front of Air Curtain	800mm Free Space for Maint from Front of Air Curtain	800mm Free Space for Maint from Front of Air Curtain
25	Air Curtain Sensor at Door	Provided	Provided	Provided	Provided



SAM PRODUCTS Pvt Ltd

B 137, Sector - 6,

Noida 201301 UP

[samproducts@vsnl.com](mailto:samproducts@vsnl.com)

[samproducts1992@gmail.com](mailto:samproducts1992@gmail.com)

0120-4357039, 40, 9810065139

09AAKCS6327D1Z8

ISO 9001:2015



## AIR CURTAINS

Sr No	Item	Refer Page No
1	<b>Verticale Models of AIR CURTAINS</b>	<b>2</b>
2	<b>SCM Series (MOC - Mild Steel)</b>	<b>3</b>
3	<b>SCS Series (MOC - SS 202 Grade)</b>	<b>4</b>
4	<b>SCS3 Series (MOC - SS 304 Grade)</b>	<b>5</b>
5	<b>Photographs of AIR CURTAINS</b>	<b>6</b>
6	<b>SCA Series (MOC - Aluminium)</b>	<b>7</b>
7	<b>SCFP Series (Flame Proof Air Curtains)</b>	<b>8</b>
8	<b>Accessories/ Other Options</b>	<b>9</b>
9	<b>Horizontal Models of AIR CURTAINS</b>	<b>10</b>
10	<b>SCMH Series (MOC - Mild Steel)</b>	<b>11</b>
11	<b>SCSH Series (MOC - SS 202 Grade)</b>	<b>12</b>
12	<b>SCS3H Series (MOC - SS 304 Grade)</b>	<b>13</b>
13	<b>SCAH Series (MOC - Aluminium)</b>	<b>14</b>
14	<b>SC3PH Series (Three Phase Electrical Motors)</b>	<b>15</b>
15	<b>Air Curtain Installed Images</b>	<b>16</b>

## MODELS

Sr No	Series	Material Construction	Size Available	Finish
1	SCM1	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated
2	SCM2	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated
3	SCM3	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated
4	SCM4	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated
5	SCM5	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated

Sr No	Series	Material Construction	Size Available	Finish
1	SCS1	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
2	SCS2	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
3	SCS3	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
4	SCS4	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
5	SCS5	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.

Sr No	Series	Material Construction	Size Available	Finish
1	SCS31	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
2	SCS32	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
3	SCS33	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
4	SCS34	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
5	SCS35	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.

Sr No	Series	Material Construction	Size Available	Finish
1	SCA1	Aluminum Sheet	3', 1m, 3'6", 4', 5', 6'.	Plain Factory Finish.
2	SCA2	Aluminum Sheet	3', 1m, 3'6", 4', 5', 6'.	Plain Factory Finish.
3	SCA3	Aluminum Sheet	3', 1m, 3'6", 4', 5', 6'.	Plain Factory Finish.
4	SCA4	Aluminum Sheet	3', 1m, 3'6", 4', 5', 6'.	Plain Factory Finish.
5	SCA5	Aluminum Sheet	3', 1m, 3'6", 4', 5', 6'.	Plain Factory Finish.

Sr No	Series	Material Construction	Size Available	Finish
1	SCM1FP	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated
2	SCM5FP	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
3	SCS1FP	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
4	SCS35FP	Mild Steel Powder Coated	3', 1m, 3'6", 4', 5', 6'.	Powder Coated
5	SCS5FP	Stainless Steel Sheet 202	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.
6	SCS35FP	Stainless Steel Sheet 304	3', 1m, 3'6", 4', 5', 6'.	Hairline Factory Finish.

**SCM1 S = SAM PRODUCTS; C = COMMERCIAL; M = MILD STEEL SHEET; 1 = SERIES 1.**

**SCS1 S = SAM PRODUCTS; C = COMMERCIAL; S = STAINLESS STEEL SHEET 202; 1 = SERIES 1.**

**SCS31 S = SAM PRODUCTS; C = COMMERCIAL; S = STAINLESS STEEL; 3 = 304 GRADE; 1 = SERIES 1.**

**SCA1 S = SAM PRODUCTS; C = COMMERCIAL; A = ALUMINUM; 1 = SERIES 1.**

## MODEL SCM

SCM1      S = SAM PRODUCTS; C = COMMERCIAL; M = MILD STEEL SHEET; 1 = SERIES 1.

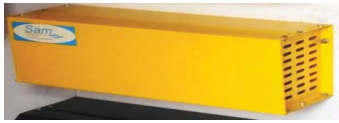
Series	Size of Air Curtain (Width) ft	Size of Air Curtain (Width) mm	Model Number	Front Face	Air Inlet	OD Height (mm)	OD Depth (mm)	Air Flow (m/s)	No. of Motors	Finish	Material of Construction	Motor Phase
SCM1	3'	915	SCM13	Slotted	Front/ Top/ Side	370	280	15 - 17	1	Powder Coated	Mild Steel	Single
SCM1	3'3"	1000	SCM11	Slotted	Front/ Top/ Side	370	280	15 - 17	1	Powder Coated	Mild Steel	Single
SCM1	4'	1220	SCM14	Slotted	Front/ Top/ Side	370	280	15 - 17	1	Powder Coated	Mild Steel	Single
SCM1	5'	1525	SCM15	Slotted	Front/ Top/ Side	370	280	15 - 17	2	Powder Coated	Mild Steel	Single
SCM1	6'	1830	SCM16	Slotted	Front/ Top/ Side	370	280	15 - 17	2	Powder Coated	Mild Steel	Single
SCM1	6'6"	2000	SCM12	Slotted	Front/ Top/ Side	370	280	15 - 17	2	Powder Coated	Mild Steel	Single

SCM2	3'	915	SCM23	Top/ Side	Plain Curved Sheet	370	280	15 - 17	1	Powder Coated	Mild Steel	Single
SCM2	3'3"	1000	SCM21	Top/ Side	Plain Curved Sheet	370	280	15 - 17	1	Powder Coated	Mild Steel	Single
SCM2	4'	1220	SCM24	Top/ Side	Plain Curved Sheet	370	280	15 - 17	1	Powder Coated	Mild Steel	Single
SCM2	5'	1525	SCM25	Top/ Side	Plain Curved Sheet	370	280	15 - 17	2	Powder Coated	Mild Steel	Single
SCM2	6'	1830	SCM26	Top/ Side	Plain Curved Sheet	370	280	15 - 17	2	Powder Coated	Mild Steel	Single
SCM2	6'6"	2000	SCM22	Top/ Side	Plain Curved Sheet	370	280	15 - 17	2	Powder Coated	Mild Steel	Single

SCM3	3'	915	SCM33	Side	Plain Slope Sheet	255	200	19 - 21	2	Powder Coated	Mild Steel	Single
SCM3	3'3"	1000	SCM31	Side	Plain Slope Sheet	255	200	19 - 21	2	Powder Coated	Mild Steel	Single
SCM3	4'	1220	SCM34	Side	Plain Slope Sheet	255	200	19 - 21	2	Powder Coated	Mild Steel	Single
SCM3	5'	1525	SCM35	Side	Plain Slope Sheet	255	200	19 - 21	3	Powder Coated	Mild Steel	Single
SCM3	6'	1830	SCM36	Side	Plain Slope Sheet	255	200	19 - 21	3	Powder Coated	Mild Steel	Single
SCM3	6'6"	2000	SCM32	Side	Plain Slope Sheet	255	200	19 - 21	3	Powder Coated	Mild Steel	Single

SCM4	3'	915	SCM43	Side	Plain Slope Sheet	255	200	22 - 24	3	Powder Coated	Mild Steel	Single
SCM4	3'3"	1000	SCM41	Side	Plain Slope Sheet	255	200	22 - 24	3	Powder Coated	Mild Steel	Single
SCM4	4'	1220	SCM44	Side	Plain Slope Sheet	255	200	22 - 24	3	Powder Coated	Mild Steel	Single
SCM4	5'	1525	SCM45	Side	Plain Slope Sheet	255	200	22 - 24	4	Powder Coated	Mild Steel	Single
SCM4	6'	1830	SCM46	Side	Plain Slope Sheet	255	200	22 - 24	4	Powder Coated	Mild Steel	Single
SCM4	6'6"	2000	SCM42	Side	Plain Slope Sheet	255	200	22 - 24	5	Powder Coated	Mild Steel	Single

SCM5	3'	915	SCM53	Top/ Side	Plain Slope Sheet	415	330	24 - 26	1	Powder Coated	Mild Steel	Single
SCM5	3'3"	1000	SCM51	Top/ Side	Plain Slope Sheet	415	330	24 - 26	1	Powder Coated	Mild Steel	Single
SCM5	4'	1220	SCM54	Top/ Side	Plain Slope Sheet	415	330	24 - 26	2	Powder Coated	Mild Steel	Single
SCM5	5'	1525	SCM55	Top/ Side	Plain Slope Sheet	415	330	24 - 26	3	Powder Coated	Mild Steel	Single
SCM5	6'	1830	SCM56	Top/ Side	Plain Slope Sheet	415	330	24 - 26	3	Powder Coated	Mild Steel	Single
SCM5	6'6"	2000	SCM52	Top/ Side	Plain Slope Sheet	415	330	24 - 26	4	Powder Coated	Mild Steel	Single



SCM34



SCM31



SCM24



SCM53



SCS353



SCM3



SCM2





NEW MODEL






SCS1




	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
<input checked="" type="checkbox"/> CAT I - Approved <input type="checkbox"/> CAT II - Approved with Comments as Noted <input type="checkbox"/> CAT III - Not Approved <input type="checkbox"/> CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
Inspection Category  
CAT-III. QAP Reviewed  
by BHEL and approved.  
2019.06.07 19:07:06  
+05'30'

PROJECT	2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI
	CUSTOMER  TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)
	CONSULTANT  DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI
	EPC CONTRACTOR  BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301

STATUS	CONTRACT	DOC. NO: PE-V0-412-553-A050	Rev: 00
PACKAGE		AIR CONDITIONING SYSTEM	
TITLE		QAP OF LIFTING EQUIPMENT FOR AC SYSTEM	

MANUFACTURERS NAME & ADDRESS		MANUFACTURING QUALITY PLAN				PROJECT					
 M/S REVA INDUSTRIES LIMITED UNIT-I PLOT-28 SECTOR-25, FARIDABAD UNIT-II PLOT NO.164,SECTOR-24, FARIDABAD		Q.P NO	Q.P NO	Q.P NO	Q.P NO	CONSULTANT	2X660 MW ENNORE SEZ COAL BASED STPP AT ASHDYKE OF NCTPS, CHENNAI				
		REV	DATE	DATE	DATE	REVA CONTRACT NO.	5440				
AS PER APPROVED VENDOR LIST		DATE	DATE	DATE	DATE	CONTRACTOR	BHEL-PS PEM, NOIDA				
CHARACTERISTICS		DATE	DATE	DATE	DATE	CONTRACTOR	BHEL-PS PEM, NOIDA				
COMPONENT & OPERATIONS	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS				
S.No											
1.0	RAW-MATERIALS	3	4	5	6	7	8	9	10	11	
1.1	a) STRUCTURAL MATERIAL b) RAW MATERIAL FOR HOIST AND GEAR BOX HOUSING, TROLLEY PLATE, ROPE DRUM IF FABRICATED	CHEM & MECH PROPS	MA	Lab analysis	1 SAMPLE PER LOT%	IS 2062 /APPD. DRG./ DATA SHEET		MTC/IR	✓ P/V	V	Test shall be carried out in absence of mill TC or non-correlation of TC with material.BHEL to identify Samples for testing. Test to be carried out at NABL accredited Lab. Reports to be submitted for verification during inspection.
1.1 A	SEAMLESS PIPE FOR ROPE DRUM	NDT	MA	UT	100%	ASTM A388-2004	NOTE 1	IR	✓ P	V	For plate thickness above 40mm
		Flattening & Acid Etching test	MA	PHYSICAL & METALLOGRAPHY	1 SAMPLE /pipe	No cracks, pitting, rusting, damage etc		IR	✓	V	Test shall be carried out in absence of mill TC or non-correlation of TC with material.BHEL to identify Samples for testing. Reports to be submitted for verification during inspection
		SURFACE DEFECTS	MA	Visual	100%						
1.2	FORGINGS FOR GEARS,PINIONS, SHAFT/AXLES, WHEELS	MECH , CHEM. PROPS	MA	Lab analysis	100%	APPD. DRG./ DATA SHEET	APPD. DRG./ DATA SHEET / IS:3938	LAB.REPORT / MANUFACTURER S TEST CERTIFICATE	✓ P	V	
		NDT	CR	UT	100%	ASTM A 388	NOTE 1	INSPN.REPORT	✓ P	V	IF DIA or THK > 50mm
		Hardness , surface defects after machining/grinding	MA	DPT/MPI	100%	ASTM E - 165 /E-709, No linear indication		MTC	✓ P	V	
1.3	WIRE ROPE	Dimensional, type, construction , EXAMINATION OF REPORT OF BREAKING LOAD CAPACITY	MI	measurement	100%	APPD. DRG./ DATA SHEET	APPD. DRG./ DATA SHEET	MFRS' TEST CERT.	✓ P	V	
		MECH , CHEM. PROPS.	MA	Lab analysis	100%	IS: 2266		MFRS' TEST CERT.	✓ P	V	
1.4	HOOKS	U.T IF SHANK DIA > 50mm	CR	NDT	100%	ASTM A 388	NOTE 1	INSPN. REPORT	✓ P	V	SHANK PORTION ONLY
		Dimension & PROOF LOAD TESTING	CR	Measurement, PROOF LOAD TEST	100%	APPROVED DRG/DATA SHEET / IS:938 / IS:15560		QCR	✓ P	V	IF REQUIRED BY END CUSTOMER.
		DP AFTER PROOF LOAD	CR	NDT	100%	ASTM E-165	NO CRACKS	INSPN. REPORT	✓ P	V	
1.5	SHEAVES	MECH	MAJOR	TENSILE & HARDNESS	I/LOT	APPROVED DRG.		MTC/IR	✓ P	V	






**MANUFACTURERS NAME & ADDRESS**  
 M/S REVA INDUSTRIES LIMITED  
 UNIT-I PLOT-28 SECTOR-25,  
 FARIDABAD  
 UNIT-II PLOT NO.164, SECTOR-24,  
 FARIDABAD

