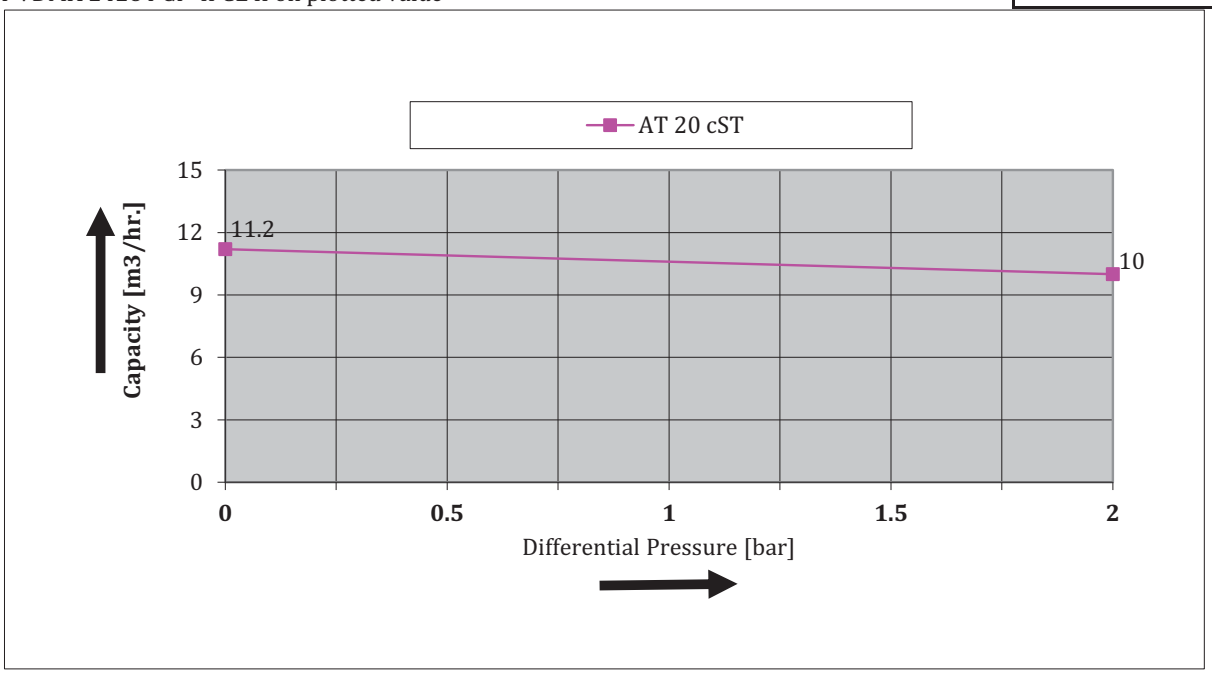
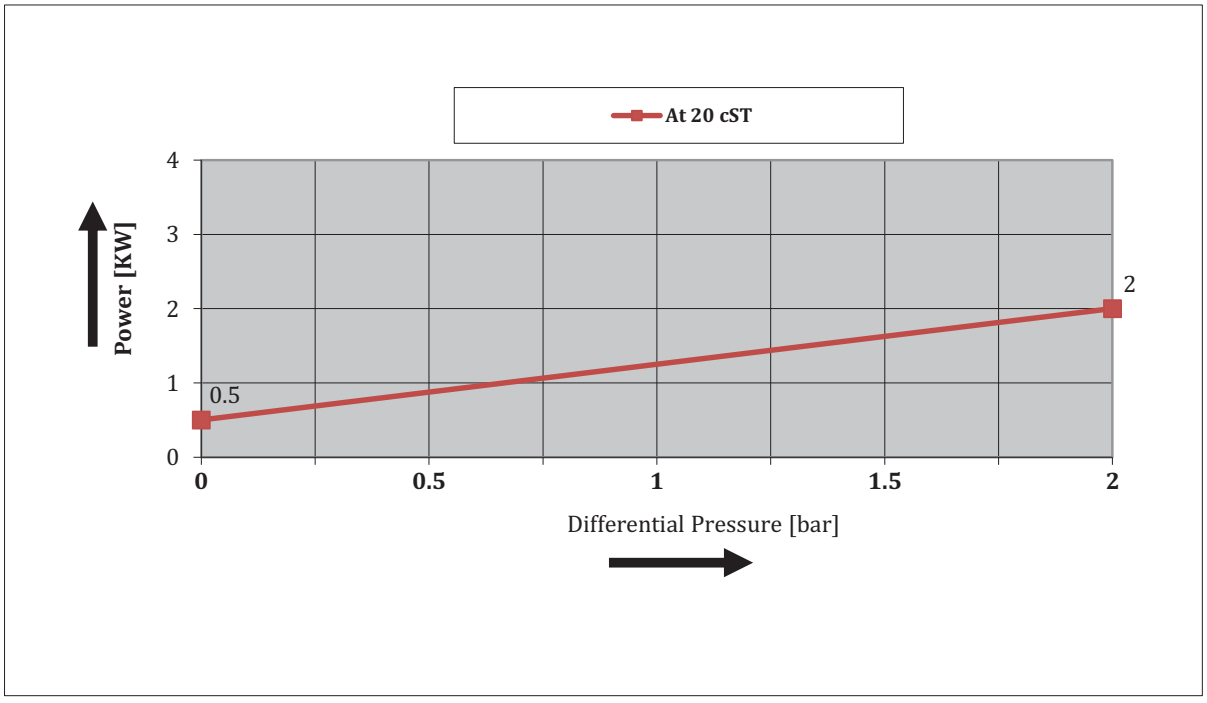
UT PUMPS & SYSTEMS PVT. LTD. 14/7, Mathura Road, Faridabad- 121 003	PERFORMANCE CURVE 10 m3/hr. @ 2 bar PUMP MODEL : EH 600	REV. 0	DATE 29-11-2018

Guaranteed parameters are with tolerances as per VDMA 24284 Gr -II CL II on plotted value

n : 350 RPM





Made By
UT Pumps System Pvt. Ltd.
29-11-2018

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Madan Lal, DGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919425080823 Email : mlal@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.130/19 dt.03.09.2019

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.'14
BHEL REF.	1.BHEL Emails Dt.20.08.'19,24.08.'19. 2.DESEIN REF:D6953,D6954,D6962 dt.21.08.'19,D6968 dt.26.08.'19.
Subject	TANGEDCO –Approval on ETP drawings-submitted by M/s BHEL/PEM - Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A003	1	Data sheet for Metering Pumps for ETP	04
2	PE-V0-412-164-A007	2	Technical data sheet for Screw Pumps for ETP	04
3	PE-V0-412-164-A012	2	QAP for Screw pumps with motor for ETP	04
4	PE-V0-412-164-A016	1	QAP for Metering pumps with motor for ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.03.09.2019
Superintending Engineer/E/PrI

DOC APPROVED VIDE Lr.No.:SE/E/PrI/EE-7/M/ AEE/M/F.En SEZ STPP/D.130/19 dt.03.09.2019

2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NCTPS, CHENNAI
CUSTOMER: TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LTD. (TANGEDCO)
MINUTES OF MEETING FOR MAUX PACKAGES DURING ERM DATED 30-31 July 2019 AT PSSR HQ CHENNAI

S. No.	Clear Water Doc. No.	Title of Document
1.	I) PE-V0-412-164-A016 Rev 01 II) Milton Roy QAP Doc. No. QAP /EMAG /04 REV.08 DT. 01.10.2015	QAP for Metering Pumps for Effluent Treatment Plant

Compliance Report

S.No.	Desein Comments	BHEL Reply	Resolution
1	Indicate standard title block	Attached	Noted
2.	Make of pumps shall be subject to approval of TANGEDCO. Please confirm that sub vendor approval for package has been taken.	i) We have offered Accudyne (Milton Roy) Make Pumps ii) Sub Vender Doc. has been forwarded , approval to which is still awaited	Sub-vendor list is under approval of TANGEDCO. Sub-vendor shall be revised in case Accudyne (Milton Roy) Make Pumps is not approved by TANGECO. TANGEDCO Noted.

Based on the above Revised document will be submitted to TANGEDCO for formal approval.

Sub-vendor list doc no. PE-V0-412-164-A034 is approved by TSGENCO on 08-08-2019. M/s Accudyne (formally Milton Roy) is approved.
Data sheet of metering pump is also submitted for approval after sub-vendor list approval.

31/7/19
(BHEL)

(DESEIN)

(TANGEDCO) 1.8.19

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				QAP FOR METERING PUMPS FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

DOC APPROVED VIDE Lr.No.:SE/E/PrI/EE-7/M/ AEE/M/F.En SEZ STPP/D.130/19 dt.03.09.2019

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

FALGUNI SAHA
2020.02.05 13:54:25 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	**CWL. DOC. NO.**
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	**Milton Roy QAP Doc. No. QAP / EMAG /04 DT. 02.10.2015** Rev 08 Dt. 01.10.2015

BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A016	1
1	R.R.Bagari		24.07.2019		
0	R.R.Bagari		02.04,2019	NO. OF SHEETS 1 EXCLUDING COVER PAGE	

QUALITY ASSURANCE PLAN

M/S.ACCUDYNE INDUSTRIES INDIA PVT.LTD., (Formerly Milton Roy India Pvt.Ltd.,) P45/1, EIGHT AVENUE, DOMESTIC TARIFF AREA MAHINDRA WORLD CITY, KANCHEEPURAM DISTRICT, CHENGALPET-603 002 Telephone : (044) 474381132	PRODUCT: E-MAG PUMPS MODELS: A,B,D,UC,V	CWL QAP No. QAP-01/17-04M(84) QAP NO : QAP/EMAG/04 DATE : 02.12.10 REV.NO : 08 REV DATE : 01.10.15

S.NO	COMPONENTS	CHARECTERESTICS	CLASS	TYPE OF CHECK	QUANTITY OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	INSPECTION AGENCY			REMARKS
									P	W	R	
1	Raw material:											
	Head,Housing,Diaphragm	chemical Composition	Major	Chemical analysis	1/model	appd.Drawing appd.datasheet	as per stadard material specification	TC/MCC	2			For Plastic/rubber materials MCC of MRIPL will be provided
2	Final testing of pump assy:											
2.1	Dimension	Dimensions(Foundation details)	Critical	Measure	100%	appd.Drawing	appd.Drawing	DR	2		1	
2.2	Performance flow test with water and test bed	Performance test at 100 % of strokes / speed with required pressure Only	Critical	Measurement	1no/model	appd.datasheet	0/+25% of rated capacity	PTR	2	1		Internal tests will be conducted 100%
2.3	Hydro test	Hydro test	Critical	Leak test	1no/model	1.5 times of max.working pressure	No leak for 10 minutes	HTR	2	1		

Legends:	P-Perform,W-Witness,R-Review,1-Customer/Third party inspection,2-MRIPL,3 -Supplier,MCC-Material compliance certificate of MRIPL,TC-Test certificateof supplier,PTR-Performance test report ,HTR -Hydro test report,DR-Dimension report	
Note :	When Pressure decreases flow will increase	
Prepared by:	K.BALASUBRAMANIUM	Approved by:
Date:	01.10.15	Date:

RAM RATAN BAGRI

Digitally signed by RAM RATAN BAGRI
Date: 2019.04.02 15:22:36 +05'30'

Bharat Heavy Electricals Limited
PPEI SECTOR-16A NOIDA 201301
PEM/Mech.Aux.

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Madan Lal, DGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919425080823 Email : mlal@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.130/19 dt.03.09.2019

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.'14
BHEL REF.	1.BHEL Emails Dt.20.08.'19,24.08.'19. 2.DESEIN REF:D6953,D6954,D6962 dt.21.08.'19,D6968 dt.26.08.'19.
Subject	TANGEDCO –Approval on ETP drawings-submitted by M/s BHEL/PEM - Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A003	1	Data sheet for Metering Pumps for ETP	04
2	PE-V0-412-164-A007	2	Technical data sheet for Screw Pumps for ETP	04
3	PE-V0-412-164-A012	2	QAP for Screw pumps with motor for ETP	04
4	PE-V0-412-164-A016	1	QAP for Metering pumps with motor for ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.03.09.2019
Superintending Engineer/E/PrI

DOC APPROVED VIDE Lr.No.:SE/E/PrI/EE-7/M/ AEE/M/F.En SEZ STPP/D.130/19 dt.03.09.2019

2X660 MW ENNORE SEZ COAL BASED STPP AT ASH DYKE OF NNTPS, CHENNAI
CUSTOMER: TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LTD. (TANGEDCO)
MINUTES OF MEETING FOR MAUX PACKAGES DURING ERM DATED 30-31 July 2019 AT PSSR HQ CHENNAI

S. No.	Clear Water Doc. No.	Title of Document
1.	DS-01/17-04(84) Rev 01 dt. 02.05.2019 (Sh 1 to 3) PE-V0-412-164-A003	Data Sheet for Metering Pumps for Effluent Treatment Plant

Compliance Report is as under:

S.No.	Desein Comments	BHEL Reply	Resolution in Meeting
1	Indicate standard Title block applicable for the project.	Attached	Noted
2.	S. No. 5 – Mandatory spares shall be supplied as contract specification. Please correct the same.	No mandatory spares are required for metering pumps as per mandatory spares list attached with specification.	Noted
3	Please indicate MOC of selected model. It is not marked in the catalogue	i) It is already indicated in Data Sheet. ii) Please refer to details under Sr. No. 18.	Noted
8.	Make shall be subject to approval of TANGEDCO. Please confirm that sub vendor approval for package has been taken.	i) Accudyne (Milton Roy) make Pumps have been offered. ii) Sub Vendor list document already submitted by us but approval is still awaited.	Sub-vendor list is under approval of TANGEDCO. Sub-vendor shall be revised in case Accudyne (Milton Roy) Make Pumps is not approved by TANGECO. TANGEDCO Noted.

Based on the above Revised document will be submitted to TANGEDCO for formal approval.

Sub-vendor list doc no. PE-V0-412-164-A034 is approved by TSGENCO on 08-08-2019.
M/s Accudyne (formally Milton Roy) is approved.

(BHEL) 31/7/19 (DESEIN) (TANGEDCO) 107/112

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				DATA SHEET FOR METERING PUMPS FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	2020

FALGUNI SAHA
2020.02.05 13:52:16 +05'30'

DOC APPROVED VIDE Lr.No.:SE/E/PrI/EE-7/M/ AEE/M/F.En SEZ STPP/D.130/19 dt.03.09.2019

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	**CWL. DOC. NO.**
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	**DS-01/17-04M(84)** **Dtd. 24.07.2019**

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A003	01
01	R. R. BAGARI		02.05.2019		
00	R. R. BAGARI		02.04.2019	NO. OF SHEETS: 7	EXCLUDING COVER PAGE

BHEL Doc. No. PE-V0-412-164-A003					
Clear Water Limited **B- 14/1, Okhla Industrial Area** **Phase – II** **New Delhi – 110 020**		**DATA SHEET** **Metering Pumps for Effluent Treatment Plant**		**CWL Doc. No.**	**DS-01/17-04M(84)**
				Sheet	**1 of 3**
				Rev	**01**
1	P&I Drg. Ref.	Clear Water : 17-04 / A012 ; BHEL : PE-V0-412-164-A004 ; Sh 2 of 3			
2	Make	**Milton Roy**			
3A	Application	**Hydrochloric Acid Dosing Pump**		**Alkali Dosing Pump**	
		To CMB	To Guard pond	To CMB	To Guard Pond
	Pump Tag No.	90GNN04/AP-001 & 2	90GNN06/AP-001 & 2	90GNN05/AP-001 & 2	90GNN07/AP-001 & 2
	Location	Chemical House / Ground Floor / Indoor ; Intermittent		Chemical House / Ground Floor / Indoor ; Intermittent	
	Numbers	1W+1SB	1W+1SB	1W+1SB	1W+1SB
	Fluid to be handled	38 % (w/w)	38 % (w/w)	48 % (w/w)	48 % (w/w)
	Type	Electronically operated mechanically actuated Diaphragm ; Solid state encapsulated electronics			
	Model	D-14	D-14	D-14	D-14
	Maximum Capacity available of selected pump (lph)	0-90	0-90	0-90	0-90
	Minimum Flow (LPH)	0.6	0.6	0.6	0.6
3B	Application	**Alum Dosing**	**Polyelectrolyte Dosing**		
	Pump Tag No.	90GNN01 / AP001 &2	90GNN03/AP001 &2		
	Location	Chemical House / Ground Floor / Indoor ; Intermittent	Chemical House / Ground Floor / Indoor ; Intermittent		
	Numbers	1W+1SB	1W+1SB		
	Fluid to be handled	10 % (w/w) solution	0.5 % (w/w) PE solution		
	Type	Electronically operated mechanically actuated Diaphragm ; Solid state encapsulated electronics			
	Model	D-14	D-14		
	Maximum Capacity available of selected pump (lph)	0-90	0-90		
	Maximum Flow (LPH)	0.6	0.6		
	Minimum Pressure (Kg/ Sq. cu.m)	1.5	1.5		
4	For Typical details of Pump , MOC; Performance details please refer to Catalogue attached				

01	Sub. for Approval	02.05.2019	**Project:** 2x660 MW Ennore Sez STPP **Owner:** Tamil Nadu Generation & Distribution Corporation Ltd **Consultant:** Desein Pvt Ltd
00	Sub. for Approval	02.04.2019	
Rev	**Description**	**Date**	

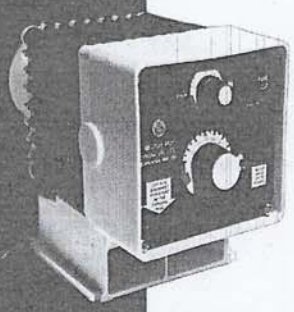
BHEL Doc. No. PE-V0-412-164-A003				
Clear Water Limited **B- 14/1, Okhla Industrial Area** **Phase – II** **New Delhi – 110 020**		**DATA SHEET** **Metering Pumps for Effluent Treatment Plant**	**CWL Doc. No.**	**DS-01/17-04M(84)**
			Sheet	**2 of 3**
			Rev	**01**
	General			
1	Diaphragm Size (SI)	6		
2	Stroke Length (mm; Appx.)	4		
3	Volumetric Efficiency (%)	> 90		
4	Tolerance for Flow (%)	0 to 25		
5	Repeatability (%)	+/- 5		
6	Steady State Accuracy (%)	+/- 2		
7	Flow Adjustment	a) By Manual Stroke adjustment b) By Manual Speed Adjustment		
8	Speed Range (SPM)	0-100		
9	Input	230V, 1 Phase, 50 HZ AC ; Separate for each Pump		
10	Power (Watt ; Appx)	100		
11	Drive	Electrical Power Unit , Class “F Insulation”		
12	Suction Lift (Max.)	1.5 M of Water Column		
13	Liquid End Temperature (deg C Max).	50		
14	Differential Pressure (Kg/Sq. cm Max)	0.7		
15	Suction Pressure (Kg/Sq.cm Max)	1		
16	Ambient Temperature (deg C Max)	50		
17	ON / OFF provision	Power ON / OFF from PLC thru LT		
18	**MOC**			
a)	Housing	30% Glass Filled PP		
b)	Spacer	30% Glass Filled PP		
c)	Diaphragm	Teflon Faced Hypalon		
d)	Ball	Ceramic		
e)	Liquifram Shaft	SS		
f)	Head	PP,		
g)	Valve Seat	PVC		
h)	Valve Housing	PVC		
i)	Ring Seal	Teflon		

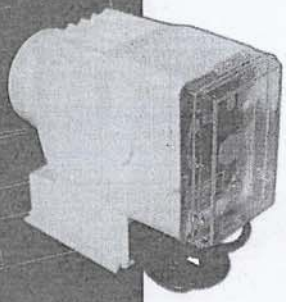
01	Sub. for Approval	02.05.2019	**Project:** 2x660 MW Ennore Sez STPP **Owner:** Tamil Nadu Generation & Distribution Corporation Ltd **Consultant:** Desein Pvt Ltd
00	Sub. for Approval	02.04.2019	
Rev	**Description**	**Date**	

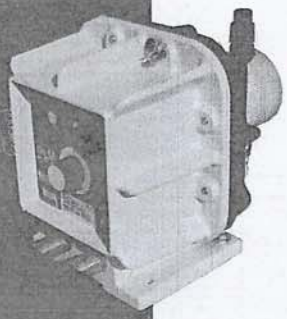
BHEL Doc. No. PE-V0-412-164-A003					
Clear Water Limited **B- 14/1, Okhla Industrial Area** **Phase – II** **New Delhi – 110 020**		**DATA SHEET** **Metering Pumps for Effluent Treatment Plant**	**CWL Doc. No.**	**DS-01/17-04M(84)**	
			Sheet	**3 of 3**	
			Rev	**00**	
	ANCILLARY	Undernoted accessories not supplied along with Pump shall be procured from other approved venders as these are pipe accessories and not supplied by Pump vender			
	External Pressure Relief Valve (PVC)	Supplied along with Pump			
	Suction Strainer (Y- Type) (PVC) ; Scd	Provided as pipe accessories			
	Anti syphon Valve (NRV) D/F; PVC	Provided as pipe accessories			
	Interconnecting LDPE tubing	Pump shall be connected to Suction and discharge piping thru LDPE tubing supplied along with Pump			
	DOCCUMENTS:				
	Catalogue	Enclosed	Enclosed	Enclosed	Enclosed
	Performance Curve	Enclosed	Enclosed	Enclosed	Enclosed
	Typical GA Drg.	Enclosed	Enclosed	Enclosed	Enclosed
	Typical X-Sectional Details	Enclosed	Enclosed	Enclosed	Enclosed
	QAP	Please refer to Doc. No. i) Clear Water Doc. No. QAP-01/17-04M(84) / BHEL Doc. No. PE-V0-412-164-A016			
5	**MANDATORY SPARES**				
	i) No Pump mandatory spares are to be provided as per Spec. Doc. No. PE-TS-412-164-A001 ; page 78 to 80				
	ii) Stand by Pumps have been offered as per Spec.; Data Sheet and approved P & I Drg.				
6	**PERFORMANCE TEST**				
	i) Inspection shall be carried out as per Approved QAP				
	ii) Test Tolerance shall be as per Milton Roy standard.				
	iii) Performance Test Report shall be reviewed.				
	Inspection Status	Cat-III			
7	**PACKING**				
	i) Pumps shall be packed as per manufacturer's Standard Engineering practices				

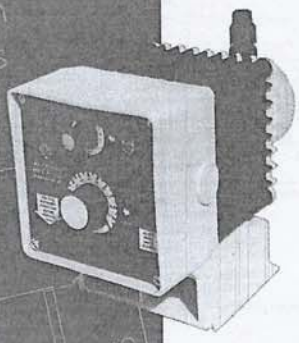
01	Sub. for Approval	02.05.2019	**Project:** 2x660 MW Ennore Sez STPP **Owner:** Tamil Nadu Generation & Distribution Corporation Ltd **Consultant:** Desein Pvt Ltd
00	Sub. for Approval	02.04.2019	
Rev	**Description**	**Date**	

ELECTRONIC DOSING PUMPS







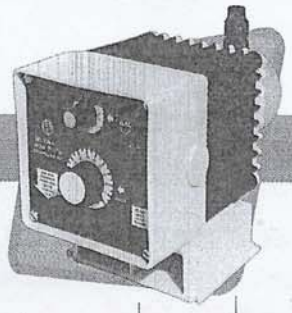


KEY SPECIFICATION FEATURES

- Electronically operated Mechanically Actuated Diaphragm
- Solid state encapsulated electronics
- Compact Size
- Light Weight
- Low Maintenance
- High Precision ball and seats for reliable sealing
- Manual stroke length control adjustable while running .
- Manual/Automatic speed control adjustable while running or stopped.
- Steady State Accuracy of ± 2%
- Tolerance on Max.capacity 0 to +25%
- Repeatability± 5%
- Composite PTFE faced Hypalon Diaphragm for longer life.
- Electro Magnetic Drive: Less moving parts.
- Low Power Consumption
- Liquid End Material of construction in PP, PVC, PVDF, SS-316
- Suction Lift 1.5 mwc max.

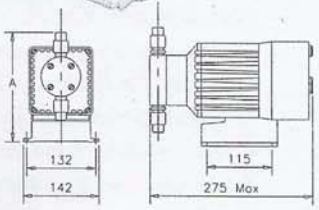
MILTON ROY INDIA

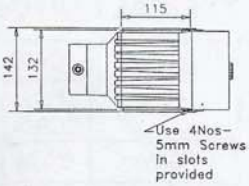
SERIES B

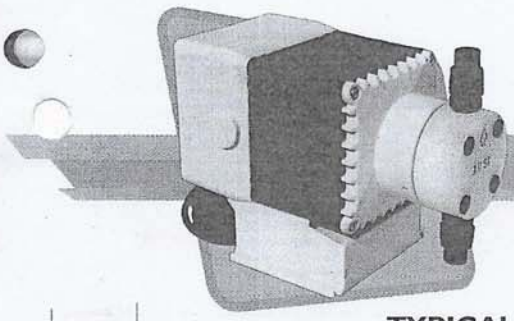


TYPICAL PERFORMANCE

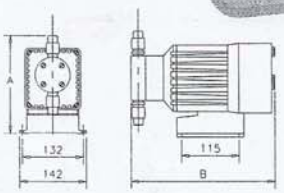
PUMP MODEL	CAPACITY MIN CC/HR	CAPACITY MAX LPH	MAX. INJ. PRESS KG/CM^2	DIAPHRAGM SIZE (Sq.Inch)	DIMENSION DETAILS A	SIZE OF TUBING OD x ID	NET WEIGHT
B-11, B-71, B91	60	6.0	10.0	0.9	210	3/8"X1/4"	Plastic Liquid end 5.5 kg Metallic Liquid end 6.0 kg
B-12, B-72, B92	95	9.5	7.0	0.9			
B-13, B-73, B93	170	17.0	3.5	1.8	210	1/2"x3/8	

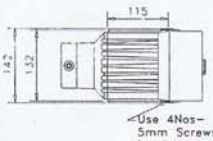






SERIES D





TYPICAL PERFORMANCE

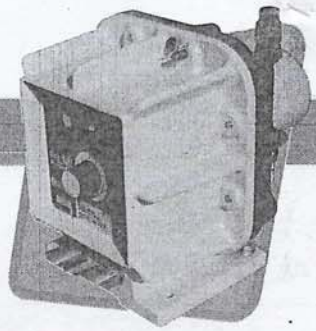
PUMP MODEL	CAPACITY MIN CC/HR	CAPACITY MAX LPH	MAX. INJ. PRESS KG/CM^2	DIAPHRAGM SIZE (Sq.Inch)	DIMENSION DETAILS A	DIMENSION DETAILS B	SIZE OF TUBING OD x ID	NET WEIGHT Plastic	NET WEIGHT Metallic
D-10/D-70/D-90	50	5.0	18.0	0.9	210	278	3/8"x1/4"	8.5 kg	9.0 Kg
D-11/D-71/D-91	100	12.0	9.0	1.8					
D-12/D-72/D-92	150	17.0	7.0	1.8			1/2"x3/8		
D-13/D-73/D-93	250	35.0	4.0	3.0					
D-14/D-74/D-94	600	90.0	1.5	6.0	235	295	1/2"x3/8	9.0 kg	10.5 kg

MATERIAL OF CONSTRUCTION

PART	MATERIAL			
HEAD	P P	PVC	PVDF	CF8M
DIAPHRAGM	TEFLON FACED HYPALON	TEFLON FACED HYPALON	TEFLON FACED HYPALON	TEFLON FACED HYPALON
BALL	CERAMIC	CERAMIC	CERAMIC	CERAMIC
RING SEAL	TEFLON	TEFLON	TEFLON	TEFLON
SUCTION / DISCHARGE VALVE	PVC	PVC	PVC	SS - 316
ANTISYPHON VALVE	PVC	PVC	PVC	SS - 316
FOOT VALVE	PVC	PVC	PVC	SS - 316
TUBING	LDPE	LDPE	LDPE	LDPE

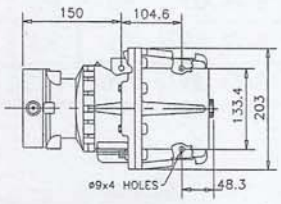
CLEAR WATER LTD. NEW DELHI

SERIES E



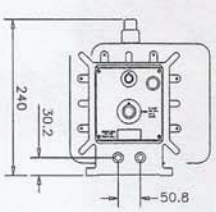
KEY SPECIFICATION FEATURES

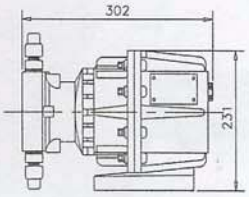
- Rugged, Urethane coated cast housing for applications in hazardous environment.
- Manual stroke control.
- Explosion proof enclosure.
- UL Listed for Class -1, Group - C&D:Class-II, Group - E, F&G.
- CCOE Approved for Gas Group 2, Zone II A & II B.
- Pumps will accept modulated frequency signal.
- Explosion proof Junction Box is provided as a standard.



TYPICAL PERFORMANCE

PUMP MODEL	CAPACITY		MAX. INJ. PRESS KG/CM^2	DIAPHRAGM (Sq.Inch)	NET WEIGHT	
	MIN CC/HR	MAX LPH			Plastic	Metallic
E-70	0.024	4.9	20.7	0.9	22.0kg	22.5 kg
E-71	0.047	9.5	10.3	1.8		
E-72	0.047	5.2	6.9	1.8		
E-73	0.150	30.	4.1	3.0		
E-74	0.038	76.0	1.4	6.0	23.0 kg	24.0 kg





Notes (For all models)

- Drive Details : Electromagnetic Power Unit (EPU) 230V, 50Hz. Single Phase AC.
- MAX SPEED 100 SPM
- Discharge End Connection ½" NPT(M)
- Model Suffix 'L' comes with Milton Roy Standard Float Type Level Switch with in-built pump trip Eg: A13L.
- Optional : Unique Four Function Valve(FFV) for Positive Anti-syphon,Priming Aid, Back Pressure, Pressure Relief. Available on all pumps except 'V' Series and D -14 models and pumps with rated pressure 2 Kg /cm^2
- A-79 to A-73/B-71 to B-73/D-70 to D-74: Instrument responsive pumps will accept modulated frequency signal.
- A-99 to A-93/B-91 to B-93/D-90 to D-94: Instrument responsive pumps will accept 4-20 mA signal.
- Pumps are provided with Foot Valve, Anti-syphon Valve and 3M LDPE tubing. Y strainer optional instead of Foot Valve.
- Power Consumption Approx.40 Watts for A&V models
  Approx.75 Watts for B models.
  Approx.100 Watts for D models
- For 'V" Series pumps speed control is not available.
- 'V' Series pump is available in 'PP' (Liquid End MOC) only.
- Foundation Details : For A, V, B, D use four numbers 5mm screws in slots provided.

ISO 9001 : 2000 Certified

MILTON ROY INDIA (P)LTD
SUBSIDIARY - HAMILTON SUNDSTRAND CORPN.,USA
A United Technologies Company

4,Rajarajan Street, Visalakshi Nagar,
Ekkaduthangal, Chennai - 600097,India.
Phone : 91 - 44 - 22254000 - 3
Fax : 91 - 44 - 22254004
e-mail : info@miltonroyindia.com
Web site : www.miltonroyindia.com

Represented By :

CLEAR WATER LTD. NEW DELHI

MR/ELECTRONIC/3K/08/2006

All Specifications are Subject to change without notice

MILTON ROY INDIA (P) LTD					
DOCUMENT NAME	DATA SHEET FOR D-SERIES PUMPS			REV NO.	2
DOCUMENT NUMBER	DS-DS			DATE	14.01.04
APPROVED BY	C.RAMESH			PAGE	1 OF 2
TYPE	ELECTRONICALY ACTUATED DIAPHRAGM TYPE				
MODEL	D-10/D-70/ D-90/D-10L	D-11/D-71/ D-91/D-11L	D-12/D-72/ D-92/D-12L	D-13/D-73/ D-93/D-13L	D-14/D-74/ D-94/D-14L
MAX FLOW (IN LPH)	5	12	17	35	90
MIN FLOW (IN LPH)	0.5	0.1	0.15	0.25	0.6
MAX PRESSURE(KG/SQCM)	18	9	7	4	1.5
DIAPHRAGM SIZE	0.9 SI	1.8 SI	1.8 SI	3 SI	6 SI
STROKE LENGTH	3mm (apx)	3mm (apx)	4mm (apx)	4mm (apx)	4mm (apx)
VOLUMETRIC EFFICIENCY	>45%	>55%	>60%	>75%	>90%
TOLERANCE FOR FLOW	0 to +25 %				
REPEATABILITY	+ / - 5%				
STEADY STATE ACCURACY	+/- 2%				
FLOW ADJUSTMENT	a) BY MANUAL STROKE ADJUSTMENT, b) BY MANUAL SPEED ADJUSTMENT c) BY EXTERNAL PULSE (ONLY FOR D-7 SERIES PUMPS), d) BY EXTERNAL 4-20 m A (ONLY FOR D-9 SERIES PUMPS)				
SPEED RANGE	0 - 100 SPM				
INPUT	230V,1PHASE,50HZ AC				
POWER	100 WATTS (APPX)				
DRIVE	ELECTRICAL POWER UNIT, CLASS "F" INSULATION				
SUCTION LIFT	1.5 M OF WATER COLUMN				
LIQUID END TEMPERATURE	50 DEG C MAXIMUM				
DIFFERENTIAL PRESSURE	0.7 KG/SQ.CM MINIMUM				
SUCTION PRESSURE	1 KG/SQ.CM MAX				
AMBIENT TEMPERATURE	50' C MAX				
OPTIONS	a) BUILT-IN LOW LEVEL TRIP OPTION AVAILABLE IN ALL D-7, D-9 AND D-**L SERIES PUMPS				
M O C					
1.HOUSING	30 % GLASS FILLED PP				
2.SPACER	30 % GLASS FILLED PP				
3.DIAPHRAGM	TEFLON FACED HYPALON				
4.BALL	CERAMIC				
5.LIQUIFRAM SHAFT	SS				
6.HEAD	PP, CF8M, PVC, PVDF				
7.VALVE SEAT	PVC, SS 316				
8.VALVE HOUSING	PVC, SS 316				
9.RING SEAL	TEFLON				
10.ANTISYPHON VALVE	PVC, SS 316				
11.FOOT VALVE	PVC, SS 316				
12.SUCTION STRAINER-Y TYPE	PP,CF8M				
END CONNECTION	SUCTION - 1/2" BSP(F) FOR Y-STRAINER DISCHARGE - 1/2" NPT(M)				

CLEAR WATER LTD. NEW DELHI

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

Er. K.SUBASH CHANDRA BOSE .,M.E ., Chief Engineer/Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRRMaaligai, Anna salai, Chennai-2 Tel: 044-28520878, Mobile:+919445857543.Email: cepr@tnebnet.org.	To Bharat Heavy Electricals Limited, POWER PROJECT ENGINEERING INSTITUTE HRD & ESI COMPLEX NOIDA - 201301(U.P)

Lr.No.CE/Pr-I/SE/E/Pr-I/EE2/AEE/F. PESD / D. 817 /19 dtd. 19 .09.2019

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF No.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW Ennore SESTPP/D.60/14, dt.27.09.2014
BHEL Reference No:	1. Lr.No.SE/E/THPro./EE2/AEE/F.BHEL/PEM/ D.385/19 dtd.2 .04.2019 2. BHEL Email Dt .13.09.2019 3. M/s. Desein Pvt.Ltd. Comments ref:D-4027/TANGEDCO/2301 Dt.10/13.09.2019 received by E-Mail
Subject	TANGEDCO – Approval QAP/ Inspection Checklist for Instruments for ETP drawing / document submitted by M/s BHEL - Reg

Sir,

The Approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

Sl. No	DRG/DOC.No:	DESCRIPTION	Rev No.	Status	Remarks
01	PE-V0-412-164-A043	QAP/ Inspection Checklist for Instruments for ETP	01	04	M/s. BHEL is requested to submit Six sets of drawings and documents for stamping and distribution

Status : Category 1- Approved. Category: 2 – Approved with comments, Resubmit for approval under, Category 1. Category 3 – Not approved (See attachment Memo) Resubmit for approval. Category 4 – Information furnished is noted.

Yours faithfully,

…Sd.19.09.2019…

Chief Engineer/Projects-I

Copy to Shri E.V. Anand/DESEIN Consultants India Pvt. Ltd., DESEIN HOUSE, Greater Kailash-II New Delhi-48(by E-mail)

Copy submitted to The Chief Engineer/Civil/Ennore SEZ/Chennai 600120.(by E-mail)

Annexure

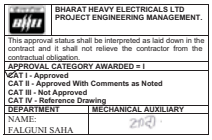
S.No.	TANGEDCO Comments	BHEL reply	TANGEDCO Comments
1.	Complete test shall be included as per contract specification, Vol. V, Chapter 14, cl. No. 14.02.04.21 for each type of instrument.	Incorporated in revised document	Noted.
2.	Type test report for protection class shall be furnished by BHEL as per specification, Vol. V, Chapter 14, Cl. No. 17.02.05. QAP shall be revised accordingly.	Incorporated in revised document	Noted.
3.	Word "TSGENCO" shall be corrected as "TANGEDCO".	Incorporated in revised document	Noted.
4.	Complete test reports shall be verified by TANGEDCO.	Incorporated in revised document	Noted.

…Sd.19.09.2019…

Chief Engineer/Projects-I

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				QUALITY ASSURANCE PLAN / INSPECTION CHECK LIST FOR INSTRUMENTS
				STATUS : CONTRACT
				JOB NO.: 17-04

DOC APPROVED VIDE Lr.No.CE/Pr-I/SE/E/Pr-I/ EE2/AEE/F. PESD / D. 817 /19 dtd. 19 .09.2019.



