

This is part of Technical Specification No. PE-TS-434-571-A001, Rev 01

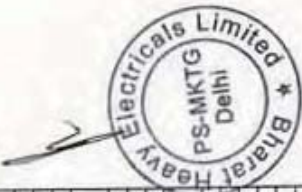
NTPC		PROJECT : Patrai STPS Phase-I (3 X600MW)				LIST OF ITEMS REQUIRING QP APPROVAL & ACCEPTABLE				REVISION NO : QP	
		CONTRACTOR : BHEL Ltd				VENDOR AS APPROVED BY				DATE : 24.04.2017	
No.	Major Equipment	Inspected on	QP No.	QP No.	QP No.	Proposed Sub Supplier	Country	SS Approval Status	SS Detail Sub SCH	SS Approval Sub QR	Remark
		Y				Finlex Cable	Finland	DR *			
						Incab	Finland	DR *			
						Gupta Power Infrastructure Ltd.	India	A			
						Large cables	India	DR			
						Large cable	India	DR			
						RR Kabel	India	DR			
						Shasta	India	DR			
						Uthmaniyah	Uthmaniyah	DR			
						CEC International	Malaysia	DR			
						Advanced cable Technologies	Bangalore	DR			
						Energy Electricals Ltd.	Vijayawada	DR			
						Special Cable	India	DR			
						CMR	Kolkata	DR			
						Coaxial Cables	Kolkata	DR			
						Associated Cables	Mumbai	DR			
						Radiant RSCC Specialty	Hyderabad	DR			
						AFAR Industries	Bangalore	DR			
						Tempters Cable	Udaipur	DR			
						Manfield cables co. Ltd.	Hyderabad	DR			
						Servel India Pvt. Ltd.	Nasirabad	DR			
						TC Communication Pvt. Ltd.	Gwalior	DR			
						Auma	Germany	A			
						Limberg	USA	A			
						Relax	UK	A			
						Limberg	Finland	A			
						Relax	Finland	A			
						Nippon gear	Japan	A			
						Auma	Bangalore	A			
						Harold truck	USA	A			
						Drehmo	Germany	A			
						Antrieb	China	A			
						Limberg	USA	DR			
						Harold truck	USA	DR			
						SIPROS Automat GmbH	Germany	A			
						ABB	Germany	DR			
						Microprotection	Finland	A			
						SEIKO	Austria	A			
						TECHNOMAT	Italy	A			
						Intelligent Limited	Pakistan	A			
						Starline	Pune	A			
						WSE Control	Korea	A			



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NTPC		PROJECT : Patratu STPS Phase-I (3 X100MW)				LIST OF ITEMS REQUIRING QP				REVISION NO : 00	
		PACKAGE : EPC PACKAGE				APPROVAL & ACCEPTABLE				DATE : 24.04.2017	
		CONTRACTOR : BHEL LM				VENDOR AS APPROVED BY					
No.	Major Equipment	CONTRACT NO : GS-993-691-2									
		QP	QP No.	QP	QP	Proposed Sub Supplier	Country	SS Approval Status	SS Detail Sub-SCH	SS Approval Sub-QR	Remark
		Inspert on 9955-001-QV1	Submittal Q	Submittal SCH	Submittal Val						
49	HIGH Temp. cable (PTFE/PEP)	I				MINICO India Flow Elements Pvt. Ltd.	GOA	A			
						SAMEL	Korea	DR			
						MINICO	GOA	DR			
						Engg. Specialties	Kolkata	DR			
						Pyrotelectric	Mumbai	DR			
						Hydro Pneumatics	Mumbai / Goa	DR			
						ASIAN INDUSTRIAL VALVES	Chennai	DR			
						Dynaluid valves Pvt. Ltd.	Belgium	DR			
						Habib cables	Sweden	A			
						Lapp cables	Germany	A			
						Wanzen cables	Germany	A			
						TEW & C	USA	A			
						Thermo-Electra Bv	Netherlands	A			
						Habib cables	China	A			
50	Fiber optic cable					Thermocables	Hyderabad	A			
						Tempents	Udaipur	A			
						Delton Cables	Fairfield	DR			
						RJ Cables	Roosket	DR			
						HFCL	Goa	A			
						REMI	Switzerland	A			
						Aksh Fibre	Bhuvard	A			
						Fenilos	Pune/Goa	A			
						Birda Ericson	Rawal	A			
						Molax	UK	A			
						Coming	USA	A			
						Schneider	GOA	A			
						RPG Cables	India	DR			
						Uniflex Cables	India	DR			
51	Pneumatic Actuator (Power Driver & 9 FOR SADC)					Terracon	India	DR			
						Dong Wico Valve Control Co. LTD	Korea	A			
						Shen Hwa Engineering Co. LTD	Palghat	A			
						Instrumentation Limited	Cochin(Malapp)	A			
						Kolon	Holba	A			
						SMD Pneumatics	Mumbai	A			
						Rotax	Chennai	DR			
						Emerson Process Management	Alwayr	DR			
						MIL Controls	Bangalore	DR			
						Festo	Holba	DR			
						IMI Norman	Aurangabad	A			
						ENDRESS & HOUSER	BELOUM	A			
						MAGNETROL	PUNE	A			
						SBEA	PUNE	A			
52	Level switch capacitance type					PUNE TECHTROL	PUNE	A			



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NTPC		PROJECT : Patrauli STPS Phase-I (3 X800MW) PACKAGE : EPC PACKAGE CONTRACTOR :BHEL Ltd				LIST OF ITEMS REQUIRING QP APPROVAL & ACCEPTABLE VENDOR AS APPROVED BY				REVISION NO : 00 DATE : 26.04.2017			
No.	Major Equipment	Qp Inspecti on	Qp No.	Qp SSS- 001-QV1 Q	Qp SSS- 001-QV1 SCH	Qp Appro val SCH	Proposed Sub Supplier	Country	SS Approval Status	SS Detail Sub-SCH	SS Approval SCH	Sub QR	Remark
53	Transducer	II					LEVCON	KOLKATA	A				
		II					Nivo Controls	Indore	A				
		*					V AUTOMAT	Hind Delhi	DR				
		*					D K Instrument	Kolkata	DR				
		*					Siemens	Germany	DR				
		*					ABB	Korea	DR				
		*					Rosemount	Korea	DR				
		II					AE	Mumbai	A				
		II					Southern Transducer	Chemical	A				
		II					Eisler	Mumbai	A				
54	Mini UPS up to 3.5 KVA	II					Camille Bauer	Germany	A				
		II					Metzger	Germany	A				
		II					Rustad	Haack	A				
		*					Pyrotech	Udaipur	DR				
		*					Marbus	Gandhinagar	DR				
		*					SIEMENS	Germany	DR				
		II					EMERSON	Mumbai	A				
		II					EMERSON	Pune	A				
		II					Hiachi Hi-Rel	Gandhinagar	A				
		II					APC	Bangalore	A				
55	Level switch- cond typ	II					APLAJ	Mumbai	A				
		II					Della	Gurgaon	A				
		*					Powertronix	Bangalore	DR				
		*					OLUBAS ENG G PVT LTD.		DR				
		*					BANGALORE		DR				
		*					Grid power conversion Pvt Ltd.	Bangalore	DR				
		II					Schneider	UK	DR				
		II					EMERSON (Isolation motrey)	Kolkata	A				
		II					Hi Tech	USA	A				
		II					Varady	UK	A				
56	Level switch- Fresh/Displacer Type	II					LEVEL STATE	UK	A				
		II					Raman Instruments	Delhi	A				
		*					BIHEL	Trichy	DR				
		*					IGEMA	Germany	DR				
		II					ENDRESS & HOUSER	AURANGABAD	A				
		II					MAGNETROL	BELGIUM	A				
		II					LEVCON	KOLKATA	A				
		II					SIEM	PUNE	A				
		II					Chambers samal	Madurai	A				
		II					NAKATYA	JAPANI	A				

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PROJECT : Patratu STPS Phase-I (3 X600MW)		LIST OF ITEMS REQUIRING QP APPROVAL & ACCEPTABLE				REVISION NO : 00						
PACKAGE : EPC PACKAGE		APPROVAL & ACCEPTABLE				DATE : 28.04.2017						
CONTRACTOR : BHEL Ltd		VENDOR AS APPROVED BY										
CONTRACT NO : CS-8382-001-2												
Sl. No.	Major Equipment	QP Inspect on Category	QP No. 9245-901-QV	QP Submittal SCH	QP Approval SCH	Proposed Sub Supplier	Country	55 Approval Status	55 Detail Sub SCH	55 Approval SCH	Sub QR	Remark
57	Air filter regulator	III				Gauguin Bourdon (GIC)	Parvel	A				
		III				Asian Scientific Process	Navi Mumbai	DR				
		III				Falchid	USA	A				
		III				Sharo Hergen	Mumbai	A				
		III				SMC Pneumatics	HIOUA	A				
		III				Emerson (Asep)	Chennai	A				
		III				Festo	Bangalore	A				
		III				Flacka	Chennai	A				
		III				Dyna Control Elements	Gulbarga	DR				
58	Copper tubing/Brass connectors	III				Main Contractor approved Sources		A				
59	Coupling / Interlocking relays	III				PARAMOUNT	BANGALORE	A				
		III				OMRON		A				
		III				OEN		A				
		III				Leoli	Baroda	A				
		III				ELSTA	SWITZERLAND	A				
		III				Schneider	Germany	DR				
		III				Siemens	Germany	DR				
		III				Phoenix	Germany	DR				
		III				Finder		DR				
		III				Relex	Noida	A				
		III				Avcon	Mumbai	A				
		III				Herton	Germany	A				
		III				IMI NORGREN	GERMANY	A				
		III				Julifram	Argentina	A				
		III				Azop	Chennai/USA	A				
		III				Festo	Bangalore	A				
		III				SMC	Noida	A				
		III				Parker	Brand Name	A				
		III				Schneider	Germany	DR				
		III				Nuccon Industries Pvt. Ltd.		DR				
61	Lube oil control valve - Self Regulating	III				NUOVO PIGNONE	ITALY	A				
		III				EMERSON	CHEMUN	A				
		III				SAUMSON	GERMANY / PUNE	A				
62	Guided waveRadar type level transmitter	III				Forbes Marshall asep Pvt. Ltd.	Pune	A				
		III				Magnetrol	Belgium	A				
		III				Endress & Hauser	Germany	A				
		III				Emerson Process Management	Aurangabad	A				
		III				ABB(R-Tech)	Sweden / PAVANE	A				
		III				Supreme Technology	USA	A				
		III				Yokogawa	Thane	A				
		III				ABB	India	DR				
		III				P & F	Bangalore	DR				