**AS PER APPROVED VENDOR LIST**

**PROJECT**  
 2X660 MW ENNORE SEZ COAL BASED STPP AT  
 ASHDYKE OF NCTPS, CHENNAI

S/NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
									D*	M	C	
1	CASTING FOR BEARING PLATED, ROPE GUIDES, PULLEYS ETC		4	5	6	7	8	9	**	10	11	
1.6		CHEMICAL & MECHANICAL	MAJOR	LAB ANALYSIS	I/LOT	APPROVED DRG/MFG STANDARD	APPROVED DRG/MFG STANDARD	LAB REPORT	P	V	V	
2.0	<b>IN-PROCESS</b>											
2.1	Welding process capability and welder skill	WPS,PQR & WPQ	MA	Welding procedure approval and Welder performance qualification in accordance with ASME Section IX	100%		ASME Section IX	WPS,PQR & WPQ	P	V	V	In case approved WPS/PQR/WPQ from BHEL/NTPC/EIL/LLOYDS/TPL available, then documents/records to be submitted for verification during inspection, else, Vendor shall get the approval of Welding Procedure / Welder from the identified agency prior to carrying out welding at the job.
2.2	Welding of trolley, rope drum etc	Fillet weld	MA	LPI/MPI	100%		ASTM E165 or Eq/ No cracks or linear indication	INSPN. REPORT	P	V	V	
		Butt welds	MA	RT	100%		ASME SEC VIII, DIV 1, UW 51/52	RT FILM & REPORT	P	V	V	100% RT for butt weld in tension and 25 % in compression. 100% RT on butt weld of rope drum
2.3	NDT OF LOAD BEARING BUTT WELDS (IF ANY)	WELD QUALITY OF BUTT WELDS IN TENSION	CR	PT & RT	100%		ASME SEC. VIII DIV. 1 ASME SEC. VIII DIV. 4 . CLUW-51 FOR RT APPENDIX -8 FOR PT	INSPN. REPORT ND FILM	P	V	V	
2.4	<b>GEAR BOXES</b>											
	<b>COMPLETE ASSEMBLY</b>	OVERALL DIMENSIONS. LEAK TEST, REDUCTION RATIO, BACK LASH AND CONTACT PATTERN,	MA	MEAS./VISUAL	100%		MFG. DRG./NO LEAKAGE WHEN FILLED	INSPN. REPORT	P	V	V	
	<b>NO LOAD RUN TEST FOR HRS</b>	CHECK FOR OIL LEAKAGE, VIBRATION, NOISE ,TEMP. RISE.	MA	PERFORMANCE	100%		APPROVED DRGS /No leakage,Noise 85dbA maxat 1 mtrs, vibration 75 microns max, oil temp rise 20 deg above ambient max	- DO -	P	V	V	
3.0	<b>ELECTRICALS</b>											
1	<b>MOTORS &amp; CABLES</b>	Make, type , rating ROUTINE TESTS	MA	Visual /measurement	100%	Apprvd drg	IS 325 /IS:3938	IR, MTC	P	V	V	For motor refer Note: 2



MANUFACTURERS NAME & ADDRESS		MANUFACTURING QUALITY PLAN										PROJECT	
 M/S REVA INDUSTRIES LIMITED UNIT-I PLOT-28 SECTOR-25, FARIDABAD UNIT-II PLOT NO.164,SECTOR-24, FARIDABAD		ELECTRIC WIRE ROPE HOIST CAP UP TO 3 TON		QIP NO	PE-V0-412-553-A050	CONTRACT NO.		CONTRACTOR		AGENCY		REMARKS	
		ITEM:		REV	0	REVA CONTRACT NO.		BHEL-PS PEM, NOIDA		DESIGN PRIVATE LIMITED, DESIGN HOUSE, GREATER KAILASH-II, NEW DELHI		5440	
AS PER APPROVED VENDOR LIST		CHARACTERISTICS		EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY		REMARKS			
S/No	COMPONENT & OPERATIONS	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY		REMARKS			
1		4	5	6	7	8	9	**		11			
3	LIMIT SWITCHES,SFU, ISOLATOR/ O/L RELAY, MCB, FUSES,PUSH BUTTONS,CONTACTOR, INDICATING LAMPS etc	MA	Review of TC	100%	Approved drgs	Approved drgs	IR	✓	P	V	V		
4	BRAKES	MA	Review of TC	100%	Approved drgs	Approved drgs	IR, MTC	✓	P	V	V		
5	DSL	MA	Review of TC	100%	Approved drgs	Approved drgs	IR	✓	P	V	V		
6	Control transformer	MA	Review of TC	100%	Approved drgs	Approved drgs	IR	✓	P	V	V		
	CONTROL PANEL, PENDANT SWITCH	MA	VISUAL/MEASURE	100%	APPD.DRG. WIRING DIAGRAM,	APPD. DRG. WIRING DIAGRAM,	IR	✓	P	V	V		
8	VVVF DRIVES ( IF APPLICABLE)	MA	VISUAL/VERIFY	100%	APPROVED DRAWINGS	APPROVED DRAWINGS	MTC	✓	P	V	V		
4.0	FINAL INSPECTION												
4.1	COMPLETELY ASSEMBLED HOIST	MA	VISUAL, MEAS	100%	APPD. DRG.	APPD. DRG.	MNFRS' TEST CERT.	✓	P	V	V		
4.2	ASSEMBLED HOIST PERFORMANCE WITH ACTUAL CONTROL PANEL AND PENDENT PUSH BUTTON	CR	LOAD TEST at SWL	100%	IS:6547 / IS:3938	IS:6547 / IS:3938	MNFRS' TEST CERT.	✓	P	V	V		





**MANUFACTURERS NAME & ADDRESS**  
 M/S REVA INDUSTRIES LIMITED  
 UNIT-I PLOT-28 SECTOR-25,  
 FARIDABAD  
 UNIT-II PLOT NO.164, SECTOR-24,  
 FARIDABAD

**AS PER APPROVED VENDOR LIST**

CHARACTERISTICS	CATEGORY
3.	4
2. HOISTING & LOWERING SPEED, PERFORMANCE OF CONTROLLERS SWITCHES CONTACTORS, RELAYS AND OTHER CONTROL DEVICES CORRELATIONS OF CIRCUITS AND INTERLOCKS AND SEQUENCES OF OPERATION, CURRENT MEASUREMENT, LIMIT SWITCH OPERATION.	CR
3. OPERATION OF ALL PROTECTIVE DEVICES	CR
OVER LOAD TEST INCLUDING HOLDING CAPACITY OF BRAKES, LIFTING LOAD FROM MID AIR, SOUNDNESS OF WELD AFTER OVERLOAD TEST.	CR
5. PAINTING	
PRIMER & FINISHING AND SHADE	MI
DFT	MA
STURDINESS, PROTECTION MARKING	MA
6. PACKING	
NOTE:	

**MANUFACTURING QUALITY PLAN**

QP NO	PE-V0-412-553-A050	PROJECT	2X660 MW ENNORE SEZ COAL BASED STPP AT ASHDYKE OF NCTPS, CHENNAI
ITEM:		CONSULTANT	DESIGN PRIVATE LIMITED, DESIGN HOUSE, GREATER KAILASH-II, NEW DELHI
ELECTRIC WIRE ROPE HOIST CAP UP TO 3 TON	0	REVA CONTRACT NO.	5440
DATE	28.05.2019	CONTRACTOR	BHEL-PS PEM, NOIDA
PAGE	1 of 4		



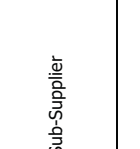
S/NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CATEGORY	TYPE OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD			REMARKS
								D*	M	C	
1		3.	4	5	6	7	8	9	**	10	11
		2. HOISTING & LOWERING SPEED, PERFORMANCE OF CONTROLLERS SWITCHES CONTACTORS, RELAYS AND OTHER CONTROL DEVICES CORRELATIONS OF CIRCUITS AND INTERLOCKS AND SEQUENCES OF OPERATION, CURRENT MEASUREMENT, LIMIT SWITCH OPERATION.	CR	MEAS & VISUAL	100%	IS:3938, TECH SPEC.	TECH SPEC.	✓	P	V	V
		3. OPERATION OF ALL PROTECTIVE DEVICES	CR	VISUAL	100%	TECH SPEC	TECH SPEC.	✓	P	V	V
4.3	OVER LOAD TEST	OVER LOAD TEST INCLUDING HOLDING CAPACITY OF BRAKES, LIFTING LOAD FROM MID AIR, SOUNDNESS OF WELD AFTER OVERLOAD TEST.	CR	TEST AT 125 % OF SWL	100%	IS:3938	IS:3938	INSPN. REPORT	✓	P	V
5	PAINTING										
5.1	PRIMER & FINISHING AND SHADE	Examination - Shade , DOP by paper insertion method	MI	visual	100%	DRG. & DATA SHEET & RELV. IS SPEC.		MNFRS' TEST CERT.	P	V	
		DFT	MA	measurement	Sample				P	V	
6	PACKING	STURDINESS, PROTECTION MARKING	MA	VISUAL	100%	MFG STD	MFG STD		P		
	NOTE:										
1	When back wall echo is set to 100% in sound area then a) defect echo shall not exceed 20% b) Back echo shall be minimum 80% in any area.										
2	Less than 30 KW. Acceptance of motor less than 30 KW is based on COC of the manufacturer & the contractor confirming as follows : It is hereby confirmed that the above mentioned motor/motors were manufactured taking care of specific requirement regarding ambient temp. voltage & frequency variation, hot start, pull out torque, starting KVA/KW, temp rise, distance between centerof stud and gland plate and tested in accordance with approved drawing/data sheet.										



**LEGENDS**

- \* RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY INCLUDED BY MANUFACTURER IN QA DOCUMENTATION.
- \*\* M: MANUFACTURER/SUBCONTRACTOR
- C: BHEL/BHEL NOMINATED THIRD PARTY INSPECTION AGENCY
- N: CUSTOMER/CUSTOMER'S CONSULTANT/CUSTOMER'S APPOINTED THIRD PARTY
- P: PERFORM", W": WITNESS AND "V"- VERIFICATION
- " CHP" CUSTOMER HOLD POINT




	 VIPIN NAUNI 20/9.06.07 18:58:31 +05'30'	REVIEWED BY	NAME & SIGN OF APPROVING AUTHORITY & SEAL
	MANUFACTURER/ SUB CONTRACTOR SIGNATURE		



MANUFACTURER'S NAME & ADDRESS		MANUFACTURING QUALITY PLAN										Client	
 TRACTEL TIRFOR INDIA PVT. LTD. PLOT NO.1, SECTOR-D, INDUSTRIAL ESATE, KALYANI, NADJA WEST BANGAL 741235 (INDIA)		QP No. :		PE-V0-412-553-A050		Project		(2X660MW) ENNORE SEZ, CHENNAI		REVA INDUSTRIES LTD.			
		Rev. No :		ITEM : Chain Pulley Block		Cont. No.		5440					
		Date :		21-05-2019		Main Contractor		BHEL					
		No of Pages:		2		Format of Record							
S.NO	Components and Operations	Characteristics / Instruments	Class	Type of check	Quantum of check		Reference Documents	Acceptance Norms	Format of Record	AGENCY			Remarks
					M	C/N				M	C	N	
1	2	3	4	5	6	7	8	9	D*	**	10		11
<b>Final Inspection</b>													
3.1	Chain Pulley Block	Dimension	Critical	Measure	100%	100%	Approved Drg/Data Sheet/IS:3832	IR	V	P	V	V	Endurance Type Test carried out earlier for similar capacity on sample block, as per IS:3832, shall be submitted for review during inspection
		Operational Proof Load & Light Load Test	Critical	Strength Test	100%	100%	Approved Drg/Data Sheet/IS:3832	IR	V	P	V	V	
		Effort	Major	Pull On Hand Chain	100%	100%	Approved Drg/Data Sheet/IS:3832	IR	V	P	V	V	
4	Packing And Despatch	Document Verification	Major	Verification	100%	-	Manufacturer Std.			P			
Note-1: When Back Wall Echo (BWE) is set at 100% of full screen height (FSH) in defect free area then : (A) Defect Echo should not exceed 20% of FSH & (B) BWE should be min 80% of FSH in any area.													
				Doc. No: REV. 0 CAT...		VIPIN NAUNI 2019.06.07 18:58:59 F0530		Approved By		Approval Seal			
Manufacturer / Sub-Supplier		Main-Supplier		LEGEND: * RECORDS IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. A: CRITICAL, B:MAJOR C:MINOR ** M: MANUFACTURER/SUB-SUPPLIER C: MAIN SUPPLIER, N:INSPECTION AGENCY & END CLIENT P: PERFORM W: WITNESS AND V: VERIFICATION, R: REVIEW, AS APPROPRIATE,		2/2							
Signature													

	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
<input checked="" type="checkbox"/> CAT I - Approved <input type="checkbox"/> CAT II - Approved with Comments as Noted <input type="checkbox"/> CAT III - Not Approved <input type="checkbox"/> CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 



VIPIN NAUNI  
Reviewed by BHEL and  
found in order. Submitted  
for TANGEDCO / Desein  
Approval.  
2019.06.13 11:03:09 +05'30'

Date	Rev	Description of Revision	ALT	CHD	APPD
PROJECT		2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI			
	<b>CUSTOMER</b>  TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)				
	<b>CONSULTANT</b>  DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI				
	<b>EPC CONTRACTOR</b>  BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301				
<b>STATUS</b>	<b>CONTRACT</b>	<b>DOC. NO: PE-V0-412-553-A052</b>			<b>Rev: 00</b>
<b>PACKAGE</b>		<b>AIR CONDITIONING SYSTEM</b>			
<b>TITLE</b>		<b>SPLIT AC SCHEDULE ALONG WITH HEAT LOAD CALCULATION FOR AUXILIARY BUILDINGS</b>			





