



3x800 PATRATU TPS

PACKAGE: GYPSUM DEWATERING SYSTEM

SPECIFICATION NO.: PE-TS-434-571-A001

SECTION: III

SUB SECTION:

REV: 00

DATE: 21-11-2020

PRE-BID CLARIFICATIONS -1



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ANNEXURE-3

PRE-BID CLARIFICATION SCHEDULE

S. NO.	SECTION	CLAUSE	PAGE NO.	STATEMENT OF THE REFERRED CLAUSE	CLARIFICATION REQUIRED BY BIDDER(S)	BHEL Reply
1	Technical specifications 1	5.7	42 of 460	clarified water analysis	Provide the temperature of the clarified water.	Clarified water will be at 36 deg C.
2	Technical specifications 1	2.1.1.5	29 of 460	Bidder to consider the requirement of the vertical seal water sump pumps (2 nos., 1 working + 1 stand by) in his scope for pumping the water expended from the Vacuum pump(s) to the Cake Wash Tank(s). The system shall be complete with pumps, valves, instruments and accessories along with associated supports, fasteners, gaskets etc. with drive (IE3 motor). Also, bidder to include all connection bolts/nuts/washers for installation. Required instruments	Please provide the PID for vertical seal water sump arrangement or bidder will consider minimum requirement	Bidder to refer clause 2.0 of Sub section C4, page 185 of 460. Further, refer relevant clause in Sub section C4 for redundancy for instrumentation. Bidder to furnish P&ID considering the same for BHEL/Customer approval.



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				and any safety device shall be supplied.		
3	Technical specifications 1	2.1.1.6	29 of 460	Vent fan including enclosure and its arrangement: Two (2) numbers	Bidder will consider Centrifugal type of vent fan. please confirm	Noted. Bidder to decide capacity and head of fan to meet system requirement in line with the tender specification.
4	Technical specifications 1	2.1.1.6	29 of 460	Vent fan including enclosure and its arrangement: Two (2) numbers	Client to specify the MOC of Fume enclosure & ducting if any to be maintained.	Bidder to note that MOC of fan as well ducting shall be as per proven practice meeting the system requirement.
5	Technical specifications 1	2.1.1.3	29 of 460	Vacuum belt filters complete with Accessories including discharge chute up to the gypsum conveyor skirt board.	Belt width & skirt board inside dimension to be provided to check the feasibility of proposed arrangement & profile of chute & angle.	Bidder to refer "Layout details of Gypsum Dewatering Building" page 354 & 355 of 460. The width of Gypsum conveyor belt is 650 mm and that of the skirt board is 433 mm.
6	Technical specifications 1	2.1.1.9	30 of 460	Scope of below-mentioned interconnected piping (slurry, air and water pipes) along with valves, rubber lining (wherever applicable), instruments, valves, supports, gaskets, fasteners and accessories which is non-integral to Gypsum dewatering system is limited to engineering only and supply shall be made by BHEL.	We understand all the drawings required for the engineering shall be provided by BHEL (Drawings for valves, pumps and other requirements). Please confirm.	All relevant input drawings shall be made available during detailed engineering of the package.



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				Engineering includes layout & routing of pipes, preparation of isometric drawing and BOQ:		
7	Technical specifications 1	2.1.5	33 of 460	Any other items required not covered above but required for the completeness of the system; it shall be included in the offer and shall be supplied by the Bidder/supplier. Bidder shall refer to the P&ID enclosed in Annexure-IV, Sub-Section-D of Section-I for the items under the bidder's scope. All the items indicated in the P&ID are minimal requirements.	Items shall be supplied as per Client P&ID to make the system operable. If any specific requirement, please define.	Tender Specification requirement is clear. However, any specific query / clarity required may be sought by the bidder.
8	Technical specifications 1	2.3	33 of 460	TERMINAL POINTS	TP point to be indicated in building GA for clarity. As mentioned in clause no. 2.3, point no.6, TP distance at 5 meter from building boundary. Please identify the column & locate the same in GA drawing.	Coordinates shall be provided during detail engineering of the package.