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PROJECT : Pauran STPS Phase-I (3 X 800MW)												
PACKAGE : EPC PACKAGE												
CONTRACTOR : BHEL Ltd.												
CONTRACT NO : CS-5584-01-3												
No.	Major Equipment	QIP Inspection Category	QIP No. SSS- 001-QW	QIP Submittal SCH	QIP Approval SCH	Proposed Sub Supplier	Country	SS Approval Status	SS Detail Sub-SCH	SS Approval SCH	Sub QR	Remark
-	-	I	-	-	-	Honeywell	France	DR				
-	-	-	-	-	-	HONEYWELL	Pune	DR				
-	-	-	-	-	-	Vega	Germany / India	DR				
-	-	-	-	-	-	Siemens	India	DR				
-	-	-	-	-	-	SHEM	Pune	DR				
63	Maintenance and Calibration (Calibration)	III				BUDERBERG	UK	A				
64	Temperature Gauge	III				DRESSUR (ASHCROFT) Wix	USA/Germany GERMANY	A				
		III					Pune	A				
		III				KUSE Control	Korea	A				
		III				Nagano KENKI	Japan	A				
		III				H Guni Spun India	Bangalore	A				
		III				A.N. Instruments	Kolkata	A				
		III				NUOVA FIMA	ITALY	A				
		III				Goa Thermotonic	Goa	A				
		III				Goa Instrument Industries	Goa	A				
		III				Baumert	Vijay	A				
		III				Precision mass products Pvt. Ltd.	Gandhinagar	A				
		III				H Guni	Rishra Muratapur	A				
		III				Baumert	Vapi	A				
		III				Forbes Marshall	Hyderabad	A				
		III				Gauges Bourdon (GIC)	Panaji	A				
		-				Konica	Korea	DR				
		-				Pyrotecnic	GOA	DR				
		-				Winners Gauge	USA	DR				
		-				Walchandnagar Industries Ltd.	Dharwad	DR				
		-				Naasrach	Vapi	A				
		-				US Gauge	USA	DR				
65	Furniture for computer (Chair, Armchair, Lock etc.)	III				Main contractor approved sources		A				M/s BHEL will forward only two proposals after details review of NTPC Technical specification requirements.
66	Terminal Block (Cable and Clamp type)	III				Weidmuller	Germany	A				
		III				Phoenix	Germany / India	A				
		III				Wago	Germany / India	A				
		III				Eltner	Vadodra	A				CE Mark only
67	FRP Junction Box for C&I system	III				BHEL Approved Sources		A				
68	PLC System (If applicable)	I				GE Intelligent platforms	Bangalore	A				
		I				ABB	Bangalore	A				
		I				Schneider	Mumbai	A				
		I				Rockwell	Sanitized	A				
		I				Siemens	Nashik	A				
		I				HONEYWELL	Pune	A				
69	SMART POSITIONER (Make)	-				ABB		A				

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NTPC		PROJECT : Paluratu STPS Phase-I (3 X800MW) PACKAGE : EPC PACKAGE CONTRACTOR : BHEL Ltd CONTRACT NO : CS-5543-001-3				LIST OF ITEMS REQUIRING OP APPROVAL & ACCEPTABLE VENDOR AS APPROVED BY				REVISION NO : 00 DATE : 28.04.2017	
No.	Major Equipment	Qp Inspect on	Qp No. 9545- 001-QV	Qp Subm ision	Qp Appr val	Country	SS Approval Status	SS Detail Sub SCH	SS Approval SCH	Sub OR	Remark
		Y				Proposed Sub Supplier					
						Mitsubishi					
						Siemens					
						Star					
						Yokogawa					
						EMERSON (Fisher Rosemount)					
						METSO					
						Yamatake					
						Moore					
						IEPL					
						TRAC					
						PLACKA					
						EURIKA					
						SCIENTIFIC DEVICES					
						FLOW STAR					
						TOKYO KEISO					
						Flowtech Instrument Services					
						Vadodara					
						MUMBAI					
						Samir Chemical					
						Gaucha Roundin					
						Panel					
						Thana					
						YOKOGAWA INDIA					
						CHIND CORPORATION					
						UK					
						EUROTHERM					
						INDIA					
						YOKOGAWA					
						ABB					
						UK/GERMANY					
						JAPAN					
						USA /					
						NETHERLAND					
						USA					
						GE BENTLY NEVEDA					
						SHIKAWA					
						P & F					
						Mean controller approved sources					
						HACH					
						YOKOGAWA					
						ABB					
						EMERSON					
						Thermita onlin					
						Forbes Marshall					
						Main Contractor will propose the vendors during detail Engineering.					
						GE Sinking					
						Michael Instrument					
						Shaw					



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PROJECT : Patrauli STPS Phase-I (3 X800MW)										LIST OF ITEMS REQUIRING QP			
PACKAGE : EPC PACKAGE										APPROVAL & ACCEPTABLE			
CONTRACTOR :BHEL Ltd										VENDOR AS APPROVED BY			
CONTRACT NO : CS 0885-001-2													
No.	Major Equipment	QP Inspection Category	QP No.	QP ES&S- Q	QP Submittal Q	QP Approval SCH	Proposed Sub Supplier	Country	SS Approval Status	SS Detail Sub SCH	SS Approval Sub QR	Remark	
		III					COSA XENTAUR	USA	A			through Spectrum automation interface	
		-					VATIGALA	Sweden / Japan	DR				
		-					OWEN	USA	DR				
		-					Ende	Mumbai	DR				
		-					Nivo Controls	India	DR				
		-					Bates GMBH	Germany	DR				
		III					Rajal	Bangalore	A				
77	Blank Panels / Cabinets	III					Hindman	BANGALORE	A				
		III					Pyrotech	Udaipur	A				
		III					BHEL	Bangalore	A				
		III					Schneider	Bangalore	DR				
		-					Sony	Japan	DR				
		-					Siemens	Pondicherry	DR				
78	CCTV Components (EP)	-					Dv Tel	USA	DR				
	Integrators will be decided during detail Engineering.	-					Henry Weil	Gurgaon	DR				
		II					Bosch	Bangalore	A			With Bosch Software	
		II					Auris	Sweden	A			With Bosch Software	
		-					Palco	USA	DR				
		II					Auris	Sweden	A			With Milestone Software	
79	Control Desk, Server / PC Rack for Unit Control room and Auxiliary control room.	I					Pyrotech works Space	Udaipur	A				
		I					Cosmas	Huda	A				
		-					Adash Control	Bangalore	A				
		-					Chem Control	Pondicherry	DR				
		-					Harmony Systems	New Delhi	DR				
80	Digital Indicators	III					Mathias	Gurgaon Nagar	A			For Non mosaic mounting	
		III					ABE	Germany	A				
		III					Felborg	UK	A				
		III					Yokogawa	Japan	A				
		III					Gossen / Melinwall / Camille Bauer	Germany	A				
		III					Sandera	Germany	A				
		III					China	Japan	A				
		III					Weiss Messgeräte	Germany	A				
		III					Pyrotech	Udaipur	A				
		-					Chuo Corporation	Mumbai	DR				
		-					Yokogawa	Bangalore	DR				
		-					Leitzlok	Pune	DR				
		-					Telchem	Chennai	DR				
		III					Land Instrument International	UK	A				
81	Dust Emission Monitor	III					Durg	Germany	A				
		III					Sick Mahak	Germany	A				
		III					Emerson Process Management	Ireland	A				
		III					Codal	UK	A				



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NTPC		PROJECT : Patrauli STPS Phase-I (3380MW)				LIST OF ITEMS REQUIRING QP				REVISION NO : 03		
		PACKAGE : EPC PACKAGE				APPROVAL & ACCEPTABLE				DATE : 24.03.17		
		CONTRACTOR : BHEL Ltd				VENDOR AS APPROVED BY						
		CONTRACT NO : GS-1511-051-2										
No.	Major Equipment	QP Inspect on Category	QP No. 9545-001-QV1	QP Submis sion SCH	QP Appro val SCH	Proposed Sub Supplier	Country	SS Approval Status	SS Detail Sub.SCH	SS Approval SCH	Sub QR	Remark
82	Electrical Indicating Instruments (Mosaic Compatible)	III				Forbes Marshall	Pune	A				Main kit from M/s Codel, UK
		III				Siemens	Germany	A				
		III				Gespen / Mettler / Camille Bauer	Germany	A				
		III				Gatz	Germany	A				
83	Flue Gas Analyser (CO)	III				Volpert Messtechnik	Germany	A				
		III				Codel	UK	A				
		III				Emerson Process Management	Pavane	A				Analysier from M/s Emerson, Germany / USA
		III				Land Instrument International	UK	A				Land Collaboration Div
		III				Sick Mahlak	Germany	A				
		III				Siemens	Germany	A				
84	Flue Gas Analyser (CO2)	*				Codel	UK	DR				
		*				Sick Mahlak	Germany	DR				
		*				Kiwaka Pricol Ltd.	Germany	DR				
85	Flue Gas Analyser (SO2 and NOx)	III				Sick Mahlak	Germany	A				Analysier from M/s Emerson, Germany / USA
		III				Emerson Process Management	Pavane	A				
		III				Siemens	Germany	A				
		III				Fuji Electric	Japan	A				
		*				Yokogawa	UK	DR				
		*				Codel	UK	DR				
		*				ABB	Gloucestershire	DR				
86	Flue Gas Analyser (O2 Analyser (H1))	II				SECO	Chennai	A				Main Contractor Can propose additional vendor for this item
		III				Marathon Monitor	USA	A				
87	Flue Gas Analyser (O2 Analyser (H1))	III				Emerson (Rosemount)	Pavane	A				Make EMERSON, USA
		III				Forbes Marshall	Pune	A				Make Endreac, Germany : Model Deltec 5000 series
		III				ICE	Mumbai	A				Make Analist, USA
		III				Yokogawa	Bangalore	A				Make Yokogawa, Japan
		III				ABB	Bangalore	A				Make ABB, UK
		*				AMETEK (P and A) division	Singapore	DR				
		*				Endreac	Germany	DR				
		*				Fuji Electric	Japan	DR				
		*				Teledyne	USA	DR				
		I				Chemtrol	Goa	A				
		I				Emerson Process Management	New Mumbai	A				
		I				Pyrotech	Udaipur	A				
		I				Analytical Instrument Company	Kota	A				Analysier from M/s Fuji, Japan
		I				Yokogawa	Bangalore	DR				
		I				Adage	Mumbai	A				
		*				Marvel Enrgy Company	Chennai	DR				