PROJECT : 2x660 MW ENMORE STPP														
DOCUMENT : SPLIT AC SCHEDULE ALONGWITH HEAT LOAD CALCULATION FOR AUXILIARY BUILDINGS														
DOCUMENT No: PE-V0-412-553-A052, REV. 00														
PACKAGE: AIR CONDITIONING SYSTEM														
S.No.	Name of Area	Design Conditions		Floor Area (Sq.ft)	Occupancy (Nos.)	Lighting Load (Watt)	Equipment Load (Watt)	Unit Refrigeration Load	Selected capacity with 10% Margin (TR)	Machine Capacity (In TR) Selected	Quantity of Machine Required (In Nos)	No. of machine Selected (In Nos)	Equipment selection	Remarks
		DB (Deg C)	RH (%)											
1	LOCATION: AC Control Room EF - 13-14, 0.0M	22+1	50±5	516.00	2	1032	6000	5.42	5.96	2	2.98	3	2TR(3W+3S)	
2A	CPU CONTROL ROOM TG 0.0M (UNIT 1)	22+1	50±5	146.00	1	292	1000	1.72	1.89	2	0.95	1	2TR(1W+1S)	
2B	CPU CONTROL ROOM TG 0.0M (UNIT 2)	22+1	50±5	146.00	1	292	1000	1.72	1.89	2	0.95	1	2TR(1W+1S)	
3A	OPERATOR ROOM AT 0.0M (UNIT 1)	22+1	50±5	103.00	1	206	500	1.15	1.26	2	0.63	1	2TR(1W+1S)	
3B	OPERATOR ROOM AT 0.0M (UNIT 2)	22+1	50±5	103.00	1	206	500	1.15	1.26	2	0.63	1	2TR(1W+1S)	
4	CHARGER ROOM 12.0M U1 BC 4 5	22+1	50±5	497.00	2	994	10000	8.10	8.91	5	1.78	2	5TR(2W+2S)	
5	CHARGER ROOM 12.0M U2 BC 14-15	22+1	50±5	464.00	2	928	10000	7.92	8.71	5	1.74	2	5TR(2W+2S)	
6	TG 17.0M CONFERENCE ROOM BC 23	22+1	50±5	1259.00	30	2518	10000	8.97	9.87	2	4.93	5	2TR(3W+5S)	
7	TG 17.0M MEETING ROOM BC34	22+1	50±5	237.00	2	474	1000	1.82	2.00	2	1.00	1	2TR(1W+1S)	
8	TG 17.0M MAINT ROOM GEN BC45	22+1	50±5	222.52	2	445	500	1.72	1.89	2	0.95	1	2TR(1W+1S)	
9	TG 17.0M MAINT ROOM GEN BC34	22+1	50±5	222.52	2	445	500	1.72	1.89	2	0.95	1	2TR(1W+1S)	
10	TG 17.0M DOC ROOM BC34	22+1	50±5	235.00	1	470	100	1.25	1.38	1.5	0.92	1	1.5TR(1W+1S)	
11	TG 17.0M LOCKER ROOM BC34	22+1	50±5	235.00	1	470	100	1.25	1.38	1.5	0.92	1	1.5TR(1W+1S)	
12A	TG 17.0M MISL ROOM 1 BC45	22+1	50±5	100.61	1	201	250	0.69	0.76	1.5	0.51	1	1.5TR(1W+1S)	
12B	TG 17.0M MISL ROOM 2 BC45	22+1	50±5	100.61	1	201	250	0.83	0.91	1.5	0.61	1	1.5TR(1W+1S)	PE-V0-412-502-A007 - GAD OF ELEVATOR FOR TG BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A007) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.
13A	ELEVATOR MACHINE ROOM - TG BUILDING U1	22+1	50±5	203.71	0	407	300	1.59	1.75	2	0.88	1	2TR(1W+1S)	PE-V0-412-502-A007 - GAD OF ELEVATOR FOR TG BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A007) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.
13B	ELEVATOR MACHINE ROOM - TG BUILDING U2	22+1	50±5	203.71	0	407	300	1.59	1.75	2	0.88	1	2TR(1W+1S)	PE-V0-412-502-A007 - GAD OF ELEVATOR FOR TG BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A007) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.
14	CANTEEN BUILDING (NEAR ADMIN BUILDING)	22+1	50±5	240.99	16	482	500	2.90	3.19	2	1.60	2	2TR(2W+2S)	
15	SAFETY WELFARE ROOM - ADMIN BLDG, 21.25M	22+1	50±5	587.50	5	1175	500	3.32	3.65	2	1.82	2	2TR(2W+2S)	
16	ELEVATOR MACHINE ROOM - ADMIN BUILDING ROOF	22+1	50±5	349.70	0	699	300	1.75	1.93	2	0.96	1	2TR(1W+1S)	PE-V0-412-502-A009 - GAD OF ELEVATOR FOR ADMIN BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A010) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.
17A	FIELD MAINTENANCE OFFICE - 1 NEAR DG BUILDING	22+1	50±5	84.86	20	2	170	1.33	1.47	1.5	0.98	1	1.5TR(1W+1S)	
17B	FIELD MAINTENANCE OFFICE - 2 NEAR DG BUILDING	22+1	50±5	84.86	20	2	170	1.33	1.47	1.5	0.98	1	1.5TR(1W+1S)	
17C	FIELD MAINTENANCE OFFICE - 3 NEAR AIR WASHER BUILDING	22+1	50±5	84.86	20	2	170	1.33	1.47	1.5	0.98	1	1.5TR(1W+1S)	
18	CANTEEN BUILDING - NEAR SERVICE - VIP DINING HALL	22+1	50±5	285.45	15	571	500	2.67	2.94	2	1.47	2	2TR(2W+2S)	
19	CONFERENCE ROOM/ CANTINE BLDG NEAR SERVICE	22+1	50±5	1958.03	35	3916	1000	8.20	9.02	2	4.51	5	2TR(3W+5S)	
20	FOPH BUILDING	22+1	50±5	748.64	1	1497	5000	5.31	5.85	2	2.92	3	2TR(3W+3S)	
21	PTP CHEMICAL HOUSE - OFFICE	22+1	50±5	209.82	1	420	300	1.65	1.82	2	0.91	1	2TR(1W+1S)	
22	CW PUMP HOUSE CONTROL ROOM	22+1	50±5	878.85	2	1758	3500	5.33	5.86	2	2.93	3	2TR(3W+3S)	
23	SEA WATER PUMP HOUSE CONTROL ROOM	22+1	50±5	688.00	3	1376	4500	5.17	5.68	2	2.84	3	2TR(3W+3S)	
24	SEA WATER PUMP HOUSE - OFFICE	22+1	50±5	2259.26	20	4519	2000	11.32	12.46	2	6.23	7	2TR(7W+7S)	
25	FW PUMP (ENGG. WORKS)	22+1	50±5	129.10	1	258	300	0.94	1.03	2	0.52	1	2TR(1W+1S)	

PROJECT : 2x660 MW ENNORE STPP															
DOCUMENT : SPLIT AC SCHEDULE ALONGWITH HEAT LOAD CALCULATION FOR AUXILIARY BUILDINGS															
DOCUMENT No: PE-V0-412-553-A052, REV. 00															
PACKAGE: AIR CONDITIONING SYSTEM															
S.No.	Name of Area	Design Conditions		Floor Area (Sq.ft)	Occupancy (Nos.)	Lighting Load (Watt)	Equipment Load (Watt)	Unit Refrigeration Load		Selected capacity with 10% Margin (TR)	Machine Capacity (In TR) Selected	Quantity of Machine Required (In Nos)	No. of machine Selected (In Nos)	Equipment selection	Remarks
		DB (Deg C)	RH (%)					(TR)	(TR)						
26	FIRE WATER PUMPS (OPERATOR WORKS)	22+1	50+5	215.17	1	430	5000	3.13	3.44	3.44	2	1.72	2	2TR(2W+2S)	
27	COMPRESSOR HOUSE CONTROL ROOM	22+1	50+5	443.78	2	888	5000	4.26	4.69	4.69	2	2.34	3	2TR(3W+3S)	
28	CPU REGENERATION BUILDING	22+1	50+5	622.37	2	1245	4500	4.82	5.30	5.30	2	2.65	3	2TR(3W+3S)	
29A	ESP CONTROL BUILDING UNIT-1	22+1	50+5	230.44	6	461	3000	2.91	3.20	3.20	2	1.60	2	2TR(2W+2S)	
30A	ESP OFFICE STAFF ROOM UNIT-1	22+1	50+5	114.31	2	229	300	1.21	1.33	1.33	1.5	0.89	1	1.5TR(1W+1S)	
29B	ESP CONTROL BUILDING UNIT-1	22+1	50+5	230.44	6	461	3000	2.91	3.20	3.20	2	1.60	2	2TR(2W+2S)	
30B	ESP OFFICE STAFF ROOM UNIT-1	22+1	50+5	114.31	2	229	300	1.21	1.33	1.33	1.5	0.89	1	1.5TR(1W+1S)	
31	WEIGH BRIDGE CONTROL ROOM	22+1	50+5	101.40	1	203	150	1.17	1.29	1.29	2	0.64	1	2TR(1W+1S)	
32	PTP CONTROL ROOM	22+1	50+5	645.87	2	1292	8000	6.45	7.10	7.10	2	3.55	4	2TR(4W+4S)	
33	ITP CONTROL ROOM	22+1	50+5	597.09	2	1194	4500	4.57	5.03	5.03	2	2.51	3	2TR(3W+3S)	
34	MRS CONTROL SYSTEM	22+1	50+5	713.17	2	1426	7000	7.23	7.95	7.95	2	3.97	4	2TR(4W+4S)	
35	PERMANENT STORE INCHARGE	22+1	50+5	325.26	5	651	500	1.98	2.18	2.18	1.5	1.45	2	2TR(2W+2S)	
36	PERMANENT STORE-P.A ROOM	22+1	50+5	94.31	3	189	300	0.46	0.51	0.51	1.5	0.34	1	1.5TR(1W+1S)	
37	PERMANENT STORE-CONFERENCE ROOM	22+1	50+5	419.58	20	839	500	3.07	3.38	3.38	2	1.69	2	2TR(2W+2S)	
38	PERMANENT STORE-OFFICE ROOM	22+1	50+5	594.40	5	1189	500	3.22	3.54	3.54	2	1.77	2	2TR(2W+2S)	
39	COLD STORAGE AREA	22+1	50+5	553.00	3	1106	1500	3.75	4.12	4.12	2	2.06	3	2TR(3W+3S)	
40	WORK SHOP HOUSE-INCHARGE	22+1	50+5	215.17	2	430	300	1.95	2.15	2.15	2	1.07	2	2TR(2W+2S)	
41	WORK SHOP HOUSE-CHANGE ROOM	22+1	50+5	215.17	2	430	0	1.80	1.98	1.98	2	0.99	1	2TR(1W+1S)	
42	WORK SHOP HOUSE-STAFF OFFICE	22+1	50+5	268.96	5	538	500	2.34	2.58	2.58	2	1.29	2	2TR(2W+2S)	
43	FIRE STATION-RECREATION ROOM	22+1	50+5	128.47	3	257	500	1.21	1.33	1.33	2	0.66	1	2TR(1W+1S)	
44	FIRE STATION-TRAINING	22+1	50+5	163.36	5	327	1000	1.61	1.78	1.78	2	0.89	1	2TR(1W+1S)	
45	FIRE STATION-DUTY ROOM	22+1	50+5	140.59	2	281	500	1.21	1.33	1.33	2	0.66	1	2TR(1W+1S)	
46	FIRE STATION-STORE INCHARGE	22+1	50+5	155.95	4	312	500	1.33	1.47	1.47	2	0.73	1	2TR(1W+1S)	
47	STP CONTROL ROOM	22+1	50+5	549.72	2	1099	8000	6.03	6.63	6.63	2	3.32	4	2TR(4W+4S)	
48	DISPENSARY-DRESSING ROOM	22+1	50+5	109.22	3	218	150	1.05	1.16	1.16	1.5	0.77	1	1.5TR(1W+1S)	
49	DISPENSARY-NURSE ROOM	22+1	50+5	59.87	2	120	500	0.51	0.56	0.56	1.5	0.37	1	1.5TR(1W+1S)	
50	DISPENSARY-WAITING LOBBY	22+1	50+5	434.48	4	869	700	2.51	2.76	2.76	2	1.38	2	2TR(2W+2S)	
51	DISPENSARY-PHARMACY ROOM	22+1	50+5	172.50	4	345	500	1.54	1.69	1.69	2	0.85	1	2TR(1W+1S)	
52	DISPENSARY-DR. ROOM-1	22+1	50+5	113.48	3	227	500	1.20	1.32	1.32	1.5	0.88	1	1.5TR(1W+1S)	
53	DISPENSARY-STORE RECORD	22+1	50+5	32.71	2	65	500	0.35	0.38	0.38	1.5	0.25	1	1.5TR(1W+1S)	
54	DISPENSARY-DR. ROOM-2	22+1	50+5	113.48	3	227	500	1.16	1.28	1.28	2	0.64	1	2TR(1W+1S)	
55	DISPENSARY-WARD	22+1	50+5	130.03	4	260	1000	1.53	1.68	1.68	2	0.84	1	2TR(1W+1S)	
56	TIME-OFFICE	22+1	50+5	365.03	4	730	500	2.75	3.03	3.03	2	1.51	2	2TR(2W+2S)	
57	SECURITY-OFFICE	22+1	50+5	441.19	4	882	500	4.31	4.75	4.75	2	2.37	3	2TR(3W+3S)	
58	STORE ROOM	22+1	50+5	116.97	1	234	100	0.80	0.88	0.88	1.5	0.59	1	1.5TR(1W+1S)	
59	GENTS CHANGE ROOM	22+1	50+5	91.83	1	184	200	0.82	0.90	0.90	1.5	0.60	1	1.5TR(1W+1S)	
60	LADIES CHANGE ROOM	22+1	50+5	91.83	1	184	200	0.90	0.99	0.99	1.5	0.66	1	1.5TR(1W+1S)	
61A	ELEVATOR MACHINE ROOM 1- SERVICE BLDG	22+1	50+5	242.06	0	484	300	1.69	1.86	1.86	2	0.93	1	2TR(1W+1S)	PE-V0-412-502-A008 - GAD OF ELEVATOR FOR SERVICE BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A008) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.
61B	ELEVATOR MACHINE ROOM 2- SERVICE BLDG	22+1	50+5	435.31	0	871	300	2.39	2.62	2.62	2	1.31	2	2TR(2W+2S)	PE-V0-412-502-A008 - GAD OF ELEVATOR FOR SERVICE BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A008) AND THREE (3) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.

PROJECT : 2x660 MW ENMORE STPP															
DOCUMENT : SPLIT AC SCHEDULE ALONGWITH HEAT LOAD CALCULATION FOR AUXILIARY BUILDINGS															
DOCUMENT No: PE-V0-412-553-A052, REV. 00															
PACKAGE: AIR CONDITIONING SYSTEM															
S.No.	Name of Area	Design Conditions		Floor Area (Sq.ft)	Occupancy (Nos.)	Lighting Load (Watt)	Equipment Load (Watt)	Unit Refrigeration Load (TR)	Selected capacity with 10% Margin (TR)	Machine Capacity (In TR) Selected	Quantity of Machine required (In Nos)	No. of machine Selected (In Nos)	Equipment selection	Remarks	
		DB (Deg C)	RH (%)												
62A	ELEVATOR MACHINE ROOME- ESP BLDG 1	22±1	50±5	218.53	0	437	300	1.70	1.87	2	0.93	1	2TR(LW+1S)	PE-V0-412-502-A010 - GAD OF ELEVATOR FOR ESP BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A010) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.	
62B	ELEVATOR MACHINE ROOME- ESP BLDG 2	22±1	50±5	218.53	0	437	300	1.70	1.87	2	0.93	1	2TR(LW+1S)	PE-V0-412-502-A010 - GAD OF ELEVATOR FOR ESP BUILDING NOTE: ONE (1) NOS. SPLIT AC WILL BE SUPPLIED BY ELEVATOR SUPPLIER (REFER DOC NO. PE-V0-412-502-A010) AND ONE (1) NOS. SHALL BE SUPPLIED BY AC SUPPLIER.	
TOTAL NOS. OF SPLIT UNITS															
						SPLIT AIR CONDITIONER - 1.5TR CAPACITY						38		NOS	
						SPLIT AIR CONDITIONER - 2.0TR CAPACITY						212		NOS	
						DUCTABLE TYPE SPLIT AC - 5.0TR CAPACITY						8		NOS	
(205 NOS. BY AC SUPPLIER & 7 NOS. BY ELEVATOR SUPPLIER)															

	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
<input checked="" type="checkbox"/> CAT I - Approved <input type="checkbox"/> CAT II - Approved with Comments as Noted <input type="checkbox"/> CAT III - Not Approved <input type="checkbox"/> CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
Reviewed by BHEL and  
found in order. Submitted  
for TANGEDCO / Desein  
Approval.  
2019.06.13 17:34:28  
+05'30'

Date	Rev	Description of Revision	ALT	CHD	APPD
PROJECT		2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI			
		<b>CUSTOMER</b>  TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)			
		<b>CONSULTANT</b>  DESEIN PRIVATE LIMITED DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI			
		<b>EPC CONTRACTOR</b>  BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301			
		<b>AC SUPPLIER</b>  ROOTS COOLING SYSTEM PRIVATE LIMITED B-53, HOSIERY COMPLEX, NOIDA, PHASE-II, NOIDA-201305			
JOB No.	412				
STATUS	CONTRACT	DOC. NO: PE-V0-412-553-A057			Rev: 00
PACKAGE		AIR CONDITIONING SYSTEM			
TITLE		PG TEST PROCEDURE OF AC SYSTEM			



**PG / DEMONSTRATION TEST PROCEDURE FOR  
AIR CONDITIONING SYSTEM  
2X660 MW ENNORE TPS**

BHEL DOC NO. PE-V0-412-553-A057

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### **1.0.0 INTRODUCTION**

The efficiency of an Air Conditioning Plant depends on the efficiency of each item / equipment. PG Test shall be conducted to ensure that the plant is delivering the desired requirement.