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9	Technical specifications 1	3.1	34 of 460	Codes & Standards	Design & Material shall be as per latest Indian Standard / Equivalent standards. Please confirm.	Latest edition of Codes and Standards mentioned at clause 3.1 and elsewhere in the tender Specification to be followed.
10	Technical specifications 1	4.3.4	36 of 460	The complete frame of the filter and all parts in contact with gypsum shall be made of corrosion resistant material or shall be provided with corrosion resistant liners of proven design.	Since frames are not in contact with gypsum slurry hence shall be made of mild steel epoxy coated and parts which are in contact with slurry are made of PP or MSRL. This is as per proven practice in similar application and same has considered.	Bidder is to follow the specification. The complete frame of the filter and all parts in contact with gypsum shall be made of corrosion resistant material or shall be provided with corrosion resistant liners of proven design. Accordingly, bidder may consider 'Corten / Weathering Steel' or 'SS 304' or any other suitable corrosion resistant material conforming to ASTM A606-4, A588, A847 etc. as applicable. The material so selected, should be meeting the strength requirement of the belt filter.
11	Technical specifications 1	4.3.10	37 of 460	The filtrate from gypsum slurry and from cake washing shall be taken to a separate vacuum receiver tank(s) as per the proven practice of the supplier. Each belt filter shall have an independent vacuum pump.	Filtrate from slurry and cake washing will be collected in the single receiver, this is the proven practice hence Separate receiver tank is not required (as per Client PID dwg no: 3-FW-000-01095 filtrate is collecting in single receiver).	The P & ID attached with tender specification has to be followed.



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12		4.3.12	37 of 460	A 2 m (min) wide platform shall be provided all around each belt filter for easy approach and maintenance	Due to the larger spacing between HBF's, the platform width and estimate shall be more than 4m. Also only when it is 4 m, we can approach the HBF's. The platform as shown in GA of client with 2.5m width doesn't facilitates the Access and Maintenance	Bidder to note that approach platform with access ladder for equipment's in bidder's scope shall be provided by bidder.Regarding HBF, bidder to provide 2m (min) wide platform for each belt filter as per Clause 4.3.12, Page 37 of 460 or it may provide a common platform of 3.3m (approx.) width. The "Layout details of Gypsum Dewatering Building" page 354 & 355 of 460 is for reference purpose.In case, common platform for HBF is provided as mentioned above, a movable platform along with access ladder shall be provided for approaching equipment/item on other side of HBF. A 1000 mm wide platform with suitable approach shall be provided by the bidder for each hydro cyclone as per Clause 4.5.36, Page 40 of 460.
13	Technical specifications 1	4.5.6	38 of 460	All pumps shall be fitted with suction and discharge pressure gauges.	Bidder will supply pressure gauge as per Client PID.	The P&ID provided with tender specification has to be followed. However, if the pressure gauge is required at the pump suction for reliable operation; the same shall be provided to meet system control requirement.
14	Technical specifications 1	4.4	37 of 460	Vacuum System	Client to specify the Margin of Motor for installed power over the Absorbed kW required to select the motor power	Bidder to refer Clause 4.00.00 (b) page 115 of 460 of the Tender specification.



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15	Technical specifications 1	4.4	37 of 460	Vacuum System	Client to specify whether Bidder can Choose either among rpm 1000 or 1500 rpm speed motor for vacuum pump?	RPM of vacuum pump shall be as per system requirement & should be of proven design of the sub supplier approved during detailed engineering
16	Technical specifications 1	4.4.2	37 of 460	The vacuum pump shall be of low speed liquid ring type of proven design.	Client to specify the low speed range for selecting the vacuum pump	
17	Technical specifications 1	4.4.5	37 of 460	The vacuum receiver and pump internals shall be suitably lined to protect against the corrosive environment.	Vacuum pump shall be without linings. Material of Construction of Vacuum Pump: MOC of vacuum pump shall be as below mentioned or better material as per SPECIFICATION No: PE-TS-467-571-A101 Page 3 of 5 1) Casting: ~ 2% Ni Cast Iron (GB 9439, HT 250)/ASTM A48, CLASS35 2) Shaft: Carbon Steel, En-8 or better 3) Impeller: Nodular Iron (ASTM A536, Gr.65-45-12) or better 4) Shaft Sleeve :(If applicable) Stainless Steel	Bidder to follow tender specification.