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SUB VENDOR LIST (PERMANENT CATEGORY) AS ON 12/19/2019 2:58:38 PM

Sl No	Package Name	Supplier Name	Supplier Communication Address	Supplier Works Address
1	Cold Junction Compensation Box (CJCB)	CREATIVE INSTRUMENTS & CONTROLS	NO-17/1, 1ST FLOOR, 11TH CROSS 1ST K BLOCK, RAJAJINAGAR, BANGALORE-560010 Phone- Pincode : Email : crinstruments@gmail.com	
2	CONTROL VALVE	Valvitalia S.P.A. ,	Mr. Salvatore Ruggeri Via Tortona 69, Rivanazzano (Pavia) Phone- +39-03839459875 Pincode : 27055 Email : dario.torluccio@valvitalia.com	Works-1->Mr. Salvatore Ruggeri Via Tortona 69,Rivanazzano (Pavia) - Italy Phone- +39-03839459875 FAX : Pincode : 27055 Email : dario.torluccio@valvitalia.com; diego.poletti@valvitalia.com; sales@bhgassociates.com
		R.K.CONTROL INSTRUMENTS PVT. LTD.	PLOT NO.A-250, OPP.POLICE STATION, WAGLE INDUSTRIAL ESTATE, THANE Phone- 25820943/2331 Pincode : 400604 Email : rkcipl@vsnl.com ; rkcinpt@bol.net.in	Works-1->SAVITH KUMAR PLOT NO. A-250, OPP.POLICE STATION,WAGLE INDUSTRIAL ESTATE, THANE -THANE- MAHARASHTRA INDIA Phone- 022-66060942 FAX : 022-25820801 Pincode : 400 604 Email : rkadmin@rkcipl.co.in
		Mascot Valves Pvt. Ltd.	166-167 GIDC Naroda Ahmedabad Phone- 0792282 1619 Pincode : 382330 Email : dom.sales@mascotvalves.com	Works-1->Varun Patel Dir 166-167 ,GIDC Naroda -Ahmedabad- GUJARAT India Phone- 0792282 1619 / 3369 FAX : Pincode : 382330 Email : dom.sales@mascotvalves.com
		EMERSON PROCESS MANAGEMENT CHENNAI LIMITED	147, KARAPAKKAM VILLAGE, CHENNAI Phone- 23722184, 23716242 Pincode : 600096 Email : jatinder.singh@emerson.com	Works-1->Mr. Rangarajan (Head - Lean and Manufact 147,Karapakkam Village, -Chennai-TAMIL NADU India Phone- 0444903 4395 FAX : Pincode : 600097 Email : Rangarajan.M@emerson.com
		Severn Glocon India Pvt. Ltd.	F96 & F97, Sipcot Industrial Park, Irungattukottai, Chennai, Phone- 044-47104200, Pincode : 602117, Email : info@severnglocon.co.in,	Works-1->Mr. K.Kaushik, F96 & F97, Sipcot Industrial Park,Irungattukottai, -Chennai-TAMIL NADU India Phone- 044-47104200, FAX : 044-47100073, Pincode : 602117, Email : info@severnglocon.co.in
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		Koso India Private Limited,	H 33 & 34, MIDC, Ambad, Nashik, Phone- 09650233433 Pincode : 422010, Email : jetmal.gour@koso.co.in	Works-1->P.J.ASHOK KUMAR/SEEMA ANAND Control Valve Division, H-33&34, MIDC, Ambad, -Nashik-MAHARASHTRA India Phone- 91 944 744 3198 FAX : 0491 - 5269914 Pincode : 422010 Email : pja@koso.co.in;enquiry@koso.co.in Works-2->+P.J.ASHOK KUMAR/SEEMA ANAND J-1,MIDC,Ambad -Nashik-MAHARASHTRA India Phone- 91 944 744 3198 FAX : 0491 - 5269914 Pincode : 422010 Email : pja@koso.co.in;enquiry@koso.co.in
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		AJMERIA INDUSTRIAL & ENGINEERING WORKS	JIGNESH MAHENDRA AJMERIA DENA BANK BLDG.,SHREE NAGESH INDL. ESTATE,STATION ROAD, MUMBAI Phone- 022 67973578 Pincode : 400 088 Email : ajmeria@ajmeria.net, imajmeria@vahoo.com	Works-1->JIGNESH MAHENDRA AJMERIA DENA BANK BLDG., SHREE NAGESH INDL. ESTATE,STATION ROAD, -MUMBAI-MAHARASHTRA INDIA Phone- 022 67973578 FAX : Pincode : 400 088 Email : ajmeria@ajmeria.net
		TOSHNIWAL BROTHERS PVT.LTD.	WORKS:TOSHNIWAL IND.PVT.LTD, INDUSTRIAL ESTATE MAKHUPURA, AJMER Phone- 441171 Pincode : 305002 Email : toshniwalprocess@gmail.com	
11	PRESSURE GAUGE/ DIFF.PRESSURE GAUGE	BLISS ANAND PVT. LTD.	Mr. Vikas Anand/ Mr.RGRajan 92B & 93 B , IMT MANESAR Gurgaon Phone- 0124-4366000 TO 9 Pincode : 122001 Email : sales@blissanand.com	Works-1->Mr. Bharat Kumar/ Mr. Sasi Kumar Plot No. 92B & 93B,Sec-V, IMTManesar -GURGAON-HARYANA INDIA Phone- 0124-4366000 TO 9 FAX : 0124-2290884 Pincode : 122002 Email : bharat@blissanand.com
		SIGMA INSTRUMENTS CO.	Gopal Kannan/R Gopinath 201, ANANDRAJ INDUSTRIAL ESTATE, OFF.LBS MARG, SONAPUR LANE, BHANDUP (W) MUMBAI Phone- +919821038162 Pincode : 400078 Email : sales@siomainstruments.co.in	Works-1->R Gopinath 27 Nahur Udyog Industrial Premises,M.M.Malviya Road, Mulund(-MUMBAI-MAHARASHTRA INDIA Phone- +912225918567 FAX : +912225918566 Pincode : 400080 Email : sales@siomainstruments.co.in
		BOSE PANDA INSTRUMENTS PVT.LTD.	Mr. Partha Bose 44, Saheed Hemanta Kumar Bose, Sarani, Kolkata Phone- +91 33 2548 7220 Pincode : 700074 Email : parthabosebpi@gmail.com; bosepanda@vsnl.net	Works-1->Mr. Partha Bose 44, Saheed Hemanta Kumar Bose,Sarani, -Kolkata-WEST BENGAL India Phone- +91 33 2548 7220 FAX : +91 33 2548 0429, Pincode : 700074 Email : parthabosebpi@gmail.com bosenanda@vsnl.net
		A.N. INSTRUMENTS PVT. LTD.	MARKETING DIVISION, 5th FLOOR, 59-B, CHOWRINGHEE ROAD, KOLKATA Phone- 24757784,22472509 Pincode : 700020 Email : anidel@bol.net.in	Works-1->Mr. Gautam Mukherjee Kusumba,Sonarpur Station Road,P.O. -Narendrapur, -Kolkata-WEST BENGAL INDIA Phone- 9836878855 FAX : 033-24342748 Pincode : 700103 Email : okm_ani@hotmail.com
12	PRESSURE GAUGE/ DIFF.PRESSURE GAUGE	H.GURU INDUSTRIES	Mr. G. D. Hazra/Mr. P. K. Mitra 10 B, HO-CHI-MINH SARANI, KOLKATA Phone- 033 2282 2463 / 1637 Pincode : 700071 Email : mguru@vsnl.net	Works-1->NA NA -- Phone- FAX : Pincode : Email :
		FORBES MARSHALL (HYD) LTD.	MR SAILESH PATALAY/MR. M K SRINIVASAN PLOT NO.A-19/2, & T-4/2, IDA, NACHARAM, HYDERABAD Phone- 9849913704 Pincode : 500 076 Email : mksrinivasan@forbesmarshall.com	Works-1->MR G.SRINIVASAN/MR ANUJ MALPANI PLOT NO:A-19/2 & T-4/2,I.DA. NACHARAM , -HYDERABAD-TELANGANA INDIA Phone- 09866550762 FAX : 040 27152193 Pincode : 560076 Email : ashrinivasan@forbesmarshall.com
		PRECISION MASS PRODUCTS PVT. LTD.	Mr. Nishit Patel/Mr. Anuj Verma Plot No.2306, Phase II, GIDC Chhatral Kalol Phone- 9999464663 Pincode : 382729 Email : sales@precisionmass.com	Works-1->Mr. Hitesh Parmar/Mr. Hitesh Parmar Plot No.2306, Phase II, GIDC Chhatral, -Kalol-GUJARAT INDIA Phone- 9327359227 FAX : 02764-233440 Pincode : 382729 Email : hitesh.parmar@ashcroftindia.com