### **2.0.0 SCOPE**

The test procedure shall cover the Performance and Guarantee Tests to be conducted at site for the entire system / sub systems and individual equipment's covered in the AC Package. The test procedure shall cover the testing method for parameters covered as "Guaranteed Parameters" as per specification and checking of ratings and performance requirements stipulated for various equipment's covered in the specifications.

### **3.0.0 OBJECTIVE OF THE TEST**

- 3.1.0 To check healthy working of all the equipment's forming the total air conditioning system
- 3.2.0 To check the power consumption of the motors for which power consumption limited are guaranteed at specified capacity of equipment's.
- 3.3.0 To verify the total capacity of the plant including stand-by equipment's. The tonnage rating obtained from all AHUs/Chillers is to be cross checked from the heat rejection across the condensers.
- 3.4.0 Capacity rating and guaranteed power consumption to be established during summer only during April to June, when the ambient temp. (DBT) is generally high. July to October for Monsoon test & November to January for Winter test, only inside temp. & humidity condition to be established. Room temp. Verification for 72 hrs. shall be done during summer & monsoon & for winter it shall be done for 24 hrs.
- 3.5.0 To check the temperature and relative humidity conditions during summer or monsoon in the air-conditioned space as indicated /incorporated in the contract.
- 3.6.0 Operating parameters of the system to be logged for complete cycle with calibrated instruments at the time of capacity test.
- 3.7.0 Operating parameters of the system may be logged with online instruments except calibrated psychrometer for Room condition test during summer or Monsoon & winter test.
- 3.8.0 To check satisfactory operation of all safety switches and electrical interlocks for each individual equipment and for the complete system.
- 3.9.0 Vibration and noise level to be measured for all rotating equipment's.

### **4.0.0 CONDITION OF TEST**

#### **4.1.0 CONDUCTANCE OF TEST**

Performance and Guarantee Test at site shall be conducted by accredited representatives of Vendor, BHEL and Owner. The contractor shall be given permission to inspect the entire system in advance and make system ready for test. Vendor's representative's witness and associate with all phases of the test and record the data jointly with BHEL representatives.



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- 4.1.1 The responsibility for conducting the test rests with the AC SUPPLIER/BHEL
- 4.1.2 Necessary power supply to all the equipment's (as required by system) as per scope shall be provided by TANGEDCO/BHEL.

**4.2.0 TEST INSTRUMENTS**

- 4.2.1 All instruments required for the PG Test will be provided by the Vendor.
- 4.2.2 Calibration of test instruments shall be responsibility of the vendor.
- 4.2.3 Calibration of instruments (to be used in the test) shall be carried out at a Govt. / BHEL approved test laboratory/NABL approved Laboratory.
- 4.2.4 Calibration of the instruments should be carried out prior to, but not more than six months before the commencement of the test. The calibration certificate of the instruments should be valid for the period of the test.
- 4.2.5 Calibration certificates (in original) of all instruments from Govt. /BHEL approved Test Laboratory shall be submitted by the vendor for BHEL approval prior to start of the test. Original Calibration certificate will be returned to vendor after review & acceptance of the certificate.
- 4.2.6 All the calibrated instruments preferably shall be sealed after calibration at Test Lab & intactness of the seal shall be checked by BHEL before start of the test.
- 4.2.7 All on line instruments which will be used for recording the parameters of compressor cycle. The online pressure & temp. gauges shall be calibrated in Govt. Approved labs prior to test. Calibrated gauges of  $\pm 1\%$  accuracy shall be used on water circuit for pressure and temperature measurement.
- 4.2.8 On line Pressure Gauges shall be used for recording the parameters of compressor cycle. Airflow of AHU shall be measured by using calibrated anemometer /velometer.
- 4.2.09 Bearing temperature is to be measured with thermometer of  $\pm 1$  deg C accuracy with LC of 0.5 deg C.
- 4.2.10 Dry and wet bulb temperatures shall be measured using sling psychrometers. The thermometers of sling psychrometers shall be  $\pm 0.5\%$  accuracy with LC of 0.5 deg C.
- 4.2.11 All power consumption measurements shall be done by 2-wattmeter method OR clamp-on power analyzer. The watt meters of accuracy class  $\pm 1\%$  duly calibrated shall be used.
- 4.2.12 Tachometer for RPM measurement shall be of  $\pm 1.0\%$  accuracy.
- 4.2.13 Calibrated instruments shall be used for vibration and noise level measurement.



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List of Instruments used in PG/Demonstration test: -

Sr. No.	Instrument Name	Application
1	Anemometer	For measuring Air Velocity
2	Sling Psychrometer	For measuring DB/WB Temp.
3	Clamp Meter	For measuring Current
4	Temp. Gun	For measuring Bearing Temp.
5	Vibration Meter	For measuring of Equipment's
6	Tachometer	For measuring RPM/Speed of Equipment's

#### 4.3.0 PRE-REQUISITES TO THE P & G TESTS

- 4.3.1 The Sub-Vendor should furnish a written statement to the effect that work covered in the contract has been completed for the system for which PG test will be carried out.
- 4.3.2 All the erection/commissioning protocols in respect of hydro test of pipelines headers, alarm/annunciation/control system, vibration and noise level data of AHU, condenser and chiller pump etc. during commissioning shall be made available during PG Test by the vendor.
- 4.3.3 All BHEL/TANGEDCO approved data sheets for the plant/system for which PG test is to be carried out to be made available during PG Test.
- 4.3.4 Uninterrupted power supply within specified parameters for the duration of the test to be ensured by other agencies.
- 4.3.5 Proper lubrication and oil level of all equipment's to be ensured.
- 4.3.6 Cleanliness of plant/system shall be ensured by BHEL/TANGEDCO.
- 4.3.7 Protection relays of switchgears and all motor feeders shall be checked by other agencies.
- 4.3.8 Readiness of all protections, interlocks and safety switches to be ensured. Joint protocol in this respect shall be signed.
- 4.3.9 Availability of suitable fire protection systems/firefighting equipment's to be ensured by other agencies during PG Test.
- 4.3.10 Deputation of team to site to be associated with the P & G Test to be ensured by the AC SUPPLIER
- 4.3.11 Arrangement of all calibrated test instruments as per CL. 4.2.0 to be ensured by the AC SUPPLIER
- 4.3.12 All power consumption measurement shall be done by power analyzer or 2 wattmeter method. The accuracy class (+/-) 1% duly calibrated shall be used.
- 4.3.13 The plant/system shall be jointly inspected by BHEL/TANGEDCO, Vendor and a joint protocol shall be signed that the plant is fit for P & G Test.



#### **4.4.0 GUARANTEED PARAMETERS DECLARATION**

The contractor should furnish a declaration in the manner as per Annexure-1 for the guaranteed parameters which attract levy of liquidated damages for shortfall in performance. Also declaration in manner as per Annexure-2 shall be given by contractor for other parameters covered as guaranteed parameter (without liquidity damages)

#### **5.0.0 TEST METHODOLOGY**

The test can be classified into four following groups:

1. Equipment performance: Capacity Assessment – Verify the plant capacity (tonnage rating) During summer or Monsoon season.
2. Power consumption at specified capacity of the equipment. Power measured at site shall be for demonstration purpose only. However, for guarantee purpose power of applicable equipment measured at shop shall be considered
3. Room condition test during summer and monsoon.

#### **5.1.0 Equipment performance**

The plant should run continuously for 2 to 3 hours for stabilization of the system before measurements. After stabilization of the system, various parameters of the major equipment will be recorded in hourly log sheet. Four sets of such readings are to be recorded under stable conditions.

Followings are the parameters to be recorded during equipment performance check

- 5.1.1 Current rating and voltage of all motors with on line meter or calibrated tong tester to be logged.
- 5.1.2 Bearing temperature of all motors with calibrated thermometer.
- 5.1.3 Suction pressure, discharge pressure and oil pressure of compressors with on line gauges
- 5.1.4 Pressure of water at condenser water pump inlet and outlet with calibrated gauges (To be done preferably with differential pressure gauge in order to avoid inaccuracy).
- 5.1.5 Pressure of water at chilled water pump inlet and outlet with calibrated gauges (To be done preferably with differential pressure gauge in order to avoid inaccuracy).
- 5.1.6 Temperature of water at condenser inlet and outlet with calibrated gauges.
- 5.1.7 Temperature of water at chiller inlet and outlet with calibrated gauges.
- 5.1.8 Dry and wet bulb temperature of entering air to AHU and of leaving air from cooling coil with calibrated psychrometer.  
  
DBT and WBT measurement of leaving air from canvas connection of AHU shall be done.
- 5.1.9 Velocity of air shall be measured on the filters at the suction area of the AHUs with calibrated anemometer/velometer.



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5.1.10 After completion of capacity tests, working of heaters and humidifiers shall be demonstrated by adjusting the set points. The instruments controlling this equipment's are to be kept in their set points during PG test and shall operate automatically only, if the inside conditions demand for.

5.1.11 Following shall be checked for Cooling Tower

- a) Correct direction of fan with proper orientation of leading and trailing edges shall be checked.
- b) Free & clear flow of all nozzles shall be checked
- c) Inlet & outlet temp of cooling tower shall be recorded.

5.1.12 Speed of rotating equipment, wherever possible shall be checked with calibrated Tachometer

5.1.13 Proper working of modulating type mixing valves to be demonstrated by adjusting set points

**5.1.14 Noise and vibration level measurement**

Vibration and noise level of compressor, condenser water pump, chilled water pump, AHU fan, cooling tower motor shall be measured during PG test. Permissible limit of vibration for pumps shall be 2.5 mm/s as per ISO10816-7-2009 (E) and for AHU, shall be in line with VDI 2056 class IV machines (Good Zone). Vibration level of Cooling Tower and other equipment's shall be as per manufacturer recommendation.

The maximum noise level shall be 85 dbA at 1 meter elevation and at a horizontal distance of 1.0 meter from the equipment.

5.1.15 Interlock & Protection need to be checked & recorded in the form of a protocol jointly signed by persons responsible for conductance of PG test.

**5.2.0 CAPACITY ASSESSMENT:**

**i) CHILLED WATER SYSTEM:**

The capacity of the plant shall be assessed by chiller method as detailed in 5.2.2. The same will however, be cross checked by condenser and AHU method as detailed at 5.2.3 and 5.2.1 respectively.

**5.2.1 PLANT CAPACITY FROM AHU METHOD**

For verifying the plant capacity by AHU method the total air quantity handled by individual AHU shall be measured as mentioned below:

Air quantity measurement will be taken on filters in front of AHU suction area. The air velocity shall be measured with calibrated anemometer/velometer. While taking this measurement, the following conditions are to be maintained:

- a) All the AHUs except the standby unit should be in running condition.
- b) Doors leading to AHU room should be kept closed and all other openings in AHU room as well as in the air-conditioned space and the areas in the return air path are to be sealed.
- c) Air quantity of fresh air should be measured and damper is to be adjusted to allow the required quantity of fresh air only.



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d) Air velocity should be measured using calibrated Anemometer/velometer. Velocity shall be taken at 9 points in a direction perpendicular to AHU suction area. Measurements shall be carried out to compute average air flow.

AHU being the ultimate equipment for heat transfer, Capacity of the system shall be arrived at by calculations based on various recorded data of AHU.

It is to be ensured that while recording different parameters of AHU, the compressor shall run at full load.

**METHOD OF CALCULATIONS:**

$$\text{AHU capacity (TR)} = \frac{Q \times d \times (E1-E2)}{3024}$$

Where,

Q = Quantity of air in m<sup>3</sup>/hr.

D = Density of air AHU inlet in kg/m<sup>3</sup>, i.e. 1.2 kg/m<sup>3</sup>

E1 = Enthalpy of entering air at AHU in Kcal/kg`

E2 = Enthalpy of leaving air from AHU in Kcal/kg

Q is to be calculated by multiplying mean velocity of air by inlet suction area of AHU.

E1 & E2 are to be found out at Cooling Coil of AHU by plotting dry and wet bulb temperatures of entering and leaving air on psychrometric chart.

**5.2.2 PLANT CAPACITY FROM CHILLER:**

$$\text{TR} = \frac{Q_w \times (T1-T2) \times 1000}{3024}$$

Where

TR = Capacity in TR

Q<sub>w</sub> = Water flow rate thru chiller (m<sup>3</sup>/hr)

= Quantity of water circulated by chilled water pump in m<sup>3</sup>/hr

T1 = Water temp at chiller inlet (deg C)

T2 = Water temp at chiller outlet (deg C)

1000 = Multiplying factor

Q<sub>w</sub> value shall be measured by flow meter.



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**5.2.3 PLANT CAPACITY FROM CONDENSER**

Heat rejection across the condenser should be equal to the sum of the heat absorbed by the evaporator (cooling coil) and the equivalent heat of the compressor shaft kw. However, heat rejection may be more upto 5%.

Heat absorbed by the evaporator may be calculated from the corresponding data of the AHU recorded simultaneously by the formula in 5.2.1 above.

Heat rejection across the condenser (Kcal/hr) =  $Q_w \times (T_1 - T_2) \times 1000$  .....A

Where,

$Q_w$  = Water flow rate thru condenser (m<sup>3</sup>/hr)

= Qty of water circulated by cond. Water pump in m<sup>3</sup>/hr

T<sub>1</sub> = Water temp at condenser outlet (deg C)

T<sub>2</sub> = Water temp at condenser inlet (deg C)

1000 = Multiplying factor

$Q_w$  value shall be measured by flow meter.

Heat equivalent of compressor shaft kW (Kcal/hr)

= Input KW of compressor motor x motor efficiency x 860.....B

1 kW = 860 Kcal

Tonnage Capacity =  $\frac{A - B}{3024}$

3024

Since 1 Ton = 3024 Kcal/hr

**5.3.0 POWER CONSUMPTION TEST:**

Measurement of power for all motors shall be done by Power Analyzer OR Two wattmeter method only. Power measurement shall be done at rated capacity during test equipment's.

Power measured at site shall be for demonstration purpose only. However, for guarantee purpose power of applicable equipment (as per Annexure-I) measured at shop shall be considered



**PG / DEMONSTRATION TEST PROCEDURE FOR  
AIR CONDITIONING SYSTEM  
2X660 MW ENNORE TPS**

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**5.4.0 ROOM CONDITION TEST:**

Room condition shall consist of taking the readings of dry and wet bulb temperature at different location points to be mutually decided at site in the areas which are air-conditioned by the respective system/plant room condition test shall be done after stabilization of system.

The dry and wet bulb temperature shall be measured by sling psychrometer which will have accuracy of  $\pm 0.5\%$  with at least count of 0.5 deg C.

This will be carried out for 24 hours continuously and readings will be taken 3 times randomly. Standby equipment should be changed over during these 24 hours. This test shall be carried out during summer when the maximum ambient temperature is at least 40°C and during when relative humidity prevalent is not less than (-) 10% of design value.



