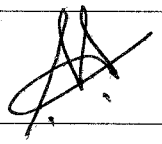
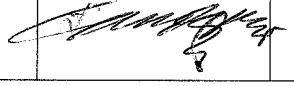
TITLE : TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

ITEM : LT MOTOR

Project : BHEL standard

	NAME	DESIGNATION	SIGNATURE	DATE
PREPARED	**K S S MANIAN**	**Sr Addl Engr**		19.3.13
CHECKED	**S RANGARAJAN**	**Dy G M**		19.3.13
APPROVED	**S JAYAPRAKASAM**	**A G M**		**19.3.13**

ISSUED BY **EDC ECI**

Record of revision

REVISION NO : 00 **INITIAL RELEASE : 19.3.2013**

Based on TDC TCI 140 Rev 08 & TFN LTM rev 05

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
1.0	SITE CONDITIONS		
1.1	Altitude above mean sea level	➢ 1000 m.	
1.2	Ambient temperature condition	6 to 50°C.	
1.3	Relative humidity	100 %	
1.4	Atmosphere	Tropical ,Dusty, salty, corrosive & highly polluted in a coal based Thermal power plant.	
2.0	GENERAL		
2.1	Reference standards	IS 325, IS 1231, IS 4722, IS 6362, IS 2253, IS 12065, IS 12075 , IS 4691 **& IS 12615- Eff 1 Energy efficient if called for in enquiry.**	
2.2	Design ambient	50 Deg C	
2.3	Application/ Type(Normal/ Energy efficient)	As per Enquiry & PO.	
2.4	Duty cycle	Continuous S1	
2.5	Rated voltage, frequency & Phases	415 V AC ±10%; 50 Hz ± 5%;(PI check enquiry for voltage) 10% absolute sum - 3 phase	
2.6	Minimum starting voltage	80% of the rated voltage	
2.7	Minimum voltage under which motor will run satisfactorily	75% of the rated voltage for 5 minutes	
	Capacity to restart (at voltage specified in point No. 2.4)	i. TWO successive starts from cold condition ii. Two HOT restarts starts from Hot condition iii. Three equally spread start per hour	
2.8	High speed bus transfer withstand capability	Suitable to withstand 150 % of rated voltage	
2.9	Type of balancing for rotor	Dynamic balancing	
2.10	Direction of rotation	Suitable for both direction	
2.11	Direction of cooling air	Non-drive end to driving end	
2.12	Class of insulation	Class F with temperature rise limited to Class B.	
2.13	Winding treatment	The insulation shall be given tropical and fungicidal treatment for successful operation of the motor in hot , humid & tropical climate.	
2.14	Allowed winding temperature rise at continuous full load	60°C by thermometer method & 70°C by resistance method	

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
2.15	Starting current	**Less than or equal to 600% full load current subject to tolerance as per IS.(Normal motor)** **Less than or equal to 700% full load current subject to tolerance as per IS.(Energy efficient)**	
2.16	Starting time & locked rotor withstand time	The locked rotor withstand time (LRWT) at 110% rated voltage (RV) under **HOT** condition shall be at least 3 sec more than the starting time at 80% of rated voltage for motors with acceleration time upto 20 sec at RV and 5 sec where the accelerating time is more than 20 sec at RV.	
2.17	Vibration	The peak amplitude of vibration shall be as per IS 12075	
2.18	Noise level	Within the limits specified by IS 12065. (<80 db at full load condition) @ 1 metre distance.	
2.19	Type of enclosure	TEFC, IP 55 as per IS 4691.	
2.20	Type of mounting	Horizontal foot mounted.	
2.21	Bearings	Ball or roller type / bearings effectively sealed against ingress of dust. The bearing shall be so constructed that the loss of lubricating grease is kept to minimum. Sealed bearings are also acceptable.	
2.22	Lubricant Type	Grease	
2.23	Bearing life	Bearings shall have a minimum life of **40000** Working hours.	
2.24	Shaft extension	Motors shall be provided with key slotted bare shaft extension with key at the driving end.	
2.25	Terminal box Type	Weather proof IP 55 as per IS 4691, Capable of being turned through 360° in steps of 90°.	
2.26	Cable gland and lugs	Double compression type nickel plated brass cable glands and insulated tinned copper crimping lugs to suit the cable size shall be supplied along with the motor. i) Size of power cables will be intimated after PO. ii) For space heater cable glands and lugs suitable for 2CX2.5 to be provided	
2..27	Type of terminals	Stud / screw type with plain washers, spring washers / checknuts & lugs	

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
2.28	Fault level	40 KA for 0.25 Sec (Suitable HRC fuse backup will be provided by BHEL in MCC/switchgear)	
2.29	Painting	Epoxy based paint (Colour shade 631/ Shade 632/ Shade 275/ RAL 5012 as per IS:5. This will be confirmed after PO.	
30.0	Space heaters		
30.0.A	Motors above 30 kW	Separate space heater suitable for 240V, ! Phase, AC ,50 Hz shall be provided	
30.0.B	Motors below 30 kW	Winding shall be suitable for heating continuously at 24 V, Single phase, AC,50 Hz	
30.0.C	Terminals for space heater	Separately terminated with clear identification in main terminal box.	
31.0	RTD for winding	Two numbers of Thermistors / RTD for each phase as below are to be provided A. Motors above 37 Kw shall have thermistors Or RTD if specifically called for in enquiry. B. Motor rated 160kW and above shall have RTDs	
32.0	Bearing RTD	For motors 132 Kw and above bearing temperature detectors(RTD) shall also be offered.	
33.0	Terminals for RTD/ Thermistor	Thermistors/ RTDs shall be terminated in a auxiliary terminal box. Details shall be furnished in TB diagram.	
34.0	Earthing	Two no of earthing provisions on terminal box and on motor body	
35.0	Name plate	**As per IS 325 and Addl data on name plate::** a. Bearing DE/ NDE details. b. Year of manufacture	
36.0	Lifting Device	Eye bolt or lugs to facilitate safe lifting	
37.0	INSPECTION & TESTING	**As per applicable quality plan**	