		Baumer Technologies India Pvt. Ltd.	Mr. Shyam Warilani/Mr. V Suresh Babu 36, DAMJI SHAMJI INDUSTRIAL COMPLEX, OFF.-MAHAKALI CAVES ROAD, ANDHERI(E) MUMBAI Phone- +91 99589 25151 Pincode : 400093 Email : sales.in@baumer.com	Works-1->Mr. Shyam Warilani/Mr. V Suresh Babu Plot No 34 A GIDC A Phase 1, -VAPI-GUJARAT INDIA Phone- +91 11 4161 7111 FAX : 022 2687 3613 Pincode : 396 195 Email : pbajaj@baumer.com
		H.GURU INSTRUMENTS (SOUTH INDIA) P. LTD	32,INDUSTRIAL SUBURB YESWANTHAPUR BANGALORE Phone- 080-23370300, Pincode : 560022 Email : info@hgurusouth.com	Works-1->Shikha Hazra/ Shyamal Hazra 32, Industrial Suburb,Yeshwanthpur -BANGALORE-KARNATAKA INDIA Phone- 080-23370300 FAX : 080-23379890 Pincode : 560022 Email : shikhabazra@hgurusouth.com
		GAUGE BOURDON INDIA PVT. LTD.	194/195, Gopi Tank Road, Off Pandurang Naik Marg, Mahim Mumbai, Phone- 011-41607463, Pincode : 400016, Email : gjcdelhi@general-gauges.com,	Works-1->Gauge Bourdon India Pvt. Ltd., Plot No-4, 5, 6,Jawahar Co-operative Industrial Estate, -Kalamboli Taluka Panvel-MAHARASHTRA India Phone- 022-27421095, FAX : 022-27421901, Pincode : 410209, Email : info@general-gauges.com
		Nesstech Instruments Private Limited	26/2, G Type, Global Industrial Park Near Nahuli Railway Crossing, Valvada Vapi Phone- 9920576002 Pincode : 396105 Email : sales@nesstech.co.in	Works-1-> Others 26/2, G Type, Global Ind. Park Near Nahuli Railway Crossing, -Vapi-GUJARAT INDIA Phone- 9920576002 FAX : Pincode : 396105 Email : sales@nesstech.co.in, bkpadia@nesstech.co.in
		SCIENTIFIC DEVICES (BOMBAY) PVT LTD,	Office no. 53, Shree Manoshi Complex, Plot No. 5 & 6, Sec-3, Ghansoli (East), Navi Mumbai, Phone- 9892230623, Pincode : 400 701, Email : sdbpl@vsnl.com	Works-1->Scientific Center, Others By-Pass Junction,Near Kalsekar College kausa, mumbra,Thane -Mumbai-MAHARASHTRA INDIA Phone- 022-25491409,9892230623 FAX : Pincode : 400612 Email : sdbpl@vsnl.com
12	TEMP. ELEMENT	DETRIVE INSTRUMENTATION & ELECTRONICS LTD.	320, TV INDUSTRIAL ESTATE, OFF.DR.A.BESANT ROAD, BEHIND GLAXO, WORLI, MUMBAI Phone- 24934125,24938403 Pincode : 400025 Email : trivtech@vsnl.com	Works-1->Mr. A.D.Solomon J-14, MIDC, TARAPORE, BOISER STN., -THANE-MAHARASHTRA India Phone- FAX : Pincode : Email : trivtech@vsnl.com
		Nesstech Instruments Private Limited	26/2, G Type, Global Industrial Park Near Nahuli Railway Crossing, Valvada Vapi Phone- 9920576002 Pincode : 396105 Email : sales@nesstech.co.in	Works-1-> Others 26/2, G Type, Global Ind. Park Near Nahuli Railway Crossing, -Vapi-GUJARAT INDIA Phone- 9920576002 FAX : Pincode : 396105 Email : sales@nesstech.co.in, bkpadia@nesstech.co.in
		Thermal Instrument India Pvt. Ltd.	Mr. Raghavendra M. Kulkarni 194/195, Gopi Tank Road Behind Citylight Cinema,Mahim Mumbai Phone- 09322664709 Pincode : 400016 Email : ramk@giconindia.com	Works-1->Mr. Raghavendra M. Kulkarni Survey No. 250A/B, Post-Mangaon,Tal.- Kudal, Dist.- Sindhudurg, --MAHARASHTRA India Phone- 09322664709 FAX : 022-24455026 Pincode : 416519 Email : ramk@giconindia.com
		Tempsens Instrument (I) Pvt Ltd	MR. V.P.RATHI/MR. HEMANT RATHI B-188A ROAD NO.5 , M.I.A UDAIPUR Phone- 09352420069 Pincode : 313003 Email : info@tempsens.com	Works-1->Mr. S.D Deval B-188A ROAD NO.5 ,M.I.A -UDAIPUR- RAJASTHAN INDIA Phone- 9352501530 FAX : 0294-3057750 Pincode : 313003 Email : deval@tempsens.com
		Baumer Technologies India Pvt. Ltd.	Mr. Shyam Warilani/Mr. V Suresh Babu 36, DAMJI SHAMJI INDUSTRIAL COMPLEX, OFF.-MAHAKALI CAVES ROAD, ANDHERI(E) MUMBAI Phone- +91 99589 25151 Pincode : 400093 Email : sales.in@baumer.com	Works-1->Mr. Shyam Warilani/Mr. V Suresh Babu Plot No 34 A GIDC A Phase 1, -VAPI-GUJARAT INDIA Phone- +91 11 4161 7111 FAX : 022 2687 3613 Pincode : 396 195 Email : pbajaj@baumer.com
		GOA INSTRUMENTS INDUSTRIES PVT.LTD.,	D2/5, Mapusa Industrial Estate, Mapusa, Goa, Phone- 09326054551, Pincode : 403507, Email : sumukh@ggoainstruments.com.	Works-1->Mr. S.G. Dixit D2/5, Mapusa Industrial Estate, -Mapusa-GOA INDIA Phone- 09326054551 FAX : 0832-2262331 Pincode : 403 507 Email : sumukh@ggoainstruments.com
		PYRO ELECTRIC INSTRUMENTS GOA PVT.LTD.	M. D. BICHU/R. M. BICHU G.B. HILL CROWN APARTMENTS, COLLEGE ROAD, MAPUSA Phone- 9326114601 Pincode : 403507 Email : priyanka.marketing@pyro-electric.in	Works-1->A A KULKARNI/ VINOD C G PLOT NO. 71,BICHOLIM INDUSTRIAL ESTATE -BICHOLIM-GOA INDIA Phone- 9326114409 FAX : 91 832 2363381 Pincode : 403529 Email : pyroworks@pyro-electric.in
		GAUGE BOURDON INDIA PVT. LTD.	194/195, Gopi Tank Road, Off Pandurang Naik Marg, Mahim Mumbai, Phone- 011-41607463, Pincode : 400016, Email : gjcdelhi@general-gauges.com,	Works-1->Gauge Bourdon India Pvt. Ltd., Plot No-4, 5, 6,Jawahar Co-operative Industrial Estate, -Kalamboli Taluka Panvel-MAHARASHTRA India Phone- 022-27421095, FAX : 022-27421901, Pincode : 410209, Email : info@general-gauges.com
		TOSHNIWAL INDUSTRIES PVT. LTD.,	Industrial Estate, Makhupura, Ajmer, Phone- 9352009000, Pincode : 305002, Email : info@tipl.com,	Works-1-> Khasra No.: 218-230& 235, Industrial Estate,Makhupura, -Ajmer-RAJASTHAN India Phone- 9887865856, FAX : 0145-2695174, Pincode : 305002, Email : rajeev.gupta@tipl.com
		SCIENTIFIC DEVICES (BOMBAY) PVT LTD,	Office no. 53, Shree Manoshi Complex, Plot No. 5 & 6, Sec-3, Ghansoli (East), Navi Mumbai, Phone- 9892230623, Pincode : 400 701, Email : sdbpl@vsnl.com	Works-1->Scientific Center, Others By-Pass Junction,Near Kalsekar College kausa, mumbra,Thane -Mumbai-MAHARASHTRA INDIA Phone- 022-25491409,9892230623 FAX : Pincode : 400612 Email : sdbpl@vsnl.com
13	TEMPERATURE GAUGE	H.GURU INSTRUMENTS (SOUTH INDIA) P. LTD	32,INDUSTRIAL SUBURB YESWANTHAPUR BANGALORE Phone- 080-23370300, Pincode : 560022 Email : info@hgurusouth.com	Works-1->Shikha Hazra/ Shyamal Hazra 32, Industrial Suburb,Yeshwanthpur -BANGALORE-KARNATAKA INDIA Phone- 080-23370300 FAX : 080-23379890 Pincode : 560022 Email : shikhabazra@hgurusouth.com
		GAUGE BOURDON INDIA PVT. LTD.	194/195, Gopi Tank Road, Off Pandurang Naik Marg, Mahim Mumbai, Phone- 011-41607463, Pincode : 400016, Email : gjcdelhi@general-gauges.com,	Works-1->Gauge Bourdon India Pvt. Ltd., Plot No-4, 5, 6,Jawahar Co-operative Industrial Estate, -Kalamboli Taluka Panvel-MAHARASHTRA India Phone- 022-27421095, FAX : 022-27421901, Pincode : 410209, Email : info@general-gauges.com
		H.GURU INDUSTRIES	Mr. G. D. Hazra/Mr. P. K. Mitra 10 B, HO-CHI-MINH SARANI, KOLKATA Phone- 033 2282 2463 / 1637 Pincode : 700071 Email : mguru@vsnl.net	Works-1->NA NA -- Phone- FAX : Pincode : Email :
		GOA THERMOSTATIC INSTRUMENTS PVT.LTD.	FLAT -B , GF, HILL CROWN APTS., COLLEGE ROAD, MAPUSA Phone- Pincode : 403525 Email : gttilworks@pyro-electric.in	Works-1->Mrs Saanvi Naik BICHOLIM, -BICHOLIM-GOA INDIA Phone- 959855152 FAX : Pincode : 403 529 Email : saanvi.naik@thermostatic.in
		A.N. INSTRUMENTS PVT. LTD.	MARKETING DIVISION, 5th FLOOR, 59-B, CHOWRINGHEE ROAD, KOLKATA Phone- 24757784,22472509 Pincode : 700020 Email : anidel@bol.net.in	Works-1->Mr. Gautam Mukherjee Kusumba,Sonarpur Station Road,P.O. -Narendrapur, -Kolkata-WEST BENGAL INDIA Phone- 9836878855 FAX : 033-24342748 Pincode : 700103 Email : qkm_ani@hotmail.com
		FORBES MARSHALL (HYD) LTD.	MR SAILESH PATALAY/MR. M K SRINIVASAN PLOT NO.A-19/2, & T-4/2, IDA, NACHARAM, HYDERABAD Phone- 9849913704 Pincode : 500 076 Email : mksrinivasan@forbesmarshall.com	Works-1->MR G.SRINIVASAN/MR ANUJ MALPANI PLOT NO:A-19/2 & T-4/2,I.D.A. NACHARAM , -HYDERABAD-TELANGANA INDIA Phone- 09866550762 FAX : 040 27152193 Pincode : 560076 Email : oshrinivasan@forbesmarshall.com
		GOA INSTRUMENTS INDUSTRIES PVT.LTD.,	D2/5, Mapusa Industrial Estate, Mapusa, Goa, Phone- 09326054551, Pincode : 403507, Email : sumukh@ggoainstruments.com.	Works-1->Mr. S.G. Dixit D2/5, Mapusa Industrial Estate, -Mapusa-GOA INDIA Phone- 09326054551 FAX : 0832-2262331 Pincode : 403 507 Email : sumukh@ggoainstruments.com
		PRECISION MASS PRODUCTS PVT. LTD.	Mr. Nishit Patel/Mr. Anuj Verma Plot No.2306, Phase II, GIDC Chhatral Kalol Phone- 9999464663 Pincode : 382729 Email : sales@precisionmass.com	Works-1->Mr. Hitesh Parmar/Mr. Hitesh Parmar Plot No.2306, Phase II, GIDC Chhatral, -Kalol-GUJARAT INDIA Phone- 9327359227 FAX : 02764-233440 Pincode : 382729 Email : hitesh.parmar@ashcroftindia.com