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2X660 MW ENNORE TPS**

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**ANNEXURE-I**

**OTHER GUARANTEED PARAMETERS**

Ambient Temperature (summer)	i) DB – 47°C
	ii) WB – 27.8°C
	iii) RH – 41%
Ambient Temperature (monsoon)	i) DB – 28.3°C
	ii) WB – 26.7°C
	iii) RH – 88%
Ambient Temperature (winter)	i) DB – 18.3°C
	ii) WB –13.9°C
	iii) RH – 60%

**MAIN POWER HOUSE & ESP BLDG.**

**Design Indoor Conditions For Summer, Monsoon and Winter**

<b><u>DB</u></b>	<b><u>RH</u></b>
22°C± 1°C	50%±5%

**Selected Plant Capacity**

i) Main AC Plant	300 TR(1W+1S) Screw Chiller
ii) ESP Bldg. (Unit 1 & 2): -	27.2 TR (1W+1S) Condensing Unit

**Pump Capacity**

- i) Chilled water pump for MPH building: 215 M<sup>3</sup>/hr & 32 Mtr. head (1W+1S)
- ii) Condenser water pump for MPH: 307 M<sup>3</sup>/hr & 35 Mtr. head (1W+1S)
- iii) Condenser water pump for ESP Bldg Unit 1 & 2: 30 M<sup>3</sup>/hr & 25 Mtr. head (1W+1S)

List of AHU Location wise

Sr. No.	Location	Air flow Capacity	Tonnage	Quantity
1	AHUs for Common control room areas, CER, computer room etc at EL 24 M. at TG Bldg.	54200 CFM	111 TR	4 Nos. (2W + 2S)
2	AHUs for UPS room area at EL 8.5 M.	31700 CFM	60 TR	2 Nos. (1W + 1S)
3	AHU for ESP Bldg.	10000 CFM	30 TR	2 Nos. (1W + 1S)



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**SERVICE BUILDING**

**Design Indoor Conditions for Summer, Monsoon and Winter**

**DB**

24°C± 1°C

**RH**

50%±5%

(Refer point no. 2 of compliance sheet of Heat Load Calculation, PE-V0-412-553-A011, R01 for Inside Condition for Service Building)

Inside Room Conditions shall be demonstrated at site.



**PG / DEMONSTRATION TEST PROCEDURE FOR  
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**ANNEXURE-III**

**TITLE : FORMAT FOR RECORDING AIR VELOCITY ACROSS AHU& AIR VOLUME  
CALCULATION.**

**AHU NO.:**

**AREA:**

**INSTRUMENT USED & SL. NO.:**

Filters	Number of reading in each AHU					
	Time	Set 1	Time	Set 2	Time	Set 3
No. 1						
No. 2						
No. 3						
No. 4						
No. 5						
No. 6						
No. 7						
No. 8						
No. 9						
Average Velocity						



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**ANNEXURE-IV**

**TITLE : SYSTEM COOLING CAPACITY METHOD, AHU METHOD  
CALCULATION.**

**AHU NO.:**

**AREA:**

**INSTRUMENT USED & SL. NO.:**

**DATE:**

		AHU No.:		
		Reading-I Time:	Reading-II Time:	Reading-III Time:
A.	Average Velocity at intel of AHU (m/s)			
B.	Air quantity, Q (m <sup>3</sup> /hr)= Vav x A (A= Area of filter at the inlet of AHU)=			
C.	Enthalpy of entering air at AHU in, E1 (Kcal/kg)			
D.	Enthalpy of leaving air at AHU in, E2 (Kcal/kg)			
	AHU capacity (TR)= $\frac{Q \times d \times (E1-E2)}{3024}$			



**PG / DEMONSTRATION TEST PROCEDURE FOR  
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2X660 MW ENNORE TPS**

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**ANNEXURE-V**

**TITLE : FORMAT FOR ROOM CONDITION TEST**

**INSTRUMENT USED & SL. NO.:**

**DATE:**

**AREA& UNIT NO.:**

S.NO.	TIME/HRS	READING NO.1			READING NO.2			READING NO.3			AMBIENT			REMARKS
		DB (°C)	WB (°C)	RH (%)	DB (°C)	WB (°C)	RH (%)	DB (°C)	WB (°C)	RH (%)	DB (°C)	WB (°C)	RH (%)	





**PG / DEMONSTRATION TEST PROCEDURE FOR  
AIR CONDITIONING SYSTEM  
2X660 MW ENNORE TPS**

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**ANNEXURE-VII**

**TITLE : FORMAT OF RECORD SHEET FOR EQUIPMENT PARAMETERS OF AIR  
CONDITIONING PLANT**

**INSTRUMENT USED & SL. NO.:**

**DATE:**

**AREA:**

**AMBIENT CONDITIONS: DBT: \_\_\_\_\_ RH: \_\_\_\_\_**

<u>EQUIPMENT PARAMETERS</u>	UNIT#				
	READING-I TIME:	READING-II TIME:	READING-III TIME:	READING-IV TIME:	READING-V TIME:
<b>A. COMPRESSOR</b>					
i Discharge pressure (Kg/cm <sup>2</sup> )					
ii Suction pressure (Kg/ cm <sup>2</sup> )					
iii Oil pressure (Kg/cm <sup>2</sup> )					
iv Oil Level (N/H/L)					
v RPM					
<b>B. CONDENSER &amp; CONDENSER WATER PUMP</b>					
i Temp. at inlet of condenser (°C)					
ii Temp. at outlet of condenser (°C)					
iii Pressure at suction of pump (Kg/cm <sup>2</sup> )					
iv Pressure at discharge of pump (Kg/cm <sup>2</sup> )					
v RPM of pump					
<b>C. CHILLER &amp; CHILLED WATER PUMP</b>					
i Temp. at inlet of Chiller (°C)					
ii Temp. at outlet of Chiller (°C)					
iii Pressure at suction of pump (Kg/cm <sup>2</sup> )					
iv Pressure at discharge of pump (Kg/cm <sup>2</sup> )					
v RPM of pump					



**PG / DEMONSTRATION TEST PROCEDURE FOR  
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**ANNEXURE-VIII**

**TITLE : FORMAT FOR RECORDING TEMP.PARAMETER ACROSS AHU**

**INSTRUMENT USED & SL. NO.:**

**DATE:**

**AREA:**

**AMBIENT CONDITIONS: DBT: \_\_\_\_\_ RH: \_\_\_\_\_**

S. No.	Unit of operation	Reading No.	Time/Hrs	Entering air parameters			Leaving air parameters		
				DB (°C)	WB (°C)	Enthalpy kcal/kg)	DB (°C)	WB (°C)	Enthalpy kcal/kg)
1	Air Handling Unit no.	1							
		2							
		3							
		4							
2	Air Handling Unit no.	1							
		2							
		3							
		4							
3.	Air Handling Unit no.	1							
		2							
		3							
		4							
4.	Air Handling Unit no.	1							
		2							
		3							
		4							



**PG / DEMONSTRATION TEST PROCEDURE FOR  
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**ANNEXURE-IX**

**TITLE : FORMAT FOR DEMONSTRATION OF POWER CONSUMPTION**

**INSTRUMENT USED & SL. NO.:**

**DATE:**

**AREA:**

S. No.	Unit of operation	Line Voltage in Volt (V)	Line current in Amp. (I)	Power Consumption in kW
1				
2				
3				
4				
5				
6				
7				

$$\text{Power Consumption, ikW} = \frac{\sqrt{3} \cdot V \cdot I \cdot \text{Cos}\phi}{1000}$$

Where, V = Line voltage in Volt

I = Line current in Amp.



$\phi$  = Power factor (0.8)

$$\text{BKW} = \eta \times \text{ikW}$$




Where,  $\eta$  = Motor efficiency corresponding load from the characteristics curve of the motor. The corresponding load motor is the ratio of actual to the full load current.

**Note: Power measured at site shall be for demonstration purpose only. However, for guarantee purpose power of applicable equipment measured at shop shall be considered**

DOC MENT IS APPRO ED IDE TANGEDCO LETTER NO. CE/P-I/SE/E/T&H(P)/EE-6/E/AE2/E/P/F.E SE DRG APPL./D.167 /19 .14.06.2019

	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING MANAGEMENT (MECHANICAL AUXILIARY)
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from his contractual obligation.	
APPROVAL CATEGORY AWARDED = I	
<b>CAT I</b> - Approved CAT II - Approved with Comments as Noted CAT III - Not Approved CAT IV - Reference Drawing	
Name: VIPIN NAUNI	Signature: 

VIPIN NAUNI  
Reviewed by BHEL and found in order. Submitted for TANGEDCO / Desein Approval.  
2019.05.06 11:57:02 +05'30'

Date	Rev	Description of Revision	ALT	CHD	APPD
PROJECT		2x660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI			
		<b>CUSTOMER</b>  TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED (TANGEDCO)			
		<b>CONSULTANT</b>  <b>DESEIN PRIVATE LIMITED</b> <b>DESEIN HOUSE, GREATER KAILASH-II, NEW DELHI</b>			
		<b>EPC CONTRACTOR</b>  BHARAT HEAVY ELECTRICALS LTD PS-PEM, PPEI-BUILDING, SECTOR-16A, PLOT NO. 25, NOIDA-201301			
<b>STATUS</b>	<b>CONTRACT</b>	<b>DOC. NO: PE-V0-412-553-059</b>			<b>Rev: 00</b>
<b>PACKAGE</b>		<b>AIR CONDITIONING SYSTEM</b>			
<b>TITLE</b>		<b>TDS &amp; GAD FOR FCU FOR AC SYSTEM</b>			

### TECHNICAL DATA SHEET FOR FAN COIL UNIT

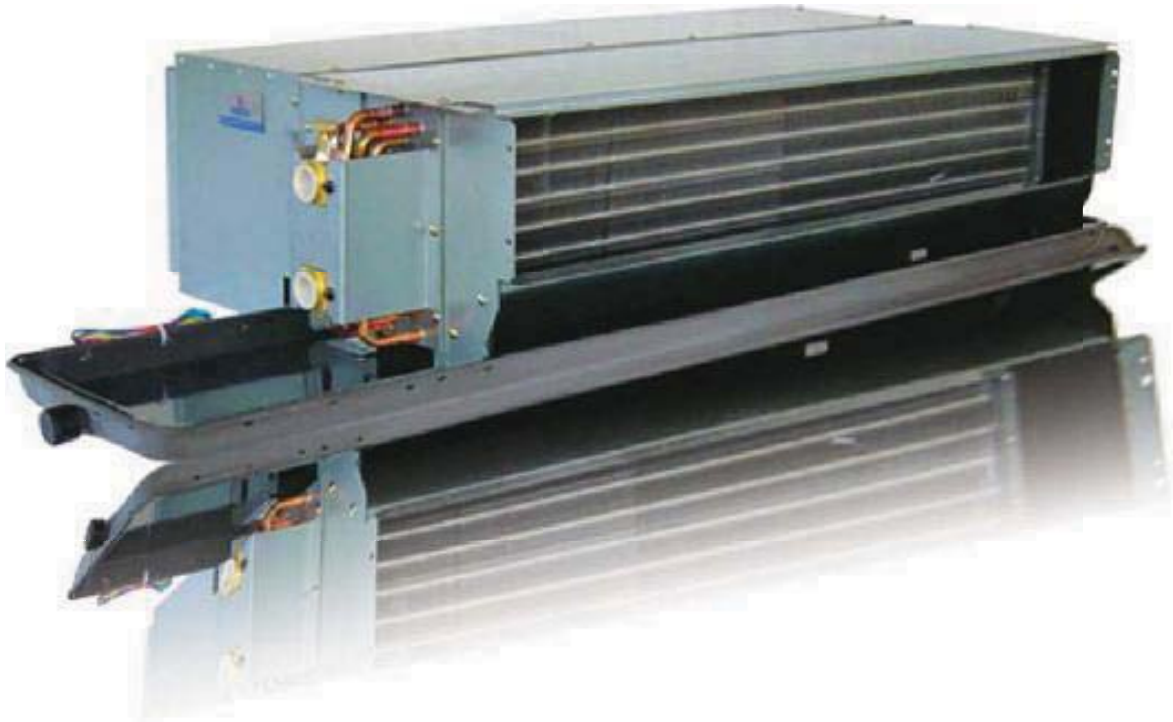
S.NO	DESCRIPTION	SPECIFICATION
1	Item	Fan coil unit
2	MAKE	Waves Aircon Pvt Ltd / Approved make list
3	Model No	WFCU-1200
4	Casing	20G , Pre Coated / GI duly powder coated sheet
5	Drain Pan (Primary)	Externally Insulated 18G GI Drain Pan
6	Interior Chassis	20G SS-304 Drain Pan
7	Blower Type	Galvanized/ Aluminium Direct Driven Forward Curved Blower
8	Motor	OEM specific design three speed / low noise motor
9	Coil Type	Chilled Water Coil
10	Coil Tube	Copper / 3/8" / 0.4mm
11	Coil Fin	Aluminum / 37G / 11-13FPI
12	Coil Frame	Galvanized
13	Coil Header	¾" Brass Socket
14	Pre Filter	12mm thick HDPE Mesh Filter with AL. Frame
15	Power Supply	240 V AC Thermostat for Temp. & Fan Speed control is provided
16	Power Cable Size	3Cx2.5 Sq.mm Copper Cable

**REVIEWED**

By VIPIN NAUNI at 11:55 am, May 06, 2019



## Fan Coil Unit



### Special Features : -

**Low Noise**

**Low Height**

**Compact**

- DRAIN PAN Single Piece, Deep Drawn, Externally insulated G.I./Stainless Steel Drain Pan in weldless construction concept with in built slope.
- SILENT FAN DECK Silent fan deck comprising of specially designed Centrifugal Fans for low noise and FHP split capacitor permanent lubricated / ball bearing motor for maintenance free operation.
- FLEXIBLE DESIGN The Return Air Plenum can be interchanged from back air suction to bottom air suction. Chilled water connections are flexible and can be changed either to right or the left side at site.
- RUST PROOF POWDER COATED/PREPAINTED FINISH The units are designed to be long life and more durable due to weld-less design and the powder-coated/Prepainted G.I panels besides appealing looks.