Cl No.	CHARACTERISTICS	REQUIREMENT	VENDOR COMPLIANCE (Refer Note: 2)
	DOCUMENTS		
38.0	a) Along with offer:	One set of technical data sheet as per the enclosed format and Motor general arrangement drawing giving foundation details, shaft details.	
	b) After placement of Purchase order (**within 15 days**)	**Three sets of the following for approval:** 1. Technical Data sheet as per the enclosed format of TECI LTMOTOR REV 00- **sh 6 to 8** 2. Motor general arrangement drawing giving foundation details, shaft details and weight 3. Motor Terminal box arrangement drawing 4. Motor characteristic curves . The following shall be submitted 1.Guarantee certificate. 2. O & M manuals. 3. Acceleration time and LRWT calculation shall be submitted for review.	
39.0	PACKING	As per Packing Procedure **QA:CI:STD:PR:03** or as per Manufacturer's Standard Practice subject to approval . The packing shall meet the Transport , Environment & Storage hazards. **Vendor shall check the applicable rated voltage in enquiry.**	

NOTE:

1. Refer current valid list for revision status of Quality Plan & Packing Procedure.

2. In 'Vendor compliance' column Vendor to indicate 'YES', 'NO' or 'NOT APPLICABLE'. Clarification , if any, in this column will not be considered.

DATA SHEET - **Cust No ::** **Project ::**

CL. NO	CHARACTERISTICS	**Vendor data (To be filled by vendor)**
1.0	Application	
1.1	Fan / Load Curve referred	
2.0	Manufacturer	
3.0	Type & frame size	Normal / Energy efficient **Frame size**:
3.1	Degree of Protection	IP55
4.0	Rated output in kW	
4.1	Rated speed	
5.0	Rated voltage , frequency & phases	• **415 V** AC ±10%; 50 Hz ± 5%; (Check voltage as per engy), 10% absolute sum - 3 phase
6.0	Full load current	Amps
7.0	Energy efficient	**As per IS 12615 –Eff 1**
8.0	Efficiency & power factor at Full load	Eff-- PF---
9.0	Efficiency & power factor at 75 % load	Eff-- PF---
10.0	Efficiency & power factor at 50 % load	Eff-- PF---
11.0	Duty Cycle	S1 - Continuous
12.0	Rated torque	
13.0	Starting current	600% of full load current
14.0	No load current (with mechanism coupled)	**@ RV and Frequency**
15.0	Starting torque in % of full load torque	
16.0	Pull up torque in % of full load torque	
17.0	Pull out torque in % of full load torque	
18.0	No load starting time (without mechanism coupled)	
19.0	Locked rotor withstand time at rated voltage	a. Hot b. Cold
20.0	Locked rotor withstand time at minimum starting voltage	a. Hot b. Cold
21.0	Locked rotor withstand time at 110% rated voltage	a. Hot b. Cold
22.0	Starting time at **minimum** starting voltage with mechanism coupled	
23.0	Starting time at **rated** voltage with mechanism coupled	
24.0	Maximum permissible starting time	
25.0	Stator thermal time constant	Minutes
26.0	Type & No of terminals brought out	

Cl no	CHARACTERISTICS	Vendor Data (**To be filled by vendor**)
27.0	Stator winding connection	Delta / star
28.0	Class of insulation & temperature rise	Class F; 60°C by thermometer method / 70°C by resistance method.
29.0	Minimum permissible starting voltage	Volts
30.0	Resistance per phase @20 Deg C (Indicative)	Ohms
31.0	No of successive starts in Hot condition	ONE / TWO
32.0	Quantity and power consumption of space heater	Qty== Watts==
33.0	Direction of rotation	Bi-Directional.
34.0	Bearing make & type	Make:: Drive End; Non Drive End;
35.0	Lubricant quantity , grade & recommended interval of lubrication	
36.0	Type of mounting & shaft orientation	Foot mounting; Horizontal.
	Terminal Box	
37.0	Location & angle of rotation	
38.0	Gland size for stator winding	
39.0	Gland size for space heater	Suitable for 2CX2.5 sq.mm(armoured), if applicable.
40.0	Cable entry	
41.0	GD^2 of motor (kg-m^2)	
42.0	Total weight of motor (kg).	
43.0	Weight of stator (kg)	
44.0	Weight of rotor (kg)	
45.0	Anticipated bearing life in Hours	
46.0	Method of connection to driven equipment	
47.0	Limiting rotor temperature for determining safe stall time	☐
48.0	RTD for winding/ Bearing	Applicable YES NO
49.0	Grade of balance of motor	
50.0	Standard continuous rating at 40 Deg C ambient.	
51.0	Derated rating of motor at 50 Deg C.	
52.0	a. Locked Rotor KVA b. Ratio of Locked rotor KVA / Rated KW	
53.0	a. Motor Dynamic Load b. Motor Static load	Upward/ Downward— Upward / Downward—
54.0	PAINT SHADE	

Vendor's signature and seal **Rev No ::** **Date ::**

The following curves are to be enclosed during datasheet approval.

1. GA drawing , Terminal box arrangement
2. Torque Vs Speed with load curve superimposed.
3. Speed Vs Current
4. Time Vs Current
5. Thermal with stand curve
6. Load Vs Efficiency
7. Load Vs Slip
8. Load Vs Power factor
9. Speed Vs Time
10. Load Vs Current.