FALGUNI SAHA
2020.02.05 13:55:19 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	**CWL. DOC. NO.**
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	**QAP-01/17-04M(92)** **Dtd. 01.05.2019**

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-VO-412-164-A043	01
01	R. R. BAGARI		01.05.2019		
00	R. R. BAGARI		03.04.2019	NO. OF SHEETS: 1	EXCLUDING COVER PAGE

QUALITY ASSURANCE PLAN / INSPECTION CHECK LIST FOR INSTRUMENTS

CLEAR WATER LTD.
Regd. Office :
CLEAWAT HOUSE
B-14/1, OKHLA INDUSTRIAL AREA,
PHASE -II, NEW DELHI -110 020

cwl

ITEM: **instruments**
BHEL Doc. No.:

QAP No: QAP-01/17-04M(92)
DATE: 01.05.2019
REV - 01
PE-VO-412-164-A043
PAGE NO: 1 OF 1

PROJECT : 2X660 MW EnnoreSEZ STPP
PACKAGE : EFFLUENT TREATMENT PLANT
PO. No.: PW/PE/PG/EN1/P-215/17 dt. 16 Nov 2017

SR. NO.	OPERATION	CHARACTERISTIC	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORM	FORMAT OF RECORD		INSP AGENCY			REMARKS
										P	W	V	
1	2	3	4	5	6	7	8	9	D	10			11
A	**INSTRUMENTS**			ed									
1.	Pressure Gauges	a) Make , Model ; Range & Type	Major	Visual	100% by Manufacturer	Data Sheet	Data sheet	Mfr. TC	√	1	-	2,3	
2.	Differential Pressure Gauge	b) Overall Dimension / Process connection	Major	Measurement	1 per type	Data Sheet	Data sheet	Mfr. TC	√	1	-	2,3	
3.	Pressure Transmitter	c) Calibration & Accuracy	Major	Document Review	1 per type	Data Sheet	Data sheet	Mfr. TC	√	1	-	2,3	
4.	Differential Pressure Switch	d) Degree of Protection	Major	Document Review	1 per type	Data Sheet	Data sheet	Mfr. TC	√	1	-	2,3	
5.	Level Gauges	e) Over range Test (as applicable)	Major	Measurement	1 per type	Data Sheet	Data sheet	Mfr. TC	√	1	-	2,3	
6.	Flow Transmitter												
7.	Pressure Switch												
8.	Level Transmitter												
9.	Temp. Transmitter												
10.	Turbidity Meter												
11.	pH Meter												

NOTE:-i) Records , Identified with tick (√) shall be essentially included by supplier in QA Documentation ii) Test Reports shall be reviewed by TANGEDCO.iii) Type Test Report for Protection Class as per manufacturer standard shall besubmitted for TANGEDCO review; iv) Calibration of Field Instruments shall be done following Contract Specification , Vol. V , Chapter 14, ClNo. 14.02.04.21 for each type of instruments; v) Standard Check List as applicable for C&I Instruments as per Specification for Quality Assurance & Testing forming part of Specification shall be followed [1]

LEGENDS:- 1: Manufacturer (CWL)/Subcontractor, 2: BHEL, 3: TANGEDCO, P: Performed by, W: Witnessed by, V: Verification by, IR: Internal Inspection Report
MTC: Material Test Certificate, TC: Test Certificate

SUBCONTRACTOR : Clear Water Ltd SIGNATURE	CONTRACTOR : BHEL SIGNATURE	/VED BY	FOR CLIENT USE	NAME & SEAL OF APPROVING AUTHORITY

APPROVED

BHEL DOC. NO. PE-V0-412-164-A001

Clear Water Limited **B-14/1, Okhla Industrial Area, Phase-II,** **New Delhi- 110 020**	**MOTOR LOAD SCHEDULE FOR ETP Plant**	**CLEAWAT DOC. NO.**	**DS-01/17-04 E (72) REV–01**
		SHEET	**1 OF 4**

S. No.	Tag No.	Description	Motor Rating (KW)	RPM (Pole)	Controlled From	Voltage Rating (V)	Qty			Duty (Cont/ Int.)		Ref. Note
							Working	Stand by	Spare			
A	**ETP Area**											
1	90GMA01/AE 003 & 4	~~CMB Pump~~ Guard Pond Pump	125	4		415	1	1	--	Int.		IE-2;
2	90GMA21/AE 001 & 2	~~Guard Pond Pump~~ CMB Pump	75 KW	4		415	1	1	--	C		IE-3;
3	90GMA01/AE 001 & 2	Gardening Pump	2.2	8		415	1	1	--	Int.		IE-2;
4	90GNS01/ AE001 & 2	Sludge Transfer Pump	3.7	4		415	1	1	--	Int		IE-2;
5	90GNC01/ AE001 & 2	Air Blower for Sludge Sump	5.5	4		415	1	1		Int		IE-2;
6	900GMA21/A E001 & 2	TPI Inlet Water Transfer Pumps	2.2	4		415	1	1	-	Int		IE-2;
7	90GMA 11/AA001	Motorized Valve Actuator	0.75	4		415	1	-	-	Int.		-
8	90GMA 11/AA002	Motorized Valve Actuator	0.75	4		415	1	-	-	Int.		-
9	90GMA 11/AA003	Motorized Valve Actuator	0.75	4		415	1	-	-	Int.		-
10	90GMA 12/AA002	Motorized Valve Actuator	0.75	4		415	1	-	-	Int.		-
11	90GMA 301/AA001	Motorized Valve Actuator	0.75	4		415	1	-	-	Int.		-

BHARAT HEAVY ELECTRICALS LTD PROJECT ENGINEERING MANAGEMENT.
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.
APPROVAL CATEGORY AWARDED = I
CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing
DEPARTMENT: MECHANICAL AUXILIARY
NAME: FALGUNI SAHA

FALGUNI SAHA - 2020.02.05 13:51:33 +05'30'

Rev	Description	Date
01	Revised to include actuators and hoists	30.09.2019
0A	Revised as per approved P & I	02.04.2019
00	Submitted for approval	15.10.2018

Project: 2x660 MW Ennore Sez STPP
Client: Tamilnadu Generation & Distribution Corporation Limited .
Consultant: Desein Pvt Ltd. New Delhi

APPROVED ON 22-05-2019

12	90GMA 301/AA002	Motorized Valve Actuator	1.5	4		415	1	-	-	Int.		-
13	90GMA 301/AA003	Motorized Valve Actuator	0.75	4		415	1	-	-	Int.		-
14	90GMA 01/A001	3 Ton Electrically operated Mono rail Hoist at CMB	2.50	4		415	1	0	-	Int		Hoist Motor ; IE-2:
			0.25	4		415	1	0	-	Int		Trolley Motor ; IE-2:
15	90GMA 01/A002	3 Ton Electrically operated Mono rail Hoist at Guard Pond	2.50	4		415	1	0	-	Int		Hoist motor ;IE-2:
			0.25	4		415	1	0	-	Int		Trolley Motor ; IE-2:
B	**Chemical House Located in ETP Area**											
6.1	90GNN01/ AE001	Alum Solution Preparation Tank Agitator	1.5	4		415	1	0	--	Int		IE-2;
6.2	90 GNN01 CP501/502	Alum Dosing Pump	-				1	1				Electronic Model 220V-AC supply
6.3	90GNN02/ AE001	Lime Solution preparation Tank Agitator	2.2	4		415	1	0	--	Int		IE-2;
6.4	90GNN02/AE 002 &3	Lime Dosing Pump	0.75	4		415	1	1	--	Int		IE-2;
6.5	90GNN0 3 / AE001	Polyelectrolyte Tank Agitator	1.5	4		415	1	0	--	Int		IE-2;
6.6	90GNN03CP 501/502	Polyelectrolyte Dosing Pumps	-				1	1				Electronic Mode l220V-AC supply
9	**Chemical Dosing system for Guard Pond& CMB**											
9.1	90GNN01AP 001	Hydrochloric Acid Dosing pumps to CMB	-				1	1		Int		Electronic Model 220V-AC supply
9.2	90GNN01AP 002	Hydrochloric Acid Dosing pumps to Guard Pond	-				1	1		Int		Electronic Model 220V-AC supply
9.3	90GNN01AP 003	Alkali Dosing pumps to CMB	-				1	1		Int		Electronic Model 220V-AC supply
9.4	90GNN01AP 004	Alkali Dosing pumps to Guard Pond	-				1	1		Int		Electronic Model 220V-AC supply
9.5	90GNN07 AE001	ALKALI Tank Agitator	1.5	4		415	1	0	--	Int		IE-2;

Rev	Description	Date	
			Project: 2x660 MW Ennore Sez STPP **Client: Tamilnadu Generation & Distribution Corporation Limited .** **Consultant:** Desein Pvt Ltd. New Delhi
01	Revised to include actuators and hoists	30.09.2019	
0A	Revised as per approved P & I	02.04.2019	
00	Submitted for approval	15.10.2018	

S. No.	Tag No.	Description	Motor Rating (KW)	RPM (Pole)	Controlled From	Voltage Rating (V)	Qty			Duty (Cont/ Int.)		Ref. Note
							Working	Stand by	Spare			
8		**Field Pumps (outside ETP area)**										
10GNA01/AE001&2		**Transformer Yard Area Oily Waste Transfer Pumps (Unit no.1)**	3.7	4		415	1	1		INT		IE-2;
10GNA02/AE001&2		**Coal Mill Oily Waste Transfer Pumps (Unit no.1)**	3.7	4		415	1	1		**INT**		IE-2;
10GNA03/AE001&2		**Coal Mill Oily Waste Transfer Pumps (Unit no.1)**	3.7	4		415	1	1		**INT**		IE-2;
10GNA04/AE001&2		**Power House Oily Area Service Waste Transfer Pumps (Unit No. 1)**	3.7	4		415	1	1		**INT**		IE-2;
10GTA01/AE001&2		**Pre-Settling Over Flow Pumps (Unit No. 1)**	3.7	4		415	1	1		**INT**		IE-2;
20GNA01/AE001&2		**Transformer Yard Area Oily Waste Transfer Pumps(Unit no.2**	3.7	4		415	1	1		**INT**		IE-2;
20GNA02/AE001&2		**Coal Mill Oily Waste Transfer Pumps (Unit no.2)**	3.7	4		415	1	1		**INT**		IE-2;
20GNA03/AE001&2		**Coal Mill Oily Waste Transfer Pumps (Unit no.2)**	3.7	4		415	1	1		**INT**		IE-2;
20GTA01/AE001&2		**Pre-Settling Over Flow Pumps (Unit No. 2)**	3.7	4		415	1	1		**INT**		IE-2;
20GNA04/AE001&2		**Power House Oily Area Service Waste Transfer Pumps (Unit No. 2)**	3.7	4		415	1	1		**INT**		IE-2;

Notes:-

Rev	Description	Date	**Project:** 2x660 MW Ennore Sez STPP **Client: Tamilnadu Generation & Distribution Corporation Limited .** **Consultant:** Desein Pvt Ltd. New Delhi
01	Revised to include actuators and hoists	30.09.2019	
0A	Revised as per approved P & I	02.04.2019	
00	Submitted for approval	15.10.2018	

1. At any given time, only one motor per system shall operate.
2. Data sheets for Motors forming integral part of equipment such as MOV / Dosing Pumps / Electric Hoist shall be as per mfr. Standard. Details shall be furnished along with particular equipment.
3. All motors located in ETP area shall be controlled thru dedicated DDCMIS . REFER DOC NO. PE-V0-412-164-A039
4. All motors located in field (outside ETP area). Shall be controlled thru near by Control Stations/MAIN PLANT DDCMIS .

Rev	Description	Date	**Project:** 2x660 MW Ennore Sez STPP **Client: Tamilnadu Generation & Distribution Corporation Limited .** **Consultant:** Desein Pvt Ltd. New Delhi
01	Revised to include actuators and hoists	30.09.2019	
0A	Revised as per approved P & I	02.04.2019	
00	Submitted for approval	15.10.2018	

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED

From
Er.K.Subash Chandra Bose.,M.E.,
Chief Engineer/Projects I,
V Floor, Western Wing,
144, Anna Salai,
Chennai-600 002.
Fax No : 044- 28520878
Cell No: 9445857543
Email ID: cepr@tnebnet.org

To
M/s. Bharat Heavy Electrical Limited,
Project Engineering Management
PPEI Building, HRDI & ESI Complex,
Plot No.25, Sector-16A, Noida-201301(U.P)
Fax : 0120-423522
E mail: permindersingh@bhelpem.co.in,
jd@bhel.in, rajivb@bhel.in
pmgsalil@bhel.in, akashverma@bhel.in

Lr.No.CE/E/P.I/SE/E/Proj. I/AEE/E/P/F.Ennore SEZ Drg Appl./D. 369 /19 Dt.12 .09.2019

Sir.

Sub: TANGEDCO - Setting up of 2x660 MW Ennore SEZ Coal based super critical thermal power project at ash dyke of North Chennai Thermal Power Station (Kattupalli) –EPC cum Debt Finance Contract awarded to M/s BHEL – Document on QAP Motors Vertical/Horizontal Pumps for ETP (PE-V0-412-164-A014/Rev.02) submitted by M/s.BHEL/PEM - Approval accorded under **Category 1**- Reg.

Ref: 1)Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW Ennore SEZ STPP/ D.60/ 14 Dt.27.09.2014
2)Your letter Ref: MS-1-13-E-0005 dated 27.09.2014.
3) Your Doc Ref No.: Downloaded from CDF/PEDM on 04.05.2019.
4) M/s Desein Pvt. Ltd. Comments ref: D-4027/TANGEDCO/5975 Dt.17.04.2019 received on 22.04.2019.
5) Lr.No.SE/E/T&H(P)/EE-6/AEE/E/P/F.Ennore SEZ Drg Appl./D.83/19 Dt.10.05.2019
6) M/s Desein Pvt. Ltd. Comments ref: D-4027/TANGEDCO/6861 Dt.05.08.2019 received on 08.08.2019. (for R01)
7)Your Doc sub ref.: Downloaded from CDF/PEDM on 12.09.2019.
8) M/s Desein Pvt. Ltd. Comments ref: D-4027/TANGEDCO/6967 Dt.26.08.2019 received on 27.08.2019. (for R02)

Please refer to the letters cited above.

The revised document received from M/s.BHEL/PEM vide ref.(7), the following approval accorded under Cat 1.

Sl. No.	Drawing/Document No.	Rev	Description	TANGEDCO's Approval
1.	PE-V0-412-164-A014	02	QAP Motors Vertical/Horizontal Pumps for ETP Vendor: M/s.FlowMore Limited, Ghaziabad	Cat 1

It is requested that eight copies of hard copy of the above document shall be submitted immediately for according stamped approval.

Yours faithfully,

12/9

CHIEF ENGINEER/PROJECTS-I

Copy to the Chief Engineer/Civil/Ennore SEZ/Chennai-120 (by E-mail)
Copy to the Superintending Engineer/Electrical/Ennore SEZ/Chennai-120 (by E-mail)
Copy to the Superintending Engineer/Civil/Ennore SEZ/Chennai-120 (by E-mail)
Copy to M/s.Desein Pvt Ltd, New Delhi.

APPROVED

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				QAP FOR VERTICAL/ HORIZONTAL PUMPS WITH MOTOR FOR EFFLUENT
				STATUS : CONTRACT
				JOB NO.: 17-04

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT: MECHANICAL AUXILIARY

NAME: FALGUNI SAHA

FALGUNI
SAHA
2020.07.3
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DOC APPROVED VIDE Lr.No.:CE/E/P.I/SE/E/Proj.I/AEE/E/P/ R.Ennore SEZ Drg Appl./D.369/19 dT.12.09.2019.

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	**CWL. DOC. NO.**
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	**Flowmore QAP Doc. No. QAP /**

BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
1	R.R.Bagari		21-08.2019	**PE-V0-412-164-A014**	2
1	R.R.Bagari		24.07.2019		
0	R.R.Bagari		02.04,2019	NO. OF SHEETS: 1	EXCLUDING COVER PAGE

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN	QAP NO.– 3985 Rev-2	Client: Clear Water Limited.
FLOWMORE PUMPS	FLOWMORE LIMITED (UNIT – I) 9th Mile Stone, G.T. Road Mohan Nagar, Ghaziabad (U.P.) FLOWMORE LIMITED (UNIT – II) 28 A, Site IV, Sahibabad Industrial Area Ghaziabad (U.P.)	(Vertical Turbine Pump Set) BHEL PE-V0-412-164-A014	Dt. [illegible].2019 PAGE 1 OF 2	Project : TANGEDCO-ENNORE STPP P.O NO.: 142/17-04M(82) Dated :- 23-Feb-2019

SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUATUM OF CHECK		REFERENCE DOCUMENT	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
1.	RAW MATERIAL													
1.1	Bowl, Impeller, Shaft & Shaft Sleeve	Chemical & Physical Properties	Major	Chemical Analysis & Mechanical Hardness	Each Heat	Each Heat	Approved C.S. Drawings & Relevant IS	Approved C.S. Drawings & Relevant IS	T R	✓	P	V	V	
2	IN PROCESS INSPECTION													
2.1	Bowl, Impeller, Shaft & Shaft Sleeve	Surface Defects	Major	DPT on Machined Surface	100%	100%	ASTME-165 & ASTM-388	No Liner Indications	T R	✓	P	V	V	
2.2	Impeller	Balancing	Critical	Dynamic Balancing	100%	100%	ISO 1940 Gr. 6.3	ISO 1940 Gr. 6.3	T R	✓	P	V	V	
2.3	Bowls,Col. Assly. S.D Head	Soundness of Parts	Critical	Hydro Test	100%	100%	Relevant IS /HIS	No leakage	T R	✓	P	V	V	Refer Note 1
2.4	Shaft > 50 mm dia.	Ultrasonic Test	Critical	Ultrasonic Test	100%	100%	SA-388 OF ASME	SA-388 OF ASME	TR	✓	P	V	V	
3	FINAL INSPECTION													
3.1	COMPLETE PUMP ASSEMBLY	Dimension Check	Major	Measurement	100%	One of each Type	Approved G.A. Drawings	Approved G.A. Drawings	I R	✓	P	W	W	
3.2	PERFORMANCE TEST OF PUMP WITH SHOP MOTOR AT APP. SPEED	Discharge V/S Head Discharge V/S Eff. Discharge V/S Power Noise & Vibration Level	Critical	Performance Test	100%	One of each Type	Approved G.A. Drawings & Relevant IS /HIS	Approved G.A. Drawings & Relevant IS /HIS	I R	✓	P	W	W	Refer Note 2 & 3
4	Electric Motor	Routine Test	Major	Electrical	100%	100%	IS Std. & Spec. in P.O	IS Std. & Spec. in P.O	T R	✓	P	V	V	

MANUFACTURER / SUB-SUPPLIER	MAIN-SUPPLIER	LEGEND:	VED BY	APPROVAL SEAL
		RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER , C: CUSTOMER N: TPIA P: PERFORM W: WITNESS V: VERIFICATION TR: INTERNAL TEST REPORTS, IR: INSPECTION REPORTS		

Bharat Heavy Electricals Limited PPE SECTOR-16A NOIDA 201301 RI PEM/Mech.Au

	MANUFACTURER'S NAME & ADDRESS **FLOWMORE LIMITED (UNIT – I)** 9th Mile Stone, G.T. Road Mohan Nagar, Ghaziabad (U.P.) **FLOWMORE LIMITED (UNIT – II)** 28 A, Site IV, Sahibabad Industrial Area Ghaziabad (U.P.)	**MANUFACTURING QUALITY PLAN** **(Vertical Turbine Pump Set)** BHEL PE-V0-412-164-A014	QAP NO – 3985 Rev-2 Dt. 05.06.2019 PAGE 1 OF 2	Client: **Clear Water Limited.** Project : **TANGEDCO-ENNORE STPP** P.O NO.: **142/17-04M(82)** Dated :- **23-Feb-2019**

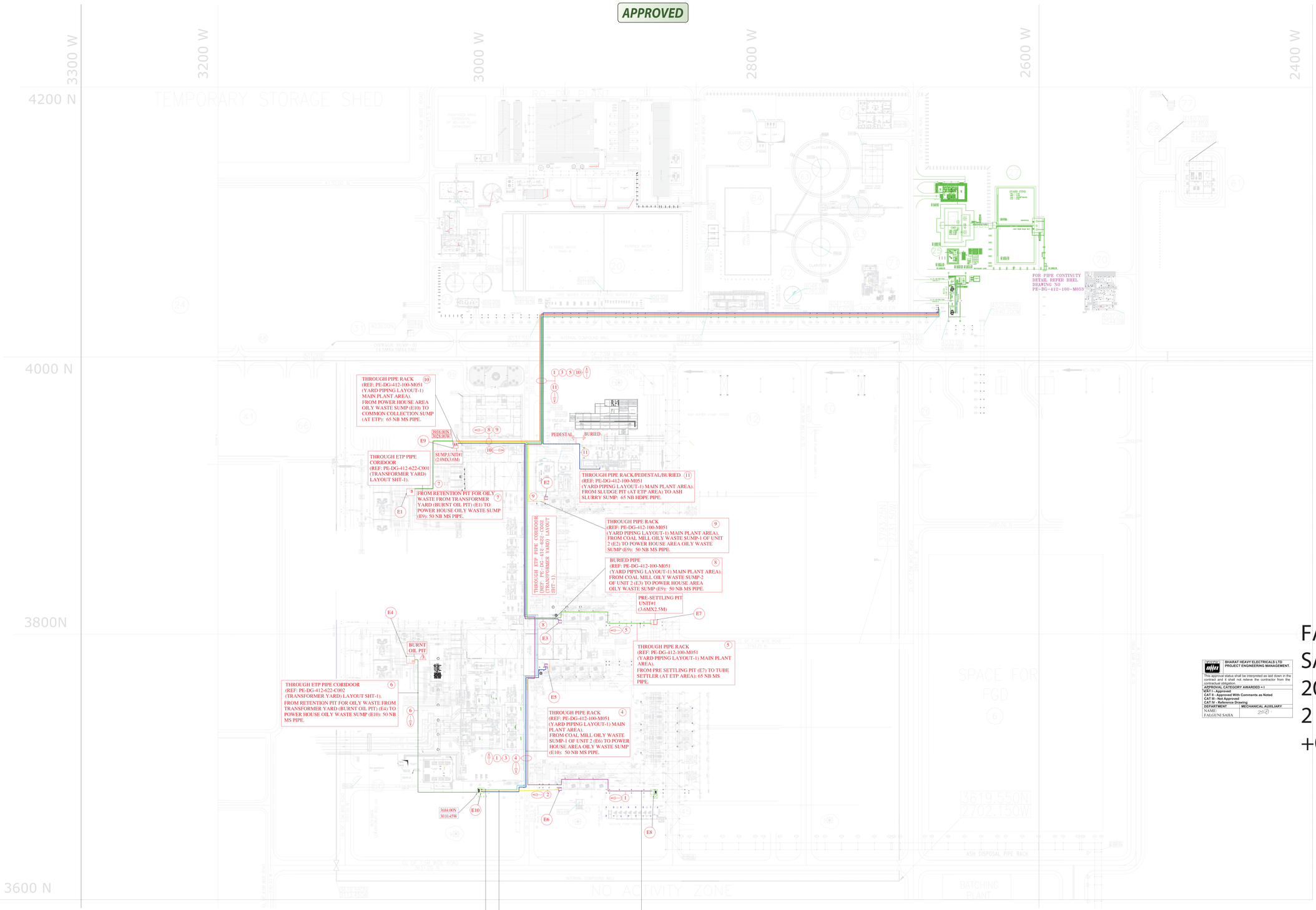
5		Painting & Packing	Major	Visual	100%	100%	Manufacturing Std.	Manufacturing Std.	---	--	P	--	--	

NOTE:
1. TEST PRESSURE SHALL BE 1.5 TIMES THE SHUT OFF HEAD OR TWICE THE DUTY POINT HEAD WHICHEVER IS HIGHER
2. NOISE & VIBRATION LEVEL SHALL BE RECORDED DURING SHOP TEST FOR REFERENCE PURPOSE ONLY, HOWEVER VALUES AS PER HIS ARE GUARANTEED AT SITE ONLY.

MANUFACTURER / SUB-SUPPLIER	MAIN-SUPPLIER	LEGEND: RECORDS, INDENTIFIED WITH "TICK" (√) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER , C: CUSTOMER N: TPIA P: PERFORM W: WITNESS V: VERIFICATION TR: INTERNAL TEST REPORTS, IR: INSPECTION REPORTS	REVIEWED BY	APPROVED BY	APPROVAL SEAL

Bharat Heavy Electricals Limited PPEI SECTOR-16A NOIDA 201301

APPROVED



FALGUNI SAHA
2020.11.02 16:02:15 +05'30'

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and shall not relieve the contractor from the contractual obligations.

APPROVAL CATEGORY AWARDED = I
CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

NOTES:–

1. ALL DIMENSIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THIS DRG. SHOULD NOT BE SCALED.
3. ISMC OVER PEDESTAL TO SUPPORT PIPES BY PEDESTAL VENDER.

REFERENCE DRAWING:

1) PE-DG-412-100-M051 (YARD PIPING LAYOUT-1) MAIN PLANT AREA).
2) PE-DG-412-622-C001 (TRANSFORMER YARD) LAYOUT SHT-1).
3) PE-DG-412-622-C002 (TRANSFORMER YARD) LAYOUT SHT-1).

PROJECT	2 x 660 MW ENNORE SEZ STPP (AT ASH DYKE OF NCTPS, CHENNAI)
OWNER	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
CONSULTANT: DESEIN	DESEIN PVT. LIMITED CONSULTING ENGINEERS NEW DELHI HYDERABAD– INDIA
CONTRACTOR	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA,NEW DELHI
ORIGINATOR: CLEARWATER	PACKAGE CONTRACTOR :– CLEAR WATER LTD. B–14/1, OKHLA INDUSTRIAL AREA PHASE–II, NEW DELHI–110020 PHONE :–26386095 E–mail :–clearwater@bol.net.in
CLEAWAT DRG. NO.	17–04/A016
VER	00
BHEL DRG.NO.	PE–V0–412–164A–A042 (SH. 1 OF 1)
REV.	0
TITLE:–	YARD PIPING LAYOUT EFFLUENT TREATMENT PLANT
SCALE	1:400

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.110/20 dt.07.12.2020

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Emails Dt.05.10.2020 & 04.11.2020. 2.DESEIN REF: D8516,D8517 & D8518 Dt.03.12.2020.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A024	0	PG test procedure for ETP	04
2	PE-V0-412-164-A013	2	Datasheet & GA for Valves for ETP	04
3	PE-V0-412-164-A023	1	VALVE SCHEDULE FOR ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.07.12.2020
Superintending Engineer/E/PrI

CRS FOR VALVE

S.NO.	Desein Comment	BHEL/CWL/AV VALVE Reply
1	Page No:4/10: (i) 2 nos 80NB NRV not available in VALVE SCHEDULE FOR ETP PE-V0-412-164-A023. (ii) MOC of Disc nut, etc., in Sr.No:9,11,12 are made of CS which is to be changed as SS 316.	i) In page number 4 of 10 please note that 2 Nos 80 NB NRV considered, but the application is wrongly indicated as process water, the same shall be for Air application (Blower Outlet) and the same is shifted to page number 5 of 10 in revised data sheet. Corrected in revised document. Also in page number 5 of 10 the 12 Nos 50 NB NRV was indicated in Rev-1 valve data sheet is shifted to page number 4 of 10 in revised valve data sheet (Rev-2). Please accept. ii) Noted and revised to SS 316.
2	Page No:6/10: (i) 2 nos 80NB BFV not available in VALVE SCHEDULE FOR ETP (ii) MOC of lever, etc., in Sr.No:5,6 are made of CS which is to be changed as SS 316.	i) 2 Nos 80 NB BFV considered, but the application is wrongly indicated as process water, the same shall be for Air application (Blower Outlet). Corrected in revised document. ii) Noted and revised to SS 316.
3	Page No:7/10: (i) 3 nos 65NB motorized BFV not available in VALVE SCHEDULE FOR ETP	i) Please note that the total 65 NB CF8M Butterfly valves is 3 nos. Among them 2 nos are manual (as per sl no 43 and 44 of valve schedule) and 1 is motorized (as per sl no 45 of valve schedule). Hence, the quantity indicated in valve schedule hold good.
4	Page No:10/10: (i) MOC of bolts, etc., in Sr.No:8,14 are made of CS which is to be changed as SS 316.	Noted and revised to SS 316.
5	Details of valve mentioned under S.No: 43 to 46,51, 63, 69 to 72 and 76 to 136 in VALVE SCHEDULE FOR ETP PE-V0-412-164-A023 are to be incorporated in this drawing.	Please note that for sl no 43, 44 and 46 indicated in page number 7 of 10 of valve data sheet. Sl no 45, 51, 63 and 77 to136 are small size valve (below 50 NB) shall be indicated separately. sl no 69 to 70 covered in page number 4 of 10 of valve data sheet (the application has been updated in data sheet from process water to air). Sl no 71 to 72 covered in page number 6 of 10 of valve data sheet (the application has been updated in data sheet from process water to air). Sl no 76 covered in page number 6 of 10 of data sheet.

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				DATA SHEET AND GA FOR VALVES FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

This document approved vide. Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.110/20 dt.07.12.2020

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

FALGUNI SAHA
2020.12.09 13:06:04 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR

TURNKEY CONTRACTOR:-

CLEAR WATER LTD.
B-14/1, OKHLA INDUSTRIAL AREA
PHASE-II, NEW DELHI-110020
PHONE: 011 26386095
EMAIL: clearwater@bol.net.in

CWL. DOC. NO.

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA
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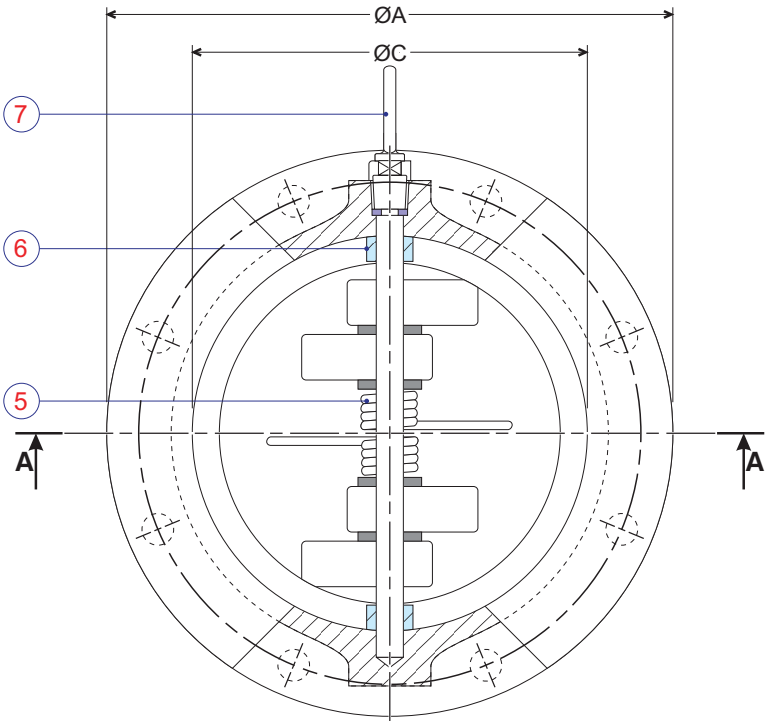
BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A013	02

				NO. OF SHEETS		EXCLUDING COVER PAGE



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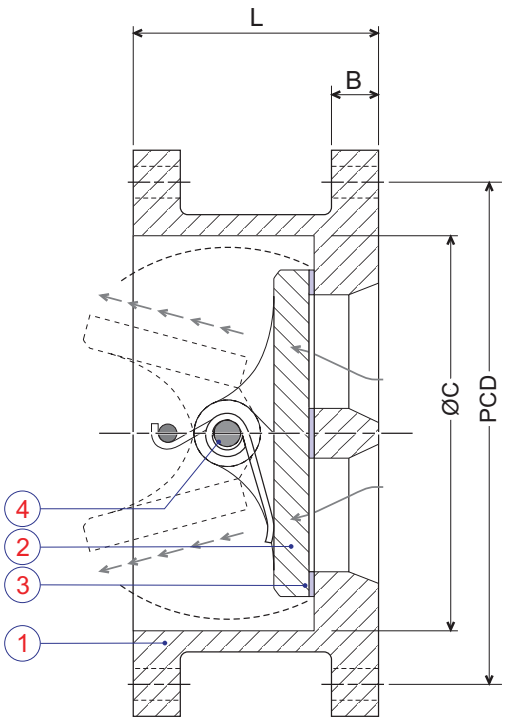


SECTION A—A

Sr. No.	Description	Material	Specification
1.	Body	SS 316L.	ASTM A 351, Gr.- CF 3M
2.	Disc	SS 316L.	ASTM A 351, Gr.- CF 3M
3.	Seat	Rubber	Nitrile
4.	Hinge Pin	SS 316L.	ASTM A 276, Type 316L
5.	Springs	Inconnel	
6.	Bearing/Bushes	SS 316L. ⚠1	
7.	Lifting Hook	Stainless Steel (SS 316L) ⚠1	

Test Pressure in Kg/cm² (g)		
Test Pressure (Hydrostatic)	BODY — 15	
	SEAT — 10	

Wt./ Pc. (Approx.)	APPLICATION	VALVE TAG No.s	SIZE ØNB	L	ØC (Approx.)	ØA	B	PCD	BOLT HOLES Dia.	BOLT HOLES Nos.	Qty. (Nos.)
130 Kgs.	SEA WATER	CMB-NR-3 & CMB-NR-4	350(14")	184.0	350.0	505.0	29.0	460.0	23.0	16	⚠2 02
158 Kgs.	SEA WATER	GP-NR-1, GP-NR-2 & GP-NR-3	400(16")	191.0	400.0	565.0	30.0	515.0	28.0	16	⚠2 03
			—	± 2.0	± 5.0	± 2.0	+ 2.0 – 0.0	± 1.0	± 0.5	TOLERANCE	

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

NOTES:—

1. Ref. Design / Manufacturing Standard = API 594.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per API 594 (Class 150#)
4. Flange drilling dimensions are as per IS : 1538 (Table-4), Flat Face, smooth finish.
5. Testing & inspection shall be done as API 598.
6. Valves shall be suitable for Horizontal / Vertical installation only.
7. An arrow indicating Direction of Flow shall be marked on valve body.
⚠2 8. All other internal & external hardware of valves shall be of SS 316L.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED

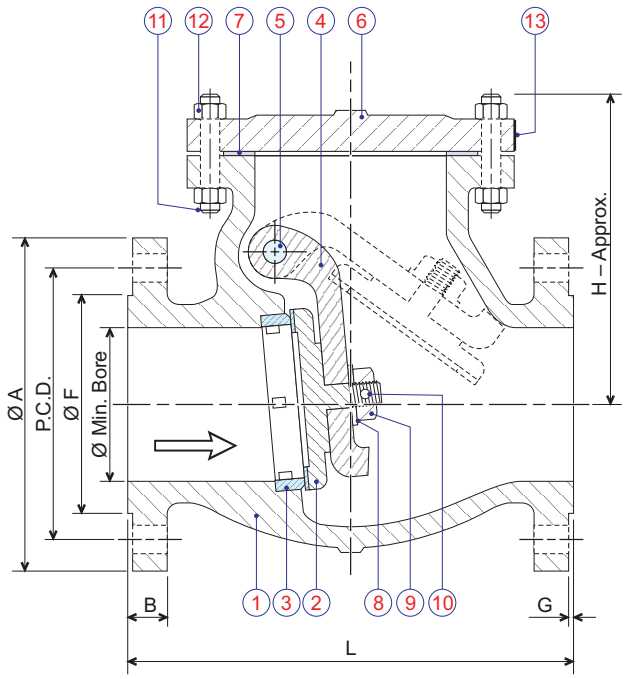
16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

STAINLESS STEEL CHECK VALVE
Class : PN-10 Rating,
Flanged (FF) Ends - Dual Plate Type

AV's DRG. NO. : RK/ 24131

DRN. : AMIT Kr. RANA
CHD. : S. K. PATHAK
APPD. :
REV. : 02
DATED : 22 / 10 / 2020
O. A. No. : 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 02 of 10



Sr. No.	Description	Material	Specification
1.	Body (Casting)	SS 316 L.	ASTM A 351, Gr.- CF 3M
2.	Disc (Swing Flap Type)	SS 316 L.	ASTM A 351, Gr.- CF 3M
3.	Body-seat ring	SS 316 L.	ASTM A 351, Gr.- CF 3M
4.	Hinge / Lever	SS 316 L.	ASTM A 351, Gr.- CF 3M
5.	Hinge Pin (No Casting)	SS 316 L.	ASTM A 276, Type 316 L.
6.	Cover	SS 316 L.	ASTM A 351, Gr.- CF 3M
7.	Cover Gasket	Spiral Wound SS 316L + Graphite Filler	
8.	Disc Washer	SS 316 L.	ASTM A 276, Type 316 L.
9.	Disc Nut	SS 316.	ASTM A 194, Gr.- 8M
10.	Pin for Disc Nut	SS 316 L.	ASTM A 276, Type 316 L.
11.	Studs / Bolts	SS 316.	ASTM A 193, Gr.- B8M
12.	Nuts	SS 316.	ASTM A 194, Gr.- 8M
13.	Name Plate	Aluminum	

Approx. Weight/pc	VALVE TAG No.s	APPLICATION	SIZE ØNB	ØMin. Bore	L	H (Approx)	ØA	B	PCD	Ø F	G	BOLT HOLES Dia.	BOLT HOLES Nos.	Qty. (Nos)
17 Kgs.	CMB-NR-1 & CMB-NR-2	SEA WATER	65 (2½")	64.0	216.0	130.0	177.8	17.5	139.7	104.8	2.0	19.1	4	02
			—	± 1.0	± 2.0	± 25.0	+ 2.0 – 1.0	+ 2.0 – 0.0	± 1.5	± 1.0	± 0.5	± 0.5	TOLERANCE	

Test Pressure in Kg/cm² (g)	
Test Pressure (Hydrostatic)	BODY — 15
	SEAT — 10

NOTES:—

1. Ref. Design / Manufacturing Standard = BS 1868.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per ASME B16.10 (Class 150#)
4. Flanges and Drilling are as per ASME B16.5 (Class 150#) Raised Face, serrated finish.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. Valves shall be suitable for Horizontal / Vertical installation only.
7. An arrow indicating Direction of Flow shall be marked on valve body.
8. All other internal & external hardware of valves shall be of SS 316L.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED

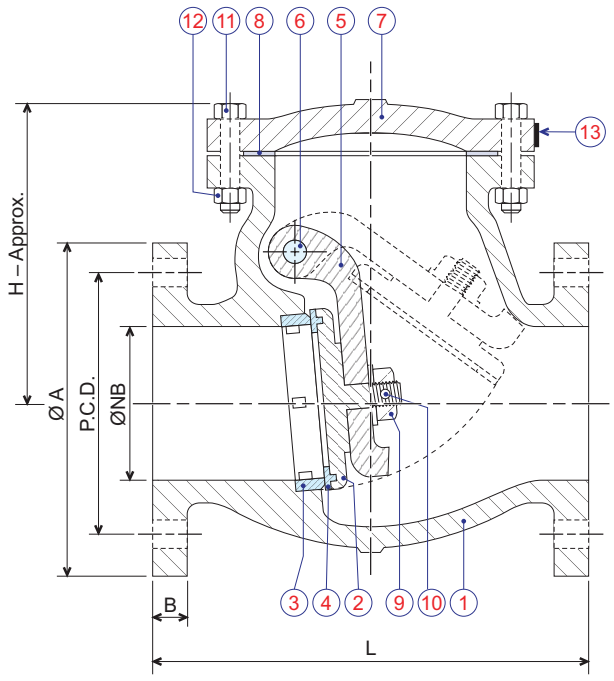
16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