ELECTRICAL FEEDER LIST		CUSTOMER: TANGEDCO							Doc No. PE-DG-412-553-A101			
		JOB: 2X660 MW ENNORE TPS							JOB No.: 412		REV: 00	REV: 01
		SYSTEM: AIR CONDITIONING SYSTEM							SI.No.: 553		DATE: 01/12/2018	23-04-2020
S No	TITLE	LOCATION	UNIT No	NAME PLATE kW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI / INTT	*VOLTAGE CODE	**LOAD CODE	REMARKS	REMARKS-2
<b>ELECTRICAL LOADS POWER HOUSE</b>												
<b>A</b>	<b>AC PLANT ROOM (FG - 13-15)</b>											
1	Screw Chiller	AC Plant Room - FG - 13-15, 0.0M		245	233	1	1	C	D	S	4 Wire Supply, Neutral Point Req'd . Inbuilt Starter, Housed in Microprocessor Panel	
2	Condenser water pump	AC Plant Room - FG - 13-15, 0.0M		45	40.05	1	1	C	D	U		
3	Chilled water pump	AC Plant Room - FG - 13-15, 0.0M		30	25.1	1	1	C	D	U		
4	3T Electric hoist	AC Plant Room - FG - 13-15, 0.0M		3.7	2.2	1	0	I	D	S	4 Wire Supply, Neutral Point Req'd	
5	Power Supply to DCS Panel for Feeding single phase Butterfly Valves	AC Control Room EF - 13-14, 0.0M		32 Amps		2	0	C	E	S	Redundant Power Supply to DCS Panel for further distribution to Air Conditioning System/ Ventilation System Butterfly Valves / VCD's etc	
6	Motorized Valve at CHW & COW Pump outlet	AC Plant Room - FG - 13-15, 0.0M		0.55-2.2		2	2	I	Ø	S	Feeder Deleted, Non UPS Grade Power Supply through DCS panel	
7	Motorized Valve for Chiller Isolation	AC Plant Room - FG - 13-15, 0.0M		0.55-2.2		2	2	I	Ø	S	Feeder Deleted, Non UPS Grade Power Supply through DCS panel	
<b>B</b>	<b>AHU ROOM CD 12A &amp; 13 - 8.5M</b>											
1	AHU Fan for UPS Room 8.5 M	CD bay at 8.50Mtr.		30	22.3	1	1	C	D	S	VFD Driven, Cabling between MCC and VFD Drive and VFD Drive to Motor shall be by BHEL. 3-PH & 4 wire Supply	
2a	Heaters for UPS Room 8.5 M - 1	CD bay at 8.50Mtr.		16	16	1	0	I	D	S	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral Point Req'd .	Load Bifurcated
2b	Heaters for UPS Room 8.5 M - 2	CD bay at 8.50Mtr.		16	16	1	0	I	D	S		
2c	Heaters for UPS Room 8.5 M - 3	CD bay at 8.50Mtr.		16	16	1	0	I	D	S		
3	Pan Humidifier for UPS Room 8.5 M	CD bay at 8.50Mtr.		1.5	1.5	1	0	I	D	S	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral Point Req'd .	
4	Fresh air fan for UPS Room 8.5 M	CD bay at 8.50Mtr.		0.3		2	0	C	E	S		
5	Motorized Valve for AHU at 8.5m - Chilled Water Line	AHU Inlet Line 8.50M		0.55-2.2		2	2	I	Ø	S	Feeder Deleted, Non UPS Grade Power Supply through DCS panel	
6	3-Way Motorized Valve in Chilled water line for AHU at 8.5m	AHU Inlet Line 8.5M		0.025	0.0	2	2	I	-	S	Feeder Deleted, Power Supply through DCS panel	
7	Motorised Volume Control damper at AHU Discharge	AHU Outlet		4 amps		2	2	I	E	S	Feeder Deleted, Power Supply through DCS panel	
8	Marine Light for AHU 8.5M	Inside AHU Panel at 8.5M		4 Amps		2	0	I	E	S		
9	Marine Light for Inside Duct Plenum	Inside Duct Plenum at 8.5M		4 Amps		2	0	I	E	S	Switch shall be provided outside duct and shall be used during filter maintenance	
10	Motorised Fire damper	Battery Charger Room, 8.5m		16 amps		2	0	C	E	S	One no-feeder-per-Zone-is-taken-For-individual fire damper, looping shall be done for which junction box shall be supplied by AC Supplier. Cabling between JB and Fire Damper shall be provided by BHEL.	Feeder Deleted, UPS Grade Power Supply through DCS panel
<b>C</b>	<b>AHU ROOM BC BAY 24.0 M</b>											
1	AHU Fan at 24.0m for Main CCR	BC bay at 24.0Mtr.		22	19.2	4	4	C	D	S	VFD Driven, Cabling between MCC and VFD Drive and VFD Drive to Motor shall be by BHEL. 3-PH & 4 wire Supply	High Inertia Fan
2a	Heaters at 24.0m for Main CCR - Bank 1	BC bay at 24.0Mtr.		74	74	1	0	I	D	S	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral Point Req'd .	
2b	Heaters at 24.0m for Main CCR - Bank 2	BC bay at 24.0Mtr.		74	74	1	0	I	D	S		
2c	Heaters at 24.0m for Main CCR - Bank 3	BC bay at 24.0Mtr.		74	74	1	0	I	D	S		
3	Pan Humidifier at 24.0m for Main CCR	BC bay at 24.0Mtr.		1.5	1.5	1	0	I	D	S	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral Point Req'd .	
4	Fresh air fan at 24.0m for Main CCR	BC bay at 24Mtr.		1.5	1.07	2	0	C	D	U		
5	Motorized Valve in Chilled Water Line of AHU at 24.0m for Isolation	AHU Inlet Line 24.0M		0.55-2.2		2	2	I	Ø	S	4 Wire Supply, Neutral Point Req'd .	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
6	3-Way Motorized Valve in Chilled water line for AHU at 24.0m	AHU Inlet Line 24.0M		0.025	0.025	2	2	I	-	S	24 V AC / DC Supply required for	Feeder Deleted, Power Supply through DCS panel
7	Motorised Volume Control damper at AHU Fan Discharge	AHU Outlet 24.0M		4 Amps		4	4	I	E	S	Feeder Deleted, Power Supply through DCS panel	
7	Marine Light for AHU	Inside AHU Panel at 24.0M		4 Amps		8	0	I	E	S		
8	Marine Light for Inside Duct Plenum	Inside Duct Plenum at 24.0M		4 Amps		8	0	I	E	S	Switch shall be provided outside duct and shall be used during filter maintenance	

VOLTAGE CODE: (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F= 110 (DC) G=220V, H= 110V, K=24V, L=24V  
 LOAD CODE: U= Unidirectional Starter, B= Bidirectional Starter S= Supply Feeder

ELECTRICAL FEEDER LIST		CUSTOMER: TANGEDCO							Doc No. PE-DG-412-553-A101				
		JOB: 2X660 MW ENNORE TPS							JOB No.: 412		REV: 00	REV: 01	
		SYSTEM: AIR CONDITIONING SYSTEM							SI.No.: 553		DATE: 01/12/2018		23-04-2020
S No	TITLE	LOCATION	UNIT No	NAME PLATE KW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI / INTT	*VOLTAGE CODE	**LOAD CODE	REMARKS	REMARKS-2	
9	Motorised Fire damper	Control Room duct, 17.0m		16 amps		10	0	C	E	S	One no. feeder per Zone is taken. For individual fire damper, looping shall be done for which junction box shall be supplied by AC Supplier. Cabling between JB and Fire Damper shall be provided by BHEL.	Feeder Deleted, UPS Grade Power Supply through DCS panel	
10	Air Curtain	CCR Entry - 17.0m		1.1		3	0	I	E	S			
<b>D COOLING TOWER &amp; ACCESSORIES (GD-13-15 EL. 32.5M)</b>													
1	Cooling tower fan motor	GD bay at 32.50Mtr.		7.5	4.95	2	2	C	D	U		High Inertia Fan	
2	Motorized Valve for Cooling Tower Isolation	Power House, CF23-32.5m		0.55-2.2		2	2	I	D	S	Feeder Deleted, Non UPS Grade Power Supply through DCS panel		
3	Motorized Valve in Make-up water line	Power House, CF23-32.5m		0.55-2.2		1	0	I	D	S	Feeder Deleted, Non UPS Grade Power Supply through DCS panel		
<b>E SWAS ROOM - 0.0M, DE- 13-15, 0.0M</b>													
1	FCU Fan SWAS Room	DE- 13-15, 0.0M		0.2	0.2	6	0	C	E	S			
2	Heater for SWAS Room	DE- 13-15, 0.0M		2.0	2.0	6	0	I	E	S	Single Phase Power Supply with Socket in SWAS Room for Room Heater Operation		
3	Air Curtain at SWAS Room Entrance	DE- 13-15, 0.0M		1.1		2	0	I	E	S			
4	Motorized Valve for FCU	DE- 13-15, 0.0M		0.1		6	0	I	E	S	Feeder Deleted, Non UPS Grade Power Supply through DCS panel		
<b>F AC Control Room - 0.0M, EF - 13-14, 0.0M</b>													
1	AC Plant Control Room (2TR Split AC)	AC Control Room EF - 13-14, 0.0M		3	2.2	3	3	C	E	S			
2	Air Curtain	AC Control Room EF - 13-14, 0.0M		1.1		1	0	I	E	S			
<b>G POWER HOUSE 0.0M, REFERENCE DRAWING, PE-DG-412-100-M003</b>													
1	Operator Room Unit 1 - 2.0 TR AC Split AC	Power House, BC56, 0.0M		3	2.2	1	1	C	E	S			
2	Operator Room Unit 2 - 2.0 TR AC Split AC	Power House, BC 16-17, 0.0M		3	2.2	1	1	C	E	S			
3	CPU IO Unit 1 - 2.0TR AC Split AC	Power House, AB45, 0.0M		3	2.2	2	2	C	E	S			
4	CPU IO Unit 2 - 2.0 TR AC Split AC	Power House, 0.0M AB15-16		3	2.2	2	2	C	E	S			
<b>H POWER HOUSE 12.0 M, REFERENCE DRAWING, PE-DG-412-100-M004</b>													
1	Charger Room, BC23, 5.0 TR Ductable AC	Power House, BC23 12.0mM		7.5	5.5	2	2	C	D	S	3 Phase, 4 Wire Power Supply		
2	Charger Room, BC23, 5.0 TR Ductable AC	Power House, BC14-15 12.0mM		7.5	5.5	2	2	C	D	S	3 Phase, 4 Wire Power Supply		
<b>I POWER HOUSE 17 M, REFERENCE DRAWING, PE-DG-423-100-M005</b>													
1	TG 17.0M Conference Room BC 23, 2.0TR Split AC	Power House, 17.0m		3	2.2	6	6	C	E	S			
2	TG 17.0M Meeting Room BC34, 2.0TR Split AC	Power House, 17.0m		3	2.2	1	1	C	E	S			
3	TG 17.0M Maint Room Gen BC45, 2.0TR Split AC	Power House, 17.0m		3	2.2	1	1	C	E	S			
4	TG 17.0M Doc Room BC34, 2.0TR Split AC	Power House, 17.0m		3	2.2	1	1	C	E	S			
5	TG 17.0M Locker Room BC34, 2.0TR Split AC	Power House, 17.0m		3	2.2	1	1	C	E	S			
6	TG 17.0M Misl Room 1 BC45, 2.0TR Split AC	Power House, 17.0m		3	2.2	1	1	C	E	S			
7	TG 17.0M Misl Room 2 BC45, 2.0TR Split AC	Power House, 17.0m		3	2.2	1	1	C	E	S			
<b>J POWER HOUSE 24.0M, 27.5M, 29.5M, REFERENCE DRAWING, PE-DG-412-100-M006</b>													
1	Elevator Machine Room, 2.0TR Split AC ((UNIT - 1)	Power House 32.5M		3	2.2	1	1	C	E	S			
2	Elevator Machine Room, 2.0TR Split AC ((UNIT - 2)	Power House 32.5M		3	2.2	1	1	C	E	S			
<b>Note:</b>													
1	This feeder list is prepared based on the input drawing available as on date. As some input are not received / available (indicated in the above list), feeder requirement has been considered based on												
2	In case of fire, fire damper should close along with the Tripping of AHU. Provision for manual tripping of all the equipment and Fire Damper shall also be provided												
3	Spare feeders may be considered by Electrical suitably at their end.												
4	ABBREVIATIONS : *VOLTAGE CODE (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F= 110 (DC) G-220V, H= 110V, K=+24V, L=-24V ** FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)												

VOLTAGE CODE: (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F= 110 (DC) G-220V, H= 110V, K=+24V, L=-24V  
LOAD CODE: U= Unidirectional Starter, B= Bidirectional Starter S= Supply Feeder