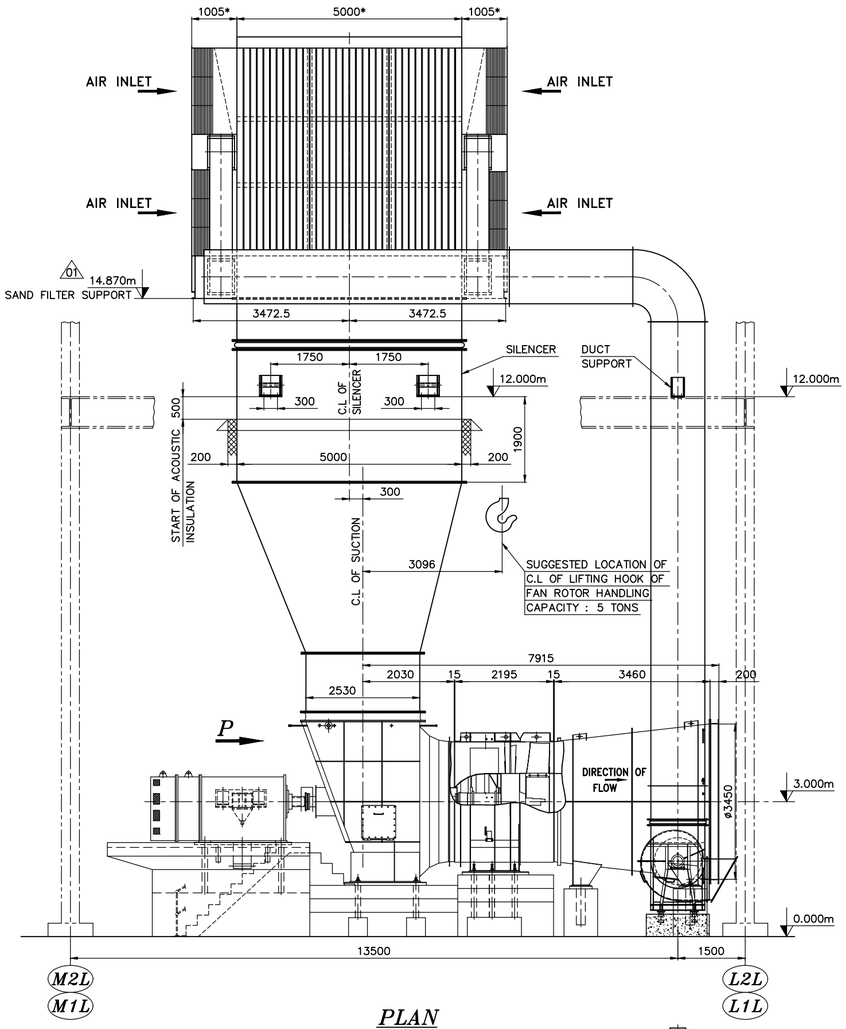
The following information shall be specifically provided for motors suitable for VFD drive (if called for in eqny during datasheet approval in addition to datasheet.

1. **Stator RESISTANCE**
2. **Stator leakage reactance**
3. **Magnetising reactance**
4. **Rotor resistance referred to stator**
5. **Rotor reactance referred to stator**

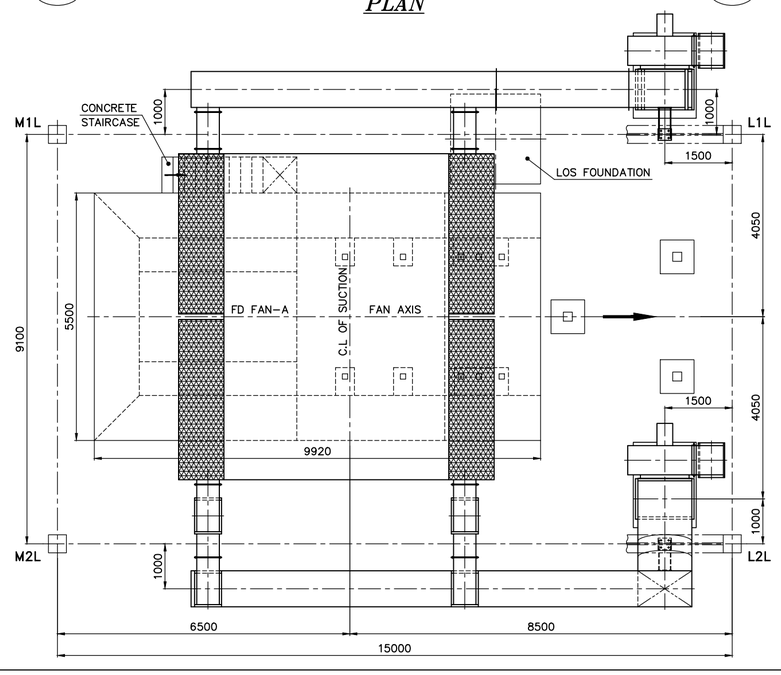
Vendor's signature and seal.

Date ::