STAINLESS STEEL CHECK VALVE
Class : PN 10 Rating,
Flange (Raised Face) Ends,
(Bolted Cover – Swing Check Type)

AV's DRG. NO. : RK/ 24132

DRN. : AMIT Kr. RANA
CHD. : S. K. PATHAK
APPD. :
REV. : 02
DATED : 22 / 10 / 2020
O. A. No. : 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 03 of 10



Sr. No.	Description	Material	Specification
1.	Body (Casting)	Cast Iron	IS : 210, Gr.- FG 260
2.	Disc (Swing Flap Type)	Cast Iron	IS : 210, Gr.- FG 260
3.	Body-seat ring	13% Cr.	ASTM A 217, Gr.- CA 15
4.	Disc Seat Ring	13% Cr.	ASTM A 217, Gr.- CA 15
5.	Hinge/Lever	Cast Iron	IS : 210, Gr.- FG 260
6.	Hinge Pin (No Casting)	13% Cr.	ASTM A 276, TP 410
7.	Cover (Bolted)	Cast Iron	IS : 210, Gr.- FG 260
8.	Cover Gasket	Rubber	IS : 638, Type 'B'
9.	Disc Nut	SS 316.[2]	ASTM A 194, Gr.- 8M[2]
10.	Pin for Disc Nut	SS 316.[2]	ASTM A 276, TP 316[2]
11.	Body-cover Bolt	SS 316.[2]	ASTM A 193, Gr.- B8M[2]
12.	Body-cover Nuts	SS 316.[2]	ASTM A 194, Gr.- 8M[2]
13.	Name Plate	Aluminum	

Approx. Weight/pc	VALVE TAG No.s	APPLICATION	SIZE ØNB	L	H (Approx)	Ø A	B	PCD	BOLT HOLES Dia.	BOLT HOLES Nos.	Qty. (Nos.)
17 Kgs.	E7-NR-1, E7-NR-2, E8-NR-1, E8-NR-2, E9-NR-1, E9-NR-2, E10-NR-1, E10-NR-2, SP-NR-1 & SP-NR-2	Process Water	65(2½")	216.0	130.0	177.8	17.5	139.7	19.1	4	10
37 Kgs.	CCS-NR-1 & CCS-NR-2	Process Water	100 (4")	292.0	175.0	228.6	23.8	190.5	19.1	8	02
12 Kgs	E1-NR-1, E1-NR-2, E2-NR-1, E2-NR-2, E3-NR-1, E3-NR-2, E4-NR-1, E4-NR-2, E5-NR-1, E5-NR-2, E6-NR-1 & E6-NR-2	Process Water	50 (2")	203.0	110.0	150.0	16.0	120.7	19.1	4	12
			—	± 2.0	± 25.0	± 2.0	+ 2.0 – 0.0	± 1.5	± 0.5	TOLERANCE	

Test Pressure in Kg/cm² (g)	
Test Pressure (Hydrostatic)	BODY — 15
	SEAT — 10

NOTES:—

1. Ref. Design / Manufacturing Standard = BS 5153.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per ASME B16.10 (Class 150#)
4. Flanges and Drilling are as per ASME B16.1 (Class 125#) Flat Face, smooth finish.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. Valves shall be suitable for Horizontal / Vertical installation only.
7. An arrow indicating Direction of Flow shall be marked on valve body.
8. Each Valve shall be supplied with a pair of companion flanges, nuts-bolts (A193,B7 & A194-2H) & gasket.
9. [2] All other internal & external hardware of valves shall be of SS 316.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED
16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

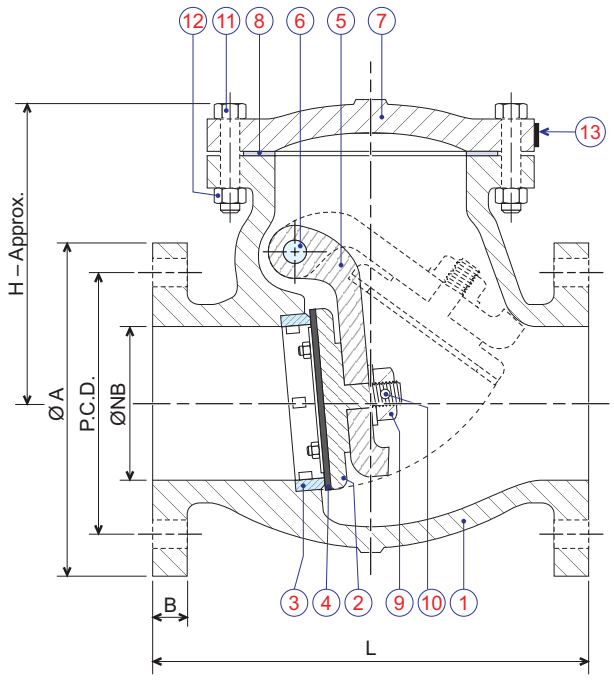
CAST IRON CHECK VALVE

Class : PN 10 Rating,
Flange (Raised Face) Ends,
(Bolted Cover – Swing Check Type)

AV's DRG. NO. : RK/ 24947

DRN. : AMIT Kr. RANA
CHD. : S. K. PATHAK
APPD. :
REV. : 02
DATED : 22 / 10 / 2020
O. A. No. : 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 04 of 10



Sr. No.	Description	Material	Specification
1.	Body (Casting)	Cast Iron	IS : 210, Gr.- FG 260
2.	Disc (Swing Flap Type)	Cast Iron	IS : 210, Gr.- FG 260
3.	Body-seat ring	13% Cr.	ASTM A 217, Gr.- CA 15
4.	Disc Seat	Rubber △2	Nitrile △2
5.	Hinge/Lever	Cast Iron	IS : 210, Gr.- FG 260
6.	Hinge Pin (No Casting)	13% Cr.	ASTM A 276, TP 410
7.	Cover (Bolted)	Cast Iron	IS : 210, Gr.- FG 260
8.	Cover Gasket	Rubber	IS : 638, Type 'B'
9.	Disc Nut	SS 316 △2	ASTM A 194, Gr.- 8M △2
10.	Pin for Disc Nut	SS 316 △2	ASTM A 276, TP 316 △2
11.	Body-cover Bolt	SS 316 △2	ASTM A 193, Gr.- B8M △2
12.	Body-cover Nuts	SS 316 △2	ASTM A 194, Gr.- 8M △2
13.	Name Plate	Aluminum	

Approx. Weight/pc	VALVE TAG No.s	APPLICATION	SIZE ØNB	L	H (Approx)	Ø A	B	PCD	BOLT HOLES Dia.	BOLT HOLES Nos.	Qty. (Nos.)
25 Kgs.	AB-NR-1 & AB-NR-2	Air	80 (3")	241.0	143.0	190.5	19.1	152.4	19.1	4	02
			—	± 2.0	± 25.0	± 2.0	+ 2.0 – 0.0	± 1.5	± 0.5	TOLERANCE	

Test Pressure in Kg/cm² (g)	
Test Pressure (Hydrostatic)	BODY — 15
	SEAT — 10

NOTES:—

1. Ref. Design / Manufacturing Standard = BS 5153.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per ASME B16.10 (Class 150#)
4. Flanges and Drilling are as per ASME B16.1 (Class 125#) Flat Face, smooth finish.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. Valves shall be suitable for Horizontal / Vertical installation only.
7. An arrow indicating Direction of Flow shall be marked on valve body.
8. Each Valve shall be supplied with a pair of companion flanges, nuts-bolts (A193,B7 & A194-2H) & gasket.
△2 9. All other internal & external hardware of valves shall be of SS 316.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED

16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

CAST IRON CHECK VALVE

Class : PN 10 Rating,
Flange (Raised Face) Ends,
(Bolted Cover – Swing Check Type)

AV's DRG. NO. : RK/ 24947-A

DRN. : AMIT Kr. RANA
CHD. : S. K. PATHAK
APPD. :
REV. : 02
DATED : 22 / 10 / 2020
O. A. No. : 4758

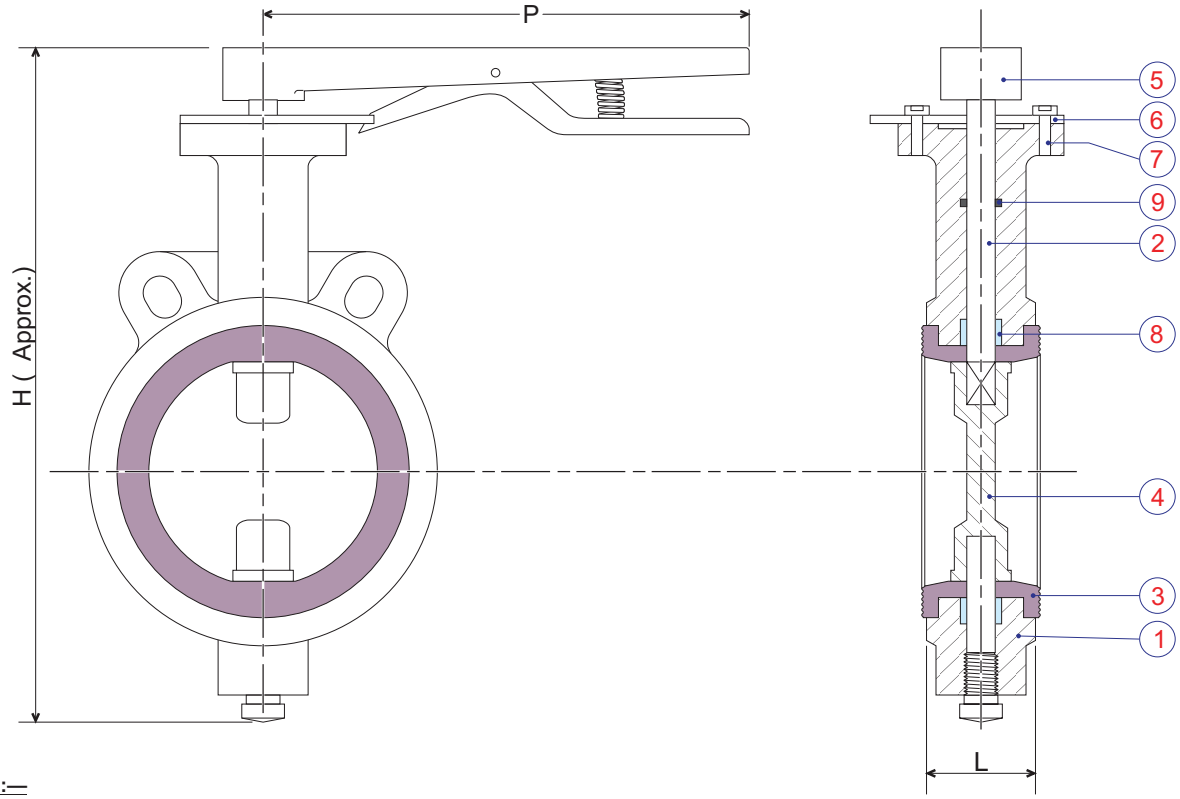
SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 05 of 10

Test Pressure in Kg/cm² (g)	
Test Pressure (Hydrostatic)	BODY — 15
	SEAT — 10

Sr. No.	Description	Material	Specification
1.	Body	C.I.+2% Ni	IS : 210, Gr.- FG 260+ 2% Ni
2.	Stem / Shaft	13% Cr.	ASTM A 276, Type 410
3.	Seat (Liner)	Rubber	Nitrile
4.	Disc	C.I.+2% Ni	IS : 210, Gr.- FG 260+ 2% Ni
5.	Lever/Handle Assm.	C. S.	IS : 2062, Gr.- B
6.	Latch Plate	C. S.	IS : 2062, Gr.- B
7.	Fasteners	SS316 △1	
8.	Shaft Bushing	Gunmetal / PTFE	
9.	Shaft Seal 'O' ring	Nitrile Rubber	

Approx. Wt./pc	Application	SIZE ØNB	L	H	P	QTY. (Nos.)
△1 2.40Kgs.	Process Water	50 (2")	43.0	230.0	170.0	△2 12
△1 2.90Kgs.	Process Water	65(2½")	46.0	260.0	170.0	△2 12
△1 3.10Kgs.	Air	80 (3")	46.0	270.0	200.0	△2 02
△1 4.50Kgs.	Process Water	100 (4")	52.0	310.0	200.0	△2 02
		—	± 2.0	± 25.0	± 25.0	TOLE.

SIZE ØNB	VALVE TAG NOS.
△1 50 (2")	E1-BF-1, E1-BF-2, E2-BF-1, E2-BF-2, E3-BF-1, E3-BF-2, E4-BF-1, E4-BF-2, E5-BF-1, E5-BF-2, E6-BF-1 & E6-BF-2
△1 65(2½")	E7-BF-1, E7-BF-2, E8-BF-1, E8-BF-2, E9-BF-1, E9-BF-2, E10-BF-1, E10-BF-2, CMB-BF-1, CMB-BF-2, SP-BF-1, SP-BF-2
△1 80 (3")	AB-BF-1 & AB-BF-2
△1 100 (4")	CCS-BF-1 & CCS-BF-2



NOTES:—

1. Ref. Design / Manufacturing Standard = BS EN 593.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per BS EN 593.
4. Wafer Ends shall be suitable for fitment between IS-1538, Table-4, Flanges.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. An arrow indicating Direction of Flow shall be marked on valve body.
△2 7. All other internal & external hardware of valves shall be of SS 316.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED

16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

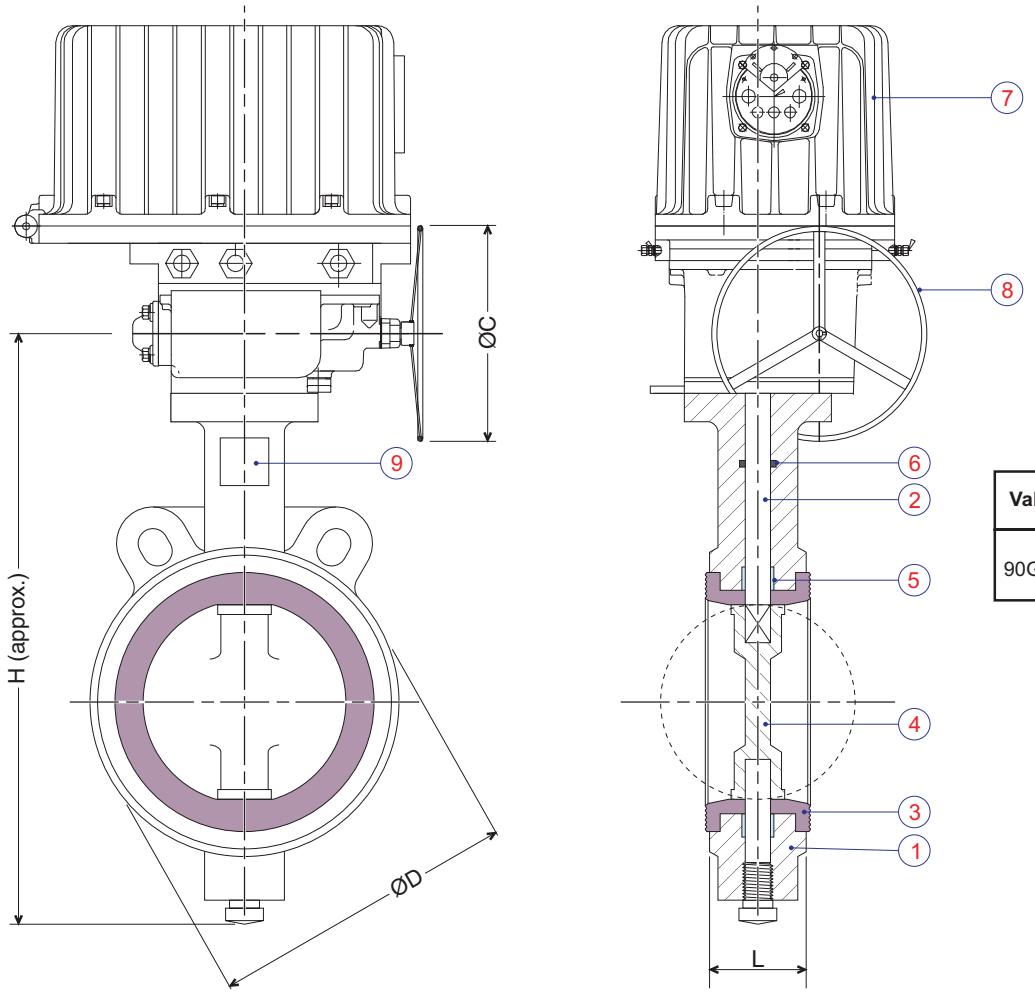
CAST IRON+2% NICKEL BUTTERFLY VALVE

Class : PN 10 Rating,
Wafer End Suit to IS-1538 Flange
(Concentric Type, Lever Operated)

AV's DRG. NO. : RK/ 24134

DRN.	: AMIT Kr. RANA
CHD.	: S. K. PATHAK
APPD.	:
REV.	: 02
DATED	: 22 / 10 / 2020
O. A. No.	: 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 06 of 10



Sr. No.	Description	Material	Specification
1.	Body	SS 316L[2]	ASTM A 351, Gr.- CF 3M[2]
2.	Stem / Shaft	SS 316L[2]	ASTM A 276, TP 316L[2]
3.	Seat (Liner)	Rubber	Nitrile
4.	Disc	SS 316L[2]	ASTM A 351, Gr.- CF 3M[2]
5.	Shaft Bushing	Gunmetal / PTFE	
6.	Shaft Seal 'O' ring	Nitrile Rubber	
7.	Elect. Actuator	415V AC, 3phase, 50Hz, Rotork/Auma make	
8.	Hand-wheel	Carbon Steel	
9.	Name Plate	Aluminum	

Valve Tag Nos.	Application	Approx. Wt./pc	ØD	Size (NB)	L	H (Approx.)	ØK	ØC	Qty. (Nos.)
90GMA12AA002	Process Water	65 Kgs.	108.0	65(2½")	46.0	325.0	64.0	229.0	03
			± 5.0	—	± 3.0	± 50.0	± 5.0	± 25.0	Tole.

Test Pressure in Kg/cm² (g)	
Test Pressure (Hydrostatic)	BODY — 15
	SEAT — 10

NOTES:—

1. Ref. Design / Manufacturing Standard = BS EN 593.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per BS EN 593.
4. Wafer Ends shall be suitable for fitment between IS-1538, Table-4, Flanges.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. An arrow indicating Direction of Flow shall be marked on valve body.
7. [2] All other internal & external hardware of valves shall be of SS 316L.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

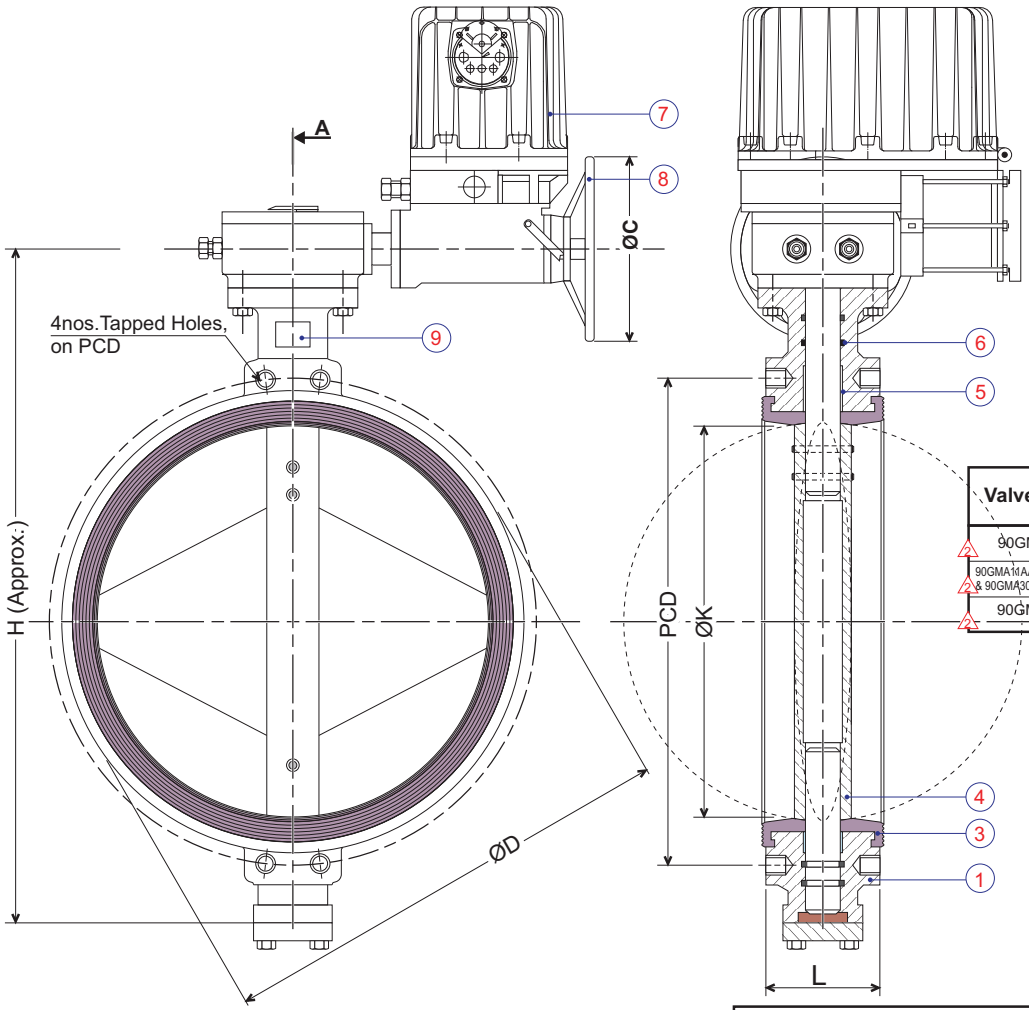
A.V. VALVES LIMITED
16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

[2] STAINLESS STEEL BUTTERFLY VALVE
Class : PN 10 Rating,
Wafer End Suit to IS-1538 Flange
(Concentric Type, Motor Operated)

AV's DRG. NO. : RK/ 24135

DRN. : AMIT Kr. RANA
CHD. : S. K. PATHAK
APPD. :
REV. : 02
DATED : 22 / 10 / 2020
O. A. No. : 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 07 of 10



Sr. No.	Description	Material	Specification
1.	Body	SS 316L.	ASTM A 351, Gr.- CF 3M
2.	Stem / Shaft	SS 316L	ASTM A 276, TP 316L
3.	Seat (Liner)	Rubber	Nitrile
4.	Disc	SS 316L	ASTM A 351, Gr.- CF 3M
5.	Shaft Bushing	Gunmetal / PTFE	
6.	Shaft Seal 'O' ring	Nitrile Rubber	
7.	Elect. Actuator	415V AC, 3phase, 50Hz, Rotork/Auma make	
8.	Hand-wheel	Carbon Steel	
9.	Name Plate	Aluminum	

Valve Tag Nos.	Approx. Wt./pc	Application	Size (NB)	L	H	ØK	ØD	PCD	Tapped Holes	Qty. (Nos.)
90GMA11AA001	95 Kgs.	Sea Water	300(12")	78.0	530.0	298.0	375.0	400.0	M20	01
90GMA11AA002, 90GMA11AA003 & 90GMA30AA003	105Kgs.	Sea Water	350(14")	92.0	590.0	348.0	437.0	460.0	M20	03
90GMA30AA002	140Kgs.	Sea Water	400(16")	102.0	685.0	394.0	488.0	515.0	M24	01
			—	± 3.0	± 50.0	± 5.0	± 5.0	± 1.5	—	Tole.

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

Test Pressure in Kg/cm² (g)		
Test Pressure (Hydrostatic)	BODY	15
	SEAT	10

NOTES:—

1. Ref. Design / Manufacturing Standard = BS EN 593.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per BS EN 593.
4. Wafer Ends shall be suitable for fitment between IS-1538, Table-4, Flanges.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. An arrow indicating Direction of Flow shall be marked on valve body.
7. All other internal & external hardware of valves shall be of SS 316L.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

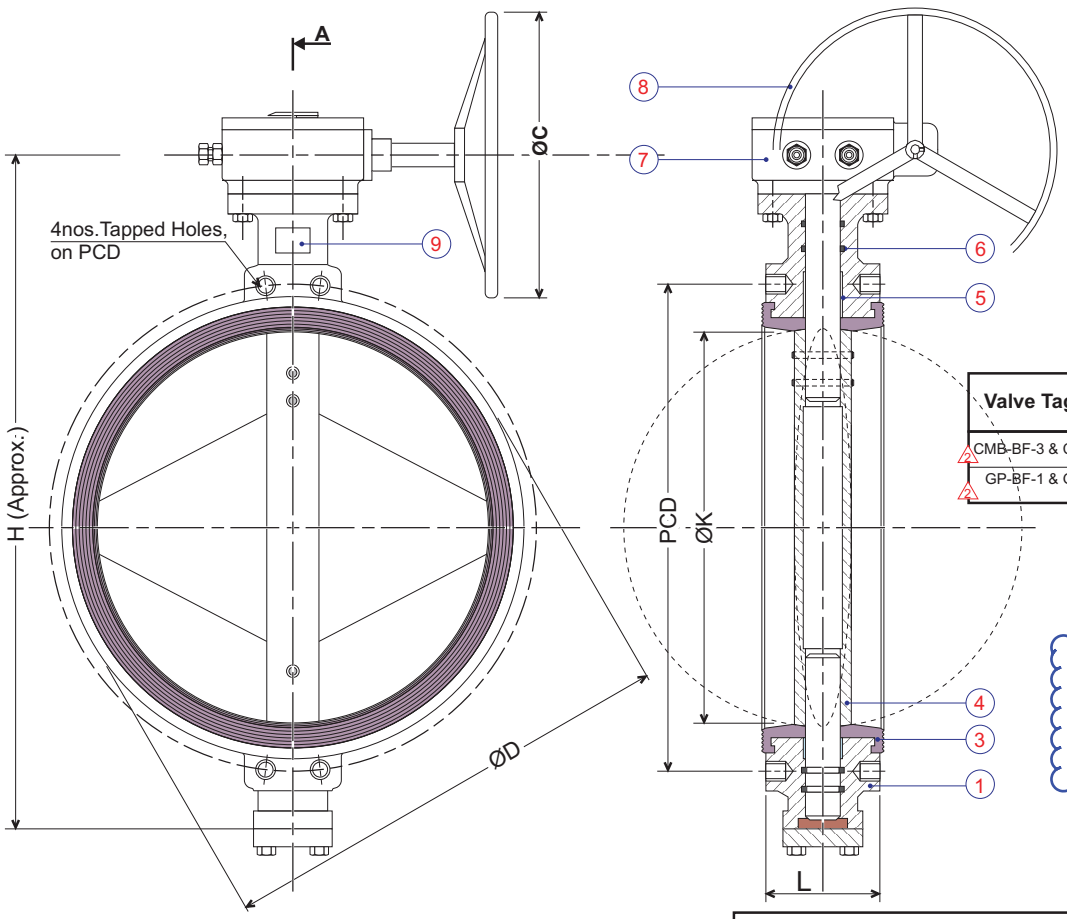
A.V. VALVES LIMITED
16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

STAINLESS STEEL BUTTERFLY VALVE
Class : PN 10 Rating,
Wafer End Suit to IS-1538 Flange
(Concentric Type, Motor Operated)

AV's DRG. NO. : RK/ 24136

DRN. : AMIT Kr. RANA
CHD. : S. K. PATHAK
APPD. :
REV. : 02
DATED : 22 / 10 / 2020
O. A. No. : 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 08 of 10



Sr. No.	Description	Material	Specification
1.	Body	SS 316L.	ASTM A 351, Gr.- CF 3M
2.	Stem / Shaft	SS 316L.	ASTM A 276, TP 316L
3.	Seat (Liner)	Rubber	Nitrile
4.	Disc	SS 316L.	ASTM A 351, Gr.- CF 3M
5.	Shaft Bushing	Gunmetal / PTFE	
6.	Shaft Seal 'O' ring	Nitrile Rubber	
7.	Gear-box & Gears	Housing in Cast Iron and Gears of EN-8	
8.	Hand-wheel	Carbon Steel	
9.	Name Plate	Aluminum	

Valve Tag Nos.	Approx. Wt./pc	Application	Size (NB)	L	H	ØK	ØD	PCD	Tapped Holes	Qty. (Nos.)
CMB-BF-3 & CMB-BF-4	105Kgs.	Sea Water	350(14")	92.0	590.0	348.0	437.0	460.0	M20	02
GP-BF-1 & GP-BF-2	140Kgs.	Sea Water	400(16")	102.0	685.0	394.0	488.0	515.0	M24	02
			—	± 3.0	± 50.0	± 5.0	± 5.0	± 1.5	—	Tole.

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

Test Pressure in Kg/cm² (g)		
Test Pressure (Hydrostatic)	BODY	15
	SEAT	10

NOTES:—

1. Ref. Design / Manufacturing Standard = BS EN 593.
2. All Dimensions are in mm, unless otherwise specified.
3. Face-to-face dimension are as per BS EN 593.
4. Wafer Ends shall be suitable for fitment between IS-1538, Table-4, Flanges.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. An arrow indicating Direction of Flow shall be marked on valve body.
7. All other internal & external hardware of valves shall be of SS 316L.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED

16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

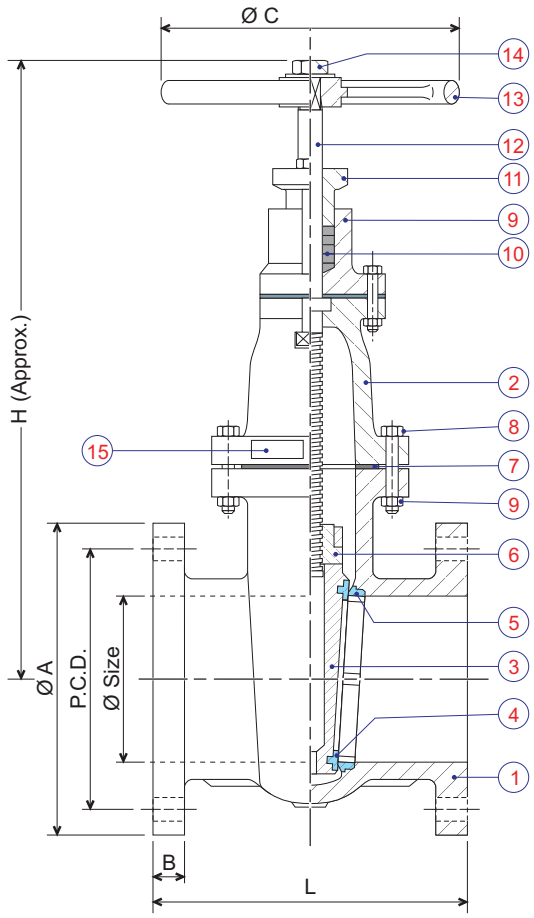
STAINLESS STEEL BUTTERFLY VALVE

Class : PN 10 Rating,
Wafer End Suit to IS-1538 Flange
(Concentric Type, Gear Operated)

AV's DRG. NO. : RK/ 24137

DRN.	: AMIT Kr. RANA
CHD.	: S. K. PATHAK
APPD.	:
REV.	: 02
DATED	: 22 / 10 / 2020
O. A. No.	: 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 09 of 10



Test Pressure in Kg/cm² (g)	
Test Pressure (Hydrostatic)	BODY — 15
	SEAT — 10

Sr. No.	Description	Material	Specification
1.	Body	Cast Iron	IS : 210 Gr.- FG 260
2.	Bonnet	Cast Iron	IS : 210 Gr.- FG 260
3.	Wedge (Disc)	Cast Iron	IS : 210 Gr.- FG 260
4.	Body Seat Ring	13% Cr.	ASTM A 217, Gr.- CA 15
5.	Wedge Seat Ring	13% Cr.	ASTM A 217, Gr.- CA 15
6.	Wedge Nut	Bronze	IS : 318, Gr.- LTB 2
7.	Gasket	Rubber	IS : 638, Type 'B'
8.	Bolt & Nuts	SS 316. [2]	ASTM A193, B8M/ A194,8M [2]
9.	Stuffing Box	Cast Iron	IS : 210 Gr.- FG 260
10.	Packing	Jute & Hemp IS 5414 / Rubber IS 638, B	
11.	Gland	Cast Iron	IS : 210 Gr.- FG 260
12.	Stem	13% Cr.	ASTM A 276, TP 410
13.	Hand Wheel	Cast Iron	IS : 210 Gr.- FG 260
14.	Hand Wheel Nut	Steel	IS : 1367, Cl.- 4.0
15.	Name Plate	Aluminum	

Approx. Weight/pc	VALVE TAG No.s	APPLICATION	SIZE ØNB	L	H (Approx.)	Ø C	Ø A	B	PCD	BOLT HOLES Dia.	BOLT HOLES Nos.	Qty. (Nos.)
25 Kgs.	OWS-SV-1 & TS-SV-1	Process Water Sludge	65(2½")	203.0	425.0	225.0	177.8	17.5	139.7	19.1	4	02
			—	± 2.0	± 25.0	± 5.0	± 2.0	+ 2.0 – 0.0	± 1.5	+ 0.5	TOLERANCE	

NOTES:—

1. Ref. Design / Manufacturing Standard = IS 14846-2000.
2. All Dimensions are in mm, unless otherwise specified.
3. Face to face dimensions are be as per IS : 14846
4. Flanges and Drilling are as per ASME B16.1 (Class 125#) Flat Face, smooth finish.
5. Testing and inspection shall be done as per BS EN ISO 12266-1.
6. An arrow indicating Direction of Flow shall be marked on valve body.
7. Each Valve shall be supplied with a pair of companion flanges, nuts-bolts (A193,B7 & A194-2H) & gasket.
8. [2] All other internal & external hardware of valves shall be of SS 316.

Owner : M/s Tamilnadu Gen. And Distri. Corpn. (TANGEDCO)	Pur. Order No. : 62/17-04, Rev.- 00, P.O. Dated : 04-Oct.-2019
Project : 2×660 MW, Ennore SEZ Super Thermal Power Project	Client : M/s Bharat Heavy Electricals Limited
Process : ETP Plant	Contractor : M/s Clear Water Ltd., New Delhi

ISO 9001:2008 CERTIFIED

Manufacturer :-

A.V. VALVES LIMITED
16, Industrial Estate, Nunhai,
AGRA 282006 (INDIA)
Phone : + 91 562 2281202
Fax : + 91 562 2281201
email : avvalves@sancharnet.in

CAST IRON SLUICE VALVE

Pressure Rating : PN 1.0,
Flange Ends, Manual H/w Operated,
(Inside Screwed – Non-rising Type)

AV's DRG. NO. : RK/ 24948

DRN.	: AMIT Kr. RANA
CHD.	: S. K. PATHAK
APPD.	:
REV.	: 02
DATED	: 22 / 10 / 2020
O. A. No.	: 4758

SCALE : NTS	BHEL Doc No.: PE-V0-412-164-A013	Doc. Rev.- 02	SHEET NO.- 10 of 10

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.110/20 dt.07.12.2020

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Emails Dt.05.10.2020 & 04.11.2020. 2.DESEIN REF: D8516,D8517 & D8518 Dt.03.12.2020.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A024	0	PG test procedure for ETP	04
2	PE-V0-412-164-A013	2	Datasheet & GA for Valves for ETP	04
3	PE-V0-412-164-A023	1	VALVE SCHEDULE FOR ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.07.12.2020
Superintending Engineer/E/PrI

CRS FOR VALVE

S.NO.	Desein Comment	BHEL/CWL Reply
1	2 nos 80NB NRV mentioned on Datasheet & GA for Valves for ETP (Page No:4/10) not available in VALVE SCHEDULE FOR ETP. Same is to be incorporated in the valve schedule.	2 Nos 80 NB NRV considered in valve data sheet in page no 4 of 10, but the application is wrongly indicated as process water, the same shall be for Air application (Blower Outlet). The same is corrected in revised valve data sheet. Please accept.
2	2 nos 80NB BFV mentioned on Datasheet & GA for Valves for ETP (Page No:6/10) not available in VALVE SCHEDULE FOR ETP. Same is to be incorporated in the valve schedule.	2 Nos 80 NB BFV considered in valve data sheet in page number 6 of 10, but the application is wrongly indicated as process water, the same shall be for Air application (Blower Outlet). Corrected in revised document. The same is corrected in revised valve data sheet. Please accept.
3	3 nos 65NB motorized BFV mentioned on Datasheet & GA for Valves for ETP (Page No:7/10) not available in VALVE SCHEDULE FOR ETP. Same is to be incorporated in the valve schedule.	Please note that the total 65 NB CF8M Butterfly valves is 3 nos and the same is considered in valve data sheet in page number 7 of 10. Among them 2 nos are manual (as per sl no 43 and 44 of valve schedule) and 1 is motorized (as per sl no 45 of valve schedule). Hence, the quantity indicated in valve schedule hold good. Please accept.
4	Total number of valves in ETP as per drg. no: PE-Vo-412-164-A004: 1) Motorised valves: 48 nos. 2) Pneumatic operated valves: 50nos. 3) Solenoid operated valves :99nos. 4) NRV:99 nos. 5) Manual valves :99 nos. 6) Pressure relief valves :99 nos. Total:494 nos. But only 176 nos. valves mentioned in the Valve Schedule. M/s BHEL is to clarify.	Please note that the valve schedule is reviewed again for any missing valves and found it is in order, however, please note that any other valves not indicated in valve schedule but required as per P&ID or process requirement the same shall be provided by M/s CWL (ETP supplier) without any price/delivery implication, one note added in this regard. Also please note that the number indicated in comments as 494 nos valves are included for isolation of instrument and the same shall be supplied along with the instrument supplier (as it is an integral part of instrument). hence, the same is not covered in valve schedule. Please accept.