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18	Technical specifications 1	4.4.6	37 of 460	Each vacuum receiver tank(s) shall be provided with slide plate type pneumatic vacuum breaker. The plate shall be stainless steel with a min. thickness of 3 mm.	Since we are maintaining sufficient barometric height and it is enough to break the vacuum. Further Bidder shall provide vacuum breaker valve in Vacuum line to prevent excess vacuum generation if require.	Bidder to follow Tender specification.
19	Technical specifications 1	4.5.8	38 of 460	Pumps shall have stable head-capacity characteristics curve from run-off to shut-off. Shutoff head should be 115% of Best Efficiency Point (BEP).	We propose Shut-off head should be minimum 110 % instead of 115% of Best Efficiency Point (BEP). Please confirm.	Bidder to follow Tender specification.
20	Technical specifications 1	4.5.15	38 of 460	The pumps shall have mechanical seals of cartridge type with self-lubrication sliding ring cartridges. The static part will be mounted on the seal plate with circumferential ring (O ring) or another flexible sealing ring. Built in seal design will not be accepted.	The pumps shall be supplied with mechanical seals of single cartridge type with self-lubrication arrangement. However, other clause i.e. " The static part will be mounted on the seal plate with circumferential ring (O-ring) or another flexible sealing ring & built in seal design will not be accepted" is not applicable. Please confirm.	Bidder to follow Tender specification.



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21	Technical specifications 1	4.5.22	39 of 460	A common base plate shall be provided for pump assembly & Motor and the same shall be rigidly constructed, adequately braced and provided with finish pads for mounting pump.	Noted the requirement, but the same shall be confirmed later on receipt of firm vendor Inputs.	Bidder to follow Tender specification.
22	Technical specifications 1	4.5.38	40 of 460	Equipment requiring monitoring during regular operation shall be approachable from the ground floor through staircase. Staircase with minimum width of 1200 mm shall be provided for approach to elevated structures at 5 m height from the nearest platform. Below this height, a vertical ladder with minimum clear width of 600 mm may also be acceptable.	The Hydrocyclone platform and HBF platform are in Bidder's scope, others platform and staircase is in client scope, please confirm.	Bidder to note that approach platform with access ladder for equipment in bidder's scope shall be provided by bidder. Regarding HBF, bidder to provide 2m (min) wide platform for each belt filter as per Clause 4.3.12, Page 37 of 460 or it may provide a common platform of 3.3m (approx.) width. The "Layout details of Gypsum Dewatering Building" page 354 & 355 of 460 is for reference purpose. In case, common platform for HBF is provided as mentioned above, a movable platform along with access ladder shall be provided for approaching equipment/item on other side of HBF. A 1000 mm wide platform with suitable approach shall be provided by the bidder for each hydro cyclone as per Clause 4.5.36, Page 40 of 460.



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23	Technical specifications 1	4.5.34	39 of 460	Bidder to provide capacity of crane or hoist required for safe material handling and the details of heaviest component to be handled.	Details shall be provided during detail engineering. The handling facility for pumps in the layout shall be confirmed by Client to finalise the same.	Bidder's understanding is correct.
24	Technical specifications 1	5.4	41 of 460	Hydro cyclone backpressure shall not exceed 20m H	Please clarify the requirement and Hydrocyclone feed inlet pressure will depends on the Hydrocyclone Vendor selection design to achieve the percent solids, Tonnage and PSD distribution.	Bidder to follow Tender specification.
25	Technical specifications 1	8.03.04 and 10.0.d	44 of 460	3d Modelling	There is no 3d modelling of layout from Bidder side. Bidder shall provide the basic engineering of Equipment layout with load data for the scope of supply of equipment and platforms by Bidder. Rest all detail engineering of complete building by the client. The (Layout drawings) inputs to client shall be in AutoCAD format. Client to confirm the same.	Bidder to refer cl 10.0 (d) page 44 of 460 wherein 3D modelling has already been indicated under exclusion.