ELECTRICAL FEEDER LIST FOR AUX BUILDINGS		CUSTOMER: TANGEDCO JOB No.: 2X660 MW ENNORE TPS SYSTEM: AIR CONDITIONING SYSTEM						Doc No. PE-DG-412-553-A102 JOB No.: 412 REV: 02 REV: 03 SI.No.: 553 DATE: 06/06/2019 DATE: 24/04/2020				
S No	TITLE	LOCATION	UNIT No	NAME PLATE kW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI / INTT	VOLTAGE CODE	LOAD CODE	REV NO.	REMARKS
<b>ELECTRICAL LOADS FOR AIR CONDITIONING SYSTEM FOR AUX BUILDING &amp; SERVICE BUILDING</b>												
1.0	CANTEEN BUILDING NEAR ADMIN BUILDING, EL. 0.0M											REFERENCE: CIVIL DRAWING NO. - PE-DG-412-610-C002 , R04
1.1	VIP ROOM - BC12	CANTEEN 0.0M		3		2	2	C	E	S	3	
2.0	CANTEEN BUILDING NEAR SERVICE BUILDING, EL. 0.0M											REFERENCE: CIVIL DRAWING NO. - PE-DG-412-610-C003 , R02
2.1	VIP ROOM - BC34	CANTEEN 0.0M		3		2	2	C	E	S	1	
2.2	CONFERENCE ROOM - BD-1-3	CANTEEN 3.65M		3		5	5	C	E	S	1	
3.0	FUEL OIL PUMP HOUSE + MCC + CONTROL ROOM, PE-V0-412-166-A017, R02											
3.1	FOPH BUILDING (2 TR)			3		3	3	C	E	S	3	
3.2	AIR CURTAIN			0.75	0.75	1	0	C	E	S	2	
4.0	PTP CHEMICAL HOUSE INCLUDING DOZING TANK, PE-V0-412-158-A035, R02 &											
4.1	PTP CHEMICAL HOUSE - OFFICE (2 TR)			3		2	2	C	E	S	2	
5.0	CW WATER PUMP HOUSE, PE-DG-412-172-N004 R03 & PE-DG-412-653-C013_R0, CW PUMP HOUSE , GA RC DETAILS OF ROOF SLAB PE-DG-412-653-C013											
5.1	CW PUMP HOUSE CONTROL ROOM (2 TR)			3		3	3	C	E	S	3	
5.2	AIR CURTAIN			0.75	0.75	1	0	C	E	S	2	
6.0	SEA WATER PUMP HOUSE MCC ROOM + OFFICE, PE-DG-412-654-C007, R0 & ELECTRICAL EQUIPMENT & CABLING LAYOUT IN INTAKE WATER PH AREA, PE-DG-412-100-E021, R03											
6.1	SEA WATER PUMP HOUSE CONTROL ROOM (2 TR)			3		3	3	C	E	S	3	
6.2	AIR CURTAIN			1	1	1	0	C	E	S	2	
6.3	SEA WATER PUMP HOUSE - OFFICE (2 TR)			3		7	7	C	E	S	3	
7.0	FIRE WATER & DRINKING / FILTER WATER PUMP HOUSE, PE-DG-412-671-C001 R2											
7.1	FW PUMP (ENGG. WORKS) (2 TR)			3		1	1	C	E	S	2	
7.2	FIRE WATER PUMPS (OPERATOR WORKS) (2 TR)			3		2	2	C	E	S	2	
7.3	AIR CURTAIN			0.75	0.75	1	0	C	E	S	3	
8.0	Compressor House, PE-DG-412-100-E017 R02 & PE-V0-412-555-A015 R0											
8.1	COMPRESSOR HOUSE CONTROL ROOM (2 TR)			3		3	3	C	E	S	2	
8.2	AIR CURTAIN			0.75	0.75	1	0	C	E	S	2	
9.0	CPU REGENERATION AREA, CIVIL DRAWING: PE-DG-412-639-C001 & C003, R00 MECH DRAWING: PE-V0-412-155-A033, R01											
9.1	CPU REGENERATION BUILDING (2 TR)			3		3	3	C	E	S	3	
9.2	AIR CURTAIN			1	1	1	0	C	E	S	2	
10.0	WEIGH BRIDGE CONTROL ROOM, PE-DG-412-634-C009, REV 01											
10.1	WEIGH BRIDGE CONTROL ROOM (2 TR)			3		1	1	C	E	S	2	
10.2	AIR CURTAIN			0.75	0.75	1	0	C	E	S	2	
11.0	ELECTRICAL EQUIPMENT & CABLING LAYOUT IN FIRE WATER PUMP HOUSE, PTP & AUX BOILER, PE-DG-412-100-E027, REV. 02											
11.1	PTP CONTROL ROOM (2 TR)			3		4	4	C	E	S	3	
11.2	AIR CURTAIN			1	1	1	0	C	E	S	2	
12.0	ELECTRICAL EQUIPMENT & CABLING LAYOUT IN ETP AREA, PE-DG-412-100-E030, REV. 02											
12.1	ETP CONTROL ROOM (2 TR)			3		4	4	C	E	S	2	
12.2	AIR CURTAIN			1		1	0	C	E	S	2	
13.0	MRS CONTROL ROOM LAYOUT, PE-DG-412-160-A005											
13.1	MRS CONTROL SYSTEM (CONTROL ROOM + PANEL ROOM) (2 TR)			3		5	5	C	E	S	3	
13.2	AIR CURTAIN			1	1	1	0	C	E	S	2	
14.0	PERMANENT STORE & OFFICE, PE-DG-412-608-C001, R03											
14.1	PERMANENT STORE INCHARGE (1.5 TR)			3		2	2	C	E	S	2	
14.2	PERMANENT STORE-P.A ROOM (1.5 TR)			3		1	1	C	E	S	2	
14.3	PERMANENT STORE-CONFERENCE ROOM (2 TR)			3		2	2	C	E	S	2	
14.4	PERMANENT STORE-OFFICE ROOM (2 TR)			3		2	2	C	E	S	3	
14.5	COLD STORAGE AREA (2 TR)			3		3	3	C	E	S	2	
15.0	WORKSHOP BUILDING + MCC ROOM, PE-DG-412-100-AE052, R01 & PE-DG-412-645-C001, R03											
15.1	WORK SHOP HOUSE-INCHARGE (2 TR)			3		2	2	C	E	S	2	
15.2	WORK SHOP HOUSE-CHANGE ROOM (2 TR)			3		1	1	C	E	S	3	
15.3	WORK SHOP HOUSE-STAFF OFFICE (2 TR)			3		2	2	C	E	S	2	
16.0	GA & LAYOUT OF FIRE STATION BUILDING, PE_DG_412_550_A001-R01 & PE-DG-412-650-C001, 01											
16.1	FIRE STATION-RECREATION ROOM (2 TR)			3		1	1	C	E	S	2	
16.2	FIRE STATION-TRAINING (2.0 TR)			3		1	1	C	E	S	3	
16.3	FIRE STATION-DUTY ROOM (2 TR)			3		1	1	C	E	S	2	
16.4	FIRE STATION-STORE INCHARGE (2 TR)			3		1	1	C	E	S	2	
16.5	FIRE STATION-OFFICEE (2 TR)			3		2	2	C	E	S	3	
17.0	SEWAGE TREATMENT PLANT,											
17.1	STP CONTROL ROOM (2 TR)			3		4	4	C	E	S	3	
17.2	AIR CURTAIN			1	1	1	0	C	E	S	2	
18.0	DISPENSARY ACRH PLAN, PE-DG-412-641-C033, R03											
18.1	DISPENSARY-DRESSING ROOM (1.5 TR)			3		1	1	C	E	S	2	
18.2	DISPENSARY-NURSE ROOM (1.5 TR)			3		1	1	C	E	S	2	
18.3	DISPENSARY-WAITING LOBBY (2 TR)			3		2	2	C	E	S	2	
18.4	DISPENSARY-PHARMACY ROOM (2.0 TR)			3		1	1	C	E	S	3	
18.5	DISPENSARY-DR. ROOM-1 (1.5 TR)			3		1	1	C	E	S	2	
18.6	DISPENSARY-STORE RECORD (1.5 TR)			3		1	1	C	E	S	2	
18.7	DISPENSARY-DR. ROOM-2 (2 TR)			3		1	1	C	E	S	2	
18.8	DISPENSARY-WARD (2.0 TR)			3		1	1	C	E	S	3	
19.0	GATE COMPLEX, PE-DG-412-641-C024, R01											
19.1	TIME-OFFICE (2 TR)			3		2	2	C	E	S	3	
19.2	SECURITY OFFICE (2 TR)			3		3	3	C	E	S	3	
19.3	STORE ROOM (1.5 TR)			3		1	1	C	E	S	2	
19.4	GENTS CHANGE ROOM (1.5 TR)			3		1	1	C	E	S	2	
19.5	LADIES CHANGE ROOM (1.5 TR)			3		1	1	C	E	S	2	
20.0	ESP CONTROL BUILDING, UNIT-1 ELECTRICAL DRAWING NO. - PE-DG-412-100-E008 , R03											
20.1	ESP CONTROL BUILDING (2 TR)	ESP Building 3.5m Level		3		2	2	C	E	S	2	
20.2	ESP OFFICE STAFF ROOM (1.5 TR)	ESP Building 3.5m Level		3		1	1	C	E	S	2	
20.3	DX TYPE CONDENSING UNIT	AC Plant Room 3.5m		30	21.2	1	1	C	D	S	2	4 Wire Supply, Neutral Point Reqd
20.4	MOTORISED VALVES AT CONDENSING UNIT-DISCHARGE	AC Plant Room 3.5m		0.042		±	±	±	E	S	3	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
20.5	CONDENSER WATER PUMPS	AC Plant Room 3.5m		5.5	4.1	1	1	C	D	U	2	
20.6	MOTORISED VALVES AT CONDENSER WATER PUMP DISCHARGE	AC Plant Room 3.5m		0.042		±	±	±	E	S	3	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
20.7	AIR HANDLING UNITS (AHU 1 & 2)	AHU Room - 3.5M		11	7.3	1	1	C	D	S	2	VFD DRIVE APPLICABLE, 4 Wire Supply, Neutral Point Reqd .
20.8	STRIP HEATER FOR AHU ROOM	AHU Room - 3.5M		6	6.0	3	0	I	D	S	2	Contacto Controlled, 4 Wire Supply, Neutral Point Reqd .
20.9	PAN HUMIDIFIER FOR AHU ROOM	AHU Room - 3.5M		1.5	1.5	1	0	I	D	S	2	Contacto Controlled, 4 Wire Supply, Neutral Point Reqd .
20.10	FRESH AIR FAN FOR AHU ROOM	AHU Room - 3.5M		0.145	0.145	2	0	C	E	S	2	
20.11	MOTORISED FIRE DAMPER-	AHU Room-wall - 3.5M		0.±	0.±	2	0	E	E	S	3	Feeder Deleted, UPS Grade Power Supply through DCS panel
20.12	AHU MARINE LAMP	AHU Room - 3.5M		0.1	0.1	2	0	I	E	S	2	
20.13	MARINE LAMP INSIDE DUCT (FILTER CHAMBER)	AHU Room - 3.5M		0.1	0.1	2	0	I	E	S	2	
20.14	AIR CURTAIN	ESP Building 3.5m Level		0.75	0.75	2	0	C	E	S	2	
20.15	COOLING TOWER FAN	At Roof of ESP Building (EL 9.0m)		2.2	1.4	1	1	C	D	U	2	

VOLTAGE CODE: (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F= 110 (DC) G=220V, H= 110V, K=+24V, L=24V  
LOAD CODE: U= Unidirectional Starter, B= Bidirectional Starter S= Supply Feeder

ELECTRICAL FEEDER LIST FOR AUX BUILDINGS		CUSTOMER: TANGEDCO						Doc No. PE-DG-412-553-A102					
		JOB: 2X660 MW ENNORE TPS						JOB No.: 412		REV: 02		REV: 03	
		SYSTEM: AIR CONDITIONING SYSTEM						SI.No.: 553		DATE: 06/06/2019		DATE: 24/04/2020	
S No	TITLE	LOCATION	UNIT No	NAME PLATE kW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI / INTT	VOLTAGE CODE	LOAD CODE	REV NO.	REMARKS	
20.16	MOTORISED-VALVES-AT-COOLING-TOWER-INLET-LINE	At-Roof-of-ESP-Building-(EL-9.0m)		0.042		1	1	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
20.17	MOTORISED-VALVES-AT-MAKE-UP-WATER-LINE	At-Roof-of-ESP-Building-(EL-9.0m)		0.042		1	1	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
20.18	Power Supply to DCS Panel for Feeding single phase Butterfly Valves / Fire Dampers	ESP Control Room, ESP Building, 0.0M		32 Amps		2	0	C	E	S	3	Redundant Power Supply to DCS Panel for further distribution to Air Conditioning System/ Ventilation System Butterfly Valves / VCD's etc	
20.19	SPLIT AC 2.0T	Elevator Machine Room		3		1	1	C	E	S	3		
21.0	ESP CONTROL BUILDING, UNIT-2 ELECTRICAL DRAWING NO. - PE-DG-412-100-E018 , ROO												
21.1	ESP CONTROL BUILDING (2 TR)	ESP Building 3.5m Level		3		2	2	C	E	S	3		
21.2	ESP OFFICE STAFF ROOM (1.5 TR)	ESP Building 3.5m Level		3		1	1	C	E	S	3		
21.3	DX TYPE CONDENSING UNIT	AC Plant Room 3.5m		30	21.2	1	1	C	D	S	2	4 Wire Supply, Neutral Point Reqd	
21.40	MOTORISED-VALVES-AT-CONDENSING-UNIT-DISCHARGE	AC Plant Room 3.5m		0.042		1	1	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
21.5	CONDENSER WATER PUMPS	AC Plant Room 3.5m		5.5	4.1	1	1	C	D	U	2		
21.60	MOTORISED-VALVES-AT-CONDENSER-WATER-PUMP-DISCHARGE	AC Plant Room 3.5m		0.042		1	1	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
21.7	AIR HANDLING UNITS (AHU 1 & 2)	AHU Room - 3.5M		11	7.3	1	1	C	D	S	2	VFD DRIVE APPLICABLE, 4 Wire Supply, Neutral Point Reqd .	
21.8	STRIP HEATER FOR AHU ROOM	AHU Room - 3.5M		6	6.0	3	0	I	D	S	2	Contactor Controlled, 4 Wire Supply, Neutral Point Reqd .	
21.9	PAN HUMIDIFIER FOR AHU ROOM	AHU Room - 3.5M		1.5	1.5	1	0	I	D	S	2	Contactor Controlled, 4 Wire Supply, Neutral Point Reqd .	
21.10	FRESH AIR FAN FOR AHU ROOM	AHU Room - 3.5M		0.145	0.145	2	0	C	E	S	2		
21.11	MOTORISED-FIRE-DAMPER-	AHU Room-wall-3.5M		0.1	0.1	2	0	I	E	S	3	Feeder Deleted, UPS Grade Power Supply through DCS panel	
21.12	AHU MARINE LAMP	AHU Room - 3.5M		0.1	0.1	2	0	I	E	S	2		
21.13	MARINE LAMP INSIDE DUCT (FILTER CHAMBER)	AHU Room - 3.5M		0.1	0.1	2	0	I	E	S	2		
21.14	AIR CURTAIN	ESP Building 3.5m Level		0.75	0.75	2	0	C	E	S	2		
21.15	COOLING TOWER FAN	At Roof of ESP Building (EL 9.0m)		2.2	1.4	1	1	C	D	U	2		
21.16	MOTORISED-VALVES-AT-COOLING-TOWER-INLET-LINE	At-Roof-of-ESP-Building-(EL-9.0m)		0.042		1	1	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
21.17	MOTORISED-VALVES-AT-MAKE-UP-WATER-LINE	At-Roof-of-ESP-Building-(EL-9.0m)		0.042		1	1	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
21.18	Power Supply to DCS Panel for Feeding single phase Butterfly Valves / Fire Dampers	ESP Control Room, ESP Building, 0.0M		32 Amps		2	0	C	E	S	3	Redundant Power Supply to DCS Panel for further distribution to Air Conditioning System/ Ventilation System Butterfly Valves / VCD's etc	
21.19	SPLIT AC 2.0T	Elevator Machine Room		3		1	1	C	E	S	3		
22.0	SERVICE BUILDING											REFERENCE: CIVIL DRAWING NO. - PE-DG-412-640-C001 / C002 / C003 / C004 / C005 / C006, R02	
22.01	Power Supply to DCS Panel for Feeding single phase Butterfly Valves / Fire Dampers	AC Control Room, Service Building, 0.0M		32 Amps		2	0	C	E	S	3	Redundant Power Supply to DCS Panel for further distribution to Air Conditioning System/ Ventilation System Butterfly Valves / VCD's etc	
22.1	SERVICE BUILDING 0.0 M												
22.11	PACKAGE AC ROOM -GRID AC-12, 0.0M												
A	PACKAGE AC 20.0 TR	PACKAGE AC ROOM - GRID AC-12, 0.0M		26	23.28	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel	
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-12, 0.0M		6	6.0	3	0	I	D	S	3	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral	
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-12, 0.0M		1.5	1.5	1	0	I	D	S	3	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral Point Reqd .	
D	FRESH AIR FAN, 900 CFM	PACKAGE AC ROOM - GRID AC-12, 0.0M		0.5	0.500	2	0	C	E	S	2		
E	MOTORISED-FIRE-DAMPER	PACKAGE AC ROOM - GRID AC-12, 0.0M		4-amps		2	0	I	E	S	3	Feeder Deleted,UPS Grade Power Supply through DCS panel	
F	MOTORIZED-VALVE-IN-CONDENSER-WATER-LINE-OF-PACKAGE	PACKAGE AC ROOM - GRID AC-12, 0.0M		0.042		2	2	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
G	MARINE LIGHT FOR INSIDE DUCT PLENNUM	PACKAGE AC ROOM - GRID AC-12, 0.0M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance	
G	Air Curtain at Air Conditioning Control Room	ADMIN BUILDING 0.0M		0.375		1	0	I	E	S			
22.12	PACKAGE AC ROOM - GRID AC-8-9, 0.0M												
A	PACKAGE AC 15.0 TR	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		20	17.53	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel	
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		4	4.0	3	0	I	D	S	3	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral	
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		1.5	1.5	1	0	I	D	S	3	Contactor Controlled , without overload relay, 4 Wire Supply, Neutral Point Reqd .	
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		0.23	0.230	2	0	C	E	S	2		
E	MOTORISED-FIRE-DAMPER	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		4-amps		2	0	I	E	S	3	Feeder Deleted,UPS Grade Power Supply through DCS panel	
F	MOTORIZED-VALVE-IN-CONDENSER-WATER-LINE-OF-PACKAGE	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		0.042		2	2	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel	
G	MARINE LIGHT FOR INSIDE DUCT PLENNUM	PACKAGE AC ROOM - GRID AC-8-9, 0.0M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance	
22.2	SERVICE BUILDING 4.25 M												
22.21	PACKAGE AC ROOM -GRID AC-12, 4.25M												

VOLTAGE CODE: (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F= 110 (DC) G=220V, H= 110V, K=+24V, L=24V  
 LOAD CODE: U= Unidirectional Starter, B= Bidirectional Starter S= Supply Feeder