ELEVATION

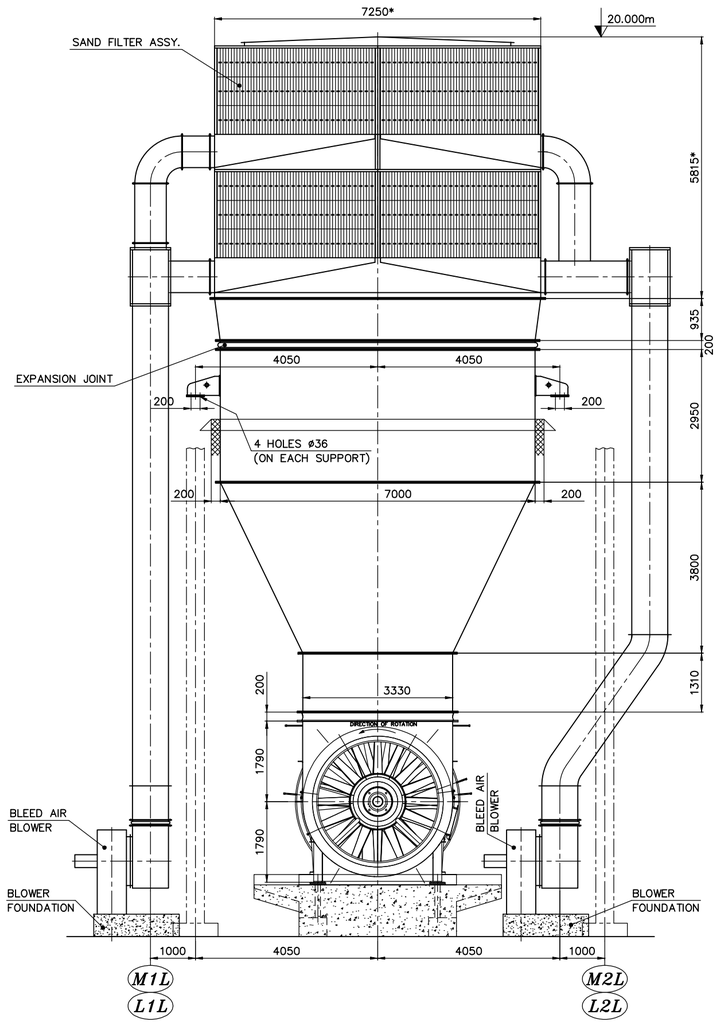


PLAN

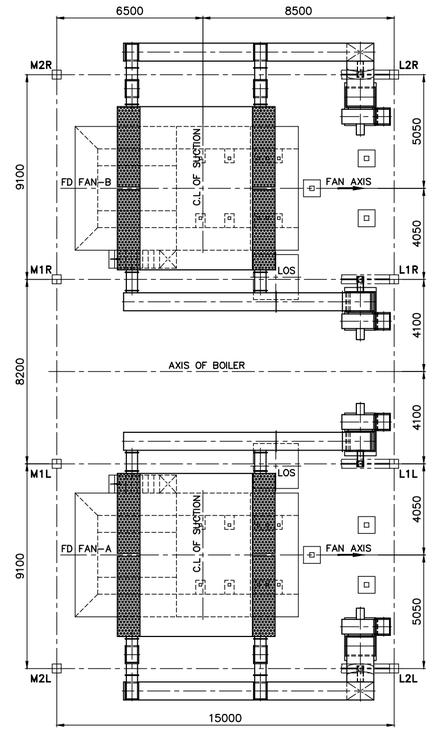


VIEW–P

(WITHOUT MOTOR & ITS FOUNDATION)



KEY PLAN



NOTE:

01. '*' INDICATED DIMENSIONS FOR VENDOR ITEM TO BE CONSIDERED AS MAXIMUM DIMENSION FOR SAND FILTER ASSY.

CUSTOMER NO : R654 & R655

REV	DATE	ALTERED	CHECKED	APPROVED
01	13.12.2013	P.S.N	S.AGARWAL	V.P.S

a) SAND FILTER ASSEMBLY SUPPORT LOCATION INDICATED.

CUSTOMER

RAJASTHAN RAJYA VIDYUT UTPADAN NIGAM LTD

CONSULTANT

TATA CONSULTING ENGINEERS LIMITED

MUMBAI

PROJECT: 2 X 660 MW SUPER CRITICAL TPS, STAGE–V, UNITS #7 & 8 AT SURATGARH, RAJASTHAN.