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26	Technical specifications 1		45 of 460	General Tech Spec- Part C-NTPC Spec.	This spec. is applicable for main contractor & not to BHEL's sub-contractors. Please confirm.	Relevant clauses as applicable for the package are to be followed.
27	Technical specifications 1	7.02.00	50 of 460	Lifting devices i.e. hoists and chain pulley jacks etc. shall be provided by the contractor for handling of any equipment or any of its part having weight in excess of 500 Kgs during erection and maintenance activities.	Not in Bidder scope. Client to confirm	Bidder to refer Clause 10.0 (c), page 44 of 460, wherein Cranes & Hoists for Material handling have already been indicated under exclusion.
28	Technical specifications 1	8.00.00	51 of 460	DOCUMENTS, DATA AND DRAWINGS TO BE FURNISHED BY CONTRACTOR	This clause shall be discussed during meeting (As mutually agreed).	Bidder to refer Note 1 of Annexure V, "Master drawing List with schedule of submission" page no 373 of 460.
29	Technical specifications 1	8.03.01	51 of 460	BASIC ENGINEERING DOCUMENTATION & DETAILED ENGINEERING DOCUMENTS	This spec. is applicable for main contractor & not to BHEL's sub-contractors. Please confirm. Bidder will provide the basic engineering documents and Detailed Engineering documents will be (As per scope of supply) as per mutually agreement.	The referred clause is of 'General Technical Requirements' of End client. The points relevant to bidder has to be followed. Further, Bidder to refer Annexure V, sub section D, page 369 to 374 of 460 of technical specification for drawing document submission schedule.



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30	Technical specifications 1	7.15.00	118 of 460	The size and number of cables (for HT motors) to be intimated to the successful Contactor during detailed engineering and the Contactor shall provide terminal box suitable for the same.	It will decided by manufacturer according to the frame size	During detail engineering bidder will inform the size and number of cables as per their equipment rating/s. BHEL shall select the cable size as available from the procured lot and inform the same. Bidder shall provide terminal box suitable for the same.
31	Technical specifications 1	1.00.00	189 of 460	MEASURING INSTRUMENTS (PRIMARY AND SECONDARY)	Instruments will be as per Client PID only, please confirm.	Bidder to refer clause 2.0 of Sub section C4, page 185 of 460.
32	Technical specifications 1	4.02.00	216 of 460	415 V/690 V LV VFD: The Variable frequency drive (VFD) system	Client scope, please confirm.	VFD panel shall be in bidder's scope as per clause 2.1.1.3, Sub section C1, page 39 of 460.
33	Technical specifications 1	2.b	333 of 460	Mandatory spares list 2,b) Belt - 2 Sets	For spare belt - Bidder shall supply wear belt or sealing belt	Bidder to note that a set shall mean complete replacement for one equipment. All type of belts shall be covered accordingly.
34	Technical specifications 1		355 of 460	In the layout drawing, Filtrate extraction pump is directly connected to the Vacuum receiver and in Page no 355 of 460 filtrate extraction pump is connected to vacuum receiver tank.	Bidder will propose seal pot (vacuum receiver tank arrangement as shown in Page 366 of 460) and filtrate extraction pump arrangement as shown in the bidder layout.	Bidder to propose the arrangement as per their proven design meeting the system requirement for BHEL/Customer approval during detailed engineering stage.