ELECTRICAL FEEDER LIST FOR AUX BUILDINGS		CUSTOMER: TANGEDCO							Doc No. PE-DG-412-553-A102			
		JOB: 2X660 MW ENNORE TPS							JOB No.: 412		REV: 02	
		SYSTEM: AIR CONDITIONING SYSTEM							SI.No.: 553		DATE: 06/06/2019	
											DATE: 24/04/2020	
S No	TITLE	LOCATION	UNIT No	NAME PLATE kW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI / INTT	VOLTAGE CODE	LOAD CODE	REV NO.	REMARKS
A	PACKAGE AC 15.0 TR	PACKAGE AC ROOM - GRID AC-12, 4.25M		20	17.53	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-12, 4.25M		6	6.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-12, 4.25M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Reqd .
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-12, 4.25M		0.3	0.300	2	0	C	E	S	2	
E	MOTORISED FIRE-DAMPER	PACKAGE AC ROOM - GRID AC-12, 4.25M		4-amps		2	0	G	E	S	3	Feeder Deleted, UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-12, 4.25M		0.042		2	2	F	E	S	3	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-12, 4.25M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.22 PACKAGE AC ROOM - GRID AC-8-9, 4.25M</b>												
A	PACKAGE AC 15.0 TR	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		20	17.53	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		7	7.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Reqd .
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		0.3	0.300	2	0	C	E	S	2	
E	MOTORISED FIRE-DAMPER	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		4-amps		2	0	G	E	S	3	Feeder Deleted, UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		0.042		2	2	F	E	S	3	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-8-9, 4.25M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.3 SERVICE BUILDING 8.50 M</b>												
<b>22.31 PACKAGE AC ROOM - GRID AC-12, 8.5M</b>												
A	PACKAGE AC 15.0 TR	PACKAGE AC ROOM - GRID AC-12, 8.5M		20	17.53	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-12, 8.5M		6	6.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-12, 8.5M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Reqd .
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-12, 8.5M		0.3	0.300	2	0	C	E	S	2	
E	MOTORISED FIRE-DAMPER	PACKAGE AC ROOM - GRID AC-12, 8.5M		4-amps		2	0	G	E	S	3	Feeder Deleted, UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-12, 8.5M		0.042		2	2	F	E	S	3	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-12, 8.5M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.32 PACKAGE AC ROOM - GRID AC-8-9, 8.5M</b>												
A	PACKAGE AC 20.0 TR	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		26	23.28	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		7	7.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Reqd .
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		0.3	0.300	2	0	C	E	S	2	
E	MOTORISED FIRE-DAMPER	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		4-amps		2	0	G	E	S	3	Feeder Deleted, UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		0.042		2	2	F	E	S	3	Feeder Deleted, Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-8-9, 8.5M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.4 SERVICE BUILDING 12.75 M</b>												
<b>22.41 PACKAGE AC ROOM - GRID AC-12, 12.75M</b>												
A	PACKAGE AC 15.0 TR	PACKAGE AC ROOM - GRID AC-12, 12.75M		20	17.53	2	2	C	D	S	2	4 Wire Supply, Neutral Point Reqd . Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-12, 12.75M		6	6.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral

VOLTAGE CODE: (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F=110 (DC) G=220V, H=110V, K=+24V, L=24V  
 LOAD CODE: U= Unidirectional Starter, B= Bidirectional Starter S= Supply Feeder

ELECTRICAL FEEDER LIST FOR AUX BUILDINGS		CUSTOMER: TANGEDCO							Doc No. PE-DG-412-553-A102			
		JOB: 2X660 MW ENNGORE TPS							JOB No.: 412		REV: 02	
		SYSTEM: AIR CONDITIONING SYSTEM							SI.No.: 553		DATE: 06/06/2019	
											DATE: 24/04/2020	
S No	TITLE	LOCATION	UNIT No	NAME PLATE kW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI / INTT	VOLTAGE CODE	LOAD CODE	REV NO.	REMARKS
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-12, 12.75M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Req.
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-12, 12.75M		0.3	0.300	2	0	C	E	S	3	
E	MOTORISED FIRE DAMPER	PACKAGE AC ROOM - GRID AC-12, 12.75M		4-amps		2	0	E	E	S	3	Feeder Deleted,UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-12, 12.75M		0-042		2	2	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-12, 12.75M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.42 PACKAGE AC ROOM - GRID AC-8-9, 12.75M</b>												
A	PACKAGE AC 20.0 TR	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		26	23.28	2	2	C	D	S	2	4 Wire Supply, Neutral Point Req. Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		8	8.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Req.
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		0.37	0.370	2	0	C	E	S	3	
E	MOTORISED FIRE DAMPER	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		4-amps		2	0	G	E	S	3	Feeder Deleted,UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		0-042		2	2	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-8-9, 12.75M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.5 SERVICE BUILDING 17.0 M</b>												
<b>22.51 PACKAGE AC ROOM -GRID AC-12, 17.00M</b>												
A	PACKAGE AC 20.0 TR	PACKAGE AC ROOM - GRID AC-12, 17.0M		26	23.28	2	2	C	D	S	2	4 Wire Supply, Neutral Point Req. Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-12, 17.0M		4	4.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-12, 17.0M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Req.
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-12, 17.0M		0.37	0.370	2	0	C	E	S	2	
E	MOTORISED FIRE DAMPER	PACKAGE AC ROOM - GRID AC-12, 17.0M		4-amps		2	0	E	E	S	3	Feeder Deleted,UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-12, 17.0M		0-042		2	2	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-12, 17.0M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.52 PACKAGE AC ROOM - GRID AC-8-9, 17.00M</b>												
A	PACKAGE AC 20.0 TR	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		26	23.28	2	2	C	D	S	2	4 Wire Supply, Neutral Point Req. Inbuilt Starter, Housed in Microprocessor Panel
B	HEATERS FOR PACKAGE AC ROOM	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		5	5.0	3	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral
C	PAN HUMIDIFIER	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		1.5	1.5	1	0	I	D	S	3	Contacto Controlled , without overload relay, 4 Wire Supply, Neutral Point Req.
D	FRESH AIR FAN	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		0.37	0.370	2	0	C	E	S	2	
E	MOTORISED FIRE DAMPER	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		4-amps		2	0	E	E	S	3	Feeder Deleted,UPS Grade Power Supply through DCS panel
F	MOTORIZED VALVE IN CONDENSER WATER LINE OF PACKAGE AC	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		0-042	0-0	2	2	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
G	MARINE LIGHT FOR INSIDE DUCT PLENUM	PACKAGE AC ROOM - GRID AC-8-9, 17.0M		0.1	0.1	1	0	I	E	S	2	Switch shall be provided outside duct and shall be used during filter maintenance
<b>22.6 COOLING TOWER &amp; ACCESSORIES - 21.5m.</b>												
A	COOLING TOWER FAN MOTOR	SERVICE BUILDING ROOF, 21.5M		7.5	6.7	2	2	C	D	U	2	
B	MOTORIZED VALVE FOR COOLING TOWER ISOLATION	SERVICE BUILDING ROOF, 21.5M		0-167	0-167	2	0	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
E	MOTORIZED VALVE IN MAKE-UP WATER LINE	SERVICE BUILDING ROOF, 21.5M		0-042	0-042	2	0	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
D	MOTORIZED VALVE CONDENSER WATER PUMP OUTLET	SERVICE BUILDING ROOF, 21.5M		0-167	0-167	2	0	I	E	S	3	Feeder Deleted,Non UPS Grade Power Supply through DCS panel
E	CONDENSER WATER PUMP	SERVICE BUILDING ROOF, 21.5M		45	38.59	1	1	C	D	U	2	

VOLTAGE CODE: (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F=110 (DC) G=220V, H=110V, K=+24V, L=24V  
 LOAD CODE: U= Unidirectional Starter, B= Bidirectional Starter S= Supply Feeder

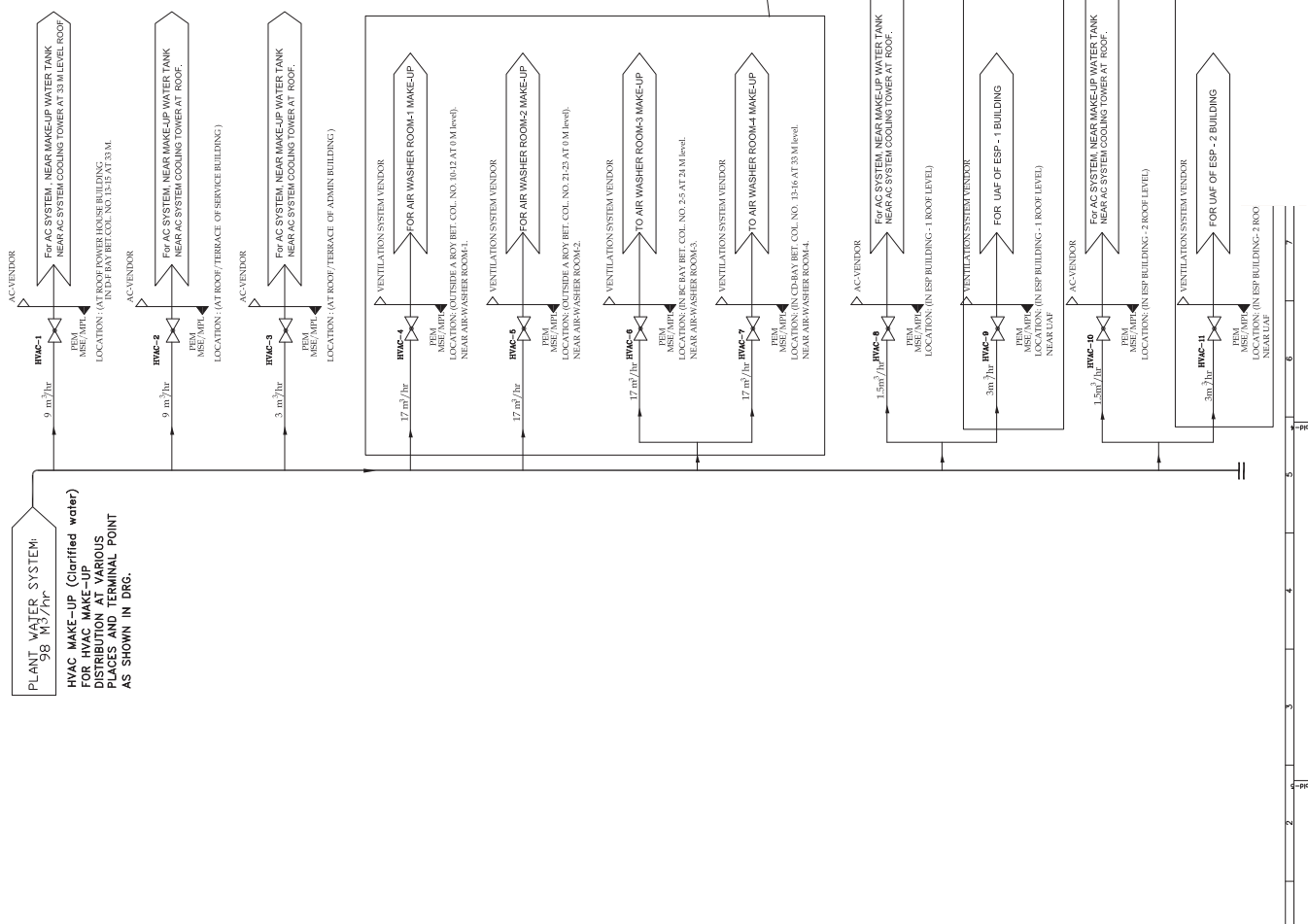


		<b>ELECTRICAL FEEDER LIST FOR AUXILIARY BUILDINGS</b>				<b>JOB: 2XG60 MW ENNORE TPS</b>				<b>Doc No. PE-DG-412-554-A106</b>			
<b>SYSTEM: AC &amp; VENTILATION SYSTEM</b>		<b>AREA - RODM BUILDINGS</b>				<b>JOB No.: 412</b>				<b>REV: 00</b>			
<b>SI No.: 554 / 553</b>		<b>DATE: 23/12/2020</b>											
S No	TITLE	LOCATION	UNIT No	NAME PLATE kW	MAX CONT. DEMAND	NO OF WORKING	NO OF STANDBY	CONTI/INT	VOLTAGE CODE	LOAD CODE	REV NO	REMARKS-1	
<b>PART-B</b>	<b>FEEDER AIR CONDITIONING SYSTEM</b>												
5.0	RO DIM CONTROL ROOM BUILDING,2-WT-330-00269 R04 & EQPT.LAYOUT -1-WT-00612 REV03												
a	RODM Office 0.0M			3		1	1	C	E	S	0		
b	RODM Laboratory. 0.0M			3		1	1	C	E	S	0		
c	RODM UPS ROOM 3.5M			3		4	4	C	E	S	0		
d	RODM CTRL. ROOM, CER 3.5M (DUCTABLE SPLIT AC)			7.5		3	3	C	E	S	0	3 Phase 4 Wire Power Supply	
e	RODM CTRL ROOM, OFFICE 3.5 (DUCTABLE SPLIT AC)			7.5		3	3	C	E	S	0	3 Phase 4 Wire Power Supply	

**Note:**

1. This feeder list is prepared based on the input drawing available as on date. As some input are not received / available (indicated in the above list), feeder requirement has been considered based on earlier project data bank.
2. Spare feeders may be considered by Electrical suitably at their end.
3. ABBREVIATIONS : \*VOLTAGE CODE (AC), A=11kV, B=6.6kV, C=3.3kV, D=415V, E=240V (1 Ph), F= 110 (DC) G-220V, H= 110V, K=+24V, L=-24V

**NOTE:-**  
 1. MPL TO PROVIDE HVAC MAKEUP WATER PIPING/FITTINGS UP TO THE TERMINAL POINT AS SHOWN IN DRG.  
 2. OF 5 METER DISTANCE FROM MAKEUP WATER TANK (AIR WASHER BY WHL UP PIPING WORKS SCOPE)  
 3. FURTHER PIPING SHALL BE DONE BY RESPECTIVE PLANT SUPPLIER AS MARKED IN THIS DRG.  
 4. HVAC MAKEUP WATER PRESSURE AT EACH TERMINAL POINT SHALL BE MAINTAINED 0.5 kg/cm<sup>2</sup>.  
 5. AC SYSTEM MAKEUP WATER PIPING FROM TERMINAL POINT TO MAKEUP WATER TANK.  
 6. MAKEUP WATER REQUIREMENT IS CONTINUOUS.



**APPLICABLE FOR VENTILATION SYSTEM**

PROJECT		26680MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI	
OWNER		TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED	
CONSULTANT		DESIEN PRIVATE LIMITED DESIEN HOUSE, NEW DELHI	
DRAWN BY		SHARAT HEAVY ELECTRICALS LTD	
CHECKED BY		PROJECT ENGINEERING MANAGEMENT	
DATE		15/08/2016	
SCALE		AS SHOWN	
SHEET		1 OF 1 REV. 01	

FOR NO.	412
DISTRIBUTION	CONTRACT
STATUS	ISSUED FOR TENDER
NO.	001
APPD	RET
DATE	15/08/2016
APPD	RET
DATE	15/08/2016

TITLE		SCHEMATIC DIAGRAM FOR HVAC MAKE UP	
DRAWING NO.		PC-02-412-553-AD55	
DATE		15/08/2016	