BHARAT HEAVY ELECTRICALS LIMITED.,

BOILER AUXILIARIES PLANT

RANIPET – 632 406

DRAWN	P.S.N	Sd.....	05.11.13
CHECKED	V.P.S	Sd.....	05.11.13
APPROVED	V.P.S	Sd.....	05.11.13

TITLE: TYPICAL SILENCER ARRGT. OF FD FAN – FAF 26.6/12.5–1

ALL DIMENSIONS IN MILLIMETRE

PROJECTION

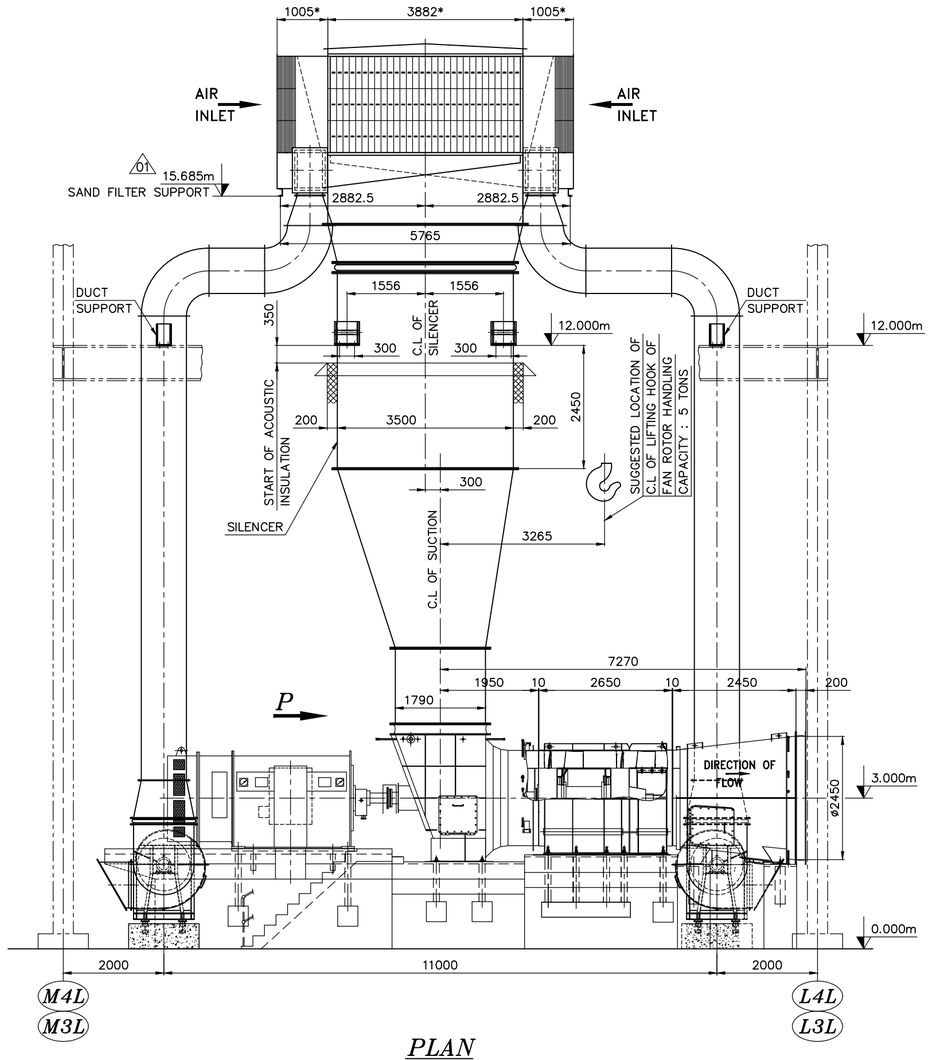
SCALE: NTS

DRG.NO. 20–A–PROP–09242

REV 01

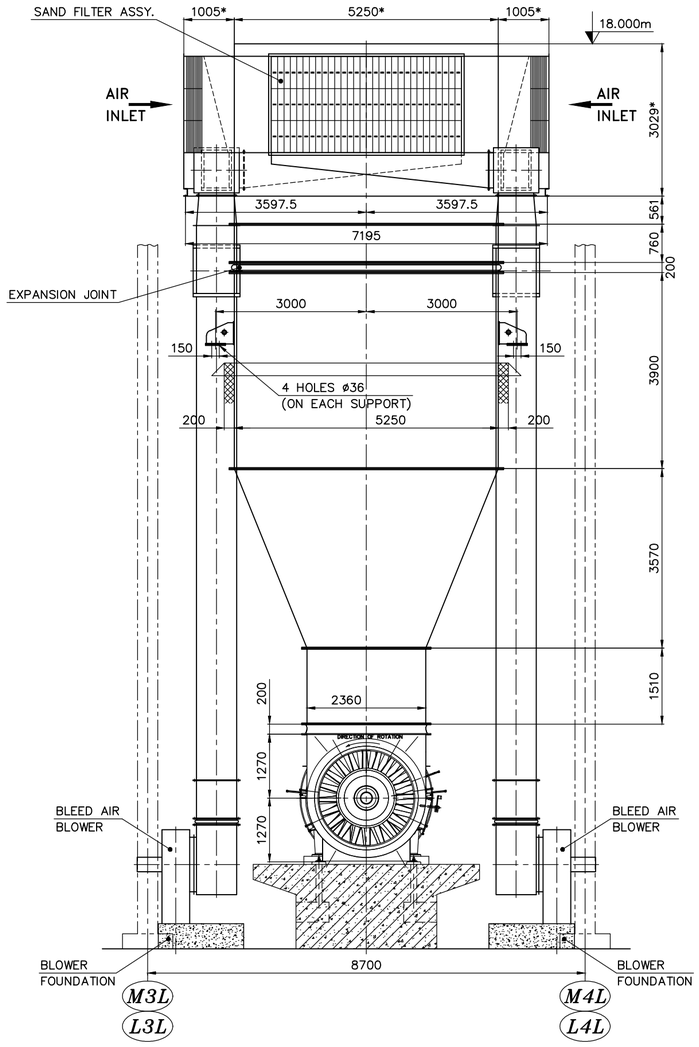
Size A2

ELEVATION



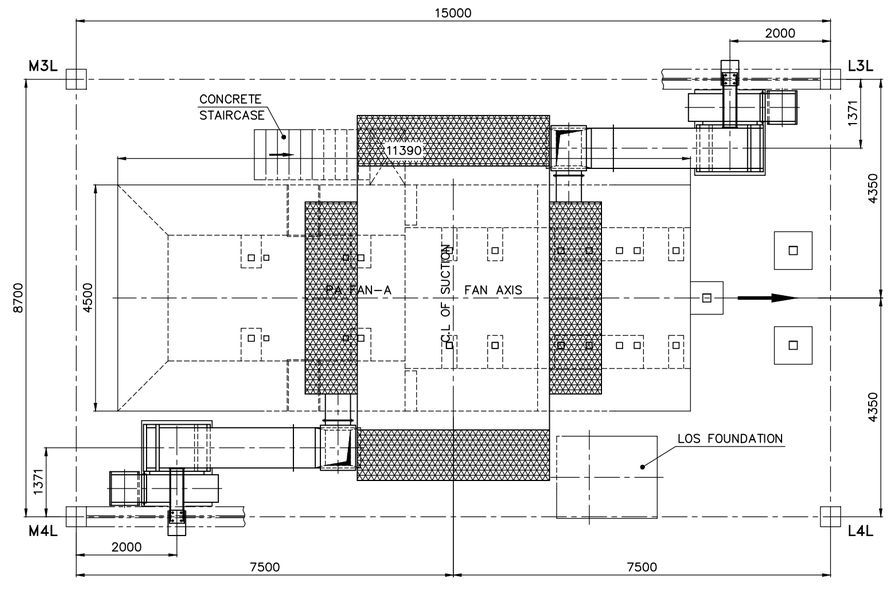
VIEW–P

(WITHOUT MOTOR & ITS FOUNDATION)



KEY PLAN

PLAN



NOTE:

01. '*' INDICATED DIMENSIONS FOR VENDOR ITEM TO BE CONSIDERED AS MAXIMUM DIMENSION FOR SAND FILTER ASSY.