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35	Technical specifications II	3	373 of 460	Only manual calculation with authentic supporting literature (e.g. extracts of hand Book/standard/codes) shall be acceptable. All design calculations and drawings shall be in SI system only.	The calculation done by reputed software, please confirm	Noted. However, all calculations shall be with authentic supporting literature (e.g. extracts of hand Book/standard/codes) shall be acceptable. All design calculations and drawings shall be in SI system only
36	Technical specifications II	1.4	439 of 460	The vacuum box shall ensure tight sealing with the belt/cloth and shall be of proven design. MOC of Vacuum Box Should be preferably UHMW-PE	MOC of the Vacuum Box shall be Polypropylene (PP) material, which is the proven practice for the similar type of application.	Tender specification requirement is clear. However, bidder can propose any material equivalent or superior to UHMW-PE during detail engineering.
37	Technical specifications II	III-B	441 of 460	For sealing of inspection doors labyrinth type arrangement to be provided.	For sealing of inspection doors of chute rubber gaskets shall be provided instead of labyrinth as it is static / stationary equipment. Please confirm.	Bidder may propose better proven solution for finalization during detailed engineering.
38	Technical specifications II	III-C	441 of 460	Complete chute work in the region of flap gates shall be fabricated from 20 thk TISCRALE or equivalent.	Please confirm the requirement of flap gate & its location in layout.	Flap gate is not applicable.



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39	Technical specifications II	III-C	441 of 460	One (1) no. chute blockage switch for each belt filter of proven type (subject to approval of the employer) shall be provided. Chute blockage switch shall trip the feeding conveyor in case of Chute blockage and protect the feeding conveyor equipment.	Since chute is around 2.4 m wide and 0.8 m width, chances of Cake blockage in the chute is less, as per the previous experience, it is not required for HBF Discharge chute. Hence supply is excluded from bidder scope.	Bidder to follow Tender specification.
40	Technical specifications II				Drip tray (civil work) design, Engineering and supply is in Client scope.	Confirmed. However, bidder to provide the input of the drip tray during detail engineering.
41	Technical specifications II	2.a.5	440 of 460	The pumps shall be connected to its motors by flexible couplings. All couplings shall have suitable rigid steel coupling guards having closed ends and anchored to the base plate.	Bidder generally suggest V- Belt driven Vacuum Pumps, which has the option to vary the rpm by changing the pulley diameter if required. Client to confirm whether v-belt pump is ok?	Vacuum pump drive arrangement shall be selected by bidder to meet system requirement as per proven practice and shall be approved during detailed engineering.
42	Technical specifications II	1.0.II.a. 7	440 of 460	Impeller Tip speed to be kept in range of 13-22 m/sec.	Provide the tip speed of Vacuum Pumps need to maintain.	Tip speed of Vacuum pump shall be in range of 13-22 m/sec.
43	Technical specifications II				Cake wash, Cloth wash and Filtrate pumps shall be direct driven pumps through spacer coupling or V-Belt	Direct driven pumps through couplings to be provided.



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					connection as per pump Vendor standard.-.Please confirm	
44	Technical specifications II		442 of 460	Cake/Cloth Wash pump shall be 1500/3000 RPM.	Pl specify the RPM for filtrate pumps if any preferred. Else Bidder shall select the same and proceed as per process requirements.	RPM of pump shall be as per system requirement & should be of proven design of the sub supplier approved during detailed engineering.
45	Technical specifications II	VI C	442 of 460	The slurry pumps shall be provided with motorized suction and discharge valves. In addition, flushing water lines with motorized valves shall be provided for each pump for automatic flushing of the pump after each shut down.	We understand as client per P&ID, instead of motorized pneumatic valves can be used. Please confirm.	Pneumatic valves are acceptable.
46					Piping software and version details to be provided	Bidder to note that CEASER is being used by BHEL for stress analysis. Bidder to share analysis compatible to same. Further details shall be shared during detail engineering.
47					Stress analysis /Critical line list to be provided	
48					Stress analysis software and version details	
49					Model review software and version details	BHEL is using SP3D/PDMS platform for 3D modelling. Bidder to share model compatible to same. Further details shall be shared during detailed engineering.