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				VALVE SCHEDLUE FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

This document approved vide. Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.110/20 dt.07.12.2020

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

FALGUNI SAHA
2020.12.09 13:02:12 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	CWL. DOC. NO.
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301. PEM/Mech. Aux. FALGUNI SAHA 2020.10.22 16:23:14 +05'30'

BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A023	01

NO. OF SHEETS		EXCLUDING COVER PAGE

S.No.	Ref. PID No.	TAG NO	Discription and location	Size (NB)	Type	MOC	End Connection	Operation	Qty	Application/ Remark
1	PE-V0-412-164-A004	E1-NR-1	Transformer Yard Area Oily waste Transfer Pump (10GNA01AP001) Discharge for unit-1.	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
2	PE-V0-412-164-A004	E1-NR-2	Transformer Yard Area Oily waste Transfer Pump (10GNA01AP002) Discharge for unit-1.	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
3	PE-V0-412-164-A004	E1-BF-1	Transformer Yard Area Oily waste Transfer Pump (10GNA01AP001) Discharge for unit-1.	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
4	PE-V0-412-164-A004	E1-BF-2	Transformer Yard Area Oily waste Transfer Pump (10GNA01AP002) Discharge for unit-1.	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
5	PE-V0-412-164-A004	E2-NR-1	Coal Mill Oily waste Transfer Pump (10GNA02AP001) Discharge (for Unit-1, Sump-1).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
6	PE-V0-412-164-A004	E2-NR-2	Coal Mill Oily waste Transfer Pump (10GNA02AP002) Discharge (for Unit-1, Sump-1).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
7	PE-V0-412-164-A004	E2-BF-1	Coal Mill Oily waste Transfer Pump (10GNA02AP001) Discharge (for Unit-1, Sump-1).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
8	PE-V0-412-164-A004	E2-BF-2	Coal Mill Oily waste Transfer Pump (10GNA02AP002) Discharge (for Unit-1, Sump-1).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
9	PE-V0-412-164-A004	E3-NR-1	Coal Mill Oily waste Transfer Pump (10GNA03AP001) Discharge (for Unit-1, Sump-2).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
10	PE-V0-412-164-A004	E3-NR-2	Coal Mill Oily waste Transfer Pump (10GNA03AP002) Discharge (for Unit-1, Sump-2).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
11	PE-V0-412-164-A004	E3-BF-1	Coal Mill Oily waste Transfer Pump (10GNA03AP001) Discharge (for Unit-1, Sump-2).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
12	PE-V0-412-164-A004	E3-BF-2	Coal Mill Oily waste Transfer Pump (10GNA03AP002) Discharge (for Unit-1, Sump-2).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
13	PE-V0-412-164-A004	E4-NR-1	Transformer Yard Area Oily waste Transfer Pump (20GNA01AP001) Discharge for unit-2.	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
14	PE-V0-412-164-A004	E4-NR-2	Transformer Yard Area Oily waste Transfer Pump (20GNA01AP002) Discharge for unit-2.	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
15	PE-V0-412-164-A004	E4-BF-1	Transformer Yard Area Oily waste Transfer Pump (20GNA01AP001) Discharge for unit-2.	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
16	PE-V0-412-164-A004	E4-BF-2	Transformer Yard Area Oily waste Transfer Pump (20GNA01AP002) Discharge for unit-2.	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
17	PE-V0-412-164-A004	E5-NR-1	Coal Mill Oily waste Transfer Pump (20GNA02AP001) Discharge (for Unit-2, Sump-1).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
18	PE-V0-412-164-A004	E5-NR-2	Coal Mill Oily waste Transfer Pump (20GNA02AP002) Discharge (for Unit-2, Sump-1).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
19	PE-V0-412-164-A004	E5-BF-1	Coal Mill Oily waste Transfer Pump (20GNA02AP001) Discharge (for Unit-2, Sump-1).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
20	PE-V0-412-164-A004	E5-BF-2	Coal Mill Oily waste Transfer Pump (20GNA02AP002) Discharge (for Unit-2, Sump-1).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
21	PE-V0-412-164-A004	E6-NR-1	Coal Mill Oily waste Transfer Pump (20GNA03AP001) Discharge (for Unit-2, Sump-2).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
22	PE-V0-412-164-A004	E6-NR-2	Coal Mill Oily waste Transfer Pump (20GNA03AP002) Discharge (for Unit-2, Sump-2).	50	NRV	Cast Iron	Flanged	Manual	1	Process Water
23	PE-V0-412-164-A004	E6-BF-1	Coal Mill Oily waste Transfer Pump (20GNA03AP001) Discharge (for Unit-2, Sump-2).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
24	PE-V0-412-164-A004	E6-BF-2	Coal Mill Oily waste Transfer Pump (20GNA03AP002) Discharge (for Unit-2, Sump-2).	50	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
25	PE-V0-412-164-A004	E7-NR-1	Pre Settling overflow Pump (10GTA01AP001) Discharge for unit-1.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
26	PE-V0-412-164-A004	E7-NR-2	Pre Settling overflow Pump (10GTA01AP002) Discharge for unit-1.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
27	PE-V0-412-164-A004	E7-BF-1	Pre Settling overflow Pump (10GTA01AP001) Discharge for unit-1.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
28	PE-V0-412-164-A004	E7-BF-2	Pre Settling overflow Pump (10GTA01AP002) Discharge for unit-1.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
29	PE-V0-412-164-A004	E8-NR-1	Pre Settling overflow Pump (20GTA01AP001) Discharge for unit-2.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
30	PE-V0-412-164-A004	E8-NR-2	Pre Settling overflow Pump (20GTA01AP002) Discharge for unit-2.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
31	PE-V0-412-164-A004	E8-BF-1	Pre Settling overflow Pump (20GTA01AP001) Discharge for unit-2.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
32	PE-V0-412-164-A004	E8-BF-2	Pre Settling overflow Pump (20GTA01AP002) Discharge for unit-2.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
33	PE-V0-412-164-A004	E9-NR-1	Power House Oily Service Waste Transffer pump (10GNA04AP001) Discharge for unit-1.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
34	PE-V0-412-164-A004	E9-NR-2	Power House Oily Service Waste Transffer pump (10GNA04AP002) Discharge for unit-1.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
35	PE-V0-412-164-A004	E9-BF-1	Power House Oily Service Waste Transffer pump (10GNA04AP001) Discharge for unit-1.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
36	PE-V0-412-164-A004	E9-BF-2	Power House Oily Service Waste Transffer pump (10GNA04AP002) Discharge for unit-1.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
37	PE-V0-412-164-A004	E10-NR-1	Power House Oily Service Waste Transffer pump (20GTA04AP001) Discharge for unit-2.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
38	PE-V0-412-164-A004	E10-NR-2	Power House Oily Service Waste Transffer pump (20GTA04AP002) Discharge for unit-2.	65	NRV	Cast Iron	Flanged	Manual	1	Process Water
39	PE-V0-412-164-A004	E10-BF-1	Power House Oily Service Waste Transffer pump (20GTA04AP001) Discharge for unit-2.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
40	PE-V0-412-164-A004	E10-BF-2	Power House Oily Service Waste Transffer pump (20GTA04AP002) Discharge for unit-2.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
41	PE-V0-412-164-A004	CMB-NR-1	Gardening pump (90GMA01AP001) Discharge.	65	NRV	CF3M	Flanged	Manual	1	Sea Water
42	PE-V0-412-164-A004	CMB-NR-2	Gardening pump (90GMA01AP002) Discharge.	65	NRV	CF3M	Flanged	Manual	1	Sea Water
43	PE-V0-412-164-A004	CMB-BF-1	Gardening pump (90GMA01AP001) Discharge.	65	Butterfly	CF3M	Wafer	Manual	1	Sea Water
44	PE-V0-412-164-A004	CMB-BF-2	Gardening pump (90GMA01AP002) Discharge.	65	Butterfly	CF3M	Wafer	Manual	1	Sea Water
45	PE-V0-412-164-A004	CMB-BV-1	Gardening pump (90GMA01AP001 & 90GMA01AP002) Common Discharge Header (Sampling).	15	Ball	CF3M	Flanged	Manual	1	Sea Water
46	PE-V0-412-164-A004	90GMA12AA002	Gardening pump (90GMA01AP001 & 90GMA01AP002) Common Discharge Header.	65	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
47	PE-V0-412-164-A004	CMB-NR-3	CMB Effluent Transfer pump (90GMA01AP003) Discharge.	350	NRV	CF3M	Flanged	Manual	1	Sea Water
48	PE-V0-412-164-A004	CMB-NR-4	CMB Effluent Transfer pump (90GMA01AP004) Discharge.	350	NRV	CF3M	Flanged	Manual	1	Sea Water
49	PE-V0-412-164-A004	CMB-BF-3	CMB Effluent Transfer pump (90GMA01AP003) Discharge.	350	Butterfly	CF3M	Wafer	Manual	1	Sea Water
50	PE-V0-412-164-A004	CMB-BF-4	CMB Effluent Transfer pump (90GMA01AP004) Discharge.	350	Butterfly	CF3M	Wafer	Manual	1	Sea Water
51	PE-V0-412-164-A004	CMB-BV-2	CMB Effluent Transfer pump (90GMA01AP003 & 10GMA01AP004) Common Discharge Header (Sampling).	15	Ball	CF3M	Flanged	Manual	1	Sea Water
52	PE-V0-412-164-A004	90GMA11AA001	CMB Effluent Transfer pump (90GMA01AP003 & 10GMA01AP004) Common recirculation line.	300	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
53	PE-V0-412-164-A004	90GMA11AA002	CMB Effluent Transfer pump (90GMA01AP003 & 90GMA01AP004) Common header to CHP D/S.	350	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
54	PE-V0-412-164-A004	90GMA11AA003	CMB Effluent Transfer pump (90GMA01AP003 & 90GMA01AP004) Common header to Guard Pond.	350	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
55	PE-V0-412-164-A004	CCS-NR-1	TPI inlet water transer pump (90GTA02AP001 & 90GTA02AP002) common dishcarge header.	100	NRV	Cast Iron	Flanged	Manual	1	Process Water
56	PE-V0-412-164-A004	CCS-NR-2	TPI inlet water transer pump (90GTA02AP001 & 90GTA02AP002) common dishcarge header.	100	NRV	Cast Iron	Flanged	Manual	1	Process Water
57	PE-V0-412-164-A004	CCS-BF-1	TPI inlet water transer pump (90GTA02AP001 & 90GTA02AP002) common dishcarge header.	100	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
58	PE-V0-412-164-A004	CCS-BF-2	TPI inlet water transer pump (90GTA02AP001 & 90GTA02AP002) common dishcarge header.	100	Butterfly	Cast Iron	Wafer	Manual	1	Process Water
59	PE-V0-412-164-A004	GP-NR-1	Guard Pond Effluent Transffer pump (90GMA21AP001) Discharge.	400	NRV	CF3M	Flanged	Manual	1	Sea Water
60	PE-V0-412-164-A004	GP-NR-2	Guard Pond Effluent Transffer pump (90GMA21AP002) Discharge.	400	NRV	CF3M	Flanged	Manual	1	Sea Water
61	PE-V0-412-164-A004	GP-BF-1	Guard Pond Effluent Transffer pump (90GMA21AP001) Discharge.	400	Butterfly	CF3M	Wafer	Manual	1	Sea Water
62	PE-V0-412-164-A004	GP-BF-2	Guard Pond Effluent Transffer pump (90GMA21AP002) Discharge.	400	Butterfly	CF3M	Wafer	Manual	1	Sea Water
63	PE-V0-412-164-A004	GP-BV-1	Guard Pond Effluent Transffer pump (90GMA21AP001 & 90GMA21AP002) Common Discharge Header (Sampling).	15	Ball	CF3M	Flanged	Manual	1	Sea Water

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0)

64	PE-V0-412-164-A004	90GMA30AA001	Guard Pond Effluent Transffer pump (90GMA21AP001& 90GMA21AP002)Common recirculation line.	300	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
65	PE-V0-412-164-A004	90GMA30AA002	Guard Pond Effluent Transffer pump (90GMA21AP001& 90GMA21AP002)Common Discharge to CW Blow down.	400	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
66	PE-V0-412-164-A004	90GMA30AA003	Guard Pond Effluent Transffer pump (90GMA21AP001& 90GMA21AP002)Common Discharge to Ash water sump.	350	Butterfly	CF3M	Wafer	Motorized	1	Sea Water
67	PE-V0-412-164-A004	GP-NR-3	Guard Pond Effluent Transffer pump (90GMA21AP001& 90GMA21AP002)Common Discharge to CW Blow down.	400	NRV	CF3M	Flanged	Manual	1	Sea Water
68	PE-V0-412-164-A004	OWS-SV-1	OWS sludge outlet.	65	Sluice Valve (Gate)	Cast Iron	Flanged	Manual	1	Process Water
69	PE-V0-412-164-A004	TS-SV-1	Tube Settler sludge outlet.	65	Sluice Valve (Gate)	Cast Iron	Flanged	Manual	1	Process Water
70	PE-V0-412-164-A004	AB-NR-1	Air Blower (90GNC01AN001)outlet.	80	NRV	Cast Iron	Flanged	Manual	1	Air
71	PE-V0-412-164-A004	AB-NR-2	Air Blower (90GNC01AN002)outlet.	80	NRV	Cast Iron	Flanged	Manual	1	Air
72	PE-V0-412-164-A004	AB-BF-1	Air Blower (90GNC01AN001)outlet.	80	Butterfly	Cast Iron	Wafer	Manual	1	Air
73	PE-V0-412-164-A004	AB-BF-2	Air Blower (90GNC01AN002)outlet.	80	Butterfly	Cast Iron	Wafer	Manual	1	Air
74	PE-V0-412-164-A004	SP-NR-1	Sludge Transffer pump (90GNS01AP001)Discharge.	65	NRV	Cast Iron	Flanged	Manual	1	Process water
75	PE-V0-412-164-A004	SP-NR-2	Sludge Transffer pump (90GNS01AP002)Discharge.	65	NRV	Cast Iron	Flanged	Manual	1	Process water
76	PE-V0-412-164-A004	SP-BF-1	Sludge Transffer pump (90GNS01AP001)Discharge.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process water
77	PE-V0-412-164-A004	SP-BF-2	Sludge Transffer pump (90GNS01AP002)Discharge.	65	Butterfly	Cast Iron	Wafer	Manual	1	Process water
78	PE-V0-412-164-A004	PE-DV-1	PE Dosing system sampling line.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
79	PE-V0-412-164-A004	PE-DV-2	PE Dosing Pump (90GNN03AP001)Suction.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
80	PE-V0-412-164-A004	PE-DV-3	PE Dosing Pump (90GNN03AP002)Suction.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
81	PE-V0-412-164-A004	PE-NR-1	PE Dosing Pump (90GNN03AP001)discharge.	15	NRV	PP	Flanged.	Manual	1	Chemical
82	PE-V0-412-164-A004	PE-NR-2	PE Dosing Pump (90GNN03AP002)discharge.	15	NRV	PP	Flanged.	Manual	1	Chemical
83	PE-V0-412-164-A004	PE-DV-4	PE Dosing Pump (90GNN03AP001)discharge.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
84	PE-V0-412-164-A004	PE-DV-5	PE Dosing Pump (90GNN03AP002)discharge.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
85	PE-V0-412-164-A004	PE-DV-6	PE Dosing Pump (90GNN03AP001& 90GNN03AP002)common discharge header drain.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
86	PE-V0-412-164-A004	LM-PV-1	Lime Dosing system sampling line.	40	Plug	Cast Iron (R/L)	Flanged	Manual	1	Chemical
87	PE-V0-412-164-A004	LM-PV-2	Lime Dosing Pump (90GNN02AP001)Suction.	40	Plug	Cast Iron (R/L)	Flanged	Manual	1	Chemical
88	PE-V0-412-164-A004	LM-PV-3	Lime Dosing Pump (90GNN02AP002)Suction.	40	Plug	Cast Iron (R/L)	Flanged	Manual	1	Chemical
89	PE-V0-412-164-A004	LM-NR-1	Lime Dosing Pump (90GNN02AP001)Discharge.	40	NRV	PP	Flanged	Manual	1	Chemical
90	PE-V0-412-164-A004	LM-NR-2	Lime Dosing Pump (90GNN02AP002)Discharge.	40	NRV	PP	Flanged	Manual	1	Chemical
91	PE-V0-412-164-A004	LM-PV-4	Lime Dosing Pump (90GNN02AP001)Discharge.	40	Plug	Cast Iron (R/L)	Flanged	Manual	1	Chemical
92	PE-V0-412-164-A004	LM-PV-5	Lime Dosing Pump (90GNN02AP002)Discharge.	40	Plug	Cast Iron (R/L)	Flanged	Manual	1	Chemical
93	PE-V0-412-164-A004	LM-PV-6	Lime Dosing Pump (90GNN02AP001& 90GNN02AP002)common discharge header drain.	40	Plug	Cast Iron (R/L)	Flanged	Manual	1	Chemical
94	PE-V0-412-164-A004	AL-DV-1	Alum Dosing system sampling line.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
95	PE-V0-412-164-A004	AL-DV-2	Alum Dosing Pump (90GNN01AP001)Suction.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
96	PE-V0-412-164-A004	AL-DV-3	Alum Dosing Pump (90GNN01AP002)Suction.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
97	PE-V0-412-164-A004	AL-NR-1	Alum Dosing Pump (90GNN01AP001)discharge.	15	NRV	PP	Flanged.	Manual	1	Chemical
98	PE-V0-412-164-A004	AL-NR-2	Alum Dosing Pump (90GNN01AP002)discharge.	15	NRV	PP	Flanged.	Manual	1	Chemical
99	PE-V0-412-164-A004	AL-DV-4	Alum Dosing Pump (90GNN01AP001)discharge.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
100	PE-V0-412-164-A004	AL-DV-5	Alum Dosing Pump (90GNN01AP002)discharge.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
101	PE-V0-412-164-A004	AL-DV-6	Alum Dosing Pump (90GNN01AP001& 90GNN01AP002)common discharge header drain.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
102	PE-V0-412-164-A004	AC-DV-1	Acid Dosing system sampling line.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
103	PE-V0-412-164-A004	AC-DV-2	Acid Dosing Pump (90GNN04AP001)Suction (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
104	PE-V0-412-164-A004	AC-DV-3	Acid Dosing Pump (90GNN04AP002)Suction (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
105	PE-V0-412-164-A004	AC-NR-1	Acid Dosing Pump (90GNN04AP001)discharge (for CMB).	15	NRV	PP	Flanged.	Manual	1	Chemical
106	PE-V0-412-164-A004	AC-NR-2	Acid Dosing Pump (90GNN04AP002)discharge (for CMB).	15	NRV	PP	Flanged.	Manual	1	Chemical
107	PE-V0-412-164-A004	AC-DV-4	Acid Dosing Pump (90GNN04AP001)discharge (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
108	PE-V0-412-164-A004	AC-DV-5	Acid Dosing Pump (90GNN04AP002)discharge (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
109	PE-V0-412-164-A004	AC-DV-6	Acid Dosing Pump (90GNN04AP001& 90GNN04AP002)common discharge header drain (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
110	PE-V0-412-164-A004	AC-DV-7	Acid Dosing Pump (90GNN06AP001)Suction (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
111	PE-V0-412-164-A004	AC-DV-8	Acid Dosing Pump (90GNN06AP002)Suction (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
112	PE-V0-412-164-A004	AC-NR-3	Acid Dosing Pump (90GNN06AP001)discharge (for Guard Pond).	15	NRV	PP	Flanged.	Manual	1	Chemical
113	PE-V0-412-164-A004	AC-NR-4	Acid Dosing Pump (90GNN06AP002)discharge (for Guard Pond).	15	NRV	PP	Flanged.	Manual	1	Chemical
114	PE-V0-412-164-A004	AC-DV-9	Acid Dosing Pump (90GNN06AP001)discharge (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
115	PE-V0-412-164-A004	AC-DV-10	Acid Dosing Pump (90GNN06AP002)discharge (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
116	PE-V0-412-164-A004	AC-DV-11	Acid Dosing Pump (90GNN06AP001& 90GNN06AP002)common discharge header drain (for Guard pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
117	PE-V0-412-164-A004	AK-DV-1	Alkali Dosing system sampling line.	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
118	PE-V0-412-164-A004	AK-DV-2	Alkali Dosing Pump (90GNN07AP001)Suction (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
119	PE-V0-412-164-A004	AK-DV-3	Alkali Dosing Pump (90GNN07AP002)Suction (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
120	PE-V0-412-164-A004	AK-NR-1	Alkali Dosing Pump (90GNN07AP001)discharge (for Guard Pond).	15	NRV	PP	Flanged.	Manual	1	Chemical
121	PE-V0-412-164-A004	AK-NR-2	Alkali Dosing Pump (90GNN07AP002)discharge (for Guard Pond).	15	NRV	PP	Flanged.	Manual	1	Chemical
122	PE-V0-412-164-A004	AK-DV-4	Alkali Dosing Pump (90GNN07AP001)discharge (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
123	PE-V0-412-164-A004	AK-DV-5	Alkali Dosing Pump (90GNN07AP002)discharge (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
124	PE-V0-412-164-A004	AK-DV-6	Alkali Dosing Pump (90GNN07AP001& 90GNN07AP002)common discharge header drain (for Guard Pond).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
125	PE-V0-412-164-A004	AK-DV-7	Alkali Dosing Pump (90GNN05AP001)Suction (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
126	PE-V0-412-164-A004	AK-DV-8	Alkali Dosing Pump (90GNN05AP002)Suction (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
127	PE-V0-412-164-A004	AK-NR-3	Alkali Dosing Pump (90GNN05AP001)discharge (for CMB).	15	NRV	PP	Flanged.	Manual	1	Chemical

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

128	PE-V0-412-164-A004	AK-NR-4	Alkali Dosing Pump (90GNN05AP002) discharge (for CMB).	15	NRV	PP	Flanged.	Manual	1	Chemical
129	PE-V0-412-164-A004	AK-DV-9	Alkali Dosing Pump (90GNN05AP001) discharge (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
130	PE-V0-412-164-A004	AK-DV-10	Alkali Dosing Pump (90GNN05AP002) discharge (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
131	PE-V0-412-164-A004	AK-DV-11	Alkali Dosing Pump (90GNN05AP001& 90GNN05AP002) common discharge header drain (for CMB).	15	Diaphragm	Cast Iron (R/L)	Flanged.	Manual	1	Chemical
132	PE-V0-412-164-A004	SW-GT-1	Service Water Tank Inlet.	50	Gate	Cast Iron (R/L)	Flanged.	Manual	1	Service Water
133	PE-V0-412-164-A004	SW-GT-2	Service Water Tank outlet to PE dosing.	25	Gate	Cast Iron (R/L)	Flanged.	Manual	1	Service Water
134	PE-V0-412-164-A004	SW-GT-3	Service Water Tank outlet to Lime dosing.	25	Gate	Cast Iron (R/L)	Flanged.	Manual	1	Service Water
135	PE-V0-412-164-A004	SW-GT-4	Service Water Tank outlet to Alum dosing.	25	Gate	Cast Iron (R/L)	Flanged.	Manual	1	Service Water
136	PE-V0-412-164-A004	SW-GT-5	Service Water Tank outlet to Alkali dosing.	25	Gate	Cast Iron (R/L)	Flanged.	Manual	1	Service Water
137	PE-V0-412-164-A004	SW-GT-6	Service Water Tank outlet to Acid dosing.	25	Gate	Cast Iron (R/L)	Flanged.	Manual	1	Service Water
NOTE: ANY VALVES NOT LISTED IN THIS LIST, BUT REQUIRED AS PER P&ID OR PROCESS REQUIREMENTSHALL BE SUPPLIED BY M/S CWL (ETP SUPPLIER) WITHOUT ANY PRICE/DELIVERYIMPLICATION.										

NOTE: THOUGH THIS DOC IS APPROVED, HOWEVER, THE VALVES APPLICABLE FROM GUARD POND AND OWARDS SHALL BE AS PER DATA SHEET ENCLOSED IN SCETION-C (SL NO 24.0).

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.110/20 dt.07.12.2020

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Emails Dt.05.10.2020 & 04.11.2020. 2.DESEIN REF: D8516,D8517 & D8518 Dt.03.12.2020.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A024	0	PG test procedure for ETP	04
2	PE-V0-412-164-A013	2	Datasheet & GA for Valves for ETP	04
3	PE-V0-412-164-A023	1	VALVE SCHEDULE FOR ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.07.12.2020
Superintending Engineer/E/PrI

APPROVED

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				PG TEST PROCEDURE FOR EFFLUENT TREATMENT PLANT.
				STATUS : CONTRACT
				JOB NO.: 17-04

This document approved vide. Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.110/20 dt.07.12.2020

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

FALGUNI SAHA 2020.12.09 12:54:46 +05'30'

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA 2020.10.05 13:48:02 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	CWL. DOC. NO.
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	

BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A024	00

NO. OF SHEETS		EXCLUDING COVER PAGE

PERFORMANCE GUARANTEE TEST PROCEDURE

FOR EFFLUENT TREATMENT PLANT (ETP).

PROJECT	:	2X660 MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT.
OWNER	:	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION.
CONSULTANT	:	DESEIN PRIVATE LTD.
CLIENT	:	BHARAT HEAVY ELECTRICALS LTD, NEW DELHI.
SUPPLIER	:	CLEAR WATER LIMITED, NEW DELHI.

TABLE OF CONTENTS

OBJECTIVE

The objective of the PG Test is to ensure that the system is performing well, with respect to meeting/delivering the required parameters of Treated effluent from final treatment Units such as Oil Water Separator and Tube Settler as indicated in this document elsewhere.

The system is closely monitored to ensure trouble free and optimum/efficient performance of all the electrical & mechanical equipments, accuracy of all instruments and functioning of all process interlocks for system reliability and integrity. Further, the PG test will also establish that the consumption of power is as per commitment with in tolerance limits, if any. Noise level for the pumps shall be demonstrated during PG test. The noise level shall not exceed 85 dB at plant boundary. The sound pressure level limit of 85 dB shall be measured at a height of 1.5 m above the floor level in elevation and at a distance of 1.0 m horizontally from the nearest surface of the Equipment/Machine, furnished and installed under these specifications.

ANNEXURE – I

WASTE WATER ANALYSIS (OUTLET TO ETP)

OUTLET WATER QUALITY FROM OIL WATER SEPARATOR AND TUBE SETTLER AND GUARD POND:

A	OUTLET WATER QUALITY FROM OIL WATER SEPARATOR		
1	OIL (FREE)	ppm	10 ppm (Subject to 500 ppm max in feed waste to the Separator).

A	OUTLET WATER QUALITY FROM TUBE SETTLER.		
1	TSS	ppm	100 ppm (Subject to 500 ppm max in feed waste to the Separator).

A	OUTLET WATER QUALITY FROM GUARD POND.		
1	TSS	ppm	<100
	Oil & Grease	ppm	<10
	pH	--	6.5-8.5

Note:

1. All above mentioned parameters shall be measured by instrument available in Plant Laboratory with prior permission from BHEL and TANGEDCO.
2. The influent qualities being not worse than the qualities indicated in the Annexure-I to guarantee the treated Effluent quality.

ANNEXURE – II

STANDARD OPERATING PROCEDURE (SOP) FOR

CONDUCTING THE P.G.TEST

STEP 1: COMPLETION OF ERECTION OF MECHANICAL AND ELECTRICAL EQUIPMENTS.

Certify that all equipments (Mechanical / Electrical / Instrumentation as indicated in P&ID for ETP) have been erected and commissioned and reliability ensured the plant is ready for PG test.

STEP 2: CALIBRATION OF INSTRUMENTS AND INTERLOCKS.

Certify that all instruments (as indicated in P&ID for ETP) have been duly calibrated and all interlocks are provided and tested and operation of compete plant demonstrated.

STEP 3: AUTHORIZATION OF TEAM FOR PG TEST

STEP 4: COLLECTION OF SAMPLES AT FEED TO EFFLUENT TREATMENT PLANT.

Equalized/Homogenized Samples shall be collected for PG test from all sources of effluent as per Annexure-I after 4hrs of respective unit running.
Testing of these samples shall be carried out in Plant Laboratory with prior permission from BHEL and TANGEDCO.

STEP 5: LOG SHEET CERTIFICATION

All readings noted will be jointly signed by representatives of CLEAR WATER LIMITED, BHEL & TANGEDCO.

CLEAR WATER LIMITED:

BHEL:

TANGEDCO:

LOG SHEET

FOR EFFLUENT TREATMENT PLANT

Sl. No.	Source	Date	Flow M3/hr	INLET EFFLUENT WATER				TREATED EFFLUENT WATER			
				Oil (free) in ppm	pH	TSS in ppm	Temp in Deg C	Oil (free) in ppm	pH	TSS in ppm	Temp in Deg C

GENERAL CONDITIONS

1) Influent water analysis to Central Monitoring Basin (CMB)/Oil Water Separator (OWS) shall be provided by BHEL prior to the start-up of the P.G. test.

2) Required quality and quantity of waste water (as mentioned in Annexure-I) power (as per approved load list of both three and single phase) must be available on continuous basis.

   In case of non-availability of the same or in case of any interruption during the PG test, the breakage in sequence will be considered as a part of the PG test.

3) All interlocks are process and safety interlocks.

4) Wherever flow measuring instruments are not available the flow to be established by measuring the sump/pit filling/evacuating depth w.r.t time.

5) PG Test will be conducted for a period of 24 hours. In case of any disruption in between the test due to the cause attributable to TANGEDCO, only then the time lapsed earlier shall be counted for full PG test.

6) At the end of the PG test, if the objective mentioned in the beginning of this PG test procedure is established, an MOM (minutes of meeting) will be signed off between CLEAR WATER LIMITED, BHEL & TANGEDCO mentioning that PG test has been completed, in case the plant has not been taken over for operation/running, considering PG test successfully shall be deemed to be taken over for operation to BHEL/TANGEDCO.

7) Punch points, if any, may be mentioned in the said MOM to enable CLEAR WATER LIMITED to subsequently address the same. These punch points will not have any effect on the success of the PG Test.

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.113/20 dt.23.12.2020

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Emails Dt.10.11.2020,15.11.2020 & 12.12.2020. 2.DESEIN REF: D8544 dt.21.12.2020,D8549 & D8551 Dt.22.12.2020.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-168-A017	4	Piping layout for Hydrogen Generation Plant	04
2	PE-V0-412-164-A028	2	Technical Data Sheet of Blowers for ETP	04
3	PE-V0-412-164-A018	2	QAP of Blowers with motor For ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/Dt.23.012.2020
Superintending Engineer/E/PrI

APPROVED

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				QAP FOR BLOWER
				STATUS : CONTRACT
				JOB NO.: 17-04

Doc approved vide Transmittal no. Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.113/20 dt.23.12.2020

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I
CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	2nd

FALGUNI SAHA 2020.12.23 14:56:56 +05'30'

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA 2020.11.02 16:22:10 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: **EFFLUENT TREATMENT PLANT**

ORGINATOR

TURNKEY CONTRACTOR:-

CLEAR WATER LTD.

B-14/1, OKHLA INDUSTRIAL AREA
PHASE-II, NEW DELHI-110020
PHONE: 011 26386095
EMAIL: clearwater@bol.net.in

CWL. DOC. NO.

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-VO-412-164-A018	2

NO. OF SHEETS		EXCLUDING COVER PAGE

KULKARNI POWER TOOL'S LTD., SHIROL	QUALITY ASSURANCE PLAN	BHEL DOC. NO. PE-VO-412-164-A018
Project name : ETP, Ennore TPP, Chennai		QAP NO: QAP/17-04M (10B) Rev-01
Customer Name : TANGEDCO		Dt. 19.04.2019
PO No: 147/17-04M (10-B)	PO DATE: 12.03.2019	BHEL Doc. No. PE-VO-412-164-A018
Item Description : Blower Assly.	QTY: 02 Assly.	Page: 1/1
Vendor Name: KULKARNI POWER TOOL'S LTD., SHIROL		

SL No	Characteristic/Item	Category	Type/method of Check	Extent of Check	Reference Document	Acceptance Norm	Format of Record	Record to be Furnished (Y/N)	Agency M	Agency C	Remarks
A	B	C	D	E	F	G	H	I	J		K
1	MATERIAL INSPECTION										
1.1	Case, housing, rotor, and gear	MA	Visual Inspection	100%	-	Free from defect	IR	N	P	R	
		MA	Dimension Inspection	Sampling	Mfg. drawing	Mfg. drawing	IR	N	P	R	
		MA	Chemical, physical & hardness test if applicable	1/heat	Apr. GA/Data sheet	Apr. GA/Data sheet	TC	Y	P	R	
1.2	Accessories	MA	Verification	100%	Apr. GA/Data sheet/ P.O.	Apr. GA/Data sheet/ P.O.	COC	Y	P	R	
2	INPROCESS										
2.1	Rotor balancing	MA	Dynamic balancing	100%	ISO 1940 Grade 2.5	ISO 1940 Grade 2.5	IR	Y	P	R	
3	PERFORMANCE TESTING										
3.1	Performace (without acoustic enclosure) At duty point on available shop motor.30 min.Cyle time for witness testing.	MA	Capacity, power consumption,pressure & air temp rise across the blower,Noise & vibration	1/model	BS ISO 1217:2009 / BS 1571-II DIN VDI 3836 As per Mfg standard	BS ISO 1217:2009 / BS 1571-II DIN VDI 3836 As per Mfg standard	TC	Y	P	W	
4	FINAL INSPECTION										
4.1	Overall dimension & completeness (Partialy)	MA	Measurement	1/Model	Apr. GA/Data sheet P.O.	Apr. GA/Data sheet P.O.	DR	Y	P	R	
5	SURFACE PREPATION & PAINTING	MA	DFT	1/Model	As per Approved,P.O. Data Sheet/Mfg Std	As per Approved,P.O. Data Sheet/Mfg Std	IR	Y	P	R	
6	REVIEW OF QA DOCUMENT	MA	REVIEW	100%	Approved QAP	Approved QAP	IR/TC	Y	P	R	

Noise & Vibration measured at shop for referance purpose. Values as per Spec/Approved drg/DS shall be demonstrated at site. Test report to be obtained after factory test.