CUSTOMER NO : R654 & R655

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01	13.12.2013	P.S.N	S.AGARWAL	V.P.S

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MUMBAI

PROJECT

2 X 660 MW SUPER CRITICAL TPS, STAGE–V,
UNITS #7 & 8 AT SURATGARH, RAJASTHAN.

BHARAT HEAVY ELECTRICALS LIMITED.,

BOILER AUXILIARIES PLANT

RANIPET – 632 406

DRAWN	P.S.N	Sd.....	05.11.13
CHECKED	V.P.S	Sd.....	05.11.13
APPROVED	V.P.S	Sd.....	05.11.13

ALL DIMENSIONS IN MILLIMETRE

PROJECTION

SCALE NTS

TITLE

TYPICAL SILENCER ARRGT. OF PA FAN – PAF 19/11.8–2

DRG.NO. 20–A–PROP–09243

REV 01

Size A2

TATA

LETTER OF TRANSMITTAL FOR VENDOR DOCUMENTS

To, BHARAT HEAVY ELCTRICALS LTD Power Sector-PMG First Floor, Vasant Square Mall,Sect-B Vasant Kunj, New Delhi-110 070 Attn.: Mr SK Gupta-GM/ Mr Tamal S	JOB NO: TCE. 5750A CLIENT:Rajasthan Rajya Vidyut Utpadan Nigam Ltd PROJECT:2X660MW Super Critical TPS, Stage-V, Units #7&8 at Suratgarh Rajasthan SUBJECT: QAP	YOUR REF: PEDM DATE: 08-08-2013 OUR REF: TCE.5750A-ME-540-VDT-068 DATE: 12-08-2013 SH. 1 of 1

We are herein conveying our approval/comments on the documents listed below. Approval/comments conveyed herein neither relieves the vendor/contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of the supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

.....
PROJECT MANAGER/ENGINEER

CODES

A:	Document approved as submitted; proceed with fabrication/construction.	**F**:	Correct original of the document to reflect our comments and resubmit for records.
B:	Document approved subject to comments noted; proceed with fabrication/construction considering our comments.	**G**:	Documents of this category are for information only and not for approval. Information furnished on the document is noted.
C:	Our comments are noted on the enclosed marked-up print.	**H**:	Document reviewed only against our previous comments and other revisions highlighted and identified by the vendor.
D:	Our comments are noted in the memo attached to this transmittal.	**I**:	Document returned without review.
E:	Correct original of the document to reflect our comments and resubmit for approval.	**J**:	Print not enclosed.

SL. NO.	VENDOR'S DOCUMENT NO.	TCE NO.	TITLE	CODE
1.0	SURA:301 R02	-	MQP-ID, FD &PA Fans	C, E
2.0	SURA:201 R02		MQP-Emitting electrode of ESP	A
3.0	PS/SURA/R654-R655 R02	-	Painting schedule for AHP,Fan,gates,ESP,Damper	A

COPY TO :
File: TCE.
Cc: RRVUNL-Jaipur Attn Mr Jinesh Jain ,SE with/without encl.-One copy
cc: Attn: Chief Engineer, Suratgarh Super Thermal Power Station, Prabhat Nagar, Dist Sri Ganganagar , Suratgarh-335804 Ph01509-245252 -one copy

TATA CONSULTING ENGINEERS LIMITED
Matulya Centre A 249 Senapati Bapat Marg Lower Parel (West) Mumbai 400 013
Tel 91 22 6662 4743 Fax 91 22 6662 4723 email mail@tce.co.in website www.tce.co.in

Bharat Heavy Electricals Limited
Boiler Auxiliaries Plant
Ranipet – 632 406

PAINTING SCHEDULE

SURATGARH SUPER CRITICAL TPS (2 X 660 MW) #UNIT 7&8 Stg-5

Applicable to APH, FAN, GATE & DAMPER AND ESP

BHEL CUSTOMER Nos.:

R 654 – R 655 (2 X 660 MW)

Prepared By	Reviewed By	Approved By
(K. JothiArulanandam)	(R. Arunachalam)	(G. Balasubramanian)

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
			PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
1	**Structural Steel (External Coatings)** 7X-X81 - Supporting Structure for ESP 7X-X56 - HVR Monorail Beams 7X-X65 - Hopper Approach Platform, 89-610 - Stair Stringer Channels, Brackets, Supp Brackets, Frames, Loose Channels, Toe Plates, Stiffener Plates & Angles 57-466 – Platform & Ladders	Blast Cleaning to SA 2 ½ (Near White metal) with surface profile 35-50µm	**Primer:** Inorganic Ethyl Zinc Silicate primer DFT = 75 µm per coat (min.) as per IS: 14946, Main Coat – (Volume of Solid min. 60% shade : Grey) **Intermediate :** Epoxy based MIO / Ti O2 Pigmented intermediate coat DFT = 75 µm per coat (min.) as per IS: 14209 Inter Coat – (Volume of Solid min. 60% shade : Grey or Brown)	**75** **75**	**Finish :** Two coats of Epoxy finish coat DFT = 35 µm per coat (min.) as per IS: 14209, Finish Coat – Volume of Solid min. 40% + Followed by one coat of Ali Acrylic PU paint DFT = 30 µm per coat (min.) as per IS: 13213 (Volume of Solid min. 40%) **Shade of colour : Dark Admiralty Grey - shade no.632 of IS: 5** ***# Note: Out of two coats of finish paint one coat of finish paint and final finish coat of Ali Acrylic PU paint will be done at Project site.***	**70#** **30#**	**250** **(Including Painting at Site)**
2	**Insulated Parts - Exposed to temperature up to < 400 ° C** Insulated Surfaces and Flue gas swept surfaces of APH, FAN, and ESP Components.	Power Tool Cleaning to St3 (SSPC – SP3)	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS: 12744 (Two Coats) DFT = 30 µm per coat	60	NIL	-	60
3	**Gates & Dampers – Insulated Surfaces > 95 ° C – PGMA 57-XXX**	Power Tool Cleaning to St3 (SSPC – SP3)	HR Aluminium Paint to IS: 13183 Gr. II (Up to 400 ° C) – Two Coats	40	NIL	-	40