		Baumer Technologies India Pvt. Ltd.	Mr. Shyam Warilani/Mr. V Suresh Babu 36, DAMJI SHAMJI INDUSTRIAL COMPLEX, OFF.-MAHAKALI CAVES ROAD, ANDHERI(E) MUMBAI Phone- +91 99589 25151 Pincode : 400093 Email : sales.in@baumer.com	Works-1->Mr. Shyam Warilani/Mr. V Suresh Babu Plot No 34 A GIDC A Phase 1, -VAPI-GUJARAT INDIA Phone- +91 11 4161 7111 FAX : 022 2687 3613 Pincode : 396 195 Email : pbajaj@baumer.com
14	TRANSMITTERS	YOKOGAWA INDIA LIMITED,	PLOT NO.96, ELECTRONICS CITY COMPLEX, HOSUR ROAD, BANGALORE, Phone- 080-41586000, Pincode : Email : uday.shankar@in.yokogawa.com,	Works-1-> PLOT NO.96, ELECTRONICS CITY COMPLEX, HOSUR ROAD, -BANGALORE-KARNATAKA INDIA Phone- 080-41586000, FAX : 080-28521442, Pincode : Email : uday.shankar@in.yokogawa.com
		ABB INDIA LIMITED	MR. RAJIV GOVIL 14, MATHURA ROAD, FARIDABAD Phone- 09971085678 Pincode : 121003 Email : vijin.swami@in.abb.com	
		V. AUTOMAT & INSTRUMENTS (P) LTD.	Mr. R. K. BASSI/Mr. PRAVEEN KUMAR F-61, OKHLA INDLAREA, PH-1 NEW DELHI Phone- 9810005826 Pincode : 110 020 Email : sales@vautomat.com	Works-1->Mr. BHAGWAN SINGH/ Mr. NANDAN SINGH F-61, OKHLA INDLAREA, PHASE-1 -NEW DELHI-DELHI INDIA Phone- 011-47627200 Extn. 3 FAX : 011- 26819440 Pincode : 110 020 Email : production@vautomat.com
		Pune Techtrol Pvt. Ltd.	N.P.Khatan/Sudhakar Badiger S-18, MIDC Bhosari, Pune Phone- 9850560042 Pincode : 411 026 Email : ho@punetechtrol.com	
		TOSHNIWAL INDUSTRIES PVT. LTD.,	Industrial Estate, Makhupura, Ajmer, Phone- 9352009000, Pincode : 305002, Email : info@tipl.com,	Works-1-> Khasra No.: 218-230& 235, Industrial Estate,Makhupura, -Ajmer-RAJASTHAN India Phone- 9887865856, FAX : 0145-2695174, Pincode : 305002, Email : rajeev.gupta@tipl.com
		Endress + Hauser (India) Pvt. Ltd.,	Mr. Prakash Vaghela 215-216, DLF Tower 'A', Jasola District Centre, New Delhi, Phone- 9717593001, Pincode : 110025, Email : prakash.vaghela@in.endress.com,	Works-1-> M-171 to 173, MIDC, Waluj, -Aurangabad-MAHARASHTRA India Phone- 9881000474, FAX : 0240-2555179, Pincode : 431136, Email : Narendra.Kulkarni@wetzler.endress.com
		SBEM PVT. LTD.	MR.N.K. BEDARKAR/MR. VISHWANATH KARANDIK 39, ELECTRONIC CO.OP. ESTATE, PUNE SATARA ROAD PUNE, Phone- 912041030100 Pincode : 411009 Email : newdelhi@sbem.co.in	Works-1->MR. MOHAN PADWAL 691/A/2,BIBWEWADI INDL ESTATE -PUNE-MAHARASHTRA INDIA Phone- 918600042374 FAX : 912024215670 Pincode : 411037 Email : wm@sbem.co.in
		PANAM ENGINEERS	Mr. Santosh Shukla 203, Jaisingh Business,Parsiwada, Sahar road,Andheri(East), Mumbai, Phone- 9892179529, Pincode : 400099, Email : santosh@panamengineers.com,	Works-1->Mr. Santosh Shukla Others R-628,TTC Industrial Area, MIDC Rabale, -Navi Mumbai-MAHARASHTRA India Phone- 9821350761, FAX : 022-27695559, Pincode : 400701, Email : sales@panamengineers.com
		SMART INSTRUMENTS LTD, BRAZIL	Agents: Digital Electronic Ltd. 74/11 'C' Cross Road MIDC Andheri (East) MUMBAI Phone- 28208477 Pincode : 400093 Email : corp@delbvy.roams.ems.vsnl.net.in	
		SIEMENS LIMITED	Dr. Armin Bruck/Sandeep Mathur 130, Pandurang Budhkar Marg Worli Mumbai Phone- 0124 383 7377 Pincode : 400018 Email : ankit.varshney@siemens.com	Works-1->Ankit Varshney Kalwa Works, Thane-Belapur Road, Thane, -MUMBAI-MAHARASHTRA INDIA Phone- FAX : Pincode : 400708 Email :
		Moore Industries International Inc.	Leonard.W. Moore/ Matt Moren 16650 Schoenborn St. North Hills Phone- +1 818 830 5548 Pincode : 91343 Email : mmoren@miinet.com	Works-1->Matt Moren/Gina Cruz 16650 Schoenborn St., North Hills - CALIFORNIA- USA Phone- +1 818 894 7111, ext FAX : +1 818 830 5588 Pincode : 91343 Email : gcruz@miinet.com
		EMERSON PROCESS MANAGEMENT (INDIA) PVT.LTD.	Mr. Amit Patthankar/Vikram Raj Singh 206-210,BALARAMA BUILDING 2ND FLR. BANDRA EAST MUMBAI Phone- 9619121500 Pincode : 400051 Email : vikramraj.singh@emerson.com	Works-1->Kalpesh Chandan/Hrishikesh Aghor Plot No. A 145/4 TTC IND AREA,MIDC, PAWANE, -NAVI MUMBAI-MAHARASHTRA INDIA Phone- 9619688001 FAX : 022-66736000 Pincode : 400 705 Email : kalpesh.chandan@emerson.com
		Honeywell Automation India Limited	Mr. Ritvij Kulkarni 917, INTERNATIONAL TRADE TOWER, NEHRU PLACE, NEW DELHI Phone- 9890200584 Pincode : 110019 Email : rajesh.chaudhary@honeywell.com	Works-1->Mr.Kedar Tillu 53, 54, 56 & 57,Hadapsar Industrial Estate -PUNE-MAHARASHTRA INDIA Phone- 9665034625 FAX : 020 66039905 Pincode : 411013 Email : kedar.tillu@honeywell.com
		NIVO CONTROLS PVT. LTD.	Mr. Praveen Toshniwal 104-115, Electronic Complex, Indore Phone- 0731-4081305 Pincode : 452010 Email : sales@nivocontrols.com	Works-1->Mr. Praveen Toshniwal 104-115, Electronic Complex, -Indore-MADHYA PRADESH India Phone- 0731-4081305 FAX : 0731-255075 Pincode : 452010 Email : sales@nivocontrols.com
15	ULTRASONIC FLOW METERS	Electonet Equipments Pvt Ltd.	Mr. Rajendra Nagaonkar/MD, Plot No. 84, 85 & 86, Tiny Industrial Estate Kondhwa Budruk, Pune Phone- 9822015256 Pincode : 411048 Email : ho@eeplindia.com	Works-1-> Others Plot No. 84, 85 & 86, Tiny Industrial Estate, Kondhwa Budruk -Pune-MAHARASHTRA INDIA Phone- 20-26932039 FAX : 20-26934122 Pincode : 411048 Email : ho@eeplindia.com
		Adept Fluidyne Pvt. Ltd.	Vinayak Gadre Plot No 4,S.No.17/1-B Kothrud Industrial Estate Pune Phone- 020 25464551 Pincode : 411038 Email : info@adeptfluidyne.com	Works-1-> Plot No 4,S.No.17/1-B Kothrud Industrial Estate -Pune-MAHARASHTRA india Phone- 020 25464551 FAX : Pincode : 411038 Email : info@adeptfluidyne.com
		FLEXIM Flexible Industriesstechnik GmbH	Boxberger Str., 4, Berlin Berlin Phone- 0049 30 93 66 76 60 Pincode : 12681 Email : info@flexim.de	Works-1-> Others Boxberger Str. 4, -Berlin- GERMANY Phone- 0049 30 93 66 76 60 FAX : Pincode : 12681 Email : info@flexim.de
		Rockwin Flowmeter India Pvt. Ltd.	B-24, Site-IV, Sahibabad Industrial Area Ghaziabad, Phone- 9810129687 Pincode : 201010, Email : amiya@rockwin.com	Works-1->MR Rajiv PRAKASH B-24, Site-IV, Sahibabad Industrial Area, -Ghaziabad-UTTAR PRADESH India Phone- 9810129687 FAX : 01202895450 Pincode : 201010, Email : rajiv@rockwin.com
		FLASH FORGE PVT LTD	Mr. Gautam Makker, 503, 'A'-wing, Delphi, Orchard Avenue Road, Powai Mumbai Phone- 022-42784300 Pincode : 400076 Email : hemendrapati@f.co.in	Works-1-> Others M/s Endress & Hauser, Aurangabad, Maharashtra -Aurangabad-MAHARASHTRA INDIA Phone- FAX : Pincode : Email : Works-2->+ Others M/s Endress & Hauser, Bhiwandi,Thane -Thane-MAHARASHTRA INDIA Phone- FAX : Pincode : Email :
		NIVUS GMBH	Mr. Marcus Fischer Im Taele 2, D - 75031 Eppingen Phone- 00491712233770 Pincode : Email : carolin.schuster@nivus.com	Works-1->Mr. Marcus Fischer CEO Im Taele 2, Eppingen, -Baden Wuerttemberg, -Foreign Country GERMANY Phone- 0049-726291910 FAX : Pincode : 75031 Email : carolin.schuster@nivus.com

Note:

1. The above sub-vendor list is tentative & reference only. However Sub-Vendor List is subject to BHEL/end user approval without any commercial/ delivery implication.

2. New Sub-Vendor if proposed by Vendor during contract stage shall subject to BHEL/ end user approval without any commercial/ delivery implication.

ANNEXURE 1
FORMAT FOR PROVENNESS CERTIFICATE

Award/Contract Agreement/
Order enclosed

Sl.No.	Item Description	Plant No.1
5.00.00	INSTRUMENTS (PRIMARY & SECONDARY)	
(i)	Type of Instrument	
(ii)	Make / Model	
(iii)	Name of Power Station (Location & Address)	
(iv)	Unit Size (MW)	
(v)	Commissioning date	
	Whether above instruments have atleast one (1) year satisfactory operation in one (1) power station having unit rating of 200 MW or above.	Yes/No
(vi)	Client's certificate attached	Yes/No

Signature of authorized signatory.....



3x800 MW PATRATU TPS

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

GYPSUM DEWATERING SYSTEM
TECHNICAL SPECIFICATION

SECTION : I

SUB-SECTION : D

REV 01

SUB-VENDOR LIST

SHEET 1 OF 1

ANNEXURE-I

1. REFER ELECTRICAL AND C&I SPECIFICATION FOR APPLICABLE SUB-VENDOR LIST FOR THE RELEVANT ITEMS FOR REFERENCE.
2. THE LIST OF ALL BOUGHT OUT ITEMS WITH MAKES AND COUNTRY OF ORIGIN AND CONTACT DETAILS OF THE MANUFACTURERS TO BE MENTIONED ALONG WITH OFFER TO BE SUBMITTED IN THE FORMAT ATTACHED IN SECTION III AS AN INFORMATION TO BHEL.
3. ACCEPTANCE OF MAKES SHALL BE SUBJECT TO BHEL/ CUSTOMER ACCEPTANCE DURING THE DETAILED ENGINEERING WITHOUT COST AND DELIVERY IMPLICATION TO BHEL.