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50					Interface details if any	Tender Specification requirement is clear. Further details shall be discussed during detailed engineering.
51				Area is in safe or hazardous zone	Kindly Confirm	Area is not classified in Hazardous zone.
52				Excluded 1. LCP & VFD Panel 2. Control Desk & Panels 3. Transformer 4. Furnitures 5. Power cables, control cables and signal cable 6. LPBS	Please confirm the scope, listed as per TECH SPEC BRBCL GDWS PART 2 page number 41 of 150.	1) For LCP and VFD panel refer clarification at SI No. 32 above. 2) Bidder to refer clause 1, Sub section C4, page 181 of 460, Specific Technical Requirements (C&I), wherein it is indicated that GYPSUM DEWATERING SYSTEM (GDS) shall be operated from DCS (BHEL's scope). 3 & 4) Transformer and Furniture are excluded from bidder's scope. 5 & 6) Power cables, control cables and signal cable / LPBS- Bidder to refer "Electrical scope between BHEL & vendor" page 111 of 460 of tender specification.
53					Provide the Approved Vendor List	Refer Annexure-I, Sub Vendor List, Page 331 of 460 of tender specification.
54					Client to confirm the laydown/dropdown area anticipated for HBF components maintenance clearly in layout.	Tentative maintenance bay has already been marked in the "Layout details of Gypsum Dewatering Building" page 354 & 355 of 460. However, the same shall be finalized during detail engineering.
				Point Added		P&IDs for Bidder's scope of Engineering as per Clause 2.1.1.9 (ii) (d), (e) & (f) are enclosed as Annexure-A to this pre-bid clarifications.

A3

DRAWING No.

THIRD ANGLE
PROJECTION

No. REQ'D

P&ID-WASTE WATER DISCHARGE SYSTEM
WASTE WATER HYDROCYCLONE A/B O/F
B240-00451
9585-001-PVM-F-014 SH 03 OF 03
FROM WASTE WATER PUMP A/B
OO HTM 05 AP 001/002

00-200-FS-4521-AA60

FROM GYPSUM AREA DRAIN SUMP PUMP
OO HTT 01 AP 001

ENGINEERING BY GDW
SYSTEM SUPPLIER AS
PER SUB SECTION C1,
CLAUSE 2.1.1.9 (ii) (d) & (f).

B240-00720

00-100-FS-7121-AA60

B240-00411
9585-001-PVM-F-029 SH 01 OF 04
FROM VACUUM RECEIVER A
OO HTM 02 BB 001

00-250-FS-4101-AA60

B240-00412
9585-001-PVM-F-029 SH 02 OF 04
FROM VACUUM RECEIVER B
OO HTM 02 BB 002

00-300-FS-4103-AA60

P&ID-VACUUM BELT FILTER-A
B240-00411
9585-001-PVM-F-029 SH 01 OF 04
FROM VACUUM BELT FILTER A
OO HTM 01 AT 001

00-300-FS-4113-AA60

P&ID-VACUUM BELT FILTER-B
B240-00412
9585-001-PVM-F-029 SH 02 OF 04
FROM VACUUM BELT FILTER B
OO HTM 01 AT 002

00-350-GS-4442-AA60

B240-00445
9585-001-PVM-F-028 SH 02 OF 02
FROM WASTE WATER HYDROCYCLONE A
FROM OO HTM 02 AT 001

00-350-GS-4452-AA60

B240-00445
9585-001-PVM-F-028 SH 02 OF 02
FROM WASTE WATER HYDROCYCLONE B
FROM OO HTM 02 AT 002

00-550-FS-4331-AA60

00 HTM 03 BB 001

FILTRATE WATER TANK

00 HTM 03 AP 001/002

FILTRATE WATER PUMP A/B

00 HTM 01 AM 001

FILTRATE WATER TANK AGITATOR

S NO	SECTION	FLOW m ³ /hr	TEMP(C)	DENSITY(kg/m)
1	Gypsum slurry from gypsum area drain sump pump	50	62.1	1177
2	Filtrate water from vacuum receiver	90	62.1	1006
3	Wash Water from vacuum belt filter	129	36.0	990
4	Underflow from sec waste water hydrocyclone	198.1	62.1	1262
5	Waste water slurry from waste water tank	169	62.1	1025
6	Suction line of filtrate tank pump	1170	58.3	1098
7	Discharge line from filtrate pump	1170	58.3	1098
8	Common discharge line to absorber	1170	58.3	1098
9	Process water for flushing	3.0	36.0	990