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
			PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
	Gates & Dampers – Insulated Surfaces < 95 ° C – PGMA 57-XXX **Silencer – Insulated < 95 ° C – for FD & PA Fan**	Power Tool Cleaning to St3 (SSPC – SP3)	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS: 12744 (Two Coats) DFT = 30 µm per coat	60	Synthetic Enamel to IS: 2932 Grey Shade 692 of IS:5 (Two Coats) DFT = 20 µm per coat	40	100
4.0	**Out Door Equipments (External Surfaces) – Temperature up to 120 ° C**						
4.1	Oil Piping, Lub Oil Circulation Units of APH & FAN Knife Gate valve, Drive Arrangements for GD, EE & CE Rapp, Outer Roof for ESP – Plain Side	Blast Cleaning to SA 2 ½ (Near White metal) with surface profile 35-50µm	Epoxy based Zinc Rich Primer Paint- Two-Pack System as per IS: 14589 – Gr.2 – Colour - Grey One coat -DFT = 60 µm per coat	60	Epoxy based polyamide cured Enamel Two Component finish paint as per IS: 14209 – Shade Smoke grey (shade no.692 of IS:5) – One coat – DFT = 35 µm per coat	35	95
	Outer Roof for ESP – Stiffener Side	-do-	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS: 12744 (Two Coats) DFT = 30 µm per coat	60	Synthetic Enamel to IS: 2932 Grey Shade 692 of IS:5 (Two Coats) DFT = 20 µm per coat	40	100
4.2	52-100,101 – Rotor Drive Assy 57-209 – Mtg Bkt for Control Lover Damper Air Cylinder, 7X-X23 - Inspection / Access Door , ESP Performance Test Equipment, Blower with Motor, Special Tools, Tools & Tackles, Fixtures, Coupling of FD,ID,PA & Seal Air Fan, Foundation Packer Plates / shim plates of ESP and Fan	Power Tool Cleaning to St 3 (SSPC – SP3)	Red Oxide Zinc Phosphate Primer (Alkyd Base) to IS: 12744 (Two Coats) DFT = 30 µm per coat	60	Synthetic Enamel to IS: 2932 – (Shade Smoke Grey – shade no 692 of IS: 5) Two coats - DFT = 20 µm per coat	40	100

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
			PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	
5	Mandatory Spares (Mech Items) and Commissioning Spares for APH & Ducts	As per respective item, as listed in this painting schedule.					
6	Foundation Materials for Fan, ESP, Collecting Electrode, Hook for EE, Gate Blades, Pins & Pin Rack for APH and all other machined components.	All Threaded and other surfaces of foundation bolts and its materials shall be coated with Temporary Rust Preventive Fluid. During execution of civil works, the dried film of coating shall be removed using organic solvents.					
7	Heating Elements of APH	Dipped in Rust Preventive Oil					
8	Hand Rail Post, Bend, ERW Tubes, Floor Grills and Step Treads	Mechanical cleaning by means of steam jetting and Sweep Blasting with fine sand	Hot Dip Galvanizing to 610 gm per Sq.Mtr and to a coating thickness of 87 µm (min.)				

I. General Notes

a) Paint damage – any areas where paint got damaged shall be applied with primer and finish as given in this painting schedule.
b) No painting is required for Galvanized, non ferrous and stainless steel items except as indicated above.
c) Machined items are to be applied with one coat of temporary rust preventive oil.
d) All the components covered under different PGMAs are to be painted. In case any component is left out, the same shall be deemed to be included under the relevant PGMA.
e) Sl.no. 8, referred above for the item name is indicative only. Actual item names and galvanizing shall be as per the applicable GMS only.
f) PGMAs and its items coming under BOI are not indicated in this painting schedule. However, respective Engg document for all BOIs shall be referred. Wherever it is not specified, it shall be as per the painting schedule of the applicable PGMA.

SL NO	SURFACE LOCATION	SURFACE PREPARATION	PRIMER		FINISH		TOTAL DFT IN (µm min.)
			PAINT	DFT (µm min.)	PAINT	DFT (µm min.)	

REV NO	DATE	DETAILS ON RECORD OF REVISION
02	06.08.2013	Refer TCE Letter of Transmittal Ref No. TCE-5750A-ME-540-VDT-060 DTD.05.08.2013 – Comments given for Epoxy finish paint instead of synthetic enamel paint had been taken care and corrected accordingly in consultation with Shri. Gowda of TCE.
01	20.06.2013	Refer TCE Letter of Transmittal Ref.No. TCE-5750A-ME-540-VDT-010 DTD.05.06.2013 – All comments given by TCE were noted and accordingly Painting Schedule revised and submitted.
00	17.04.2013	Original Issue – First Submission

RECORD OF REVISION

BHARAT HEAVY ELECTRICALS LIMITED
BOILER AUXILARIES PLANT
RANIPET – 632406 India

SPECIFICATION FOR THE SELF CLEANING TYPE SAND FILTER ASSY.&BLEED AIR BLOWER ASSY.

(1) PROJECTS: **RRVUNL / SURATGARH, STAGE-V, UNIT-7&8, 2X660MW**

(2) DESIGN DATA:	**FD FAN (FAF 26.6/12.5-1)** (Quantity 2 nos per boiler)	**PA FAN (PAF 19/11.8-2)** (Quantity 2 nos per boiler)
(i) Air flow :	**240 m^3/s**	**140m^3/s**
(ii) Pressure drop :	Less than 20 mmWC	Less than 20 mmWC
(iii) Filtration:	20 Microns (Sand)	20 Microns (Sand)
(iv) Site condition:	Sand storm condition prevailing at site	
(3) MODEL:	"Self cleaning dynavane" model or equivalent.	

Vendor to select suitable model/size of their design of sand filter assembly to suit as per the silencer & filterarrangement drawing for the FD fan and the PA fan.

(4) SCOPE OF SUPPLY :

4.1 Design, Engineering & Manufacturing of Self cleaning type Sand filter assembly with housing.

4.2 Bleed air blower – Two numbers per fan suitable for removing the collected sand.

4.3 The ducting for connecting the sand filter assembly and the bleed air blower will be in the scope of purchaser (BHEL).

4.4 Suitable support beam below the sand filter assembly is to be provided by the vendor. (Please refer our drawing enclosed for the same)

4.5 Sizing calculation for sand filter assy. &bleed air blower assy.

Remarks	PREPARED	CHECKED	APPROVED
16 12 13			
Date			
Rev 01	P.Purushothaman	P.Purushothaman	Prasanta Saha

(5) DRAWINGS TO BE PROVIDED BY VENDOR :

5.1 Vendor to provide the drawings for the filter and its general arrangement based on our drawing as above with detailed dimensions and bill of materials.