3x800 MW PATRATU TPS

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

GYPSUM DEWATERING SYSTEM

SECTION : I

SUB-SECTION : D

 TECHNICAL SPECIFICATION
 MANDATORY SPARES LIST

REV 00

SHEET 1 OF 4

ANNEXURE-II

MANDATORY SPARES LIST



3x800 MW PATRATU TPS

GYPSUM DEWATERING SYSTEM

 TECHNICAL SPECIFICATION
 MANDATORY SPARES LIST

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

SECTION : I

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Sl. No.	DESCRIPTION	Qty.
I.	MECHANICAL	
1	Hydro-cyclones (Gypsum Primary Dewatering, Secondary Waste Water and any other Hydrocyclone)	
a.	Hydro-cyclone Isolation Valve	10% of each type OR 1 no. whichever is higher
b.	Hydro-Cyclone	10% of each type OR 1 no. whichever is higher
c.	Hydro-Cyclone rubber lining	10% of each type OR 1 no. whichever is higher
2	Vacuum Belt Filter	
a.	Filter Cloth	2 sets
b.	Belt (if applicable)	1 sets
c.	Vacuum Box Seals	2 sets
d.	Drive Motor (if applicable)	1 no.
3	Vacuum Breaker Valves	
a.	Valve Assembly	1 no.
b.	Actuator	1 no.
4	Horizontal Centrifugal Pumps	
a.	Complete Impeller Assembly	1 no. of each type
b.	Casing Liners	1 set* of each type
c.	Bearing	2 set*
d.	Motor	1 no. of each type
e.	Pump discharge valve assembly	1 no. of each type
5	Slurry Valves	2 no. of each type & size
6	Slurry Line Bends	2 no. of each type & size
7	Slurry (Filtrate Extraction) Pumps	
a.	Impeller Assembly	1 no. of each type
b.	Casing Liner	2 no. of each type
c.	Seals	4 set of each type
d.	Bearings	2 no. of each type
e.	Motor	1 no. of each type
f.	Motor-Pump Coupling	1 no. of each type
8	Sump Pumps	
a.	Complete Impeller Assembly	1 no. of each type
b.	Casing Liners	1 set* of each type
c.	Bearing	2 set*
d.	Motor	1 no. of each type
e.	Pump discharge valve assembly	1 no. of each type



3x800 MW PATRATU TPS

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GYPSUM DEWATERING SYSTEM

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MANDATORY SPARES LIST

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II.	MEASURING INSTRUMENTS	
i	Electronic Transmitters	
a.	Transmitters of all types, ranges and model no. (for the measurement of Pressure, differential pressure flow, level, etc.)	10% or 1 no. of each type and model, whichever is more
b.	1.2 Level Transmitters (Ultrasonic/ radar type)	50% of each type and length, including sensors
ii	Temperature Elements	
a.	RTD's of each type and length (with head assembly, terminal block & nipple)	10% or 2 nos. of each type and length, whichever is more
b.	Thermocouples of each type like K-type, R-type, metal etc.(with head assembly, terminal block & nipple)	10% or 2 nos. of each type and length, whichever is more
c.	Thermowell for application like mill outlet temperature and SH/RH/Eco/ flue gas temp. in furnace	10% or 2 nos. of each type and length whichever is more
d.	Temperature transmitters	10% of each type & model
iii	Local Indicators like temperature gauges, pressure gauges, differential pressure gauges, flow gauges, flow meters etc.,	5% or 1 no. of each make, model and type whichever is more (to be divided to various ranges in proportion to main of all make, model, type population)
iv	Process Actuated Switch Devices Includes all types of Pressure, differential pressure, flow, temperature, differential temperature, level switch Devices	5% or 1 no. of each type and model whichever is more
v	PD Type Flow Transmitters	1 no. of each type & model
vi.	Any other instrument (If applicable)	10% or 1 no. of each type and model whichever is more

Note:

1. One set means 100% complete replacement of the particular component/equipment, as mentioned i.e., Set for the particular equipment, would include all components required to replace the item. For example, a set of bearing shall include all hardware normally required while replacing the bearings. It is further, intended that the assembly / sub-assembly which have different orientation (like left hand or right hand, top or bottom), different direction of rotation or mirror image positioning or any other reasons which result in maintaining two different sets of the spares to be used for the subject assembly / sub-assembly, these shall be considered as different types of assembly/sub-assembly.

2. Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc. these shall cover all the items supplied and installed.

3. In case spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities generally in line with the approach followed in the above list.

4. Any item which is quoted as "not applicable" in the above list and is found to be "applicable" at a later date shall be supplied by the Bidder without any commercial implications. The Bidder shall note that if there is any change/ variation in equipment/ system during detail engineering which causes any change/ variation in the essential spares quantity, the same shall be supplied without any commercial implications. The price indicated for the mandatory spares shall be considered for the purpose of evaluation.



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5. The bidder shall warrant that all spares supplied will be new and in accordance with the Contract Documents and will be free from defects in design, material and workmanship.

6. All spares supplied under this contract shall be strictly interchangeable with parts for which they are intended for replacements. These spares should include all mounted accessories like components, boards, add or items, fitting, connectors etc. and be complete in all respects so that the replacement of the main items by these spares does not require any additional item. The vendors must conform the pair to pair compatibility of each electrical spares modules with the modules should be supplied in the original package. All electronic modules should be pre-set and/or pre-programmed for ready use at site. Alternatively, suitable instruction sheet indicating the details of required PCB jumper position, BCD which is setting, EPROM/PROM listing etc should be packed along with each module. Also a caution mark sign should be put on all such module which needs pre-setting/pre-programming before putting them in to service. The spare shall be treated and properly packed for long term storage.

7. Each spare shall be clearly marked and labelled on the outside of the packing with its description. When more than one spare part is packed in single case, a general description of the contents shall be shown on the outside of such case and a detailed list enclosed. All cases, containers and other packages must be suitably marked and numbered for the purpose of identification.

8. Any item which is quoted as "not applicable" in the above list and is found to be "applicable" at a later date shall be supplied by the Bidder without any commercial implications. The Bidder shall note that if there in any change/ variation in equipment/ system during detail engineering which causes any change/ variation in the essential spares quantity, the same shall be supplied without any commercial implications. The price indicated for the mandatory spares shall be considered for the purpose of evaluation.

9. All the spares shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan. Mandatory spares shall not be dispatched before dispatch of corresponding main equipment. The spares shall be treated and packed for a long storage under the climatic condition prevailing at site.

10. The bidder shall indicate the service expectancy period for the mandatory spare parts under normal operating conditions before replacement is necessary.

11. The Contractor will provide Employer with cross-sectional drawings, catalogues, assembly drawings and other relevant documents so as to enable the Employer to identify and finalize order for recommended spares.

12. The bidder shall guarantee the long term availability of spares to the Employer for the full life of the equipment covered under the Contract. The bidder shall guarantee that before going out of production of spare parts of the equipment covered under the Contract, he shall give the Employer at least 2 years advance notice so that the latter may order his bulk requirement of spares, if he so desires. Further, in case of discontinuance of manufacture of any spares by the bidder and/or his Sub-vendors, bidder will provide the Employer, two years in advance, with full manufacturing drawings, material specifications and technical information including information on alternative equivalent makes required by the Employer for the purpose of manufacture/procurement of such items.



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ANNEXURE- III

1.01.00 INSPECTION AND TESTS DURING MANUFACTURE

1.01.01 The method and techniques to be used by the Bidder for the control of quality during manufacture of all plant and equipment shall be agreed with the Owner.

1.01.02 The Owner's general requirements with respect to quality control and the required shop tests are set out elsewhere in this specification.

1.01.03 Before any item of plant or equipment leaves its place of manufacture, the Owner shall be given the option of witnessing inspections and tests for compliance with the specification and related standards.

1.01.04 Advance notice shall be given to the Owner as agreed in the Contract, prior to the stage of manufacture being reached, and the piece of plant must be held at this stage until the Owner has inspected the piece, or has advised in writing that inspection is waived. If having consulted the Owner and given reasonable notice in writing of the date on which the piece of plant will be available for inspection, the Owner does not attend, the Bidder may proceed with manufacturing having forwarded to the Owner duly certified copies of his own inspection and test results.

The owner's representative shall have at all reasonable times access to bidder's or his sub-vendor's premises and shall have power to inspect/ examine materials and workmanship or equipment under manufacture.

The Bidder shall forthwith forward to the engineer duly certified copies of the Test Certificates in six copies (one to the Purchaser and five to the Consulting Engineer) for approval. Further nine (9) copies of Shop Test Certificates shall be bound with Instruction Manuals referred to elsewhere in the specification.

For electrical equipment, routine tests as per relevant IS/International standard as detailed in the specification are to be carried out on all equipment. Type tests are also to be carried out on selected equipment as detailed in the specifications of the electrical equipment concerned.

1.01.05 Under no circumstances, any repair or welding of castings be carried out without the consent of the Engineer. Proof of the effectiveness of each repair by radiographic and/or other non-destructive testing technique, shall be provided to the Engineer.

1.01.06 All the individual and assembled rotating parts shall be statically and dynamically balanced at the works. Where accurate alignment is necessary for component parts of machinery normally assembled on site, the Bidder shall allow for trial assembly prior to dispatch from place of manufacture.

1.01.07 All materials used for the manufacture of equipment covered under this specification shall be of tested quality. Relevant test certificates shall be made available to the Purchaser. The certificates shall include tests for mechanical properties and chemical analysis of



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representative material. Equipment or parts coming under any statutory Regulations shall be certified by a Competent Authority under the regulations in the specified format.

1.01.08 All pressure parts connected to pumping main shall be subjected to hydraulic testing at a pressure of 150% of shut-off head for a period not less than one hour. Other parts shall be tested for one and half times the maximum operating pressure, for a period not less than one hour.

1.01.09 All necessary non-destructive examinations shall be performed to meet the applicable code requirements.

1.01.10 All welding procedures adopted for performing welding work shall be qualified in accordance with the requirements of Section-IX of ASME code or IBR as applicable. All welded joints for pressure parts shall be tested by liquid penetrant examination according to the method outlined in ASME Boiler and Pressure Vessel code. Radiography, magnetic particle examination magnaflux and ultrasonic testing shall be employed wherever necessary/ recommended by the applicable code. At least 10% of all major but welding joints shall be radiographed unless otherwise stipulated.

Bidder's scope shall include to preparation of all necessary documents, co-ordination and follow-up for above approval. Owner shall only forward assistance/endorsement of documents /design /drawings /reports/records to be submitted for approval as stipulated/ required by Statutory Authorities till registration of the unit and clearance for commercial operation.

1.02.00 PERFORMANCE TESTS AT SITE

1.02.01 The full requirements for testing the system shall be agreed between the Owner and the Bidder subject to end-Customer's approval. The completely erected System shall be tested by the Bidder on site under normal operating conditions. The Bidder shall also ensure the correct performance of the System under abnormal conditions, i.e. the correct working of the various emergency and safety devices, interlocks, etc.

1.02.02 The Bidder shall provide complete details of his normal procedures for testing, for the quality of erection and for the performance of the erected plant. These tests shall include site pressure test on all erected pipe work to demonstrate the quality of the piping and the adequacy of joints made at site.

1.02.03 The Bidder shall furnish the quality procedures to be adopted for assuring quality from the receipt of material at site, during storage, erection, pre-commissioning to tests on completion and commissioning of the complete system/equipment.



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1.03.00	SPECIFIC INSPECTION REQUIREMENT FOR COMPONENTS/EQUIPMENTS
1.	Hydro-cyclones
a.	Visual
b.	Dimensional etc.
2.	Pumps :
c.	All pressure parts shall be hydraulically tested at 150% of the shut-off head or 200% of rated head, whichever is higher for 30 minutes. No leakage is allowed.
d.	Impeller and rotor shall be first statically balanced and then dynamically balanced according to ISO 1940 (in the case of impellers this shall be done before and after mounting of the service rotor shaft).
e.	Vibration levels measured on the non-rotating parts shall not exceed the zone limit "B" as defined in ISO 10816 at steady conditions and shall not exceed the zone limit "C" as defined in ISO 10816 at transient conditions.
f.	List of Non-Destructive test over and above the material test are as follows: Casing: Material test, Magnetic particle (MPI), DP and Hydro test, as applicable Impeller- DPT and MPI as applicable Shaft- Ultrasonic (UT), DPT and MPI Sleeve- DP and Hardness test/ Manufacturer's recommendation Mechanical Seal- Manufacturer's recommendation. Base Plate- Stress relieving of weld. Replaceable Rubber liner- Shore Hardness, Class and Type certificate
g.	Vibration test and Noise level test shall be witnessed at shop. (as already stated above.)
h.	Mechanical running and the performance test shall be conducted for Pump at the Bidder's works before dispatch or where the test facilities are available. All pumps to be performance tested as per Hydraulic Institute Standard/Indian Standard. Performance test to include check for noise, vibration level and temperature rise.
i.	The Bidder shall conduct performance test for the remaining pump and submit the reports.
3.	Vacuum Belt Filters:
a.	Impeller, casing and shaft of vacuum pumps shall be tested for chemical and mechanical properties as per relevant standard. All plates above 40mm shall be 100% Ultrasonically tested.
b.	UT on shaft (if greater or equal to 40mm) and impeller shall be carried out.
c.	All vacuum pumps shall be tested at shop for capacity, power, pressure, efficiency, noise and vibration etc.
d.	Filter cloths and belts shall be tested for physical properties as per relevant Standard.