P&ID-ABSORBER-UNIT 1
FILTRATE WATER TANK LEVEL SIGNAL
B240-00202
9585-001-PVM-F-004 SH 01 OF 03
FILTRATE RETURN CONTROL
P&ID-ABSORBER-UNIT 2
FILTRATE WATER TANK LEVEL SIGNAL
B240-00201
9585-001-PVM-F-004 SH 02 OF 03
FILTRATE RETURN CONTROL
P&ID-ABSORBER-UNIT 3
FILTRATE WATER TANK LEVEL SIGNAL
B240-00202
9585-001-PVM-F-004 SH 03 OF 03
FILTRATE RETURN CONTROL

Filtrate water recirculation line
from Absorber#3-2-1

P&ID-ABSORBER-UNIT 3
FILTRATE WATER
B240-00202
9585-001-PVM-F-004 SH 03 OF 03
FROM ABSORBER
30 HTD 00 BB 001

Filtrate water line to Absorber#1-2-3

P&ID-ABSORBER-UNIT 1
FILTRATE WATER
B240-00200
9585-001-PVM-F-004 SH 01 OF 03
TO ABSORBER
10 HTD 00 BB 001

P&ID-WATER DISTRIBUTION
PROCESS WATER
B270-10431
9585-001-PVM-F-021 SH 01 OF 04

NOTE A004
TO PREVENT NONFUNCTIONING OF SLURRY TANK
PUMP SUCTION VALVE DUE TO SOLID SEDIMENTATION,
THE SHAFT OF BUTTERFLY VALVE SHOULD BE INSTALLED HORIZONTALLY
AND UPPER HALF OF THE DISC SHOULD BE TURN INTO TANK INSIDE.
SUCTION VALVES SHALL BE MOUNTED ON NOZZLE DIRECTLY
AS LONG AS ACTUATOR DOES NOT COLLIDE WITH TANK CASING.

NOTE A006
DISCHARGE OF DRAIN AND OVERFLOW LINE SHALL HAVE
45 DEG INCLINATION TOWARD FLOW DIRECTION OF TRENCH
FOR SMOOTH FLOW.

NOTE A008
TEMPORARY STRAINER SHALL BE INSTALLED AT THE PUMP SUCTION
FOR THE TERMS OF PRE-COMMISSIONING.

NOTE A009
THERE SHOULD BE CERTAIN DISTANCE BETWEEN NOZZLES FOR
INFLUENT LINE AND PUMP SUCTION NOZZLE AS LONG
AS THERE IS NO INSERT PIPE.

NOTE A011
RO SHALL BE INSTALLED IN VERTICAL LINE.

NOTE A014
THE DRAIN NOZZLE SHALL BE EMBEDDED IN THE TANK BASE.
AND IT SHALL BE DIRECTED TO TRENCH SO THAT SLURRY IN THE TANK
CAN BE DRAINED OUT COMPLETELY.

CONFIDENTIAL & PROPRIETARY INFORMATION

CUSTOMER NOS: R4R3, R4S3 & R4S4

CUSTOMER: PATRATU VIDYUT UTPADAN NIGAM LIMITED
PROJECT: PATRATU STPS EXP PHASE-I (3X800 MW)
FGD SYSTEM PACKAGE

DEPT CODE	NAME (BHEL)	DATE
DRN	R.PRASANTH	30.10.19
M	CHD	R.YUVARAJ
APPD	P.NAVEEN	30.10.19

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

P & ID -FILTRATE WATER TANK

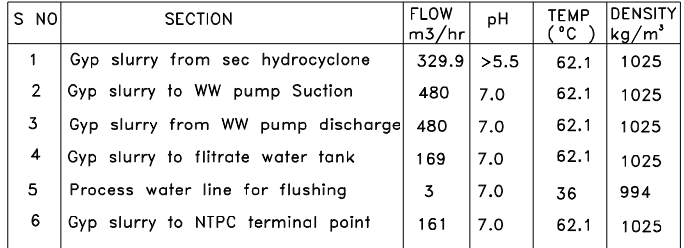
SCALE : NTS

TITLE:

NTPC DRG NO. 9585-001-109-PVM-F-015 SH 01 of 01

BHEL DRG NO	FILE NO	REV NO
3-FW-000-00562	B240 - 00431	01

CAUTION: THE DRAWING IS THE PROPERTY OF BHARAT
HEAVY ELECTRICALS LTD. AND IS NOT TO BE REPRODUCED
OR USED TO FURNISH ANY INFORMATION FOR MAKING OF
DRAWINGS OF APPARATUS EXCEPT WHERE PROVIDED
FOR AGREEMENT WITH SAID COMPANY.