5.2 Vendor to provide the following details as interface input :

5.2.1 The Flange dimensions for mounting of the sand filter assembly with housing to the silencer assembly which will be in the scope of the purchaser.

5.2.2 Flange dimension for mounting the bleed air duct ends.

5.2.3 General arrangement drawing with mounting details for suction side and foundation side for the bleed air blower.

5.2.4 Approval of the drawings to be obtained from BHEL.

(6) PACKING LIST

Packing list for the scope of supply of the vendor to be provided by the vendor with details of the items (As physically countable items) with quantity in numbers, Weight in KG for every item within a month's time from the date of the purchase order.

(7) O & M MANUALS

O&M Manuals for the self cleaning dynavane sand filter assembly and the bleed air blower to be given separately tous in three hard copies with two soft copies (CD) one month prior to the dispatch of the sand filter assembly andthe bleed air blower. All the drawings are to be given autocad indwgformat.

(8) ENCLOSURES

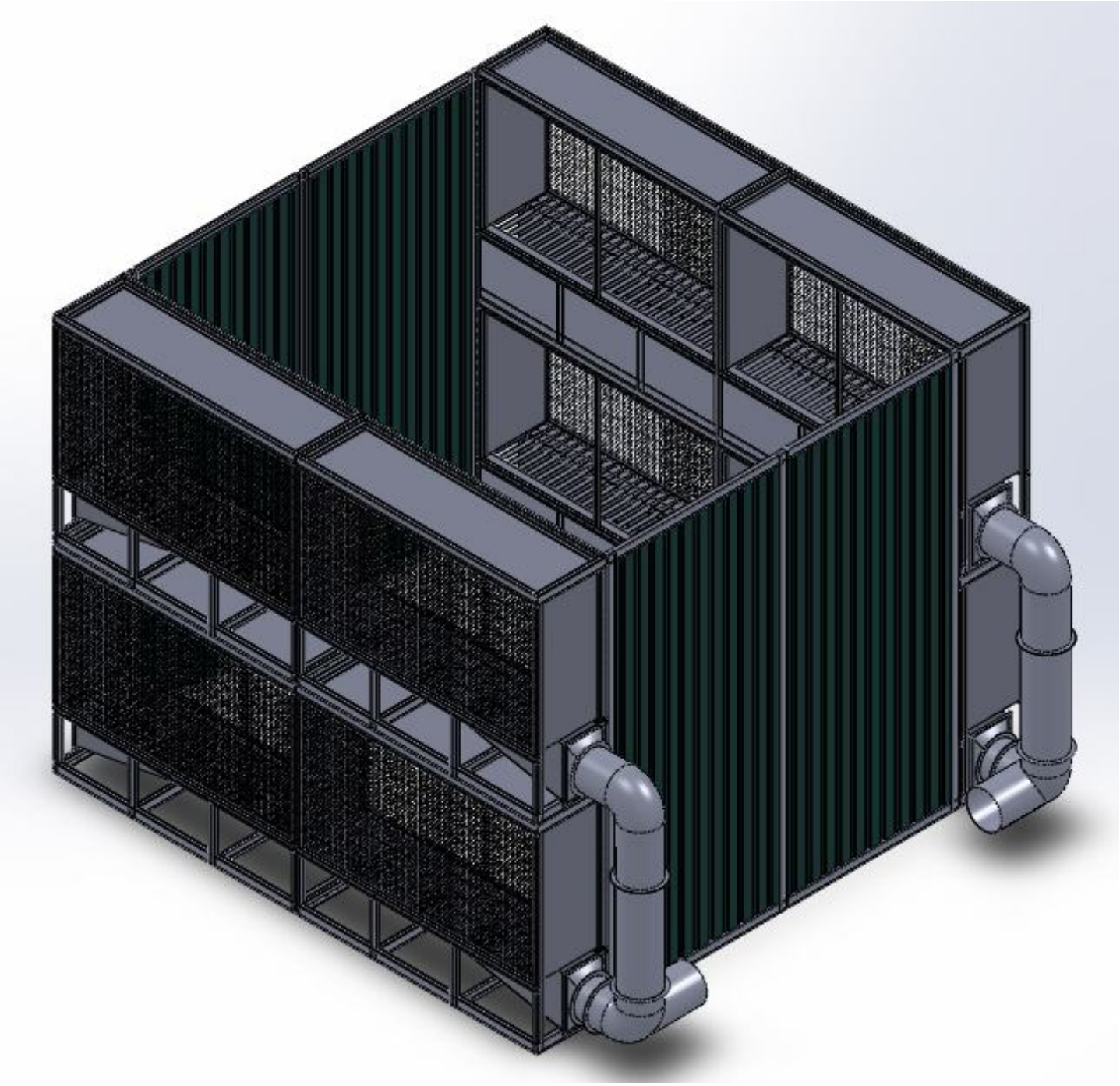
8.1 Typical Silencer Arrangement of FD fan FAF 26.6/12.5-1 - 20-A-PROP-09242/Rev 01
8.2 Typical Silencer Arrangement of PA fan PAF 19/11.8-2 - 20-A-PROP-09243/Rev 01
8.3 Annexure – I
8.4 Annexure – II
8.5 LT motor specification

Remarks	PREPARED	CHECKED	APPROVED
16 12 13			
Date			
Rev 01	P.Purushothaman	P.Purushothaman	Prasanta Saha

EDC - FANS
BHEL - RANIPET

ANNEXURE-I

TYPICAL ARRANGEMNET OF SELF CLEANING SAND FILTER ASSEMBLY FOR FD FAN



ANNEXURE-II

TYPICAL ARRANGEMNET OF SELF CLEANING SAND FILTER ASSEMBLY FOR PA FAN