Legend : M- Manufacturer, C -Customer., T.C - Test certificate, P-Perform, W-Witness , R- Review, IR - Inspection report, DR - Dimension report , COC- Certificate of conformance

Prepared By (Manufacturer)	Reviewed & Approved by :	

CLEAN WATER LTD. NEW DELHI

FALGUNI SAHA 2020.11.02 16:22:00 +05'30'

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.113/20 dt.23.12.2020

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Emails Dt.10.11.2020,15.11.2020 & 12.12.2020. 2.DESEIN REF: D8544 dt.21.12.2020,D8549 & D8551 Dt.22.12.2020.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-168-A017	4	Piping layout for Hydrogen Generation Plant	04
2	PE-V0-412-164-A028	2	Technical Data Sheet of Blowers for ETP	04
3	PE-V0-412-164-A018	2	QAP of Blowers with motor For ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/Dt.23.012.2020
Superintending Engineer/E/PrI

APPROVED

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				DATA SHEET FOR BLOWER
				STATUS : CONTRACT
				JOB NO.: 17-04

Doc approved vide Transmittal no. Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.113/20 dt.23.12.2020

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

FALGUNI SAHA 2020.12.23 15:05:30 +05'30'

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA 2020.11.02 16:47:01 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	CWL. DOC. NO.
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	**DS-01/17-04M(10-B)** **Dt. 07.05.2019**

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A028	02
				NO. OF SHEETS	EXCLUDING COVER PAGE

BHEL Doc. No. PE-V0-412-164-A028			
Clear Water Limited **B- 14/1, Okhla Industrial Area** **Phase II, New Delhi-11020**	**Data Sheet** **BLOWER**	**CWL Doc. No.**	**DS-01/17-04M(10-B)**
		REV	**01**
		Sheet	**1 of 3**

A	**Operating Conditions**	
1.	Tag No.	90GNC01 / AE001 & AE002;
2.	Application	For Sludge Sump
3.	Quantity	2 (1W + 1 SB)
4.	Service	Intermittent ;continuous; to Scour the sludge Bed
5.	Fluid Handled	Air
6.	Designed Reqd. Capacity	270 M3/hr
7.	Inlet Temperature (ºC)	17 to 50 ; Ambient
8.	Discharge Air Temperature (ºC)	45-50 above atmospheric temperature
9.	Air Inlet Pressure (kg/cm^2 (g)	Atmospheric Pressure
10.	Discharge Pressure (kg / cm^2) (Gauge) Reqd	0.40 (4000 mmwc)
11.	Location	Out Door with Acoustic cover
12.	Humidity level	38 to 82%; Annual mean – 66%
B	**Blower Constructional Features**	
1.	Blower Type	Air Cooled Rotary Twin Lobe Type ; Oil Free
2.	Make	KPT BLOWERS
3.	Model No.	SR044
4.	Inlet / Out Let Port Size(mm)	80/80 NB
5.	Flow Direction	Vertical
6	Offer Capacity (LPM) at 0.40 Kg/cm^2	4500
7	Outlet Flange Drilling As per (Off-CRS)	ANSI:911 & IS:4762 (Flexible connection)
8	Lubrication Type	Splash Lubrication (Oil)
9.	Lubricating Oil	SP460- Single side Oil lubricated
10.	Pulley & Bearing	Grease
11.	Gear & Gears End Bearing	Oil Splash Or equivalent
12	Seal Type	Lip Seals
13	Drive	Through V belt and Pulley
14	Pressure Gauge (kg / cm^2)	0-1 kg / cm^2 ; 150 dia
15	Test Pressure (Hydro Test Casing)	1.5 Times Design Pressure ; 2.5 Kg/cm ^{2} of casing for 30 mts - confirmed
16.	Suction Silencer	Provided – confirmed
17	Discharge Silencer	Provided – confirmed
18.	Noise Level	<85 dB at 1 Mtr from Blower with Silencer- confirmed
19	Dynamic Balancing	All rotor shaft assemblies dynamically balanced to Cl.6.3; ISO 1940 /1 (1986)
C	**Performance Details at duty point**	
1.	No. of Stages	Single
2.	Operating Speed (RPM)	1500
3.	Mechanical Efficiency %	74
4.	Volumetric Efficiency %	68
5.	Shaft Power (BKW)	4.7
6.	Differential Pressure (Kg/cm^2)	0.4
7.	Motor Rating (kw / RPM)	5.5/1500
8.	Power Transmission	Through V Belt Drive

Rev	**Description**	**Date**	
01	**Submitted for approval**	**07.05.2019**	**Project:** 2x660 MW Ennore Sez STPP **Client: Tamilnadu Generation & Distribution Corporation Limited .** **Consultant:** Desein Pvt Ltd. New Delhi
0B	**Submitted for approval**	**12.03.2019**	

BHEL Doc. No. PE-V0-412-164-A028			
Clear Water Limited **B- 14/1, Okhla Industrial Area Phase II,** **New Delhi-11020**	**Data Sheet** **BLOWER**	**CWL Doc. No.**	**DS-01/17-04M(10-B)**
		REV	**01**
		Sheet	**2 of 3**

8	Vibration Level	4-5mm/sec
D	**Material of Construction**	
1.	Blower Casing ;End Covers	CI IS 210 FG 260 (1993)
2.	Rotor Lobe + Rotor Shaft (Integral)	CI IS 210 FG 260 (1993)+ Carbon Steel C40 / SGIron Grade SG 600/3
3.	Rotor Shaft	Carbon Steel C40 / EN 24 / 19 / SGIron Grade SG 600/3
4	Timing Gears	Forged Alloy Steel , 815M17 / EN -353 of BS- 970, Case hardened , tempered and profile ground
5	Shaft Seal	LIP SEAL
6	Sealing	LIP SEAL
7.	Safety Relief Valve	BRASS
8.	Base Frame Plate	M.S. Fabricated;
9.	Side Plats, covers & Pulley	CI FG. 260 confirming to IS:210
10.	Coupling Pulley	CI FG. 260 confirming to IS:210
11.	Belt/ coupling Guard	M.S. Fabricated
12.	Nut and Bolts	Carbon Steel / GI
E	**Accessories by Blower Vendor**	Common base frame for motor & blower, Slide rails for motor, Reactive Silencer, Discharge Silencer, Spring loaded safety valve, Non Return Valve, Drive & Driven Pulleys, Pressure Gauge, First Fill Oil, V-belt Guard, Anti vibration pads, Foundation bolts, other Fasteners to tighten the accessories etc.
1.	Common Base Plate for Blower and Drive	Provided
2.	Slide Rail & Motor Mounting Bolts	Provided
3.	Drive & Driven Pulleys	Provided
4.	V-belts	Provided
5.	Belt Guard	Provided
6.	Anti Vibration Pads	Provided
7.	Foundation bolt	Provided
8.	Suction Air Filter	Provided; Dry Bag Type
9.	Suction Silencer	Provided
10.	Discharge Silencer	Provided
11.	Safety Relief Valve	Provided
12.	Companion Flange	Provided; As per ANSI-B 16.5 cl.150
13.	Pressure Relief Valve capacity	10% of Blower capacity; Spring loaded type
14.	Pressure Gauge	150 dia; Bourden type;
F	**Loading Data**	
1.	Static Load (Kg); approx.	300 Kg (with all Accessories) without motor
2.	Gd2 Value (kgmt2)	0.0565

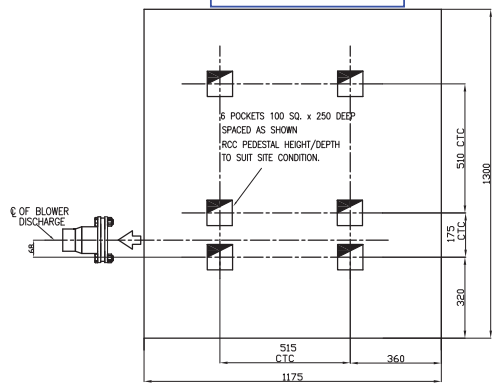
Rev	Description	Date	
01	**Submitted for approval**	**07.05.2019**	**Project:** 2x660 MW Ennore Sez STPP **Client: Tamilnadu Generation & Distribution Corporation Limited .** **Consultant:** Desein Pvt Ltd. New Delhi
0B	**Submitted for approval**	**12.03.2019**	

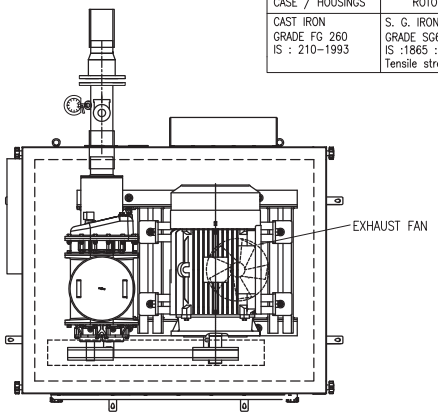
BHEL Doc. No. PE-V0-412-164-A028			
Clear Water Limited **B- 14/1, Okhla Industrial Area Phase II,** **New Delhi-11020**	**Data Sheet** **BLOWER**	**CWL Doc. No.**	**DS-01/17-04(10-B)**
		REV	**01**
		Sheet	**3 of 3**

G	**Motor Details**	
1.	Make	ABB / CGL
2.	Motor Type	TEFC. SQ. Cage; IP-55; IS : 12615 ;
3.	Supply by	Clear Water Ltd
4.	Motor Rating ;Minimum 15 % margin over BKW at rated duty point ; Not less than the maximum power required by the Blower ; KW	(IE-2) ; Intermittant
5.	Motor RPM	4 Pole
6.	Supply of voltage	415 V +/- 10% Volts
7.	Supply Power	3 Phase
8.	Supply Frequency	50 Hz, + 3 / - 5%
9.	Design Temp (Deg. Cent.)	50
10.	Insulation	Class F with Temp. rise limited to Class B [1]
H	Painting	
		i) Base Plate & Belt Guard shall be epoxy painted
		ii) Blower Body - RAL-5015
		iii) Acoustic Cover - RL - 5015 / Mfr. Std
I	Documents	
1	GA & Foundation Plan	attached
2		
3	Performance Curve	attached
4	QAP	BHEL – PE-V0-412-164-A018
		KPT – QAP Attached
J	Test and Inspection Criteria	
1	Testing Standard	BS:1571, Part - II / ISO 1217
2	Mechanical Balancing	ISO 1940 Gr.6.3 or better
2	Permissible Tolerance in rated capacity, in %	As per BS-1571- Part –II
3	Noise Level	< 85 dB at 1Mtr from Blower with Silencer and Acoustic hood
4	Performance Test to be done for determination of	Head - Capacity Curve and BHP - Capacity Curve –attached
5	Document Review	Attached
K	**Mandatory Spares**	Supply of no Mandatory Spares for Blowers are specified under Spec.

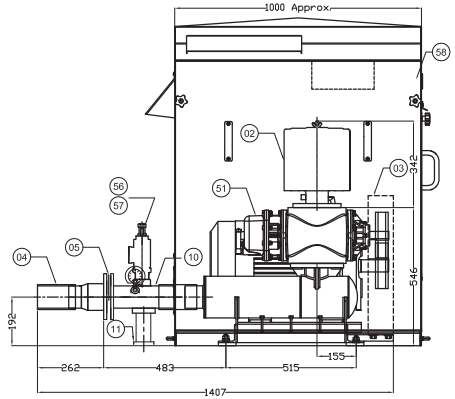
01	**Submitted for approval**	**07.05.2019**	**Project:** 2x660 MW Ennore Sez STPP **Client: Tamilnadu Generation & Distribution Corporation Limited .** **Consultant:** Desein Pvt Ltd. New Delhi
0B	**Submitted for approval**	**12.03.2019**	
Rev	**Description**	**Date**	

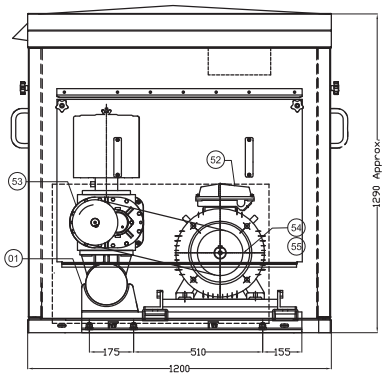
FOUNDATION PLAN





X FOUNDATION PLAN (VIEWED FROM X)

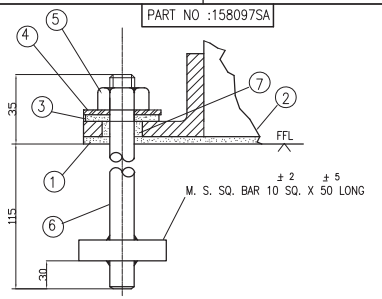




MATERIAL OF CONSTRUCTION

CASE / HOUSINGS	ROTORS	GEAR	OIL SEAL
CAST IRON GRADE FG 260 IS : 210–1993	S. G. IRON GRADE SG600 / 3 IS :1865 : 1991 Tensile strength 600 Mpa	En 353 OR En 34 BS : 970	VITON (Fluorinated rubber)

PART NO :158097SA



SR. NO.	DESCRIPTION	MATERIAL	QTY.	SIZE	PART NO.	REMARK
7	COLLER	RUBBER	6	O/D I/D L DIA 18 X DIA 12 X 5	101050	—
6	FOUNDATION BOLTS	M. S.	6	M 12 X 150 L	101051	—
5	NYLOCK NUT	STD.	6	M 12 X 1.75	101658	
4	PLAIN WASHER	M. S.	6	FOR M12	100615	STD (THICK)
3	RUBBER WASHER	RUBBER	6	O/D I/D L DIA 24 X DIA 12 X 6	101052	—
2	BASE FRAME	M. S.	1	—	—	—
1	PAD	RUBBER	2	L W T 1056 X 70 X 12	158097	—

SPECIFICATIONS AND NOTES

1) ALL DIMENSIONS ARE IN mm.
2) AIR FLOW *270 Cu.M/hr
3) PRESSURE 400 mbar
4) STATIC LOAD ON FOUNDATION 300 Kg. (APPROX. EXCLUDING MOTOR)
5) DYNAMIC LOAD = STATIC LOAD x 1.5
6) AVOID BENDS LESS THAN 90° IN THE PIPE WORK.
7) OUTLET PIPE WORK MUST BE ADQUATELY SUPPORTED.
8) UNIT MUST STAND ON A FLAT LEVEL SURFACE.
9) KEEP 0.75 METER SPACE FOR MAINTANCE ALL AROUND.
10) DIRECTION OF ROTATION – ANTI CLOCK WISE.
11) GD SQ. VALUE OF ROTOR 0.0555 KgMSQ.
12) KPT IS RESPONSIBLE ONLY FOR QUOTED FERFORMANCE OF THE EQUIPMENT AND NOT FOR THE SYSTEM PERFORMANCE OF THE CUSTOMER.
13) STANDBY BLOWER MUST BE INCARPORATED IN CONTINIOUS DUTY SYSTEM SIMILAR TO OPERATING BLOWERS FOR TOTAL RELIABILITY.
14) NOISE LEVEL AT FREE FIELD CONDITION.
15) IN ORDER TO REDUCE NOISE, DISCHARGE PIPE MUST BE COVERED BY SUITABLE NOISE INSULATING MATERIAL AS PER SITE CONDITION BY CLIENT.
16) * TOLERANCES APPLICABLE AS PER STANDARD BS–1571–Part–II/ ISO1217:2009

Tag no. : 90HNC01/AE001 & AE002
Application : For sludge sump
Project : 2x660 MW Ennore Sez STPP
Client : Tamilnadu Generation & Distribution Corporation Limited
Consultant : Desein Pvt Ltd. New Delhi

CUSTOMER:–CLEAR WATER LIMITED
P.O.NO.–147/17–04 DTD: 12.03.19
CR NO.–IB0872 DTD: 19.03.19
QTY.:– 02 Sets.

VARIABLE PARAMETERS

ITEM	DESCRIPTION	SIZE	MATERIAL	QTY/SET	REMARKS	PART NO.	DRG. NO.	SCOPE
51	P.D. BLOWER SR044	90mm	AS SHOWN ABOVE.	1	1500 RPM (*4.7 BKW) , WITH OUT FOOT	8013K	–	KPT
52	MOTOR (FRAME SIZE 132S)	–	CONSIDERED 'CGL/ABB' MAKE	1	1450 RPM, 5.5 KW., 4 POLE ,IE2, TEFC,FOOT MOUNTED.	5.5KW4P	–	KPT
53	BLOWER PULLEY	112X3AX32	C.I. (IS : 210)	1	WITH TAPER LOCK BUSH	1123A32	–	KPT
54	MOTOR PULLEY	118X3AX38	C.I. (IS : 210)	1	WITH TAPER LOCK BUSH	1183A38	–	KPT
55	V–BELTS	SPA1360	STD , SPACE SAVER	3	FENNER OR EQUIVALENT	SPA1360	–	KPT
56	PRESSURE GAUGE KIT	6" DIAL	STD, BOURDEN TYPE R1	1	0 – 1 Kg/cm2,	– – –	–	KPT
57	SAFETY VALVE (SPRING LOADED)	1.5" BSP	C.I. AND SPRING STEEL	1 SET	(SET TO 450 mbar)	101406	–	KPT
58	ACOUSTIC ENCLOSURE	–	–	1	WITH EXHAUST FAN	158761	–	KPT

STANDARD SCOPE OF SUPPLY

ITEM	DESCRIPTION	SIZE	MATERIAL	QTY/SET	REMARKS	PART NO.	DRG. NO.	SCOPE
1	BASE FRAME CUM SILENCER WITH MOTOR SLIDE RAIL	80 NB	M.S. SHEET	1	FABRICATED (IS : 1732) , WITH CLAMPING BLOCK RGWM10	158090	158090	KPT
2	FILTER CUM SILENCER	80 NB	–	1	FIBRICATED	103483	103483	KPT
3	BELT GUARD	–	M.S.	1	FABRICATED	700264	700264	KPT
4	FLEXIBLE CONNECTION	80 NB	SILICON POLY HOSE & M. S. CLIPS.	2	(IS : 911 & IS : 4762)	100323	100319	KPT
5	NON RETURN VALVE	80 NB	M.S.	1	SUB ASSY WITH FASTNERS & O RINGS	100237M	100237M	KPT
6	FOUNDATION SET	–	STD	1 SET	–	158097SA	158097SA	KPT
7	FASTNER SET	–	STD	1 SET	–	105064	–	KPT
8	LUB. OIL	–	–	1 LIT	CAN DULY FILLED.	101690	–	KPT
9	GASKET (PORT)	–	NON ASBESTOS	2	–	100250	–	KPT
10	STUB PIPE	80 NB	FABRICATED	1	–	158096	–	KPT
11	PIPE SUPPORT	–	FABRICATED	1	–	–	–	CLIENT

REV. NO.	CHANGE	PRD.	CKD	APPD
R2	AS PER CLIENT COMMENT NOTE REGARDING UNIT MUST BE INSTALLED UNDER ENCLOSED SHED IS REMOVED	13.07.19 RSB	AMC	ADC
R1	PRESSURE GAUGE DIAL SIZE 4" CHANGED TO 6"	06.07.19 AMC	RSB	ADC

PRD.– RSB | CKD.–AMC | APPD.–ADC | DATE.– 21.03.19 | SCALE– 1:1

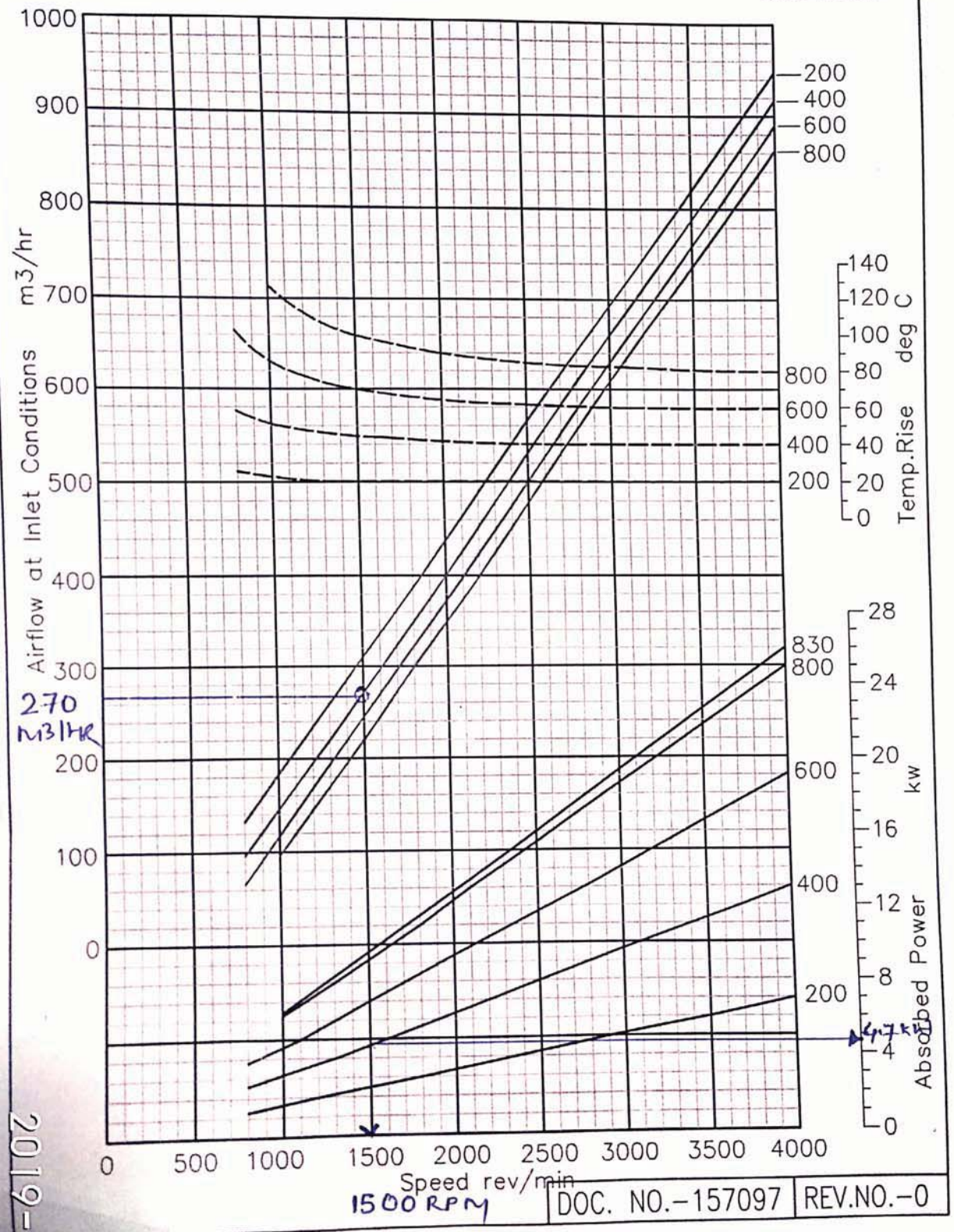
GA & FOUNDATION DRAWING FOR BLOWER MODEL SR044

KULKARNI POWER TOOLS LTD.
SHIROL , Dist : Kolhapur – 416 103 ,
Maharashtra , INDIA.

PROJ.	SIZE	DRG. NO.	Rev No.
	A3	GA/44/8590	R2

PERFORMANCE CURVE OF BLOWER MODEL SR044

Belt pull must not exceed 2450 N
Maximum pressure 830 mbar



DOC. NO.–157097 | REV.NO.–0

2019-2-23

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.02 /21 dt.08.01.2021

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Email Dt. 26.12.2020. 2.DESEIN REF: D8614 dt.08.01.2021.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A042	2	QAP for Valves of ETP	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.08.01.2021
Superintending Engineer/E/PrI

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				QAP FOR VALVES FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

APPROVED

DOC APPROVED VIDE Lr.No.:SE/E/PrI/ EE-7/M/AEE/M/F.En SEZ STPP/ D.02 /21 dt.08.01.2021.

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	

FALGUNI SAHA
2021.01.08 15:53:05 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR

TURNKEY CONTRACTOR:-

CLEAR WATER LTD.
B-14/1, OKHLA INDUSTRIAL AREA
PHASE-II, NEW DELHI-110020
PHONE: 011 26386095
EMAIL: clearwater@bol.net.in

CWL. DOC. NO.

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA
2020.12.26 12:11:31 +05'30'

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A042	02

NO. OF SHEETS		EXCLUDING COVER PAGE

A. V. VALVES LTD.
16, Industrial Estate, Nunhai, Agra - 282 006 (INDIA)
Phone : +91–562–2281202, 203, 204, 205 Fax : +91-562-2281201
E-mail: avvalves@sancharnet.in & avengg@dataone.in

ISO 9001:2008 CERTIFIED

QUALITY ASSURANCE PLAN
For BUTTERFLY VALVE

Owner : **M/s. TELANGANA STATE POWER GEN. CORPN. LTD. (TSGENCO)** Sheet No. Page 1 of 1 O. A. No. **4758**

Contractor: **M/s. CLEAR WATER LIMITED, NEW DELHI** Client : **M/s BHEL** QAP. No. **AV / QP –CBFV – 4758 /19** Rev.- 00 Dated : 07 / 03 / 2020

Reference : **PUR. ORDER NO.: 62 / 17-04, REV.-0 P.O. DATED : 04-OCT-2019** **Project :** **EFF TREATMENT PLANT , 2×660 MW ENNORE TPS**

Sr. No.	Description	Characteristics	Class / Category	Type / Method of Check	Quantum Extent of Check	Reference Document No(s)	Acceptance Norms	Format of Record	INSPECTION BY				Remarks
									AVVL	Clear Water	BHEL/ TPIA	TANG EDCO	
1.0	**RAW MATERIAL**												
1.1	Body, Disc and Stem / Shaft	Physical Properties	MA	Physical Analysis	1 / Lot	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	Lab Rep.	P	R	R	R	All T/C's shall be submitted
1.2		Chemical Properties	MA	Chemical Analysis	1 / Lot	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	Lab Rep.	P	R	R	R	
1.3		Surface Defects	MA	Surface Defect	100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	IR	P	R	R	R	
2.0	**STAGE / IN – PROCESS INSPECTION**												
2.1	Machining of Component	Dimensional Check	MA	Measurement	100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	Log Book	P	R	R	R	
2.2	Assembly	Visual : DPT	MA	Surface Defect	100%	Spec./ Appd Drg / Datasheet	ASTM E – 165	IR	P	R	R	R	
3.0	**FINAL INSPECTION**												
3.1	Testing of Complete Valve	Dimension, Surface Defect	MA	Measurement, Visual	**100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	IR	P	R	W	R	**100%by A.V. Valves & 10% by **TPIA** / **Clear Water**
3.2		Valve Operation	MA	Operation Check	**100%	Approved Drawing	Smooth Operation	IR	P	R	W	R	
3.3		Leak-test of Body	MA	Hydraulic Test	**100%	BS EN ISO 12266-1	APPROVED DRAWINGS	IR	P	R	W	R	
3.4		Leak-test of Seat	MA	Hydraulic Test	**100%	BS EN ISO 12266-1	APPROVED DRAWINGS	IR	P	R	W	R	
4.0	**PAINTING, PROTECTION, PACKING & COLOUR CODING :**												
4.1	Complete Valve	Appearance	MA	Visual	100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	IR	P	R	R	R	

Legends : 1. MA : Major, **2. I/R :** Inspection Report, **3. T/C :** Test Certificate, **4. P :** Performed, **5. W :** Witness, **6. R :** Review **7. H :** Hold

(Prepared by)
ANIL BHARADWAJ (Mgr- QA)
For **A. V. VALVES LIMITED**

(Reviewed by)
FALGUNI SAHA
2020.12.26 12:11:41 +05'30'

(Approved by)

A. V. VALVES LTD.
16, Industrial Estate, Nunhai, Agra - 282 006 (INDIA)
Phone : +91–562–2281202, 203, 204, 205 Fax : +91-562-2281201
E-mail: avvalves@sancharnet.in & avengg@dataone.in

ISO 9001:2008 CERTIFIED

QUALITY ASSURANCE PLAN
For CHECK VALVE

Owner : **M/s. TELANGANA STATE POWER GEN. CORPN. LTD. (TSGENCO)** Sheet No. Page 1 of 1 O. A. No. **4758**

Contractor: **M/s. CLEAR WATER LIMITED, NEW DELHI** Client : **M/s BHEL** QAP. No. **AV / QP –CHVS – 4758 /19** Rev.- 00 Dated : 07 / 03 / 2020

Reference : **PUR. ORDER NO.: 62 / 17-04, REV.-0 P.O. DATED : 04-OCT-2019** **Project :** **EFF TREATMENT PLANT , 2×660 MW ENNORE TPS**

Sr. No.	Description	Characteristics	Class / Category	Type / Method of Check	Quantum Extent of Check	Reference Document No(s)	Acceptance Norms	Format of Record	INSPECTION BY				Remarks
									AVVL	Clear Water	BHEL/ TPIA	TANG EDCO	
1.0	**RAW MATERIAL**												
1.1	Body, Cover, Hinge, Disc, Body-seat & Disc-seat and Hinge-pin	Physical Properties	MA	Physical Analysis	1 / Lot	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	Lab Rep.	P	R	R	R	All T/C's shall be submitted
1.2		Chemical Properties	MA	Chemical Analysis	1 / Lot	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	Lab Rep.	P	R	R	R	
1.3		Surface Defects	MA	Surface Defect	100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	IR	P	R	R	R	
2.0	**STAGE / IN – PROCESS INSPECTION**												
2.1	Machining of Component	Dimensional Check	MA	Measurement	100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	Log Book	P	R	R	R	
2.2	Assembly	Visual : DPT	MA	Surface Defect	100%	Spec./ Appd Drg / Datasheet	ASTM E – 165	IR	P	R	R	R	
3.0	**FINAL INSPECTION**												
3.1	Testing of Complete Valve	Dimension, Surface Defect	MA	Measurement, Visual	**100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	IR	P	R	W	R	**100%by A.V. Valves & 10% by **TPIA** / **Clear Water**
3.2		Valve Operation	MA	Operation Check	**100%	Approved Drawing	Smooth Operation	IR	P	R	W	R	
3.3		Leak-test of Body	MA	Hydraulic Test	**100%	API 598/BS EN ISO 12266-1	APPROVED DRAWINGS	IR	P	R	W	R	
3.4		Leak-test of Seat	MA	Hydraulic Test	**100%	API 598/BS EN ISO 12266-1	APPROVED DRAWINGS	IR	P	R	W	R	
4.0	**PAINTING, PROTECTION, PACKING & COLOUR CODING :**												
4.1	Complete Valve	Appearance	MA	Visual	100%	Spec./ Appd Drg / Datasheet	Spec./ Appd Drg / Datasheet	IR	P	R	R	R	

Legends : 1. MA : Major, **2. I/R :** Inspection Report, **3. T/C :** Test Certificate, **4. P :** Performed, **5. W :** Witness, **6. R :** Review **7. H :** Hold

(Prepared by)
ANIL BHARADWAJ (Mgr- QA)
For **A. V. VALVES LIMITED**

(Approved by)
FALGUNI SAHA
2020.12.26 12:11:54 +05'30'

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LTD

From	To
Er. B.Bertrand Russel B.E.(Hons)., Chief Engineer/Projects I, TANGEDCO,5th Floor, Western wing, 144,NPKRRMaaligai, Anna salai, Chennai-2 Tel: 044-28521591,Mobile:+919445857543. Email: cepr@tnebnet.org	Bharat Heavy Electricals Limited, POWER PROJECT ENGINEERING INSTITUTE HRD & ESI COMPLEX NOIDA - 201301(U.P)

Lr.No.CE/Proj.1/SE/E/EE2/AEE/F.BHEL/PEM/ D. 10 /21 dt. 27 .01.2021

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REFERENCE No.	LOA. Lr.No. CE / P /SE/M/P/EE-10/E/P/F.2x660 MW Ennore SEZ STPP/ D.60 /14, dt.27.09.2014
BHEL Reference No:	1. BHEL Email dated.06.01.2021 2. Desein Comments Ref. Lr.No .8609 dt .07.01.2021
Subject	TANGEDCO–Approval / Comments- Drive LIST – ETP Plant Documents / Drawings received from BHEL / PEM- Reg

Sir,

The Approval on the Drawing /Document submitted by M/s BHEL / PEM on the above subject vide BHEL transmittal under reference is furnished below.

Sl. No	DRG/DOC.No:	DESCRIPTION	Rev No.	Status	Remarks
01	PE-V0-412-164-A039	Drive LIST – ETP Plant	02	01	M/s. BHEL is requested to submit Eight sets of drawing / Document for stamping and distribution

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours sincerely,

---sd(27.01.21)---
Chief Engineer/Projects-I

Copy to Shri E.V. Anand/DESEIN Consultants India Pvt. Ltd.,DESEIN HOUSE,Greater Kailash-II New Delhi-48 (E-Mail)

Copy submitted to The Chief Engineer/Civil/Ennore SEZ/Chennai 600120.(E-Mail)

ANNEXURE

S.No.	Comments by TANGEDCO/DESEIN.	BHEL/CWL Reply	Tangedco/Desein Response dated 05/01/2021	BHEL/CWL Reply dated 05/01/2021	TANGEDCO/ Desein Response
1.	Drive list is incomplete when compared with approved P&ID PE-V0-412-164-A004.The same shall be revised.	Revised accordingly	Noted	CLOSED	-
2.	Drive list shall contain Following: a. Rating of motors b. Quantity in service/ stand by c. Voltage Code d. Feeder Code e. Continuous/Intermittent f. Location	Noted and incorporated.	Noted	CLOSED	-
3.			Sl.no 14-21,29,30,38,40,42,44 – description shall be clarified/corrected.	Noted and incorporated.	Noted
4.			Sl.no 33, tag no. & description shall be corrected in line with the P&ID drwg.no.PE-V0-412-164-A004	Tag no (KKS number) corrected. Description rechecked and found ok. Please accept.	Noted
5.			Sl.no 22 & 23 tag no & description shall be corrected in line with the P&ID drwg.no.PE-V0-412-164-A004	Tag no (KKS number) corrected. Description rechecked and found ok. Please accept.	Noted

---sd(27.01.21)---

Chief Engineer/Projects-I

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
		APPROVED		**DRIVE LIST FOR ETP ENNORE**
				STATUS : CONTRACT
				JOB NO.: 17-04

DOC APPROVED VIDE **Lr.No.CE/Proj.1/SE/E/EE2/AEE/ F.BHEL/PEM/ D. 10 /21 dt. 27 .01.2021.**

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.

This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.

APPROVAL CATEGORY AWARDED = I

CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing

DEPARTMENT	MECHANICAL AUXILIARY
NAME: FALGUNI SAHA	2021

FALGUNI SAHA 2021.01.28 15:08:28 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: **EFFLUENT TREATMENT PLANT**

ORGINATOR

TURNKEY CONTRACTOR:-

CLEAR WATER LTD.

B-14/1, OKHLA INDUSTRIAL AREA
PHASE-II, NEW DELHI-110020
PHONE: 011 26386095
EMAIL: clearwater@bol.net.in

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA 2021.01.0 7 12:49:26 +05'30'

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-VO-412-164-A039	02
				NO. OF SHEETS	EXCLUDING COVER PAGE

DRIVE LIST (FOR ETP SYSTEM) REV 01

S.NO	ID	KKS_CODE	DESCRIPTION	DRIVE_TYPE	DESTINATION	O_C	AREA	PACKAGE	DDCMIS_NAME	PROCESS_BLOCK_STREAM	MOTOR RATING KW	WORKING	STANDBY	DUTY (CONT/INT/L)	VOTAGE CODE	FEEDER CODE	FG	RIO	EQUIP_GR	SOLENOID _GR	O/P_RED UNDANC Y	UCD_ PB_ DETAIL	SYNCH	REMOTE_ O/PIN	MODULE_TYPE	MODULE_ NO	SPECIAL_ REMARK	REF_DOC_NO	REV_RE MARK	REV_ NUMBE R	REV_CO DE	REF_DOC_NAME	JB No. FOR FEED BACK SIGNALS	JB Term 1	JB Term 2	JB No. FOR COMMONSIGNAL S
1	ETP-D-001	90GNN02AM001	LIME DOSING TNK-A AGITATOR	LTUD	DDCMIS	O	LIME DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	2.2	1	0	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
2	ETP-D-002	90GNN02AP001	LIME DOSING PUMP-A	LTUD	DDCMIS	O	LIME DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
3	ETP-D-003	90GNN02AP002	LIME DOSING PUMP-B	LTUD	DDCMIS	O	LIME DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
4	ETP-D-004	90GNN01AM001	ALUM DOSING TNK-A AGITATOR	LTUD	DDCMIS	O	ALUM DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	1.5	1		INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
5	ETP-D-005	90GNN01AP001	ALUM DOSING PUMP-A	LTUD	DDCMIS	O	ALUM DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
6	ETP-D-006	90GNN01AP002	ALUM DOSING PUMP-B	LTUD	DDCMIS	O	ALUM DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
7	ETP-D-007	90GNN03AM003	PE PREPARTION TNK-A AGITATOR	LTUD	DDCMIS	O	PE DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	1.5	1		INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
8	ETP-D-008	90GNN03AP001	PE DOSING PUMP-A	LTUD	DDCMIS	O	PE DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
9	ETP-D-009	90GNN03AP002	PE DOSING PUMP-B	LTUD	DDCMIS	O	PE DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
10	ETP-D-010	10GTA01AP001	PRE SETTLING OVERFLOW PUMP -A (UNIT-1)	LTUD	DDCMIS	O	PRE SETTLING OVER FLOW	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
11	ETP-D-011	10GTA01AP002	PRE SETTLING OVERFLOW PUMP -B (UNIT-1)	LTUD	DDCMIS	O	PRE SETTLING OVER FLOW	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
12	ETP-D-012	20GTA01AP001	PRE SETTLING OVERFLOW PUMP -A (UNIT-2)	LTUD	DDCMIS	O	PRE SETTLING OVER FLOW	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
13	ETP-D-013	20GTA01AP002	PRE SETTLING OVERFLOW PUMP -B (UNIT-2)	LTUD	DDCMIS	O	PRE SETTLING OVER FLOW	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
14	ETP-D-014	10GNA01AP001	TRANSFORMER YARD OILY WASTE TRANSFER PUMP -A (UNIT-1)	LTUD	DDCMIS	O	TRANSFORMER YARD OILY WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
15	ETP-D-015	10GNA01AP002	TRANSFORMER YARD OILY WASTE TRANSFER PUMP -B (UNIT-1)	LTUD	DDCMIS	O	TRANSFORMER YARD OILY WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
16	ETP-D-016	20GNA01AP001	TRANSFORMER YARD OILY WASTE TRANSFER PUMP -A (UNIT-2)	LTUD	DDCMIS	O	TRANSFORMER YARD OILY WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
17	ETP-D-017	20GNA01AP002	TRANSFORMER YARD OILY WASTE TRANSFER PUMP -B (UNIT-2)	LTUD	DDCMIS	O	TRANSFORMER YARD OILY WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
18	ETP-D-018	10GNA04AP001	POWER HOUSE AREA SERVICE WASTE TRANSFER PUMP -A (UNIT-1)	LTUD	DDCMIS	O	POWER HOUSW SERVICE WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
19	ETP-D-019	10GNA04AP002	POWER HOUSE AREA SERVICE WASTE TRANSFER PUMP -B (UNIT-1)	LTUD	DDCMIS	O	POWER HOUSW SERVICE WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
20	ETP-D-020	20GNA04AP001	POWER HOUSE AREA SERVICE WASTE TRANSFER PUMP -A (UNIT-2)	LTUD	DDCMIS	O	POWER HOUSW SERVICE WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
21	ETP-D-021	20GNA04AP002	POWER HOUSE AREA SERVICE WASTE TRANSFER PUMP -B (UNIT-2)	LTUD	DDCMIS	O	POWER HOUSW SERVICE WASTE	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
22	ETP-D-022	90GNA02AP001	TPI INLET WATER TRANSFER PUMP -A	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	2.2	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
23	ETP-D-023	90GNA02AP002	TPI INLET WATER TRANSFER PUMP -B	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	2.2	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
24	ETP-D-024	90GMA21AP001	GUARD POND EFFLUENT TRANSFER PUMP -A	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	55	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
25	ETP-D-025	90GMA21AP002	GUARD POND EFFLUENT TRANSFER PUMP -B	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	55	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
26	ETP-D-026	90GMA30AD001	GUARD POND EFFLUENT TRANSFER PUMP DISCHARGE MOV-1	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
27	ETP-D-027	90GMA30AA002	GUARD POND EFFLUENT TRANSFER PUMP DISCHARGE MOV-2	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	1.5	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
28	ETP-D-028	90GMA30AA003	GUARD POND EFFLUENT TRANSFER PUMP DISCHARGE MOV-3	LTUD	DDCMIS	O	GUARD POND AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
29	ETP-D-029	90GMA01AP001	CMB GARDENING PUMP-A	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	2.2	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
30	ETP-D-030	90GMA01AP002	CMB GARDENING PUMP-B	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	2.2	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
31	ETP-D-031	90GMA01AP003	CMB EFFLUENT TRANSFER PUMP-A	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	125	1		C	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
32	ETP-D-032	90GMA01AP004	CMB EFFLUENT TRANSFER PUMP-B	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	125	1	1	C	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
33	ETP-D-033	90GMA12AA002	CMB GARDENING PUMP TO HORTICULTURE ISOLATION VALVE (MOV)	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
34	ETP-D-034	90GMA11AA002	CMB EFFLUENT TRANSFER PUMP TO CHP DUST SUPP ISOLATION VALVE (MOV)	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
35	ETP-D-035	90GMA11AA003	CMB EFFLUENT TRANSFER PUMP TO GUARD POND ISOLATION VALVE (MOV)	LTUD	DDCMIS	O	CMB WATER AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
36	ETP-D-036	90GMA11AA001	CMB EFFLUENT TRANSFER PUMP RECIRCULATION VALVE (MOV)	LTUD	DDCMIS	O	CMB WATER AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	0.75	1		INTL	D	B		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
37	ETP-D-037	10GNA02AP001	COAL MILL OILY WASTE TRANSFER PUMP -A (UNIT-1) COAL MILL AREA-1	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
38	ETP-D-038	10GNA02AP002	COAL MILL OILY WASTE TRANSFER PUMP -B (UNIT-1) COAL MILL AREA-1	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
39	ETP-D-039	10GNA03AP001	COAL MILL OILY WASTE TRANSFER PUMP -A (UNIT-1) COAL MILL AREA-2	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
40	ETP-D-040	10GNA03AP002	COAL MILL OILY WASTE TRANSFER PUMP -B (UNIT-1) COAL MILL AREA-2	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
41	ETP-D-041	20GNA02AP001	COAL MILL OILY WASTE TRANSFER PUMP -A (UNIT-2) COAL MILL AREA-1	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
42	ETP-D-042	20GNA02AP002	COAL MILL OILY WASTE TRANSFER PUMP -B (UNIT-2) COAL MILL AREA -1	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
43	ETP-D-043	20GNA03AP001	COAL MILL OILY WASTE TRANSFER PUMP -A (UNIT-2) COAL MILL AREA-2	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
44	ETP-D-044	20GNA03AP002	COAL MILL OILY WASTE TRANSFER PUMP -B (UNIT-2) COAL MILL AREA 2	LTUD	DDCMIS	O	COAL MILL OILY WASTE AREA	ETP	MAIN PLANT DDCMIS	MAIN PLANT DDCMIS BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
45	ETP-D-045	90GNN07AM001	ALKALI DOSING TANK AGI	LTUD	DDCMIS	O	ALKALI DOSING SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	1.5	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
46	ETP-D-046	90GNN07AP001	ALKALI DOSING PUMP -A FOR GUARD POND	LTUD	DDCMIS	O	ALKALI DOSING SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
47	ETP-D-047	90GNN07AP002	ALKALI DOSING PUMP -B FOR GUARD POND	LTUD	DDCMIS	O	ALKALI DOSING SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
48	ETP-D-048	90GNN05AP001	ALKALI DOSING PUMP -A FOR CMB	LTUD	DDCMIS	O	ALKALI DOSING SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
49	ETP-D-049	90GNN05AP002	ALKALI DOSING PUMP -B FOR CMB	LTUD	DDCMIS	O	ALKALI DOSING SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
50	ETP-D-050	90GNN04AP001	ACID DOSING PUMP -A FOR CMB	LTUD	DDCMIS	O	ACID DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
51	ETP-D-051	90GNN04AP002	ACID DOSING PUMP -B FOR CMB	LTUD	DDCMIS	O	ACID DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
52	ETP-D-052	90GNN06AP001	ACID DOSING PUMP -A FOR GUARD POND	LTUD	DDCMIS	O	ACID DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
53	ETP-D-053	90GNN06AP002	ACID DOSING PUMP -B FOR FOR GUARD POND	LTUD	DDCMIS	O	ACID DOS SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	0.75	1	1	INTL	E	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
54	ETP-D-054	90GNC01AN001	AIR BLR-B1-A	LTUD	DDCMIS	O	AIR BLOWER SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	5.5	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
55	ETP-D-055	90GNC01AN002	AIR BLR-B1-B	LTUD	DDCMIS	O	AIR BLOWER SYS	ETP	ETP DDCMIS	ETP PLANT BLOCK	5.5	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
56	ETP-D-056	90GNS01AP001	SLUDGE TRANSFER PUMP -A	LTUD	DDCMIS	O	SLUDGE PIT AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-A	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				
57	ETP-D-057	90GNS01AP002	SLUDGE TRANSFER PUMP -B	LTUD	DDCMIS	O	SLUDGE PIT AREA	ETP	ETP DDCMIS	ETP PLANT BLOCK	3.7	1	1	INTL	D	U		-	ETP_GR-B	NA	NA	NA	NA	-		-		PE-V0-412-164-A004(P&ID) REV-03				P&ID FOR EFFLUENT TRT PLANT				