S NO	SECTION	FLOW m ³ /hr	pH	TEMP (°C)	DENSITY kg/m ³
1	Gyp slurry from sec hydrocyclone	329.9	>5.5	62.1	1025
2	Gyp slurry to WW pump Suction	480	7.0	62.1	1025
3	Gyp slurry from WW pump discharge	480	7.0	62.1	1025
4	Gyp slurry to filtrate water tank	169	7.0	62.1	1025
5	Process water line for flushing	3	7.0	36	994
6	Gyp slurry to NTPC terminal point	161	7.0	62.1	1025

ENGINEERING BY GDW
SYSTEM SUPPLIER AS
PER SUB SECTION C1,
CLAUSE 2.1.1.9 (ii) e

NOTE A001
MOTOR PID ARE NOT SHOWN.

NOTE A004
TO PREVENT CONTAMINATION OF SLURRY TANK PUMP SUCTION VALVE DUE TO SOLID SEDIMENTATION, THE SHAFT OF BUTTERFLY VALVE SHOULD BE INSTALLED HORIZONTALLY AND UPPER HALF OF THE DISC SHOULD BE TURN INTO TANK INSIDE. SUCTION VALVES SHOULD BE MOUNTED ON NOZZLE DIRECTLY AS LONG AS ACTUATOR DOES NOT COLLIDE WITH TANK CASING.

NOTE A005
A MANHOLE SIZE OF 800 MM IS PROVIDED TO TAKE CARE OF ACCESS OF MAN TANK. LINING AS PER MHPS EXPERIENCE.

NOTE A006
DISCHARGE OF DRAIN AND OVERTFLOW LINE SHALL HAVE 45 DEG INCLINATION TOWARD FLOW DIRECTION OF TRENCH FOR SMOOTH FLOW.

NOTE A008
TEMPORARY STRAINER SHALL BE INSTALLED AT THE PUMP SUCTION FOR THE TERMS OF PRE-COMMISSIONING.

NOTE A009
THERE SHOULD BE CERTAIN DISTANCE BETWEEN NOZZLES FOR INFLUENT LINE AND PUMP SUCTION NOZZLE AS LONG AS THERE IS NO INSERT PIPE.

NOTE A011
RO SHALL BE INSTALLED IN VERTICAL LINE.

NOTE A014
THE DRAIN NOZZLE SHALL BE EMBEDDED IN THE TANK BASE AND IT SHALL BE DIRECTED TO TRENCH.

NOTE B002
OPEN AND CLOSE CONTACT SWITCHES ARE FOR REFERENCE ONLY.
IN CASE THAT THERE IS CUSTOMER'S SPECIFICATION,
THEY SHOULD BE DECIDED BASED ON IT.

CUSTOMER NOS: R4R3, R4S3 & R4S4

CUSTOMER: PATRATU VIDYUT UTPADAN NIGAM LIMITED
PROJECT: PATRATU STPS EXP PHASE-I (3X800 MW)
FGD SYSTEM PACKAGE

 BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET-632 406.	DEPT	NAME (BHEL)	DATE	
	M	DRN	R.PRASANTH	25.08.2020
		CHD	R.YUVARAJ	25.08.2020
		APPD	P.NAVEN	25.08.2020



MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

P & ID - WASTE WATER SYSTEM

SCALE : NTS

TITLE:			
NTPC DRG NO. 9585-001-109-PVM-F-014		SH 03 of 03	

BHEL DRG NO	FILE NO	REV NO
3-FW-000-00561	B240 - 00451	06

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