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4.	General Inspection Requirements to be considered are as below:			
1.	Sl.No.	Item	Inspection & Test Item	Remarks
	1.	Hydro-cyclones	Material certificate check	
			Dimensional Inspection	
	2.	Pumps	Material certificate check	Shaft & impeller only
			Dimensional inspection	
			Non-destructive testing	DPT on shaft & impeller
			Hydrostatic test	
			Balancing Test	Static & dynamic
			Performance test	Incl. Noise & Vibration
	3.	Motors	Material certificate check	
			Non Destructive Testing	
			Dimensional inspection	
			Balancing Test	Static & dynamic
			Function test	
	4.	Vacuum Belt filter (with Accessories)	Material certificate check	
			Dimensional inspection	
			Function test	Short time no load test
	5.	Vacuum Receiver	Material certificate check	
			Dimensional inspection	
			Hydrostatic Test	
	6.	Belt Filter Vent Fan	Material certificate check	
			Dimensional inspection	
			Performance Test	
	7.	Conveyor & Silo Extraction Device	Material certificate check	
			Dimensional inspection	
			Function Test	Short time no load test
	8.	Rubber lining Pipe	Dimensional inspection	
			Visual Inspection	
			Spark Test	
	9.	Flow Nozzles	Material certificate check	
			Dimensional Inspection	



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This is part of Technical Specification No. PE-TS-434-571-A001, Rev 01

	10.	Control Panel	Insulation Resistance Test	
			Dielectric Strength Test	
			Function Test	
			Dimensional Inspection	
	11.	Control valve & valves	Material certificate check	
			Hydrostatic test	
			Seat leak test	
			Function test	
			Dimensional Inspection	
	12.	RTD	Material certificate check	
			Performance test	
			Hydrostatic test	
	13.	Shut off valve	Material certificate check	
			Hydrostatic test	
			Seat Leak test	
			Function Test	
			Dimensional Inspection	
	14.	Flow meter	Material certificate check	
			Calibration Test	
			Dimensional Inspection	
			Hydrostatic test	
	15.	Butterfly Valve	Material Certificate check	
			Non-destructive testing	
			Hydrostatic test	
			Operation test	Motorized valve only
2.	Valves and Specialties shall be tested as per relevant standards / codes. Seat Leakage and hydraulic test to be carried out as per relevant standards /codes.			
3.	Pipes and fittings shall be tested as per relevant standards/ codes.			
4.	MQP (Manufacturing Quality Plan) shall be submitted by the bidder along with the technical offer. Above mentioned item-wise inspection requirement is tentative only and shall be mutually discussed and finalized during detail engineering.			



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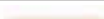
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INSPECTION AND TESTING

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5.	Bidder shall furnish written copies of shop production, fabrication and quality test procedures and drawings to be used for review by BHEL / BHEL's Customer prior to manufacture. Inspection of above mentioned tests by BHEL/ BHEL's Customer representative at bidder's works is envisaged
6.	The Bidder shall furnish performance test procedure along with standard. The test procedure will be reviewed and approved by the BHEL / BHEL's Customer.
7.	A dynamic balancing certificates stating that the rotating assembly has been balanced dynamically shall be sent to BHEL/ BHEL's Customer within one (1) week of the successful completion of balancing.
8.	Vibration levels shall be measured during shop running/performance tests.
9.	For surfaces with rubber lining, Welding shall be visually inspected to verify the absence of rough area and unacceptable transition between surfaces which prevent the adequate adherence of rubber. The acceptance criteria shall be as per latest standard.
10.	For surfaces with rubber lining, degree of cleaning shall be visually checked before the application of the coating. There must be no area with oxidation, dirt or partially or generalized corrosion defects.
11.	Test certificates shall be issued for each lot of raw material used in the coating, corresponding to specific weight and traction resistance.
12.	For surfaces with rubber lining, adherence test shall be conducted on production samples. Adherence test shall be conducted on the actual surface through hammering. In order to verify the absence of air pockets (or) surface without adherence.
13.	For surfaces with rubber lining, Coating thickness shall be checked at 100%. A High voltage porosity test will be conducted on 100 % of the coated surface.
14.	Equipment shall not be released for shipment, until shop tests data and performance tests curves have been approved by Owner.
15.	Bidder should furnish performance guarantee as per applicable standard guarantee for the design, manufacture, material and safe operation of the equipment's.
16.	BHEL/BHEL's Customer of their authorized third party inspection agency representative shall witness the test at Bidder's works and a notice of minimum three (3) weeks shall be given for attending the inspection.
17.	Bidder to arrange all calibrated gauges, Instruments during inspection at works and also during performance test at site. All inspection, measuring and test equipment(s) used by Bidder shall be calibrated (<i>at accredited laboratory, as applicable</i>) periodically depending on its use and criticality of the test/measurement to be done. The Bidder shall maintain all the relevant records of periodic calibration and instrument identification, and shall produce the same for inspection by the Owner. Wherever asked specifically, the Bidder shall re-calibrate the measuring/test equipment in the presence of Project Manager/Inspector.
18.	Mechanical running test shall be carried out for Vacuum Belt Filter, Vacuum Pump & Belt Filter Wash Pump. Bidder to arrange Motor for the shop test and inspection.
19.	In case, order is placed on a foreign vendor (i.e. supplies from outside India), vendor will tie-up with BHEL approved inspection agency on their own cost and carry out inspection as per the Quality Plan approved by BHEL/ BHEL's Customer. Vendor shall furnish BHEL the inspection reports and other documents required as per approved Quality plan duly signed by the Inspection Agency after their witness for our review and acceptance.

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	TECHNICAL SPECIFICATION GYPSUM DEWATERING SYSTEM	SECTION : I	
		SUB-SECTION : D	
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	INSPECTION AND TESTING		

QAP FORMAT

[illegible]

A Quality Plan Doc No. PE-V0-434-571-A001 is enclosed with this specification for reference of the bidder. Bidder to also refer relevant portion of Customer specification for Quality requirements. The Quality Plan shall be finalized during the detailed engineering.

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification, PE-TS-434-571-1				SPEC. NO. PE-TS-434-571-A001		DATE:	
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)						QP NO.: PE-V0-434-571-A001		DATE: 24.09.2020	
	PROJECT: 3x800 MW PATRATU STPS						PO NO.:		DATE:	
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD				SECTION:		SHEET 1 of 10	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	*	
					M	C/ N			D	
									M	C
									N	

1.0 RAW MATERIAL (*Material shall be as per Drawing)

1.1	Vacuum pump	Physical & Chemical for impeller, casing, shaft.	MA	Physical	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	TC	✓	P	V	V	NOTE-5
		NDT of Impeller, casing, shaft, sleeve	MA	DPT	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓	P	V	V	NOTE-5
		Balancing of Rotating Parts	MA	Static & Dynamic Balancing	100%	IS/ISO 21940-11	IS/ISO 21940-11	IR	✓	P	V	V	NOTE-5
		NDT of Impeller & Shaft	MA	UT	100%	ASTM A 388/ASME Sec. V	ASTM A 388/ASME Sec. V	IR	✓	P	V	V	UT of shaft ≥φ 40mm NOTE-5
1.2	Speed reducer	Visual, dimensional, Run test including oil leakage, Temp.	MA	Visual	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓	P	V	V	

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date		Seal	
Prepared by:	RAJESH RANJAN	Checked by:	ASHISH PANIGRAHI										
Reviewed by:	SUBHASHISH GUPTA	Reviewed by:	RK JAISWAL										

Rajesh Ranjan

Digitally signed by Rajesh Ranjan
DN: cn=Rajesh Ranjan, o=BHEL, ou=PS-PEM, email=err@bhel.in, c=IN
Date: 2020.09.28 10:00:11 +05'30'

Ashish Panigrahi

Digitally signed by Ashish Panigrahi
DN: cn=Ashish Panigrahi, o=BHEL, ou=PEM, email=ashishp@bhel.in, c=IN
Date: 2020.09.28 13:15:49 +05'30'

Ritesh Kumar Jaiswal

Digitally signed by Ritesh Kumar Jaiswal
DN: cn=Ritesh Kumar Jaiswal, o=BHEL, ou=PEM, email=riteshk@bhel.in, c=IN
Date: 2020.09.28 15:52:12 +05'30'

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification, PE-TS-434-571-A001		SPEC. NO. PE-TS-434-571-A001		DATE:	
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)				QP NO.: PE-V0-434-571-A001		DATE: 24.09.2020	
	PROJECT: 3x800 MW PATRATU STPS				PO NO.:		DATE:	
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD		SECTION:		SHEET 2 of 10	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/ N		D	M C N	
1.3	AC Drive	rise, Noise level and vibration								Refer Electrical AC Drive SQP for details.
1.4	Belt	Visual & review of test certificate (Tensile, Elongation, Thickness)	MA	Visual	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	TC	P V V	
1.5	Filter Cloth	Physical Properties (Tensile, Elongation, Thickness, air permeability test, etc.)	MA	Physical	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	TC	P V V	
1.6	Water Pump/ Slurry Pump	Chem. & Mech. Properties of Impeller, Casting,	MA	Chemical Mechanical	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	TC	P V V	UT of shaft ≥φ 40mm *Lining if applicable

ENGINEERING			BHEL			BIDDER/ SUPPLIER			FOR CUSTOMER REVIEW & APPROVAL		
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Sign & Date	Doc No:	Sign & Date	Name	Seal	
Reviewed by:		RAJESH RANJAN			ASHISH PANIGRAHI						
		SUBHASHISH GUPTA	Reviewed by:		RK JAISWAL						



Rajesh Ranjan
Digitally signed by Rajesh Ranjan
DN: cn=Rajesh Ranjan, o=BHEL, ou=PS-PEM, email=err@bhel.in, c=IN
Date: 2020.09.28 10:00:34 +05'30'



Ashish Panigrahi
Digitally signed by Ashish Panigrahi
DN: cn=Ashish Panigrahi, o=BHEL, ou=PEM, email=ashishp@bhel.in, c=IN
Date: 2020.09.28 13:15:24 +05'30'



RITESH KUMAR JAISWAL
Digitally signed by Ritesh Kumar Jaiswal
DN: cn=Ritesh Kumar Jaiswal, o=BHEL, ou=PS-PEM, email=riteshk@bhel.in, c=IN
Date: 2020.09.28 15:52:48 +05'30'