1. ABBREVIATIONS : * VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (cc): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V,FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.08/21 dt.03.02.2021

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Email Dt. 28.12.2020. 2.DESEIN REF: D8566 dt.28.12.2020.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

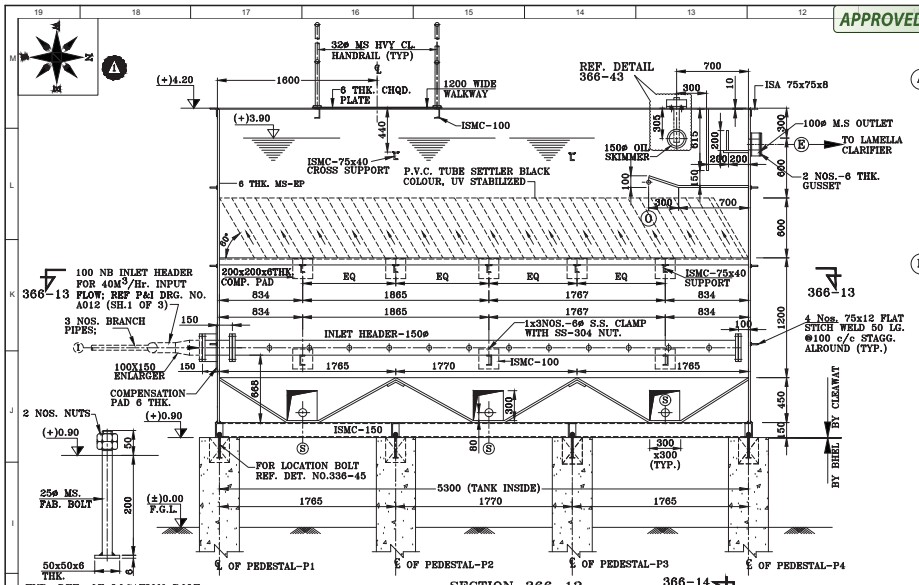
Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164-A030	1	GA of Oil water separator	04

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

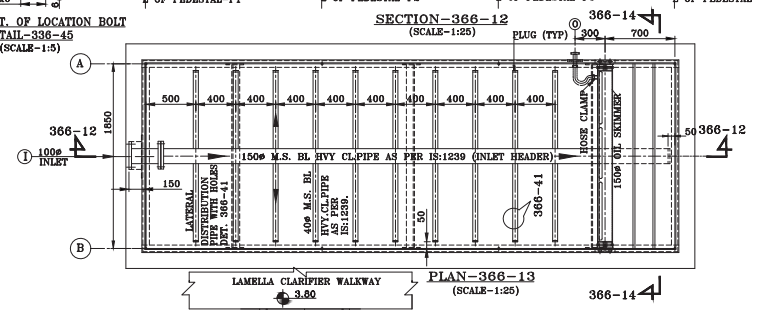
Yours faithfully,
-sd-/dt.03.02.2021
Superintending Engineer/E/PrI

APPROVED



SECTION-366-12
(SCALE-1:25)

TYP. DET. OF LOCATION BOLT
DETAIL-336-45
(SCALE-1:5)



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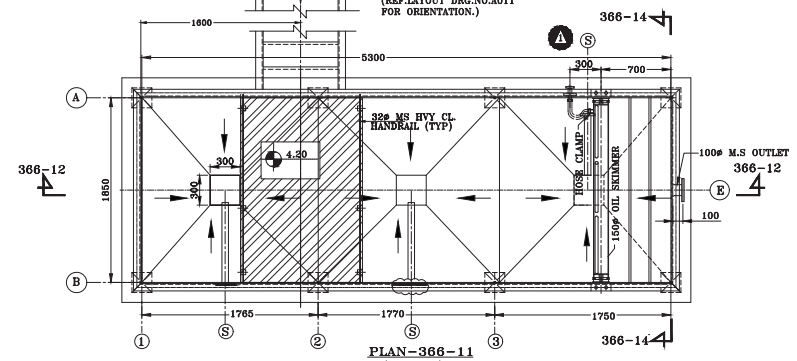

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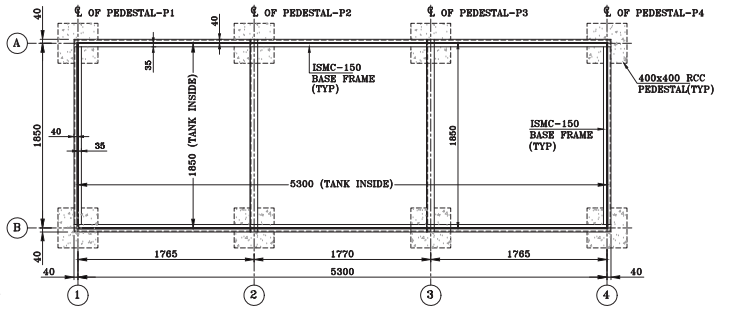
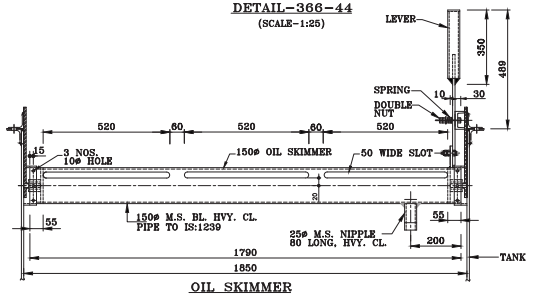
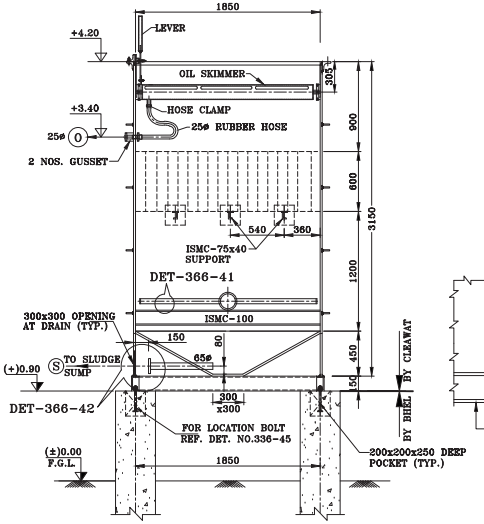


BASE FRAME DETAIL
DETAIL-366-44
(SCALE-1:25)



OIL SKIMMER
DETAIL-366-43
(SCALE-NTS)



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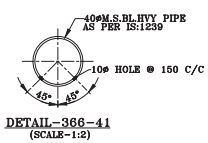
(SCALE-1:25)



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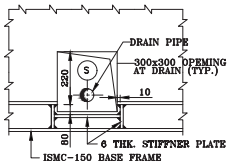

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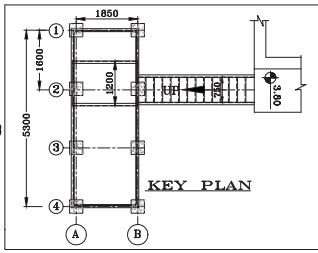

DOCUMENT APPROVED VIDE. Lr.No:SE/E/Prl/EE-7/M/AEE/M/ F.En SEZ STPP/D.08/21 dt.03.02.2021.

FALGUNI SAHA 2020.12.2 8 10:21:34 +05'30'

FALGUNI SAHA 2021.02.04 08:33:46 +05'30'

TABLE-361
DESIGN DATA
OIL WATER SEPARATOR

DESIGN	IS:805
WORKING PRESSURE / DESIGN PRESSURE	A.T.M. / FULL OF LIQUID
OILY WASTE WATER SEPARATOR MANUFACTURER	CLEAR WATER.
WORKING TEMP °C / DESIGN TEMP °C	33 / 50
CORROSION ALLOWANCE (mm)	2.0
TYPE OF HEADS	AS PER DRG.
JOINT EFFICIENCY	0.70
RADIOGRAPHY	NIL
POST WELD HEAT TREATMENT	NIL
HEAT TREATMENT	NIL
WIND SPECIFICATION	IS: 875
EARTH QUAKE SPECIFICATION	IS 1893
OPERATING MEDIUM	WASTE WATER
CAP. (M3/hr.)	40
SIZE (MxMxM)	5.30x1.85x3.1 S.W.D.
PAINTING / CLEANING	
FIRE PROOFING	□ YES. ■ NO.
HYDROSTATIC TEST	FULL OF WATER
INSPECTION BY	□ VENDOR ■ CLIENT - BHEL

TABLE-362
MATERIAL OF CONSTRUCTION

SIDE PLATE AND REINFORCEMENT PAD	IS:2062 Gr.A
BOTTOM PLATE	IS:2062
NOZZLE NECK	IS:1239 HVY. CLASS
NOZZLE FLANGE	IS:2062
GASKET	C.A.F.
EXTERNAL NUTS AND BOLTS	IS:1363; C.S. TO IS:1367(PART-3) CL-4.8
INTERNAL BOLTS AND NUTS	IS:1363; G.I. TO IS:1367(PART-3) CL-4.8
SUPPORTS / SUPPORTS BASE	IS:2062
INTERNAL PARTS	IS:2062

TABLE-363
NOZZLE DETAIL

MARK NO.	DESCRIPTION	SIZE	QTY.	CLASS	FLANGES RATING	FLANGES TYPE	FLANGES FACING	PROJECTION
I	EFFLUENT INLET	100	1	HVY.	150ø	S.O	F.F	SEE DRG.
E	EFFLUENT OUTLET	100	1	HVY.	150ø	S.O.	F.F.	SEE DRG.
S	SLUDGE OUTLET	65	3	HVY.	150ø	S.O	F.F	SEE DRG.
O	OIL OUTLET	25	1	HVY.	150ø	S.O	F.F	SEE DRG.

TABLE-364

M.S. FLAT FACE SLIP-ON FLANGE AS PER ANSI B-16.5 CL-150, TABLE-5

SL. NO.	PIPE SIZEø Dn	FLANGE (O.D.)	SLIP ON BORE (I.D)	P.C.D. K	NO. OF HOLES	HOLE DIA. H	THK. b
1	15	89	22.4	60.5	4	15.8	11.2
2	25	108	34.50	79.40	4	15.8	14.0
3	40	127	49.50	98.60	4	15.8	17.5
4	50	152.4	62.00	120.70	4	19	19.1
5	65	177.8	76.70	139.70	4	19	22.4
6	100	228.6	116.10	190.50	8	19	23.9
7	150	279.5	170.7	241.3	8	22.4	25.4
8	200	342.9	221.50	298.40	8	22.4	28.4

NOTES:-
1. ALL DIMENSIONS ARE IN mm. AND LEVELS ARE IN METER.
2. THIS DRAWING SHOULD NOT BE SCALED.
3. IF ANY DOUBT, PLEASE ASK.
4. EL 0.00M CORRESPONDS TO RL 10.00 M WHICH IS FFL OF TG BUILDING
5. GRIND SMOOTH ALL INTERNAL WELD AND SHARP CORNERS.
6. ALL FLANGES ARE TO BE DRILLED OFF CENTER.
7. ALL FLANGES DIMENSIONS SHALL CONFORM TO TABLE-314, UNLESS OTHERWISE SPECIFIED.
8. ALL PIPES SHALL BE M.S. BLACK HVY. CLASS CONFORMING TO IS:1239.

9.1 PIPE & FITTINGS BELOW 50 NB DIA. SHALL BE SCREWED TYPE CONFORMING TO IS:1239.

9.2 PIPE ABOVE 50 NB & UP TO 150mm DIA. SHALL CONFORM TO IS:1239 (ERW); M.S. BLACK HEAVY CLASS.

9.3 ALL BENDS ABOVE 50 NB & UP TO 150 DIA. SHALL BE BUTT WELD TYPE CONFORMING TO IS:1239.

9.4 FITTINGS OTHER THAN BENDS SHALL BE FABRICATED FROM M.S. BLACK HVY CLASS IS:1239 (ERW) PIPE.

10. PAINTING SCHEDULE:-
a. SURFACE PREPARATION SHALL BE MANUAL WITH WIRE BRUSHING, PRIMER SHALL BE APPLIED IMMEDIATELY AFTER SURFACE PREPARATION.
b. INTERNAL FACES OF OIL SEPARETOR SHALL HAVE TWO COATS OF EPOXY ZINC CROMATE PRIMER, TOTAL THK. DFT=50-60 MICRONS WITH TWO FINISH COATS OF SEA GREEN SELF PRIMING TANK LINER (EPOXY HIGH BUILD COATING, FIELD COATED, TOTAL THK. DFT=40-50 MICRONS PAINT, AGGREGATE TOTAL DFT=90-120, APPLIED BY BRUSH ON DRY SURFACE
c. EXTERNAL FACES SHALL HAVE TWO COATS OF EPOXY ZINC CROMATE PRIMER, TOTAL THK. DFT=50-60 MICRONS (SHOP COATED) TWO FINISH COAT OF SEA GREEN ACRYLIC POLYURETHANE PAINT (F2) , TOTAL THK.DFT=50 MICRONS AGGREGATE TOTAL DFT=220 MICRONS, APPLIED BY BRUSH ON DRY SURFACE.

10. TPI SHALL BE OF "CLEAWAT" MAKE. AND DESIGN.

IDENTIFICATION OF DRG. / PLAN / SECTION
17-04/A 3 36-I 0
WORK DICIPLINE
SHEET NO.
PLAN/SECTION NO.
DRG.NO.
DRG. APPROVED BY PUR.
JOB NO.

LEGEND
F.G.L. - FINISH GROUND LEVEL
T.W.L. - TOP WATER LEVEL

QUALITY POLICY
IN ITS QUEST TO SATISFY THE CUSTOMER, CLEAR WATER LTD. PURSUES CONTINUAL IMPROVEMENT IN THE QUALITY OF ITS PRODUCTS, SERVICES AND PERFORMANCE LEADING TO TOTAL CUSTOMER SATISFACTION AND BUSINESS GROWTH THROUGH DEDICATION, COMMITMENT AND TEAM WORK OF ALL EMPLOYEES.

QUALITY OBJECTIVES
- CUSTOMER SATISFACTION BY IMPROVING DELIVERY / COMPLETION PERIOD & RESPONSE.
- QUALITY OF SUPPLIES BY IMPROVING SUB-VENDOR PERFORMANCE.
- CAPABILITY OF HUMAN RESOURCES BY UPGRADING SKILL AND COMPETENCE.

SL. NO.	REFERENCE DRGS. DESCRIPTION	CLEWAT DRG. NO.
3	CIVIL OUTLINE DRG.	17-04/A036
2	P&I DIAGRAM	17-04/012
1	LAYOUT PLAN	17-04/A011

REV. No.	REVISIONS DETAIL	DATE
01	REVISED AS PER DESEIN COMMENTS	26.12.2020
0B	SUBMITTED FOR APPROVAL	17.11.2016
0A		30.10.2016
0	submitted for approval	06.09.2016

RRB/17-04D(36)/ DT.26.12.2020

PROJECT	2 x 660 MW ENNORE SEZ STPP (AT ASH DYKE OF NCTPS, CHENNAI)
OWNER	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
CONSULTANT: DESEIN	DESEIN PVT. LIMITED CONSULTING ENGINEERS NEW DELHI; HYDERABAD- INDIA
CONTRACTOR BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA,NEW DELHI
ORIGINATOR CLEAR WATER LTD.	PACKAGE CONTRACTOR :- CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE :-26356095 E-mail :-clearwater@bol.net.in

CLEWAT DRG. NO.	17-04/A336 (SH. 1 OF 1)	VER 00
BHEL DRG. NO.	PE-V0-412-164-A030	REV. 01
SCALE	1:25	

TITLE:- G.A OF OIL WATER SEPARATOR (EFFLUENT TREATMENT PLANT)

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED

From
Er.B.Bertrand Russell.,B.E (Hons.),
Chief Engineer/Projects-I,
V Floor, Western Wing,
144, Anna Salai,
Chennai-600 002.
Fax No : 044- 28520878
Cell No: 9445857543
Email ID: cepr@tnebnet.org

To
M/s. Bharat Heavy Electrical Limited,
Project Engineering Management
PPEI Building, HRDI & ESI Complex,
Plot No.25, Sector-16A, Noida-201301(U.P)
Fax : 0120-423522
E mail: permindersingh@bhelpem.co.in,
jd@bhel.in, rajivb@bhel.in
pmgsalil@bhel.in, akashverma@bhel.in

Lr.No.CE/E/P.I/SE/E/P.I/EE2/E/P/AEE/E/P/F.Ennore SEZ Drg Appl./D. 19/21 Dt. 21.03.2021

Sir.

Sub: TANGEDCO - Setting up of 2x660 MW Ennore SEZ Coal based super critical thermal power project at ash dyke of North Chennai Thermal Power Station (Kattupalli) –EPC cum Debt Finance Contract awarded to M/s.BHEL – Document on Cable Tray / Trench & Conduit Routing Diagram Effluent Treatment Pant (PE-V0-412-164-A033/Rev.00) submitted by M/s.BHEL/PEM – Approval accorded under **Category 4** - Reg.

Ref: 1)Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW Ennore SEZ STPP/D.60/14 Dt.27.09.2014
2)Your letter Ref: MS-1-13-E-0005 dated 27.09.2014.
3) M/s BHEL/PEM Drg. /Doc. sub ref.: Downloaded from CDF/PEDM on 25.03.2021
4) M/s Desein Pvt. Ltd. Comments ref: D-4027/TANGEDCO/8704 Dt.04.03.2021 downloaded on 04.03.2021.

Please refer to the letters cited above.

Approved vide. Lr.No.CE/E/P.I/SE/E/P.I/EET/E/P/AEE/E/P/F.Ennore SEZ Drg Appl./D.\19/21 Dt. 21.04.2021.

The document received from M/s.BHEL/PEM vide ref.(3 under Cat 1.

Sl. No.	Drawing/Document No.	Rev	Description	TANGEDCO's Approval
01	PE-V0-412-164-A033	00	Cable Tray / Trench & Conduit Routing Diagram Effluent Treatment Pant Vendor: M/s.Clear Water Ltd., New Delhi	Cat 4 (information furnished is noted)

It is requested that eight copies of hard copy of the above document shall be submitted immediately for according stamped approval.

Yours sincerely,

CHIEF ENGINEER/PROJECTS-I

Copy to the Chief Engineer/Civil/Ennore SEZ/Chennai-120 (by E-mail)
Copy to the Superintending Engineer/Electrical/Ennore SEZ/Chennai-120 (by E-mail)
Copy to M/s.Desein Pvt Ltd, New Delhi. (By E-mail)

4/5

APPROVED

Approved vide. Lr.No.CE/E/P.I/SE/E/P.I/EET/E/P/AEE/E/P/F.Ennore SEZ Drg Appl./D.\19/21 Dt. 21.04.2021.

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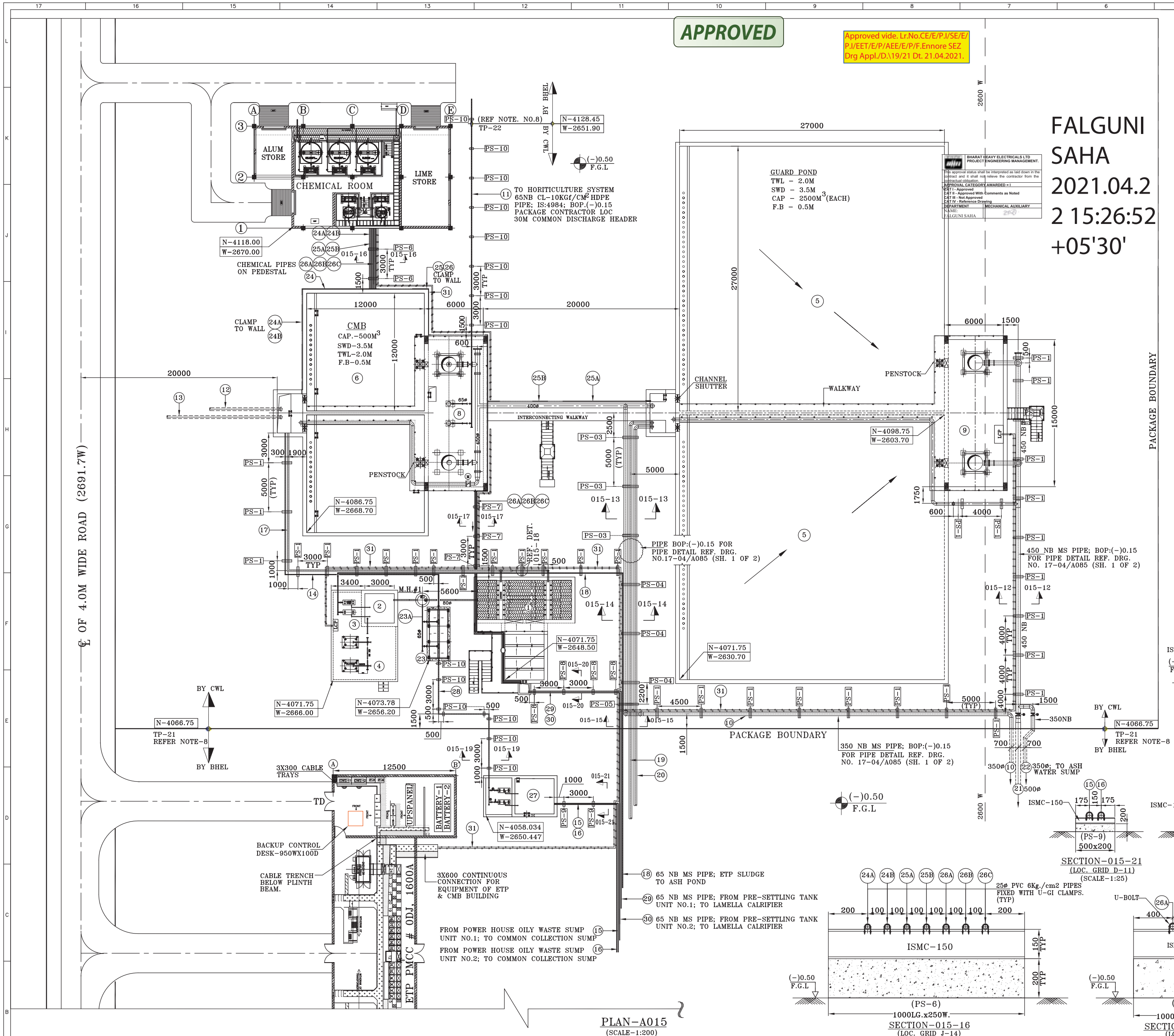
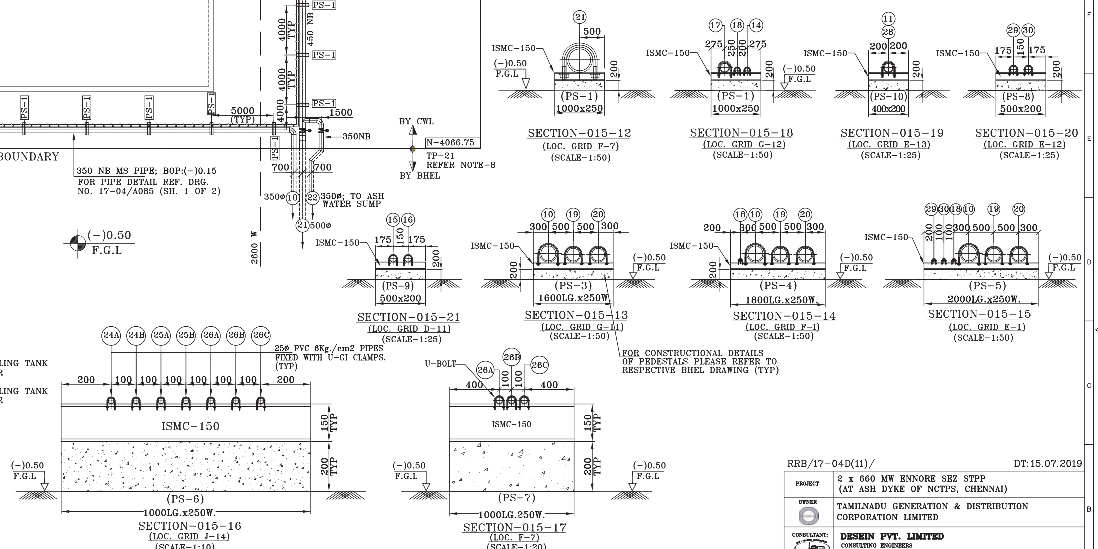


PLAN-A015

(SCALE-1:200)

SL.NO.	DESCRIPTION	CAPACITY	QTY.	MOC.	REMARK
1	LAMELLA CLARIFIER	125 Cu.M/Hr	1	R.C.C	FLOCC. ZONE (4 x 5.8M); CLARIFIER (4.0 x 9.6)
2	SLUDGE SUMP	20 Cu. M	1	R.C.C	3X3X3.3M+1.0 FB
3	SLUDGE TRANSFER PUMPS	10 Cu.M/Hr	1W+1SB	--	SCREW PUMPS
4	AIR BLOWER FOR SLUDGE SUMP	4500 LPM	1W+1SB	--	ROOTS BLOWER
5	GUARD POND(COMP. 1 & 2)	2500 Cu.M	2	R.C.C	27 x 27 x 3.5M SWD+0.5M F.B
6	CENTRAL MONITORING BASIN (COMPARTMENT 1 AND 2)	500 Cu.M	2	R.C.C	12 x 12 x 3.5M SWD+0.5M F.B
7	CHEMICAL HOUSE	-	1	R.C.C	7 x 10M;
8	CMB TRANSFER PUMP	1000 Cu.M/Hr	1W+1SB	--	--
9	GUARD POND TRANSFER PUMP	1200 Cu.M/Hr	1W+1SB	--	--
10	TO CHP DUST SUPPRESSION SYST.	500-Cu.M/Hr	--	MS-PU	350ø PIPE UP TO BATTERY LIMIT BY CLEAWAT; FLOW APPROX.
11	TO HORTICULTURE	10-Cu.M/Hr	--	HDPE	100NB PIPE;LOC 30M; 350RMT TOTAL LENGTH
12	RO REJECT-STAGE I FEED PIPE	1100 Cu.M/Hr	--	---	80NB TO CMB BY DM PLANT VENDOR
13	DMP-CPU N-PIT(CPU & DM WASTE)	80 Cu.M/Hr	--	---	150NB TO CMB BY CPU VENDOR; INTER. FLOW
14	FROM TPI (OIL WATER SEPARATOR)	40 Cu.M/Hr	--	MS	100NB TO CMB
15	FROM PRE SETTLING OVER FLOW(UNIT-1)	15 Cu.M/Hr	--	MS	65 NB TO LAMELLA CLARIFIER
16	FROM PRE SETTLING OVER FLOW(UNIT-2)	15 Cu.M/Hr	-	MS	65 NB TO LAMELLA CLARIFIER
17	LAMELLA CLARIFIER OUT PUT FLOW	125 Cu.M/Hr	--	MS	200 NB TO CMB INLET
18	ETP SLUDGE SUMP FLOW	10 Cu.M/Hr	--	MS	65 NB TO ASH SLURRY SUMP
19	RO REJECT STAGE -I	--Cu.M/Hr	---	---	300 NB TO GUARD POND BY DM VENDOR
20	FROM SLUDGE SUMP IN PT AREA	---Cu.M/Hr	----	----	300 NB TO GUARD POND BY PT VENDOR
21	TO CW BLOW DOWN HEADER	AS REQD.	---	MS-PU	450 NB UPTO TP-21 BY CLEAWAT; 500 NB FROM TP-21 TO HEADER
22	TO ASH WATER SUMP	AS REQD.	----	MS-PU	350 NB UPTO LOC#1; BY CLEAWAT
23	TPI	40 Cu.M/Hr	1	MS-EP	2.35 M X 5.5 M ; FLOW FROM FUEL OIL SEPARATOR/ POWER HOUSE OLY WASTE UNIT 1& 2
24	CHEMICAL PIPE LINES TO CMB	----	----	----	PIPE LINE LAID OVER RCC PEDESTAL
25	CHEMICAL PIPE LINES TO GAURD POND	----	----	----	-do-
26	CHEMICAL PIPE LINE TO LAMELLA CLARIFIER	----	----	----	-do-
27	COMMON COLLECTION SUMP	20 Cu.M/Hr	1	RCC	3.6 M. x 4.0 M.
28	FROM CCS TO TPI	40 Cu.M/Hr	----	MS	100 NB MS
29	FROM PRE-SETTLING TANK UNIT NO.1 TO LAMELLA CALRIFIER	15 Cu.M/Hr		MS	65 NB MS
30	FROM PRE-SETTLING TANK UNIT NO.2 TO LAMELLA CALRIFIER	15 Cu.M/Hr		MS	65 NB MS
31	CABLE ROUTING				REFER DRG. NO. A033



NOTES:-

1. ALL DIMENSIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THIS DRG. SHOULD NOT BE SCALED.
3. IF IN DOUBT , PLEASE ASK.
4. LOCATION OF FIELD SUMP HAVE BEEN INDICATED UNDER DRAWING NO. 17-04/A011(SH. 2 OF 2).
5. EL 0.00M CORRESPONDS TO RL 10.00 M WHICH IS FFL OF TG BUILDING.
6. FOR PIPE ROUTING AND PEDESTAL DETAILS REFER BHEL DRG. NO. A032.
7. FOR CABLE TRAY/TRENCH AND CONDUIT ROUTING DETAILS REFER BHEL DRG. NO. A033.
8. FLANGE CONNECTIONS AT TP-21 ARE TO BE STAGGERED AT 250 MM TO AVOID FOULING.
9. SUPPLY PROVISSION OF FIXING ACCESSORIES SUCH AS CLAMPS HARDWARE; GASKET AS REQUIRED WITHIN TERMINAL POINTS IS INCLUDED IN CLEAR WATER SCOPE OF WORK.
10. PEDESTAL WITHIN PACKAGE AREA SHALL BE PROVIDED AT C/C NOT EXCEEDING 3.0M. UNLESS OTHERWISE MENSIONED IN DRAWING.
11. ISMC OVER PEDESTAL TO SUPPORT PIPES BY PEDESTAL VENDER.

IDENTIFICATION OF DRG. / PLAN / SECTION

17-04/A 0 15-1 0 — WORK DICIPLINE; SHEET NO.; PLAN/SECTION NO.; DRG.NO.; DRG. APPROVED BY PUR.; JOB NO.

LEGEND

T.P - TERMINAL POINT

LOC. - LOCATION

SL. NO.	DESCRIPTION	CWL DRG. NO.	BHEL DRG.NO.
2	LAY OUT OF ETP (OFF SITE SUMPS)		PE-V0-412-164A-A002(SH2 OF 2)
1	PLOT PLAN	___	PE-DG-412-100-M001

REFERENCE DRGS.

	DETAILS REVISIONS	DATE
0B	ADDITIONAL PEDESTALS ADDED COORDINATES REVISED AS PER BHEL E-MAIL DT.06.07.2019	15.07.2019
0A	SUBMITED FOR APPROVAL	21.04.2019
00	SUBMITED FOR APPROVAL	17-11-2018

RRB/17-04D(11)/ DT: 15.07.2019

PROJECT: 2 x 660 MW ENNORE SEZ STPP (AT ASH DYKE OF NCTPS, CHENNAI)

OWNER: TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED

CONSULTANT: DESEIN PVT. LIMITED, CONSULTING ENGINEERS, NEW DELHI; HYDERABAD- INDIA

CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA,NEW DELHI

ORIGINATOR: PACKAGE CONTRACTOR :- CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE :-26386095 E-mail :-clearwater@bol.net.in

CLEAWAT DRG. NO. 17-04/A015 (SH. 1 OF 1) — VER 0B

BHEL DRG.NO. PE-V0-412-164-A033 (SH. 1 OF 1) — REV. 00

TITLE:- CABLE TRAY / TRENCH & CONDUIT ROUTING DIAGRAM — EFFLUENT TREATMENT PLANT

SCALE 1:400

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LTD

From	To
Er.N.Narayanan.,B.E., Chief Engineer/Projects I, TANGEDCO,5th Floor, Western wing, 144,NPKRRMaaligai, Anna salai, Chennai-2 Tel: 044-28521591,Mobile:+919445857543. Email: cepr@tnebnet.org	M/s.Bharat Heavy Electrical Limited, Project Engineering Management PPEI Building, HRDI & ESI Complex, Plot No.25, Sector-16A, Noida-201301(U.P) Fax : 0120-423522 E mail: permindersingh@bhelpem.co.in, jd@bhel.in, rajivb@bhel.in pmgsalil@bhel.in, akashverma@bhel.in

Lr.No.CE/Proj.I/SE/E/Pr-I/EE 2/AEE/E/P/F. SEZ –BHEL-PEM/ D. 28/21 dt. 11.08.2021

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO Ref No.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW Ennore SEZ STPP/ D.60/14dt.27.09.2014
BHEL Reference No:	1. Lr.No. SE/E/P.I/EE2/AEE/F.BHEL-ISG/ D.825/19 dt.21.09.2019 2. Lr.No. SE/E/P.I/EE2/AEE/F.BHEL-ISG/ D.07/21 dt.12.01.2021 3. Lr.No. SE/E/P.I/EE2/AEE/F.BHEL-ISG/ D.19/21 dt.30.04.2021 4. BHEL Email Dt .10.07.2021. 5. M/s. Desein Pvt.Ltd. Comments ref:D-4027/TANGEDCO/8906 Dt.15.07.2021 downloaded on 15.07.2021
Subject	TANGEDCO – 2x660 MW ENNORE SEZ Supercritical TPP – Control Write up for ETP - submitted by M/s.BHEL/ISG - Reg

Sir,

The Approval on the drawing/document submitted by M/s BHEL on the above subject received vide M/s.Desein transmittal under reference (5) is furnished below.

Sl. No.	DRG/DOC.No:	DESCRIPTION	Rev No.	Status	Remarks
01	PE-V0-412-164-A040	Control Write up for ETP	03	01	M/s. BHEL is requested to submit Eight sets of drawing / document for stamping and distribution

Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Thanking you.

Yours faithfully,
Sd./11.08.2021
Chief Engineer/projects-I

Copy to Shri E.V. Anand/DESEIN Consultants India Pvt. Ltd., DESEIN HOUSE, Greater Kailash-II New Delhi-48(by E-mail)

Copy submitted to The Chief Engineer/Civil/Ennore SEZ/Chennai 600120.(by E-mail)

ANNEXURE

Sl. No.	Comments on 21/09/2019 by TANGEDCO/DESEIN.	BHEL/CWL Reply	Comment by TANGEDCO/ DESEIN dated 13/01/2021.	BHEL/CWL Reply dated 13/01/2021	Comment by TANGEDCO/DESEIN dated 13/04/2021.	BHEL/CWL Reply dated 14/07/2021	Comment by TANGEDCO/DESEIN dated 15/07/2021.
1.	Control Philosophy shall be updated as per final approved P&ID FOR EFFLUENT TREATMENT PLANT, # PE-V0-412-164-A004. Reference of same shall also be included.	Control philosophy updated as per final approved P&ID for ETP (PE-V0-412-164-A004).	Noted	CLOSED	CLOSED	CLOSED	--
2.	"Control System for Mechanical Auxiliary Packages, # PE-DM-412-145-I900" shall be included as a reference document in the design philosophy.	Noted and incorporated.	Noted	CLOSED	CLOSED	CLOSED	--
3.	"Drive Control Philosophy, # PE-DM-412-145-I002" shall be included as a reference document in the design philosophy.	Noted and incorporated.	Noted	CLOSED	CLOSED	CLOSED	--
4.	Please note that i. opening & closing of discharge MOV/SOV shall be interlocked with pump status (start or stop) and as well as with pump individual discharge pressure as per approved P&IDs. ii. Auto start of standby pump or blower shall also be interlocked with discharge pressure low in addition to tripping of main pump. iii. Standby Pump shall not start if the running pump trips because of low-low level. iv. Discharge pressure low shall also be included for Tripping of pump.	i) Noted and updated. ii) Noted and updated. iii) Noted and updated. iv) Noted and updated.	Comments are not incorporated. Please mark the revision with cloud, wherein the comments are incorporated.	i) Please note automatic Open/close of these MOV/SOV has been envisaged based on the outlet water parameters like pH, turbidity, etc and the protection for the same has already included in control write up. In the P&ID the dotted line has been shown to clubbed all the instrument/analyzer/signal to a common JB. The opening of MOV/SOV is to be decided as per system requirement base on the water demand (where to pump the water). However, for pump protection MOV opening is included before starting of pump as start permissive (refer sl no B-8, B-9 for CMB	i) MOV opening before starting of pump as start permissive is not recommended. Opening & closing of discharge MOV/SOV shall be interlocked with pump status (start or stop) and as well as with pump individual discharge pressure. MOV/SOV at discharge of pump should open with time delay after the start command to respective pump or pressure in the pipe.	i) Please note that all the MOV/SOV shall be open after a certain pressure developed (predefined set pressure activated) at pump discharge. The same is incorporated in revised control write up. Please accept. ii) CLOSED. iii) CLOSED. iv) CLOSED.	i) Noted.

Sl. No.	Comments on 21/09/2019 by TANGEDCO/DESEIN.	BHEL/CWL Reply	Comment by TANGEDCO/ DESEIN dated 13/01/2021.	BHEL/CWL Reply dated 13/01/2021	Comment by TANGEDCO/DESEIN dated 13/04/2021.	BHEL/CWL Reply dated 14/07/2021	Comment by TANGEDCO/DESEIN dated 15/07/2021.
				and C-6 for Guard pond pump. Please accept. ii) The same is already included under "**Protection"** in Sl No A-2, B-2, C-2, D-2, E-2, F-2, G-2, H-2, I-2 and J-2 (**for outside of ETP area**) and Sl No A-2, B-2 & B-3, C-2 and D-2 & D-6 (**for inside ETP area**). Also Rev-2 marking is added. Please accept. iii) Noted and updated. iv) The same is already included under "**Interlock Description of Equipment"** in Sl No A-2, B-2, C-2. D-2, E-2, F-2, G-2, H-2, I-2 and J-2 (**for outside of ETP area**) and Sl No A-2, B-2 & B-3, C-2 and D-2 & D-6 (**for inside ETP area**). Also Rev-2 marking is added. Please accept.	ii) Noted. iii) Noted. iv) Noted.		
5.	Modify the project title at the footer as 2 X 660MW Ennore SEZ STPP at Ash dyke of NCTPS	Noted and corrected.	Noted	CLOSED	CLOSED	CLOSED	--

Sd./11.08.2021
CHIEF ENGINEER/PROJECTS-I

APPROVED

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				CONTROL WRITE UP FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.
APPROVAL CATEGORY AWARDED = I
CAT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing
DEPARTMENT: MECHANICAL AUXILIARY
NAME: FALGUNI SAHA

FALGUNI SAHA
2021.08.13 14:18:19 +05'30'

Bharat Heavy Electricals Limited PPEI Sector-16A NOIDA 201 301 PEM/Mech. Aux.

FALGUNI SAHA
2021.07.14 14:37:21 +05'30'

APPROVED VIDE Lr.No.CE/Proj.I/SE/E/Pr-I/EE 2/AEE/E/ P/F. SEZ –BHEL-PEM/ D. 28/21, dt. 11.08.2021

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: **EFFLUENT TREATMENT PLANT**

ORGINATOR

TURNKEY CONTRACTOR:-

CLEAR WATER LTD.

B-14/1, OKHLA INDUSTRIAL AREA
PHASE-II, NEW DELHI-110020
PHONE: 011 26386095
EMAIL: clearwater@bol.net.in

CWL. DOC. NO.
17-04/E(71-CP)
Dt. 31.10.2020

BHARAT HEAVY ELECTRICALS LIMITED

PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A040	03
				NO. OF SHEETS: 18	EXCLUDING COVER PAGE

Reference Drawing/Document:

1) **P&ID for Effluent Treatment Plant : PE-V0-412-164-A004.**
2) **Drive Control Philosophy : PE-DM-412-145-I002.**
3) **Control System for Mech Aux Package : PE-DM-412-145-I900.**

ETP PLANT OPERATION AND CONTROL PHILOSOPHY (GENERAL):

The overall operation & control of all ETP units installed in ETP area hall be through standalone control system of DDCMIS family (ETP DDCMIS), located in ETP Control Room adjacent to ETP Plant area. Clear Water shall provide Junction Box at each Unit to which cables from LT / PT / FM Instruments shall be terminated. BHEL shall connect the respective Junction Box to Control System located in ETP Control Room. For Junction Box details refer document GA & WIRING DETAILS OF Junction Box doc no. PE-V0-412-164-A035.

Sumps outside ETP area shall be controlled from nearby Control System (Main Plant DDCMIS). Clear Water shall provide Junction Box at each sump to which cables from Instruments shall be terminated. BHEL shall connect the respective Junction Box to nearby Control System. For Junction Box details of Sumps locate outside refer document GA & WIRING DETAILS OF Junction Box doc no. PE-V0-412-164-A035

All Sump / Guard Pond and CMB Pumps will be auto/manually operated by Level Transmitters (running trip on low level and Start ready/running pump on high level of water in sump) and Pressure Transmitters (running pump trip on high pressure) located over the Sumps/ Guard Pond and CMB tanks and on pump discharge headers respectively .

One pump shall be kept in Auto running and the other pump shall be kept in Auto standby. The pump selected in Auto running shall start at high level LT and trip at low level LT.

All controls, fault indications / alarms, interlocks, logics shall be implemented in standalone control system of DDCMIS family.

The control philosophy of various systems is described below. However, for all the systems, following basic process related interlocks, alarms/ pre-warning signals shall be implemented in the control system located in BHEL Panels as per requirement.

a) Among the equipments, it shall be possible to select a specific pump or tank or sump for working/ standby/ maintenance etc. through control system.

b) Permissive & Interlocks.

- Starting & tripping of pumps with respect to liquid level in the respective sump/ tanks or liquid pressure in the Delivery lines,
- Starting & tripping of agitators with respect to liquid level in the respective sump/ tanks.
- Vertical Pumps shall have oil lubrication. One Solenoid (inbuilt and as applicable) valve per pump shall be looped with power supply to Pumps. Starting and tripping of Pumps shall open or close the Solenoid valve feeding Oil to system.

- Tripping of pumps when the discharge pressure is very high to avoid operation of the pump under shutoff head,
- Automatic opening / closing of actuator/motor operated valves provided on discharge/re-circulation lines of CMB and Guard pond delivery header has been envisaged in conjunction with preset feed backs from monitoring equipment such as pH / Turbidity meter / temperature,
- Automatic starting of standby pumps upon failure of starting of selected pump or tripping of running pump as the case may be.
- Capacity of the metering pump shall be controllable from 10-100% continuously by adjusting the stroke length manually by a micro meter dial calibrated for 0-100% of pump capacity integral with the pump,
- Various annunciations related to low level of the chemical tanks & sumps shall be provided.

R3

- All the MOV shall be open after activated predefined set pressure at pump discharge line.

c) Alarms/ Signals.

- Abnormal parameters such as Low & High level in tanks/sumps; High and Low pressure at pump discharge header,
- Failure of starting of equipment such as pumps, blowers etc. upon start command.
- Tripping of equipment due to protection logic.
- In addition, the control system shall facilitate the operator to know the status of various equipment (Whether equipment is running or stopped or tripped etc., whether the equipment is selected for operation/ standby duty /maintenance mode etc. as the case may be).

d) For provision of Various Pumps; instruments such as Pressure Gauges ; Level Transmitters ; Pressure transmitters ; Flow Meters ; MOVs; DPI please refer to P & I Drg. No PE-V0-41-164-A004)

e) Chemical solution shall be prepared manually.

f) All sump pump motors shall be provided with start and an emergency stop push button station near the motor.

CONTROL FOR SYSTEM LOCATED OUTSIDE ETP AREA.

A) CONTROL FOR RETENTION PIT FOR OILY WASTE FROM TRANSFORMER YARD AREA (FOR UNIT-1)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (10GNA01CL001) in Retention Pit for Oily Waste from Transformer Yard Area for Unit-1.	--	The running Transformer Yard Area Oily Waste Transfer Pump (10GNA01AP001/10GNA01AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (10GNA01CP001) at common discharge header of Transformer Yard Area Oily Waste Transfer Pumps (10GNA01AP001/10GNA01AP002).	--	The running Transformer Yard Area Oily Waste Transfer Pump (10GNA01AP001/10GNA01AP002) will be tripped and Standby pump will be start respectively.
3	At high level of Level Transmitter (10GNA01CL001) in Retention Pit for Oily Waste from Transformer Yard Area for Unit-1.	The Transformer Yard Area Oily Waste Transfer Pump (10GNA01AP001/10GNA01AP002) will start.	--
4	At High pressure of Pressure Transmitter (10GNA01CP001) at common discharge header of Transformer Yard Area Oily Waste Transfer Pumps (10GNA01AP001/10GNA01AP002).	--	The running Transformer Yard Area Oily Waste Transfer Pump (10GNA01AP001/10GNA01AP002) will be stopped.
5	At high level of Level Transmitter (10GNA04CL001) in Power House Oily Waste Sump for Unit-1.	--	The running Transformer Yard Area Oily Waste Transfer Pump (10GNA01AP001/10GNA01AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (10GNA01CL001) in Retention Pit for Oily Waste from Transformer Yard Area for Unit-1.
2. At Low and High pressure of Pressure Transmitter (10GNA01CP001) at common discharge header of Transformer Yard Area Oily Waste Transfer Pumps (10GNA01AP001/10GNA01AP002).
3. Running Transformer Yard Area Oily Waste Transfer Pump's Motor (10GNA01AE001/10GNA01AE002) tripped.

B) COAL MILL OILY WASTE SUMP-1 (UNIT-1)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (10GNA02CL001) in Coal Mill Oily Waste Sump-1 for Unit-1.	--	The running Coal Mill Oily Waste Transfer Pump (10GNA02AP001/10GNA02AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (10GNA02CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (10GNA02AP001/10GNA02AP002).	--	The running Coal Mill Oily Waste Transfer Pump (10GNA02AP001/10GNA02AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (10GNA02CL001) in Coal Mill Oily Waste Sump-1 for Unit-1.	The Coal Mill Oily Waste Transfer Pump (10GNA02AP001/10GNA02AP002) will start.	--
4	At High pressure of Pressure Transmitter (10GNA02CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (10GNA02AP001/10GNA02AP002).	--	The running Coal Mill Oily Waste Transfer Pump (10GNA02AP001/10GNA02AP002) will be stopped.
5	At high level of Level Transmitter (10GNA04CL001) in Power House Oily Waste Sump for Unit-1.	--	The running Coal Mill Oily Waste Transfer Pumps (10GNA02AP001/10GNA02AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (10GNA02CL001) in Coal Mill Oily Waste Sump-1 for Unit-1.
2. At Low and High pressure of Pressure Transmitter (10GNA02CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (10GNA02AP001/10GNA02AP002).
3. Running Coal Mill Oily Waste Transfer Pump's Motor (10GNA02AE001/10GNA02AE002) tripped.

C) COAL MILL OILY WASTE SUMP-2 (UNIT-1)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (10GNA03CL001) in Coal Mill Oily Waste Sump-2 for Unit-1.	--	The running Coal Mill Oily Waste Transfer Pump (10GNA03AP001/10GNA03AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (10GNA03CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (10GNA03AP001/10GNA03AP002).	--	The running Coal Mill Oily Waste Transfer Pump (10GNA03AP001/10GNA03AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (10GNA03CL001) in Coal Mill Oily Waste Sump-2 for Unit-1.	The Coal Mill Oily Waste Transfer Pump (10GNA03AP001/10GNA03AP002) will start.	--
4	At High pressure of Pressure Transmitter (10GNA03CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (10GNA03AP001/10GNA03AP002).	--	The running Coal Mill Oily Waste Transfer Pump (10GNA03AP001/10GNA03AP002) will be stopped.
5	At high level of Level Transmitter (10GNA04CL001) in Power House Oily Waste Sump for Unit-1.	--	The running Coal Mill Oily Waste Transfer Pumps (10GNA03AP001/10GNA03AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (10GNA03CL001) in Coal Mill Oily Waste Sump-2 for Unit-1.
2. At Low and High pressure of Pressure Transmitter (10GNA03CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (10GNA03AP001/10GNA03AP002).
3. Running Coal Mill Oily Waste Transfer Pump's Motor (10GNA03AE001/10GNA03AE002) tripped.

D) POWER HOUSE OILY WASTE SUMP FOR UNIT-1.

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (10GNA04CL001) in Power House Oily Waste Sump for Unit-1.	--	The running Power House Area Service Waste Transfer Pump (10GNA04AP001/10GNA04AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (10GNA04CP001) at common discharge header of Power House Area Service Waste Transfer Pumps (10GNA04AP001/10GNA04AP002).	--	The running Power House Area Service Waste Transfer Pump (10GNA04AP001/10GNA04AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (10GNA04CL001) in Power House Oily Waste Sump for Unit-1.	The Power House Area Service Waste Transfer Pump (10GNA04AP001/10 GNA04AP002) will start.	--
4	At High pressure of Pressure Transmitter (10GNA04CP001) at common discharge header of Power House Area Service Waste Transfer Pumps (10GNA04AP001/10GNA04AP002).	--	The running Power House Area Service Waste Transfer Pump (10GNA04AP001/10GNA04AP002) will be stopped.
5	At high level of Level Transmitter (90GTA02CL001) in Common Collection Sump.	--	The running Power House Area Service Waste Transfer Pump (10GNA04AP001/10GNA04AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (10GNA04CL001) in Power House Oily Waste Sump for Unit-1.
2. At Low and High pressure of Pressure Transmitter (10GNA04CP001) at common discharge header of Power House Area Service Waste Transfer Pump (10GNA04AP001/10GNA04AP002).
3. Running Power House Area Service Waste Transfer Pump's Motor (10GNA04AE001/10GNA04AE002) tripped.

E) PRE-SETTLING PIT AT ESP AREA (FOR UNIT-1)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (10GTA01CL001) in Pre-Settling Pit at ESP area for Unit-1.	--	The running Pre-Settling Overflow Pump (10GTA01AP001/10GTA01AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (10GTA01CP001) at common discharge header of Pre-Settling Overflow Pump (10GTA01AP001/10GTA01AP002).	--	The running Pre-Settling Overflow Pump (10GTA01AP001/10GTA01AP002) will be tripped and Standby pump will be start respectively.
3	At high level of Level Transmitter (10GTA01CL001) in Pre-Settling Pit at ESP area for Unit-1.	The Pre-Settling Overflow Pump (10GTA01AP001/10 GTA01AP002) will start.	--
4	At High pressure of Pressure Transmitter (10GNA01CP001) at common discharge header of Pre-Settling Overflow Pumps (10GTA01AP001/10GTA01AP002).	--	The running Pre-Settling Overflow Pump (10GTA01AP001/10GTA01AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (10GTA01CL001) in Pre-Settling Pit at ESP area for Unit-1.
2. At Low and High pressure of Pressure Transmitter (10GTA01CP001) at common discharge header of Pre-Settling Overflow Pumps (10GTA01AP001/10GTA01AP002).
3. Running Pre-Settling Overflow Pump's Motor (10GTA01AE001/10GTA01AE002) tripped.

F) CONTROL FOR RETENTION PIT FOR OILY WASTE FROM TRANSFORMER YARD AREA (FOR UNIT-2)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (20GNA01CL001) in Retention Pit for Oily Waste from Transformer Yard Area for Unit-2.	--	The running Transformer Yard Area Oily Waste Transfer Pump (20GNA01AP001/20GNA01AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (10GNA01CP001) at common discharge header of Transformer Yard Area Oily Waste Transfer Pumps (20GNA01AP001/20GNA01AP002).	--	The running Transformer Yard Area Oily Waste Transfer Pump (20GNA01AP001/20GNA01AP002) will be tripped and Standby pump will be start respectively.
3	At high level of Level Transmitter (20GNA01CL001) in Retention Pit for Oily Waste from Transformer Yard Area for Unit-2.	The Transformer Yard Area Oily Waste Transfer Pump (20GNA01AP001/20GNA01AP002) will start.	--
4	At High pressure of Pressure Transmitter (20GNA01CP001) at common discharge header of Transformer Yard Area Oily Waste Transfer Pumps (20GNA01AP001/20GNA01AP002).	--	The running Transformer Yard Area Oily Waste Transfer Pump (20GNA01AP001/20GNA01AP002) will be stopped.
5	At high level of Level Transmitter (20GNA04CL001) in Power House Oily Waste Sump for Unit-2.	--	The running Transformer Yard Area Oily Waste Transfer Pump (20GNA01AP001/20GNA01AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (20GNA01CL001) in Retention Pit for Oily Waste from Transformer Yard Area for Unit-2.
2. At Low and High pressure of Pressure Transmitter (20GNA01CP001) at common discharge header of Transformer Yard Area Oily Waste Transfer Pumps (20GNA01AP001/20GNA01AP002).
3. Running Transformer Yard Area Oily Waste Transfer Pump's Motor (20GNA01AE001/20GNA01AE002) tripped.

G) COAL MILL OILY WASTE SUMP-1 (UNIT-2)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (20GNA02CL001) in Coal Mill Oily Waste Sump-1 for Unit-2.	--	The running Coal Mill Oily Waste Transfer Pump (20GNA02AP001/20GNA02AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (20GNA02CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (20GNA02AP001/20GNA02AP002).	--	The running Coal Mill Oily Waste Transfer Pump (20GNA02AP001/20GNA02AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (20GNA02CL001) in Coal Mill Oily Waste Sump-1 for Unit-2.	The Coal Mill Oily Waste Transfer Pump (20GNA02AP001/20GNA02AP002) will start.	--
4	At High pressure of Pressure Transmitter (20GNA02CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (20GNA02AP001/20GNA02AP002).	--	The running Coal Mill Oily Waste Transfer Pump (20GNA02AP001/20GNA02AP002) will be stopped.
5	At high level of Level Transmitter (20GNA04CL001) in Power House Oily Waste Sump for Unit-2.	--	The running Coal Mill Oily Waste Transfer Pumps (20GNA02AP001/20GNA02AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (20GNA02CL001) in Coal Mill Oily Waste Sump-1 for Unit-2.
2. At Low and High pressure of Pressure Transmitter (20GNA02CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (20GNA02AP001/10GNA02AP002).
3. Running Coal Mill Oily Waste Transfer Pump's Motor (20GNA02AE001/20GNA02AE002) tripped.

H) COAL MILL OILY WASTE SUMP-2 (UNIT-2)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (20GNA03CL001) in Coal Mill Oily Waste Sump-2 for Unit-2.	--	The running Coal Mill Oily Waste Transfer Pump (20GNA03AP001/20GNA03AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (20GNA03CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (20GNA03AP001/20GNA03AP002).	--	The running Coal Mill Oily Waste Transfer Pump (20GNA03AP001/20GNA03AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (20GNA03CL001) in Coal Mill Oily Waste Sump-2 for Unit-1.	The Coal Mill Oily Waste Transfer Pump (20GNA03AP001/20GNA03AP002) will start.	--
4	At High pressure of Pressure Transmitter (20GNA03CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (20GNA03AP001/20GNA03AP002).	--	The running Coal Mill Oily Waste Transfer Pump (20GNA03AP001/20GNA03AP002) will be stopped.
5	At high level of Level Transmitter (20GNA04CL001) in Power House Oily Waste Sump for Unit-2.	--	The running Coal Mill Oily Waste Transfer Pumps (20GNA03AP001/20GNA03AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (20GNA03CL001) in Coal Mill Oily Waste Sump-2 for Unit-2.
2. At Low and High pressure of Pressure Transmitter (20GNA03CP001) at common discharge header of Coal Mill Oily Waste Transfer Pumps (20GNA03AP001/20GNA03AP002).
3. Running Coal Mill Oily Waste Transfer Pump's Motor (20GNA03AE001/20GNA03AE002) tripped.

I) POWER HOUSE OILY WASTE SUMP FOR UNIT-2.

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (20GNA04CL001) in Power House Oily Waste Sump for Unit-2.	--	The running Power House Area Service Waste Transfer Pump (20GNA04AP001/20GNA04AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (20GNA04CP001) at common discharge header of Power House Area Service Waste Transfer Pumps (20GNA04AP001/20GNA04AP002).	--	The running Power House Area Service Waste Transfer Pump (20GNA04AP001/20GNA04AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (20GNA04CL001) in Power House Oily Waste Sump for Unit-2.	The Power House Area Service Waste Transfer Pump (20GNA04AP001/20 GNA04AP002) will start.	--
4	At High pressure of Pressure Transmitter (20GNA04CP001) at common discharge header of Power House Area Service Waste Transfer Pumps (20GNA04AP001/20GNA04AP002).	--	The running Power House Area Service Waste Transfer Pump (20GNA04AP001/20GNA04AP002) will be stopped.
5	At high level of Level Transmitter (90GTA02CL001) in Common Collection Sump.	--	The running Power House Area Service Waste Transfer Pump (20GNA04AP001/20GNA04AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (20GNA04CL001) in Power House Oily Waste Sump for Unit-2.
2. At Low and High pressure of Pressure Transmitter (20GNA04CP001) at common discharge header of Power House Area Service Waste Transfer Pump (20GNA04AP001/20GNA04AP002).
3. Running Power House Area Service Waste Transfer Pump's Motor (20GNA04AE001/20GNA04AE002) tripped.

J) PRE-SETTLING PIT AT ESP AREA (FOR UNIT-2)

Operations of for this area/system shall be from nearby Control System (Main Plant DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (20GTA01CL001) in Pre-Settling Pit at ESP area for Unit-2.	--	The running Pre-Settling Overflow Pump (20GTA01AP001/20GTA01AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (20GTA01CP001) at common discharge header of Pre-Settling Overflow Pump (20GTA01AP001/20GTA01AP002).	--	The running Pre-Settling Overflow Pump (20GTA01AP001/20GTA01AP002) will be tripped and Standby pump will be start respectively.
3	At high level of Level Transmitter (20GTA01CL001) in Pre-Settling Pit at ESP area for Unit-2.	The Pre-Settling Overflow Pump (20GTA01AP001/20 GTA01AP002) will start.	--
4	At High pressure of Pressure Transmitter (20GNA01CP001) at common discharge header of Pre-Settling Overflow Pumps (20GTA01AP001/20GTA01AP002).	--	The running Pre-Settling Overflow Pump (20GTA01AP001/20GTA01AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (20GTA01CL001) in Pre-Settling Pit at ESP area for Unit-2.
2. At Low and High pressure of Pressure Transmitter (20GTA01CP001) at common discharge header of Pre-Settling Overflow Pumps (20GTA01AP001/20GTA01AP002).
3. Running Pre-Settling Overflow Pump's Motor (20GTA01AE001/20GTA01AE002) tripped.

CONTROL FOR SYSTEM LOCATED INSIDE ETP AREA.

A) COMMON COLLECTION SUMP.

The overall operation & control of all ETP units installed in ETP area hall be through standalone control system of DDCMIS family (ETP DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (90GTA02CL001) in Common Collection Sump.	--	The running TPI Inlet Water Transfer Pump (90GTA02AP001/90GTA02AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (90GTA02CP001) at common discharge header of TPI Inlet Water Transfer Pumps (20GNA02AP001/20GNA02AP002).	--	The running TPI Inlet Water Transfer Pump (90GTA02AP001/90GTA02AP002) will be tripped and Standby pump will be start respectively.
3	At HIGH level of Level Transmitter (90GTA02CL001) in Common Collection Sump.	The TPI Inlet Water Transfer Pump (90GTA02AP001/90 GTA02AP002) will start.	--
4	At High pressure of Pressure Transmitter (90GTA02CP001) at common discharge header of TPI Inlet Water Transfer Pumps (90GTA02AP001/90GTA02AP002).	--	The running TPI Inlet Water Transfer Pump (90GTA02AP001/90GTA02AP002) will be stopped.

Facility of Auto starting of standby pump in case of running pump is tripped.

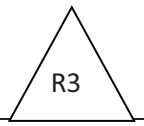
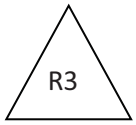
Following annunciations shall be provided

1. At Low and High level of Level Transmitter (90GTA02CL001) in Common Collection Sump.
2. At Low and High pressure of Pressure Transmitter (90GTA02CP001) at common discharge header of TPI Inlet Water Transfer Pumps (90GTA02AP001/90GTA02AP002).
3. Running TPI Inlet Water Transfer Pump's Motor (90GTA02AE001/90GTA02AE002) tripped.

B) CENTRAL MONITORING BASIN (CMB).

The overall operation & control of all ETP units installed in ETP area hall be through standalone control system of DDCMIS family (ETP DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (At Low and High level of Level Transmitter (90GMA01CL001) in Over Flow Sump of CMB.	--	The running Gardening Pump (90GMA01AP001/90GMA01AP002) will be stopped and Standby Pump will not start. The running Central Monitoring Basin Effluent Transfer Pump (90GMA01AP003/ 90GMA01AP004) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (90GMA12CP001) at common discharge header of Gardening Pumps (90GMA01AP001/90GMA01AP002).	--	The running Gardening Pump (90GMA01AP001/90GMA01AP002) will be tripped and Standby pump will be start respectively.
3	At low pressure of Pressure Transmitter (90GMA11CP001/90GMA11CP002) at common discharge header of Central Monitoring Basin Effluent Transfer Pumps (90GMA01AP003/90GMA01AP004).	--	The running Central Monitoring Basin Effluent Transfer Pumps (90GMA01AP003/90GMA01AP004) will be tripped and Standby pump will be start respectively.
4	At low Flow in Flow Transmitter (90GMA11CF001) at common at common discharge header of Central Monitoring Basin Effluent Transfer Pumps (90GMA01AP003/90GMA01AP004).	--	The running Central Monitoring Basin Effluent Transfer Pumps (90GMA01AP003/90GMA01AP004) will be tripped and Standby pump will be start respectively.
5	At High level of Level Transmitter (90GMA01CL001) in Over Flow Sump of CMB.	The Gardening Pump (90GMA01AP001/90GMA01AP002) will start. The Central Monitoring Basin Effluent Transfer Pump (90GMA01AP003/90GMA01AP004) will start.	--
6	At predefined set pressure of Pressure Transmitter (90GMA12CP001) activated at common discharge header of Gardening Pumps (90GMA01AP001/90GMA01AP002).	-- 	Motorized Discharge Valve (90GMA12AA002) will open.
7	At predefined set pressure Transmitter (90GMA11CP001/90GMA11CP002) activated at common discharge header of Central Monitoring Basin Effluent Transfer Pumps (90GMA01AP003/90GMA01AP004).	-- 	Motorized Discharge Valve (90GMA11AA002/90GMA11AA002) will open.

8	At High pressure of Pressure Transmitter (90GMA12CP001) at common discharge header of Gardening Pumps (90GMA01AP001/90GMA01AP002).	-- R3	The running Gardening Pump (90GMA01AP001/90GMA01AP002) will be stopped.
9	At High pressure of Pressure Transmitter (90GMA11CP001/90GMA11CP002) at common discharge header of Central Monitoring Basin (CMB) Effluent Transfer Pumps (90GMA01AP003/ 90GMA01AP004).	-- R3	The running Central Monitoring Basin Effluent Transfer Pumps (90GMA01AP003/90GMA01AP004) will be stopped.
10	pH Low in pH Transmitter (90GMA11CQ001)	--	Motorized Discharge Valve (90GMA11AA002/90GMA11AA002) will be closed and Motorized Discharge Valve (90GMA11AA001) for recirculation shall be open. Alkali Dosing Pump for CMB (90GNN05AP001/90GNN05AP002) will start.
11	pH High in pH Transmitter (90GMA11CQ001)	--	Motorized Discharge Valve (90GMA11AA002/90GMA11AA002) will be closed and Motorized Discharge Valve (90GMA11AA001) for recirculation shall be open. Acid Dosing Pump for CMB (90GNN04AP001/90GNN04AP002) will start.
12	Turbidity High in Turbidity Meter (90GMA11CQ002)	--	Motorized Discharge Valve (90GMA11AA002/90GMA11AA002) will be closed and Motorized Discharge Valve (90GMA11AA001) for recirculation shall be open.
13	Temperature High in Temperature Transmitter (90GMA11CT201)	--	Motorized Discharge Valve (90GMA11AA002/90GMA11AA002) will be closed and Motorized Discharge Valve (90GMA11AA001) for recirculation shall be open.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (90GMA00CL001) in Compartment-1 of CMB.
2. At Low and High level of Level Transmitter (90GMA00CL002) in Compartment-2 of CMB.
3. At Low and High level of Level Transmitter (90GMA00CL002) in Over Flow Sump of CMB.
4. At Low and High pressure of Pressure Transmitter (90GMA12CP001) at Common Discharge Header of Gardening Pump (90GMA01AP001/90GMA01AP002).
5. At Low and High pressure of Pressure Transmitter (90GMA11CP001/90GMA11CP002) at Common Discharge Header of Central Monitoring Basin Effluent Transfer Pump (90GMA01AP003/90GMA01AP004).
6. Running Gardening Pump's Motor (90GMA01AE001/90GMA01AE002) tripped.
7. Running Central Monitoring Basin Effluent Transfer Pump's Motor (90GMA01AE003/90GMA01AE004) tripped.
8. pH High and Low of pH Transmitter (90GMA11CQ001), Turbidity High (90GMA11CQ002), Temperature High in Temperature Transmitter (90GMA11CT201), Flow Low in Flow Transmitter (90GMA11CF001).

C) GUARD POND.

The overall operation & control of all ETP units installed in ETP area hall be through standalone control system of DDCMIS family (ETP DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (At Low and High level of Level Transmitter (90GMA21CL001) in Over Flow Sump of Guard Pond.	--	The running Guard Pond Effluent Transfer Pump (90GMA21AP001/90GMA21AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (90GMA30CP001/90GMA30CP002) at Guard Pond Effluent Transfer Pumps (90GMA21AP001/90GMA21AP002).	--	The running Guard Pond Effluent Transfer Pump (90GMA21AP001/90GMA21AP002) will be tripped and Standby pump will be start respectively.
3	At low Flow in Flow Transmitter (90GMA30CF001) at common at common discharge header of Guard Pond Effluent Transfer Pumps (90GMA21AP001/90GMA21AP002).	--	The running Guard Pond Effluent Transfer Pump (90GMA21AP001/90GMA21AP002) will be tripped and Standby pump will be start respectively.
4	At High level of Level Transmitter (At Low and High level of Level Transmitter (90GMA21CL001) in Over Flow Sump of Guard Pond.	The Guard Pond Effluent Transfer Pump (90GMA21AP001/90GMA21AP002) will start.	--
5	At predefined set pressure of Pressure Transmitter (90GMA30CP001/ 90GMA30CP002) activated at Guard Pond Effluent Transfer Pumps (90GMA21AP001/90GMA21AP002).	-- R3	Motorized Discharge Valve (90GMA30AA002/ 90GMA30AA003) will open.
6	At High pressure of Pressure Transmitter (90GMA30CP001/90GMA30CP002) at Guard Pond Effluent Transfer Pumps (90GMA21AP001/90GMA21AP002).	-- R3	The running Guard Pond Effluent Transfer Pump (90GMA21AP001/90GMA21AP002) will be stopped.
7	pH Low in pH Transmitter (90GMA30CQ001)	--	Motorized Discharge Valve (90GMA30AA002/90GMA30AA002) will be closed and Motorized Discharge Valve (90GMA30AA001) for recirculation shall be open. Alkali Dosing Pump for Guard Pond (90GNN07AP001/90GNN07AP002) will start.
8	pH High in pH Transmitter (90GMA30CQ001)	--	Motorized Discharge Valve (90GMA30AA002/90GMA30AA002) will be closed and Motorized Discharge Valve (90GMA30AA001) for recirculation shall be open Acid Dosing Pump for Guard Pond (90GNN06AP001/90GNN06AP002) will start.

9	Turbidity High in Turbidity Meter (90GMA30CQ002)	--	Motorized Discharge Valve (90GMA30AA002/90GMA30AA002) will be closed and Motorized Discharge Valve (90GMA30AA001) for recirculation shall be open.
10	Temperature High in Temperature Transmitter (90GMA30CT201)	--	Motorized Discharge Valve (90GMA30AA002/90GMA30AA002) will be closed and Motorized Discharge Valve (90GMA30AA001) for recirculation shall be open.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (90GMA20CL001) in Compartment-1 of Guard Pond.
2. At Low and High level of Level Transmitter (90GMA20CL002) in Compartment-2 of Guard Pond.
3. At Low and High level of Level Transmitter (90GMA21CL001) in Over Flow Sump of Guard Pond.
4. At Low and High pressure of Pressure Transmitter (90GMA30CP001/90GMA30CP002) at Common Discharge Header of Guard Pond Effluent Transfer Pumps (90GMA21AP001/90GMA21AP002).
5. Running Guard Pond Effluent Transfer Pump's Motor (90GMA21AE001/90GMA21AE002) tripped.
6. pH High and Low of pH Transmitter (90GMA30CQ001), Turbidity High (90GMA30CQ002), Temperature High in Temperature Transmitter (90GMA30CT201), Flow Low in Flow Transmitter (90GMA30CF001).

D) SLUDGE PIT.

The overall operation & control of all ETP units installed in ETP area hall be through standalone control system of DDCMIS family (ETP DDCMIS).

Following Interlocks has been be provided.

Sr. No	Interlock Description of Equipment	Interlock Effect	
		Permissive	Protection
1	At low level of Level Transmitter (90GNS01CL001) in Sludge Pit.	--	The running Sludge Transfer Pump (90GNS01AP001/90GNS01AP002) will be stopped and Standby Pump will not start.
2	At low pressure of Pressure Transmitter (90GNS01CP001) at common discharge header of Sludge Transfer Pumps (90GNS01AP001/90GNS01AP002).	--	The running Sludge Transfer Pump (90GNS01AP001/90GNS01AP002) will be tripped and Standby pump will be start respectively.
3	At High level of Level Transmitter (90GNS01CL001) in Sludge Pit.	The Sludge Transfer Pump (90GNS01AP001/90 GNS01AP002) will start.	--
4	At High pressure of Pressure Transmitter (90GNS01CP001) at common discharge header of Sludge Transfer Pumps (90GNS01AP001/90GNS01AP002).	--	The running Sludge Transfer Pump (90GNS01AP001/90GNS01AP002) will be stopped.
5	At low level of Level Transmitter (90GNS01CL001) in Sludge Pit.	--	The running Air Blower for Sludge Sump (90GNC01AN001/90GNC01AN002) will be stopped.
6	At Low pressure of pressure transmitter (90GNC10CP001) at common discharge header of Air Blower for Sludge Sump (90GNC01AN001/90GNC01AN002).	--	The Running Air Blower for Sludge Sump (90GNC01AN001/90GNC01AN002) will stop and standby blower will be start respectively.
7	At Low Flow in Flow Transmitter (90GNC10CF001) at common header of Air Blower for sludge sump (90GNC01AN001/90GNC01AN002).	--	The Running Air Blower for Sludge Sump (90GNC01AN001/90GNC01AN002) will stop and standby blower will be start respectively.

Facility of Auto starting of standby pump in case of running pump is tripped.

Following annunciations shall be provided

1. At Low and High level of Level Transmitter (90GNS01CL001) in Sludge Pit.
2. At Low and High pressure of Pressure Transmitter (90GNS01CP001) at common discharge header of Sludge Transfer Pumps (90GNS01AP001/90GNS01AP002).
3. Running Sludge Transfer Pump's Motor (90GNS01AE001/90GNS01AE002) tripped.
4. At Low and High pressure of Pressure Transmitter (90GNC10CP001) at common discharge header of Air Blower for Sludge Sump (90GNC01AN001/90GNC01AN002).
5. Running Air Blower's (for Sludge Pit) Motor (90GNC01AE001/90GNC01AE002) tripped.

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

From	To
Er.S.SUYA JOTHI,B.E., Superintending Engineer/Electrical/ Projects-I, TANGEDCO,5th Floor, Western wing, 144,NPKRR Maaligai, Anna salai, Chennai-2 Mobile:+919445859001 Email: sepr1@tnebnet.org	Shri Yogender Pal, AGM,BHEL/PS-PMG, Tower-A,4th floor, Advant Navis Business Park, Plot No:7, Sector-142, Expressway Noida, Gautam Buddh Nagar(UP) - 201305 Direct:0120- 6748021 Mobile :+919818144689 Email : yogender@bhel.in)

Lr.No.:SE/E/PrI/EE-7/M/AEE/M/F.En SEZ STPP/D.68/21 dt.06.11.2021

Project Title	2x660 MW ENNORE SEZ Supercritical TPP
TANGEDCO REF.	LOA. Lr.No. CE/P/SE/M/P/EE-10/E/P/F.2x660 MW En SEZ STPP/D.60/14,dt.27.09.14
BHEL REF.	1.BHEL Email Dt. 27.08.2021. 2.DESEIN REF: D9081 dt.05.11.2021.
Subject	TANGEDCO –Approval for PEM drawing -submitted by M/s BHEL – Reg

Sir,
The approval on the drawing/document submitted by M/s BHEL on the above subject received vide BHEL transmittal under reference (1) is furnished below.

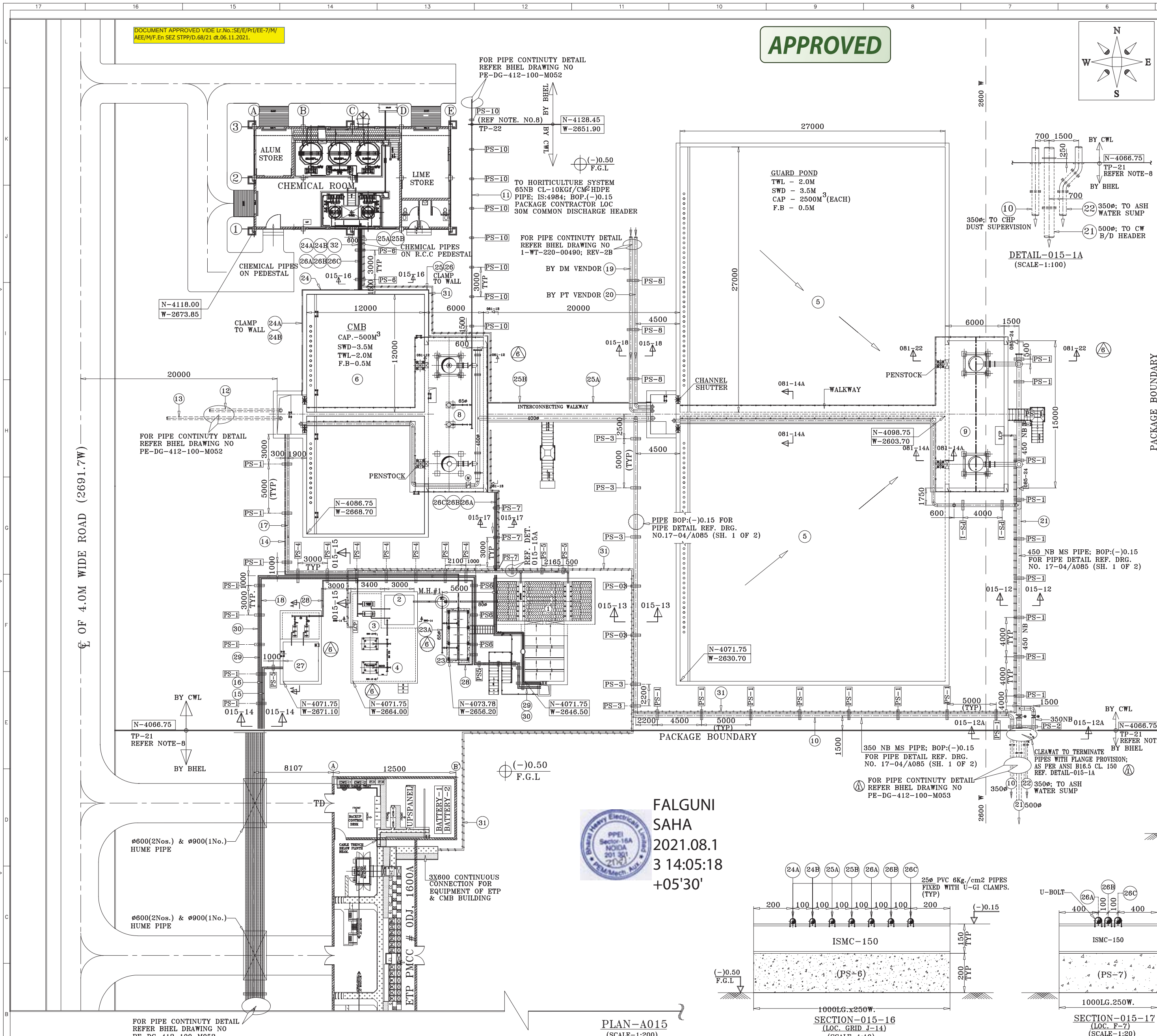
S.No.	DRG/DOC.No:	Rev.	DESCRIPTION	Status
1	PE-V0-412-164A-A032	7	Cable & Pipe routing for 1200 Cu.M/Hr ETP	04

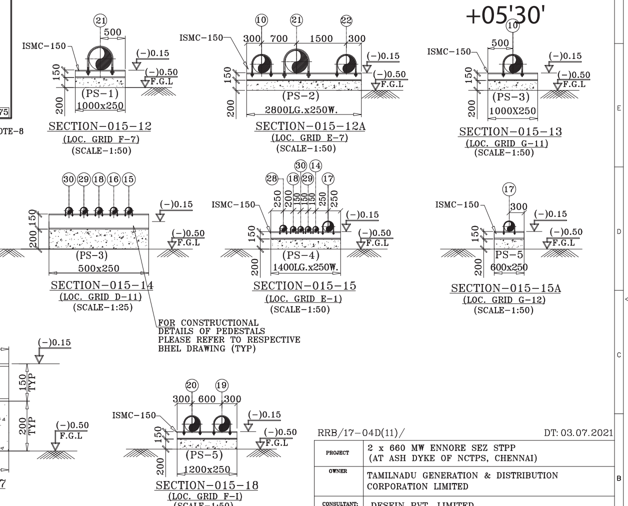
Status : Category **1**- Approved. Category: **2** – Approved with comments, Resubmit for approval under, Category **1**. Category **3** – Not approved (See attachment Memo) Resubmit for approval. Category **4** – Information furnished is noted.

Yours faithfully,
-sd-/dt.06.11.2021
Superintending Engineer/E/PrI

DOCUMENT APPROVED VIDE Lr.No.:SE/E/Pr/I/EE-7/M/AEE/M/F.En SEZ STPP/D.68/21 dt.06.11.2021.

APPROVED





SL.NO.	DESCRIPTION	CAPACITY	QTY.	MOC.	REMARK
1	LAMELLA CLARIFIER	125 Cu.M/Hr	1	R.C.C	FLOCC. ZONE (4 x 5.8M); CLARIFIER (4.0 x 9.6)
2	SLUDGE SUMP	20 Cu. M	1	R.C.C	3X3X3.3M+1.0 FB
3	SLUDGE TRANSFER PUMPS	10 Cu.M/Hr	1W+1SB	--	SCREW PUMPS
4	AIR BLOWER FOR SLUDGE SUMP	4500 LPM	1W+1SB	--	ROOTS BLOWER
5	GUARD POND(COMP. 1 & 2)	2500 Cu.M	2	R.C.C	27 x 27 x 3.5M SWD+0.5M F.B
6	CENTRAL MONITORING BASIN (COMPARTMENT 1 AND 2)	500 Cu.M	2	R.C.C	12 x 12 x 3.5M SWD+0.5M F.B
7	CHEMICAL HOUSE	-	1	R.C.C	7 x 10M;
8	CMB TRANSFER PUMP	1000 Cu.M/Hr	1W+1SB	--	--
9	GUARD POND TRANSFER PUMP	1200 Cu.M/Hr	1W+1SB	--	--
10	TO CHP DUST SUPPRESSION SYST.	500-Cu.M/Hr	---	MS-PU	350ø PIPE UP TO BATTERY LIMIT BY CLEAWAT; FLOW APPROX.
11	TO HORTICULTURE	10-Cu.M/Hr	---	HDPE	100NB PIPE;LOC 30M; 350RMT TOTAL LENGTH
12	RO REJECT-STAGE II; FEED PIPE	20 Cu.M/Hr	---	---	80NB TO CMB BY DM PLANT VENDOR
13	DMP-CPU N-PIT(CPU & DM WASTE)	80 Cu.M/Hr	---	---	150NB TO CMB BY CPU VENDOR; INTER. FLOW
14	FROM TPI (OIL WATER SEPARATOR)	40 Cu.M/Hr	---	MS	100NB TO CMB
15	FROM PRE SETTLING OVER FLOW(UNIT-1)	15 Cu.M/Hr	---	MS	65 NB TO LAMELLA CLARIFIER
16	FROM PRE SETTLING OVER FLOW(UNIT-2)	15 Cu.M/Hr	---	MS	65 NB TO LAMELLA CLARIFIER
17	LAMELLA CLARIFIER OUT PUT FLOW	125 Cu.M/Hr	---	MS	200 NB TO CMB INLET
18	ETP SLUDGE SUMP FLOW	10 Cu.M/Hr	---	MS	65 NB TO ASH SLURRY SUMP
19	RO REJECT STAGE -I	--Cu.M/Hr	---	---	300 NB TO GUARD POND BY DM VENDOR
20	FROM SLUDGE SUMP IN PT AREA	---Cu.M/Hr	---	---	300 NB TO GUARD POND BY PT VENDOR
21	TO CW BLOW DOWN HEADER	AS REQD.	---	MS-PU	450 NB UPTO TP-21 BY CLEAWAT; 500 NB FROM TP-21 TO HEADER
22	TO ASH WATER SUMP	AS REQD.	---	MS-PU	350 NB UPTO LOC#1; BY CLEAWAT
23	TPI	40 Cu.M/Hr	1	MS-EP	2.35 M X 5.5 M ; FLOW FROM FUEL OIL SEPARATOR/ POWER HOUSE OLY WASTE UNIT 1& 2
24	CHEMICAL PIPE LINES TO CMB	---	---	---	PIPE LINE LAID OVER RCC PEDESTAL
25	CHEMICAL PIPE LINES TO GAURD POND	---	---	---	-do-
26	CHEMICAL PIPE LINE TO LAMELLA CLARIFIER	---	---	---	-do-
27	COMMON COLLECTION SUMP	20 Cu.M/Hr	1	RCC	3.6 M. x 4.0 M.
28	FROM CCS TO TPI	40 Cu.M/Hr	---	MS	100 NB MS
29	FROM PRE-SETTLING TANK UNIT NO.1 TO LAMELLA CALRIFIER	15 Cu.M/Hr		MS	65 NB MS
30	FROM PRE-SETTLING TANK UNIT NO.2 TO LAMELLA CALRIFIER	15 Cu.M/Hr		MS	65 NB MS
31	CABLE ROUTING	---	---		MAJOR ROUTING INDICATED
32	OVERFLOW LINF FROM OVERHEAD TANK TO CMB			GI	40 NB GI

FALGUNI SAHA 2021.11.09 16:00:23 +05'30'

FALGUNI SAHA 2021.08.13 14:05:18 +05'30'

NOTES:-

1. ALL DIMENSIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THIS DRG. SHOULD NOT BE SCALED.
3. IF IN DOUBT , PLEASE ASK.
4. LOCATION OF FIELD SUMP HAVE BEEN INDICATED UNDER DRAWING NO. 17-04/A011(SH. 1 OF 1).
5. EL 0.00M CORRESPONDS TO RL 10.00 M WHICH IS FFL OF TG BUILDING.
6. FOR PIPE ROUTING AND PEDESTAL DETAILS REFER BHEL DRG. NO. A032.
7. FOR CABLE TRAY/TRENCH AND CONDUIT ROUTING DETAILS REFER BHEL DRG. NO. A033.
8. FLANGE CONNECTIONS AT TP-21 ARE TO BE STAGGERED AT 250 MM TO AVOID FOULING.
9. SUPPLY PROVISSION OF FIXING ACCESSORIES SUCH AS CLAMPS HARDWARE; GASKET AS REQUIRED WITHIN TERMINAL POINTS IS INCLUDED IN CLEAR WATER SCOPE OF WORK.
10. PEDESTAL WITHIN PACKAGE AREA SHALL BE PROVIDED AT C/C NOT EXCEEDING 3.0M. UNLESS OTHERWISE MENSIONED IN DRAWING.
11. ISMC OVER PEDESTAL TO SUPPORT PIPES BY PEDESTAL VENDER.

IDENTIFICATION OF DRG. / PLAN / SECTION

17-04/A 0 15-1 0 — WORK DICIPLINE; SHEET NO.; PLAN/SECTION NO.; DRG.NO.; DRG. APPROVED BY PUR.; JOB NO.

LEGEND
F.G.L. - FINISH GROUND LEVEL
T.W.L. - TOP WATER LEVEL
T.P - TERMINAL POINT
LOC. - LOCATION

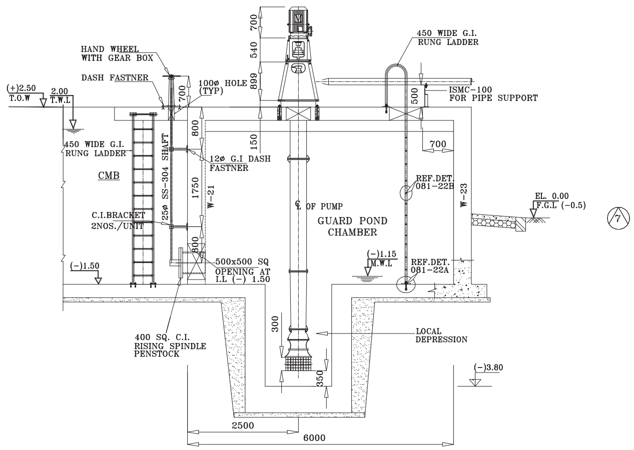
SL. NO.	DESCRIPTION	CWL DRG. NO.	BHEL DRG.NO.
2	LAYOUT OF ETP (OFF SITE SUMPS)		PE-V0-412-164A-A002(SH2 OF 2)
1	PLOT PLAN	---	PE-DG-412-100-M001

REFERENCE DRGS.

	DETAILS REVISIONS	DATE
1A	REVISED AS PER CUSTOMER COMMENTS	07.10.2019
1	REVISED AS PER CUSTOMER COMMENTS	12.09.2019
0B	ADDITIONAL PEDESTALS ADDED / COORDINATES REVISED AS PER BHEL E-MAIL DT.06.07.2019	15.07.2019
0A	SUBMITED FOR APPROVAL	21.04.2019
00	SUBMITED FOR APPROVAL	17-11-2018

RRB/17-04D(11)/ DT: 03.07.2021

PROJECT	2 x 660 MW ENNORE SEZ STPP (AT ASH DYKE OF NCTPS, CHENNAI)
OWNER	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
CONSULTANT:	DESEIN PVT. LIMITED, CONSULTING ENGINEERS, NEW DELHI; HYDERABAD- INDIA
CONTRACTOR	BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA,NEW DELHI
ORIGINATOR	PACKAGE CONTRACTOR :- CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE :-26386095 E-mail :-clearwater@bol.net.in
CLEAWAT DRG. NO.	17-04/A015 (SH. 1 OF 1) — VER 07
BHEL DRG.NO.	PE-V0-412-164A-A032 (SH. 1 OF 2) — REV. 07
TITLE:-	CABLE & PIPE ROUTING FOR 1200 Cu.M/HR EFFLUENT TREATMENT PLANT — SCALE 1:400



SECTION - 081-22
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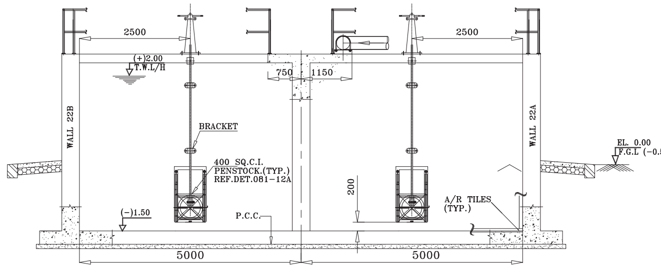

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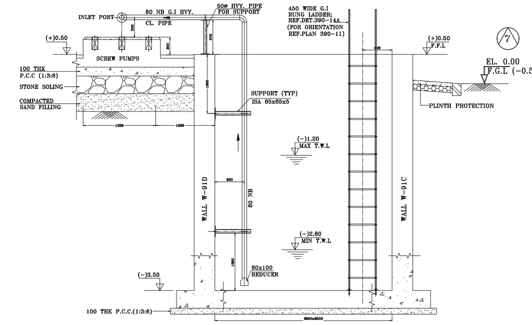

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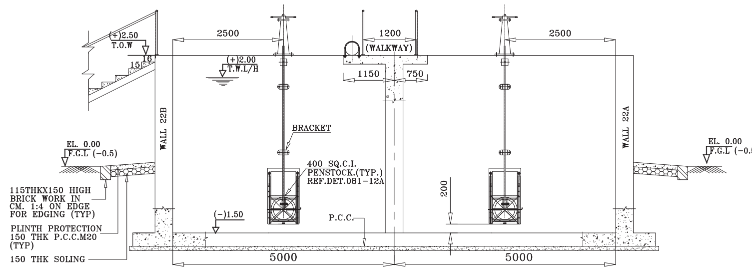

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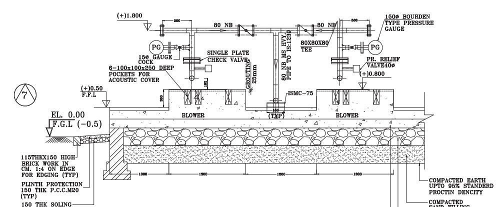

BLOWER X-SECTION-390-13
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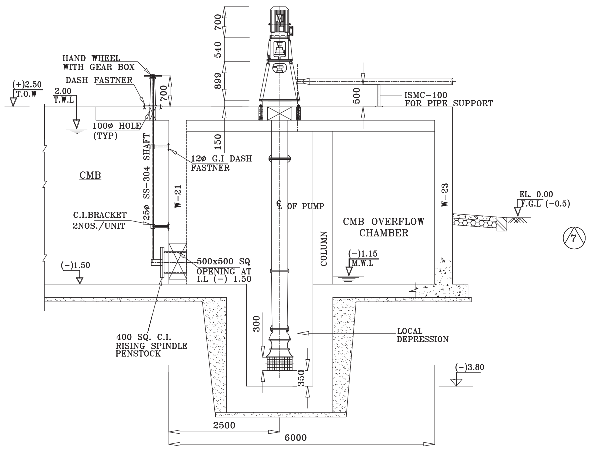
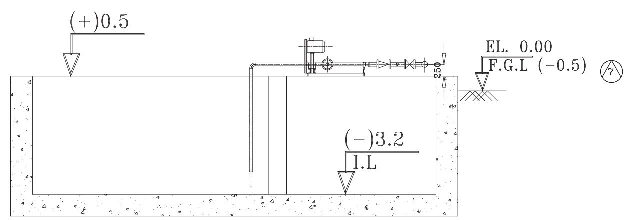


SECTION - 081-12
(SCALE-1:50)



SECTION - A-A

NOTES:-

1. ALL DIMENSIONS ARE IN mm AND ALL LEVELS ARE IN METER.
2. THIS DRG. SHOULD NOT BE SCALED.
3. IF IN DOUBT , PLEASE ASK.
4. LOCATION OF FIELD SUMP HAVE BEEN INDICATED UNDER DRAWING NO. 17-04/A011(SH. 1 OF 1).
5. EL 0.00M CORRESPONDS TO RL 10.00 M WHICH IS FFL OF TG BUILDING.
6. FOR PIPE ROUTING AND PEDESTAL DETAILS REFER BHEL DRG. NO. A032.
7. FOR CABLE TRAY/TRENCH AND CONDUIT ROUTING DETAILS REFER BHEL DRG. NO. A033.
8. FLANGE CONNECTIONS AT TP-21 ARE TO BE STAGGERED AT 250 MM TO AVOID FOULING.
9. SUPPLY PROVISSION OF FIXING ACCESSORIES SUCH AS CLAMPS HARDWARE; GASKET AS REQUIRED WITHIN TERMINAL POINTS IS INCLUDED IN CLEAR WATER SCOPE OF WORK.
10. PEDESTAL WITHIN PACKAGE AREA SHALL BE PROVIDED AT C/C NOT EXCEEDING 3.0M. UNLESS OTHERWISE MENSIONED IN DRAWING.
11. ISMC OVER PEDESTAL TO SUPPORT PIPES BY PEDESTAL VENDER.

IDENTIFICATION OF DRG. / PLAN / SECTION

17-04/A 0 15-1 0
- WORK DICIPLINE
- SHEET NO.
- PLAN/SECTION NO.
- DRG.NO.
- DRG. APPROVED BY PUR.
- JOB NO.

LEGEND

F.G.L. - FINISH GROUND LEVEL
T.W.L. - TOP WATER LEVEL
T.P - TERMINAL POINT
LOC. - LOCATION

SL. NO.	DESCRIPTION	CWL DRG. NO.	BHEL DRG.NO.
2	LAYOUT OF ETP (OFF SITE SUMPS)		PE-V0-412-164A-A002(SH2 OF 2)
1	PLOT PLAN	---	PE-DG-412-100-M001

REFERENCE DRGS.

	DETAILS REVISIONS	DATE
1A	REVISED AS PER CUSTOMER COMMENTS	07.10.2019
1	REVISED AS PER CUSTOMER COMMENTS	12.09.2019
0B	ADDITIONAL PEDESTALS ADDED COORDINATES REVISED AS PER BHEL E-MAIL DT.06.07.2019	15.07.2019
0A	SUBMITED FOR APPROVAL	21.04.2019
00	SUBMITED FOR APPROVAL	17-11-2018

CAUTION

THIS DRG. IS CONFIDENTIAL AND IS THE PROPERTY OF "CLEAR WATER LTD" IT MUST NOT BE DISCLOSED/COPIED OR LENT TO A THIRD PARTY WITHOUT WRITTEN CONSENT OF CLEAR WATER LTD.

QUALITY POLICY

IN ITS QUEST TO SATISFY THE CUSTOMER, CLEAR WATER LTD. PURSUES CONTINUAL IMPROVEMENT IN THE QUALITY OF ITS PRODUCTS, SERVICES AND PERFORMANCE LEADING TO TOTAL CUSTOMER SATISFACTION AND BUSINESS GROWTH THROUGH DEDICATION, COMMITMENT AND TEAM WORK OF ALL EMPLOYEES.

QUALITY OBJECTIVES

- CUSTOMER SATISFACTION BY IMPROVING DELIVERY / COMPLETION PERIOD & RESPONSE.
- QUALITY OF SUPPLIES BY IMPROVING SUB-VENDOR PERFORMANCE.
- CAPABILITY OF HUMAN RESOURCES BY UPGRADING SKILL AND COMPETENCE.

RRB/17-04D(11)/ DT: 03.07.2021

PROJECT	2 x 660 MW ENNORE SEZ STPP (AT ASH DYKE OF NCTPS, CHENNAI)
OWNER	TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED
CONSULTANT:	DESEIN PVT. LIMITED CONSULTING ENGINEERS NEW DELHI; HYDERABAD- INDIA
CONTRACTOR	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA,NEW DELHI
ORIGINATOR	PACKAGE CONTRACTOR :- CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE :-26386095 E-mail :-clearwater@bol.net.in

CLEAWAT DRG. NO. 17-04/A015 (SH. 1 OF 1)	VER 07
BHEL DRG.NO. PE-V0-412-164A-A032 (SH. 2 OF 2)	REV. 07
TITLE:- CABLE & PIPE ROUTING FOR 1200 Cu.M/HR EFFLUENT TREATMENT PLANT	SCALE 1:400

APPROVED

REV	DATE	ALTERED	CHECKED	DOC. TITLE :
				CABLE SCHEDULE FOR EFFLUENT TREATMENT PLANT
				STATUS : CONTRACT
				JOB NO.: 17-04

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING MANAGEMENT.
This approval status shall be interpreted as laid down in the contract and it shall not relieve the contractor from the contractual obligation.
APPROVAL CATEGORY AWARDED =1
NEXT I - Approved
CAT II - Approved With Comments as Noted
CAT III - Not Approved
CAT IV - Reference Drawing
DEPARTMENT: MECHANICAL AUXILIARY
NAME: FALGUNI SAHA

FALGUNI SAHA 2022.01.24 13:20:13 +05'30'

CUSTOMER: **TAMILNADU GENERATION & DISTRIBUTION CORPORATION LTD.**
2x660 MW Ennore Sez STPP

PACKAGE: EFFLUENT TREATMENT PLANT

ORGINATOR	TURNKEY CONTRACTOR:-	CWL. DOC. NO.
	CLEAR WATER LTD. B-14/1, OKHLA INDUSTRIAL AREA PHASE-II, NEW DELHI-110020 PHONE: 011 26386095 EMAIL: clearwater@bol.net.in	

BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NEW DELHI

REV.	NAME	SIGN	DATE	BHEL DOCUMENT NO.	REV
				PE-V0-412-164-A019	00
				NO. OF SHEETS	EXCLUDING COVER PAGE

CABLE SCHEDULE DRIVE								
Sl No	Unit Cable No	From	To	Purpose	Cable Type	Remarks	Length(m)	Cable Route
1	ETP-007-OG01	ALKALI Dosing Pump Motor-1,for CMB, MCC Module at ETP MCC Building	ETP DDCMIS	ALKALI Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
2	ETP-007-OG02	ALKALI Dosing Pump Motor-1,for CMB, (LPBS)	ETP DDCMIS	ALKALI Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
3	ETP-008-OG01	ALKALI Dosing Pump Motor-2,for CMB, MCC Module at ETP MCC Building	ETP DDCMIS	ALKALI Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
4	ETP-008-OG02	ALKALI Dosing Pump Motor-2,for CMB, (LPBS)	ETP DDCMIS	ALKALI Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
5	ETP-005-OG01	ALKALI Dosing Pump Motor-1,for GUARD POND, MCC Module at ETP MCC Building	ETP DDCMIS	ALKALI Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
6	ETP-005-OG02	ALKALI Dosing Pump Motor-1,for GUARD POND, (LPBS)	ETP DDCMIS	ALKALI Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
7	ETP-006-OG01	ALKALI Dosing Pump Motor-2,for GUARD POND, MCC Module at ETP MCC Building	ETP DDCMIS	ALKALI Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
8	ETP-006-OG02	ALKALI Dosing Pump Motor-2,for GUARD POND, (LPBS)	ETP DDCMIS	ALKALI Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
9	ETP-010-OG01	Agitator Motor for ALKALI dosing tank for CMB & GUARD POND, MCC Module at ETP MCC Building	ETP DDCMIS	ALKALI Dosing tank agitator Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
10	ETP-010-OG02	Agitator Motor for ALKALI dosing tank for CMB & GUARD POND,(LPBS)	ETP DDCMIS	ALKALI Dosing tank agitator Drive control	2PX0.5 Sqmm (F-Type)			Refer cable tray layout Drg
11	ETP-001-OG01	ACID Dosing Pump Motor-1,for CMB,MCC Module at ETP MCC Building	ETP DDCMIS	ACID Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
12	ETP-001-OG02	ACID Dosing Pump Motor-1,for CMB,(LPBS)	ETP DDCMIS	ACID Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		51	Refer cable tray layout Drg
13	ETP-002-OG01	ACID Dosing Pump Motor-2,for CMB,MCC Module at ETP MCC Building	ETP DDCMIS	ACID Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
14	ETP-002-OG02	ACID Dosing Pump Motor-2,for CMB,(LPBS)	ETP DDCMIS	ACID Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
15	ETP-003-OG01	ACID Dosing Pump Motor-1,for GUARD POND,MCC Module at ETP MCC Building	ETP DDCMIS	ACID Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
16	ETP-003-OG02	ACID Dosing Pump Motor-1,for GUARD POND,(LPBS)	ETP DDCMIS	ACID Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
17	ETP-004-OG01	ACID Dosing Pump Motor-2,for GUARD POND,MCC Module at ETP MCC Building	ETP DDCMIS	ACID Dosing pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
18	ETP-004-OG02	ACID Dosing Pump Motor-2,for GUARD POND,(LPBS)	ETP DDCMIS	ACID Dosing pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
19	ETP-016-OG01	Agitator Motor for ALUM dosing tank, MCC Module at ETP MCC Building	ETP DDCMIS	ALUM Dosing tank agitator Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
20	ETP-016-OG02	Agitator Motor for ALUM dosing tank, (LPBS)	ETP DDCMIS	ALUM Dosing tank agitator Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
21	ETP-014-OG01	ALUM Dosing Pump-1 Motor, MCC Module at ETP MCC Building	ETP DDCMIS	ALUM Dosing Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
22	ETP-014-OG02	ALUM Dosing Pump-1 Motor, (LPBS)	ETP DDCMIS	ALUM Dosing Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
23	ETP-015-OG01	ALUM Dosing Pump-2 Motor, MCC Module at ETP MCC Building	ETP DDCMIS	ALUM Dosing Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
24	ETP-015-OG02	ALUM Dosing Pump-2 Motor, (LPBS)	ETP DDCMIS	ALUM Dosing Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
25	ETP-019-OG01	Agitator Motor for Lime dosing tank, MCC Module at ETP MCC Building	ETP DDCMIS	Lime Dosing tank agitator Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg

26	ETP-019-OG02	Agitator Motor for Lime dosing tank, (LPBS)	ETP DDCMIS	Lime Dosing tank agitator Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
27	ETP-017-OG01	Lime Dosing Pump Motor-1, MCC Module at ETP MCC Building	ETP DDCMIS	Lime Dosing Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
28	ETP-017-OG02	Lime Dosing Pump Motor-1, (LPBS)	ETP DDCMIS	Lime Dosing Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
29	ETP-018-OG01	Lime Dosing Pump Motor-2, MCC Module at ETP MCC Building	ETP DDCMIS	Lime Dosing Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
30	ETP-018-OG02	Lime Dosing Pump Motor-2, (LPBS)	ETP DDCMIS	Lime Dosing Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
31	ETP-011-OG01	PE Dosing Pump Motor-1, MCC Module at ETP MCC Building	ETP DDCMIS	PE Dosing Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
32	ETP-011-OG02	PE Dosing Pump Motor-1, (LPBS)	ETP DDCMIS	PE Dosing Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
33	ETP-012-OG01	PE Dosing Pump Motor-2, MCC Module at ETP MCC Building	ETP DDCMIS	PE Dosing Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
34	ETP-012-OG02	PE Dosing Pump Motor-2, (LPBS)	ETP DDCMIS	PE Dosing Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
35	ETP-013-OG01	Agitator Motor-1 for PE Dosing Tank, MCC Module at ETP MCC Building	ETP DDCMIS	PE Dosing Tank Agitator Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
36	ETP-013-OG02	Agitator Motor-1 for PE Dosing Tank, (LPBS)	ETP DDCMIS	PE Dosing Tank Agitator Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
37	ETP-032-0OG1	CMB EFFLUENT TRANSFER PUMP RECIR VLV,at CMB Area, MCC Module ETP MCC Building	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
38	ETP-033-0OG1	Butterfly Valve Motor-2 at CMB Area, MCC Module at ETP MCC Building	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
39	ETP-034-0OG1	CMB GARDENING PUMP TO HORTICULTURE ISO VLV,at CMB Area, MCC Module ETP MCC Building	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
40	ETP-035-0OG1	CMB EFFLUENT TRSFR PMP TO CHP DUST SUPP ISO VLV,at CMB Area, MCC Module ETP MCC Building	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
41	ETP-036-0OG1	CMB EFFLUENT TRSFR PMP TO GUARD POND ISO VLV,at CMB Area, MCC Module ETP MCC Building	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
42	ETP-037-0OG1	GUARD POND EFFLUENT DISPOSAL PUMP RECIR VLV,GUARD POND Area, MCC Module at ETP MCC Building	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
43	ETP-038-0OG1	TREATED EFFLUENT TO ASH WATER SUMP ISO VLV ,GUARD POND Area, MCC Module at Chemical House Area	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
44	ETP-039-0OG1	TREATED EFFLUENT TO CW BLOWDOWN HDR ISO VLV ,GUARD POND Area, MCC Module at Chemical House Area	ETP DDCMIS	Butterfly Valve Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
45	ETP-044-0OG1	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-1,COAL MILL AREA-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
46	ETP-044-0OG2	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-1,COAL MILL AREA-1(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
47	ETP-045-0OG1	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-2,COAL MILL AREA-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
48	ETP-045-0OG2	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-2,COAL MILL AREA-1,(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg

49	ETP-046-00G1	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-1,COAL MILL AREA-2,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
50	ETP-046-00G2	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-1,COAL MILL AREA-2,(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
51	ETP-047-00G1	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-2,COAL MILL AREA-2,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
52	ETP-047-00G2	Coal Mill Oily Waste Transfer Pump(Unit-1) Motor-2,COAL MILL AREA-2,(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
53	ETP-048-00G1	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-1,COAL MILL AREA-1,MCC Module at ETP MCC	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
54	ETP-048-00G2	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-1,COAL MILL AREA-1(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
55	ETP-049-00G1	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-2,COAL MILL AREA-1,MCC Module at ETP MCC	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
56	ETP-049-00G2	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-2,COAL MILL AREA-1,(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
57	ETP-050-00G1	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-1,COAL MILL AREA-2,MCC Module at ETP MCC	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
58	ETP-050-00G2	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-1,COAL MILL AREA-2,(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
59	ETP-051-00G1	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-2,COAL MILL AREA-2,MCC Module at ETP MCC	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
60	ETP-051-00G2	Coal Mill Oily Waste Transfer Pump(Unit-2) Motor-2,COAL MILL AREA-2,(LPBS)	MAIN PLANT DDCMIS	Coal Mill Waste Oily Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
61	ETP-056-00G1	Pre Settling Overflow Pump(Unit-1) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
62	ETP-056-00G2	Pre Settling Overflow Pump(Unit-1)Motor-1 (LPBS)	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
63	ETP-057-00G1	Pre Settling Overflow Pump(Unit-1) Motor-2,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
64	ETP-057-00G2	Pre Settling Overflow Pump(Unit-1)Motor-2 (LPBS)	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
65	ETP-058-00G1	Pre Settling Overflow Pump(Unit-2) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
66	ETP-058-00G2	Pre Settling Overflow Pump(Unit-2)Motor-1 (LPBS)	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
67	ETP-059-00G1	Pre Settling Overflow Pump(Unit-2) Motor-2,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
68	ETP-059-00G2	Pre Settling Overflow Pump(Unit-2)Motor-2 (LPBS)	MAIN PLANT DDCMIS	Pre Settling overflow Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
69	ETP-040-00G1	Transformer Oily Waste Transfer Pump(Unit-1) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
70	ETP-040-00G2	Transformer Oily Waste Transfer Pump(Unit-1) (LPBS)	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
71	ETP-041-00G1	Transformer Oily Waste Transfer Pump(Unit-2) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg

72	ETP-041-0OG2	Transformer Oily Waste Transfer Pump(Unit-2) (LPBS)	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
73	ETP-052-0OG1	Power House Area Service Waste Transfer Pump(Unit-1) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
74	ETP-052-0OG2	Power House Area Service Waste Transfer Pump(Unit-1) Motor-1,(LPBS)	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
75	ETP-053-0OG1	Power House Area Service Waste Transfer Pump(Unit-1) Motor-2,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
76	ETP-053-0OG2	Power House Area Service Waste Transfer Pump(Unit-1) Motor-2,(LPBS)	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
77	ETP-054-0OG1	Power House Area Service Waste Transfer Pump(Unit-2) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
78	ETP-054-0OG2	Power House Area Service Waste Transfer Pump(Unit-2) Motor-1,(LPBS)	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
79	ETP-055-0OG1	Power House Area Service Waste Transfer Pump(Unit-2) Motor-2,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
80	ETP-055-0OG2	Power House Area Service Waste Transfer Pump(Unit-2) Motor-2,(LPBS)	MAIN PLANT DDCMIS	Power House Area Service Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
81	ETP-028-OG01	TPI Inlet Water Transfer Pump Motor-1,MCC Module at ETP MCC Building	ETP DDCMIS	TPI Inlet Water Transfer Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
82	ETP-028-OG02	TPI Inlet Water Transfer Pump Motor-1,(LPBS)	ETP DDCMIS	TPI Inlet Water Transfer Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
83	ETP-029-OG01	TPI Inlet Water Transfer Pump Motor-2,MCC Module at ETP MCC Building	ETP DDCMIS	TPI Inlet Water Transfer Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
84	ETP-029-OG02	TPI Inlet Water Transfer Pump Motor-2,(LPBS)	ETP DDCMIS	TPI Inlet Water Transfer Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
85	ETP-030-OG01	Guard Pond effluent Transfer Pump Motor-1,MCC Module at ETP MCC Building	ETP DDCMIS	Guard Pond Effluent Transfer Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
86	ETP-030-OG02	Guard Pond effluent Transfer Pump Motor-1,(LPBS)	ETP DDCMIS	Guard Pond Effluent Transfer Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
87	ETP-031-OG01	Guard Pond effluent Transfer Pump Motor-2,MCC Module at ETP MCC Building	ETP DDCMIS	Guard Pond Effluent Transfer Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
88	ETP-031-OG02	Guard Pond effluent Transfer Pump Motor-2,(LPBS)	ETP DDCMIS	Guard Pond Effluent Transfer Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
89	ETP-024-OG01	Guardening Pump Motor-1,MCC Module at ETP MCC Building	ETP DDCMIS	Guardening Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
90	ETP-024-OG02	Guardening Pump Motor-1,(LPBS)	ETP DDCMIS	Guardening Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
91	ETP-025-OG01	Guardening Pump Motor-2,MCC Module at ETP MCC Building	ETP DDCMIS	Guardening Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
92	ETP-025-OG02	Guardening Pump Motor-2,(LPBS)	ETP DDCMIS	Guardening Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
93	ETP-026-OG01	CMB Effluent Transfer Pump Motor-1,MCC Module at ETP MCC Building	ETP DDCMIS	CMB Effluent Transfer Drive Pump control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg

94	ETP-026-OG02	CMB Effluent Transfer Pump Motor-1,(LPBS)	ETP DDCMIS	CMB Effluent Transfer Drive Pump control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
95	ETP-027-OG01	CMB Effluent Transfer Pump Motor-2,MCC Module at ETP MCC Building	ETP DDCMIS	CMB Effluent Transfer Drive Pump control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
96	ETP-027-OG02	CMB Effluent Transfer Pump Motor-2,(LPBS)	ETP DDCMIS	CMB Effluent Transfer Drive Pump control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
97	ETP-022-OG01	Sludge transfer Pump Motor-1,MCC Module at ETP MCC Building	ETP DDCMIS	Sludge transfer Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
98	ETP-022-OG02	Sludge transfer Pump Motor-1,(LPBS)	ETP DDCMIS	Sludge transfer Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
99	ETP-023-OG01	Sludge transfer Pump Motor-2, MCC Module at ETP MCC Building	ETP DDCMIS	Sludge transfer Pump Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
100	ETP-023-OG02	Sludge transfer Pump Motor-2, (LPBS)	ETP DDCMIS	Sludge transfer Pump Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
101	ETP-020-OG01	Air Blower Motor-1, MCC Module at ETP MCC Building	ETP DDCMIS	Air Blower Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
102	ETP-020-OG02	Air Blower Motor-1, (LPBS)	ETP DDCMIS	Air Blower Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
103	ETP-021-OG01	Air Blower Motor-2, MCC Module at ETP MCC Building	ETP DDCMIS	Air Blower Drive control	8PX0.5 Sqmm (G-Type)		50	Refer cable tray layout Drg
104	ETP-021-OG02	Air Blower Motor-2, (LPBS)	ETP DDCMIS	Air Blower Drive control	2PX0.5 Sqmm (F-Type)		50	Refer cable tray layout Drg
105	ETP-056-0OG1	Transformer Oily Waste Transfer Pump(Unit-1) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-1)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
106	ETP-057-0OG2	Transformer Oily Waste Transfer Pump(Unit-1) (LPBS)	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-1)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg
107	ETP-058-0OG1	Transformer Oily Waste Transfer Pump(Unit-2) Motor-1,MCC Module at ETP MCC Building	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-2)	8PX0.5 Sqmm (G-Type)		75	Refer cable tray layout Drg
108	ETP-059-0OG2	Transformer Oily Waste Transfer Pump(Unit-2) (LPBS)	MAIN PLANT DDCMIS	Transformer Oily Waste Transfer Pump Drive control(Unit-2)	2PX0.5 Sqmm (F-Type)		75	Refer cable tray layout Drg