	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification No. PE-TS-434-571-1		SPEC. NO. PE-TS-434-571-A001		DATE:
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)		PE-TS-434-571-A001		Q.P. NO. : PE-V0-434-571-A001		DATE: 24.09.2020
	PROJECT : 3x800 MW PATRATU STPS		SYSTEM: FGD		PO NO.:		DATE:
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD		SECTION:		SHEET 3 of 10

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/ N		D	M C N	
		Shaft, Lining* Balancing of Rotating Parts	MA	Static & Dynamic Balancing	100%		IS/ISO 21940-11	IR	✓	Hydrostatic testing of casings for 30min.at 1.5 times of shut-off head or 2 times pump rated head which ever higher.
		Hydro test of casing	MA	Static pressure testing	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓	
		NDT of Impeller, casing, shaft, sleeve	MA	DPT	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓	
		NDT of Impeller & Shaft	MA	UT	100%	ASTM A 388/ASME Sec. V	ASTM A 388/ASME Sec. V	IR	✓	UT of shaft ≥ ϕ 40mm

ENGINEERING			BHEL			BIDDER/ SUPPLIER			FOR CUSTOMER REVIEW & APPROVAL		
Prepared by:	Sign & Date	Name	Checked by:	Sign & Date	Name	Sign & Date	Doc No:	Sign & Date	Reviewed by:	Sign & Date	Seal
Reviewed by:		RAJESH RANJAN	Reviewed by:		ASHISH PANIGRAHI						
		SUBHASHISH GUPTA			RK JAISWAL						



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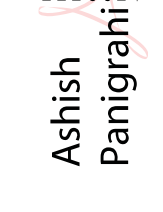
	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification, PE-TS-434-571-A001		SPEC. NO. PE-TS-434-571-A001		DATE:	
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)				QP NO.: PE-V0-434-571-A001		DATE: 24.09.2020	
	PROJECT: 3x800 MW PATRATU STPS				PO NO.:		DATE:	
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD		SECTION:		SHEET 4 of 10	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/ N		D	M C N	
1.7	Hydro cyclone	Visual & Dimension	MA	Visual & Measurement	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓ P W V	NOTE-5
1.8	Valves (Control valve & Butterfly Valve etc. *)									Refer Control Valve and Butterfly Valve SQP etc.
1.9(a)	Rubber Composition	Material content	MA	Chemical	1/Batch	Approved Drawing/Data sheet	Approved Drawing/Data sheet	COC	✓ P V	
1.9(b)	Rubber lining	Spark test at accessible area	MA	Inspection check	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓ P W V	Spark test 10-12.5KV min.
1.10	LT Motor									Refer LT Motor QP for details
1.11	Junction Box									Refer Junction Box QP for details

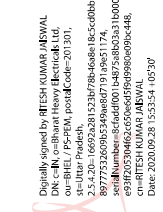
BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date	
Prepared by:	RAJESH RANJAN	Checked by:	ASHISH PANIGRAHI	Seal		Reviewed by:		Seal		Reviewed by:	
Reviewed by:	SUBHASHISH GUPTA	Reviewed by:	RK JAISWAL			Approved by:				Approved by:	



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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification No. PE-TS-434-571-1		SPEC. NO. PE-TS-434-571-A001		DATE:	
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)				QP NO.: PE-V0-434-571-A001		DATE: 24.09.2020	
	PROJECT: 3x800 MW PATRATU STPS				PO NO.:		DATE:	
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD		SECTION:		SHEET 5 of 10	

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/ N		D	M C N	
1.12	Instruments (Transmitters, Switches, Gauges, RTD etc.)									Refer Instruments (Transmitters, Switches, Gauges, RTD etc.) SQP

FINAL INSPECTION (Vacuum belt filter assembly)										
2.1	Vacuum belt filter assembly	Dimensional	MA	Dimensional	100%	Approved Drawing	Approved Drawing	IR	✓	P W V
		Run test(for 30 minutes)	MA	Visual, Measurement	100%	Approved Drawing	Approved Drawing	IR	✓	P W V
2.2	All components required paints.	Paint Finish, Paint Thickness, High voltage porosity test	MA	Measurement	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓	P W V

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date	
Prepared by:	RAJESH RANJAN	Checked by:	ASHISH PANIGRAHI	Seal		Reviewed by:		Seal		Reviewed by:	
Reviewed by:	SUBHASHISH GUPTA	Reviewed by:	RK JAISWAL			Approved by:				Approved by:	



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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification No. PE-TS-434-571-A001		SPEC. NO. PE-TS-434-571-A001		DATE:	
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)				QP NO.: PE-V0-434-571-A001		DATE: 24.09.2020	
	PROJECT: 3x800 MW PATRATU STPS				PO NO.:		DATE:	
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD		SECTION:		SHEET 6 of 10	

I-MAX														
SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS			
1	2	3	4	5	6		7	8	9	**				
					M	C/ N						D	M	C
2.3	Vacuum pump/ Water Pump/ Slurry Pump	Dimension, Capacity, power, pressure, efficiency, noise, vibration, temperature rise	MA	Measurement	100%	100%	Approved Drawing/Data sheet	Approved Drawing/Data sheet	IR	✓	P	W	V	NOTE-5

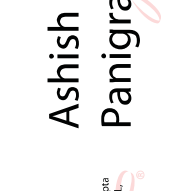
3	VACCUM TANK/STRUCTURES/DUCTS/HOPPERS (RAW MATERIAL INSPECTION)											
3.1	Plates for shell and dished ends & structural, Ducts and Hoppers	Chemical & Physical	MA	Chemical & Physical	1 /Heat	Approved Data Sheet /Drawing	Approved Data Sheet /Drawing	TC	✓	P	V	V

4.0 IN PROCESS CONTROLS												
4.1	Welding (As applicable)	WPS,PQR,WPQ	CR	Visual	100%	ASME Sec, IX	ASME Sec, IX	Report	√	P	V	V

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL					
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Sign & Date		Name		Seal	
Prepared by:	RAJESH RANJAN	Checked by:	ASHISH PANIGRAHI										
Reviewed by:	SUBHASHISH GUPTA	Reviewed by:	RK JAISWAL										



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MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS

part of Technical Specification

QUALITY PLAN No. PE-TS-434-571-A001

SPEC. NO. PE-TS-434-571-A001

DATE:

DATE: 24.09.2020

CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)

DATE:

PROJECT : 3x800 MW PATRATU STPS

PO NO.:

ITEM: GYPSUM DEWATERING SYSTEM

SYSTEM: FGD

SECTION:

DATE:

SHEET 7 of 10

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/ N		D	M C N	
4.2	Stress Relieving	Physical	MA	Physical	100%	Approved Drg./ Datasheet	Approved Drg./ Datasheet	HT chart	✓ P V	As applicable
4.3	Plates for structures, Ducts, Hoppers	NDT	MA	UT	100%	ASTM A 435	ASTM A 435	IR	✓ P W	Only for thickness>40 mm
4.4	Welds	Weld Defect	MA	DPT	100%/ 10 %	Approved Drg./ Datasheet/ ASME Sec – VIII Div.1	Approved Drg./ Datasheet/ ASME Sec – VIII Div.1	IR	✓ P W	Note-7
				MPI	100%/ 10 %	Approved Drg./ Datasheet/ ASME Sec – VIII Div.1	Approved Drg./ Datasheet/ ASME Sec – VIII Div.1	IR	✓ P V	Note-7
				RT	100%/ 10%	Approved Drg./	Approved Drg./	IR	✓ P V	Note-7

ENGINEERING

Sign & Date

Prepared by: RAJESH RANJAN

Reviewed by: SUBHASHISH GUPTA

BHEL

Sign & Date

Checked by: RAJESH RANJAN

Reviewed by: SUBHASHISH GUPTA

QUALITY

Sign & Date

Name: ASHISH PANIGRAHI

RK JAISWAL

BIDDER/ SUPPLIER

Sign & Date

Seal

Doc No:

Sign & Date

Name

Seal

Reviewed by:

Approved by:



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	MANUFACTURER/ BIDDER/ SUPPLIER NAME & ADDRESS		part of Technical Specification PE-TS-434-571-1		SPEC. NO. PE-TS-434-571-A001		DATE:
	CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)				QP NO.: PE-V0-434-571-A001		DATE: 24.09.2020
	PROJECT: 3x800 MW PATRATU STPS				PO NO.:		DATE:
	ITEM: GYPSUM DEWATERING SYSTEM		SYSTEM: FGD		SECTION:		SHEET 8 of 10

SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1	2	3	4	5	6	7	8	9	**	
					M	C/ N		D	M C N	

5.0 FINAL INSPECTION(Complete System)										
5.1	Complete System	Dimensional	MA	Dimension	100%	Approved Drawing	Approved Drawing	Approved Drawing	✓	NOTE-5
		Nozzle Orientation	CR	Dimension	100%	Approved Drawing	Approved Drawing	IR	✓	NOTE-5
		Hydro Test	CR	Hydro Test	100%	2X working PR or 1.5x design PR Whichever is higher for 30 minutes	2X working PR or 1.5x design PR Whichever is higher for 30 minutes	IR	✓	NOTE-5
		Pneumatic Test of RF pads for soundness /leakages	CR	Pneumatic Test	100%	ASME SEC – VIII / appd. Drg/ appd. Datasheet	ASME SEC – VIII / appd. Drg/ appd. Datasheet	IR	✓	*as applicable NOTE-5
5.2(a)	Rubber Lining of tank	Spark test	MA	Electrical	100%	Approved datasheet	Approved datasheet	IR	✓	Spark test 10-12.5KV min.

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		BIDDER/ SUPPLIER		FOR CUSTOMER REVIEW & APPROVAL		Doc No:		Sign & Date	
Prepared by:	RAJESH RANJAN	Checked by:	ASHISH PANIGRAHI	Sign & Date	Seal	Reviewed by:	Sign & Date	Name	Seal		
Reviewed by:	SUBHASHISH GUPTA	Reviewed by:	RK JAISWAL			Approved by:					



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MANUFACTURER/ BIDDER/ SUPPLIER
NAME & ADDRESS

part of Technical Specification, PE-TS-434-571-A001

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

DATE:

CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)

DATE: 24.09.2020

PROJECT : 3x800 MW PATRATU STPS

DATE:

ITEM: GYPSUM DEWATERING SYSTEM

SYSTEM: FGD

SECTION:

SHEET 9 of 10

I-MAX														
SL NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
1	2	3	4	5	6	7	8	9	*	**				
					M	C/ N				M	C	N		
5.2(b)	Rubber Lining of tank	Hardness testing	MA	Physical	100%	100%	Approved datasheet	Approved datasheet	IR	✓	P	W	V	Shore hardness value shall be within 60. NOTE-5
5.3	Junction Box													Refer Junction Box SQP for details
5.4	Painting & Marking	Paint Finish, Thickness, HV porosity test	MA	Visual	100%	100%	Appd. Drg /Data Sheet	Appd. Drg /Data Sheet	IR	✓	P	V	V	NOTE-5
5.5	Packing	Proper Packing	MA	Visual	100%	100%	BHEL packing specification	BHEL packing specification	Packing List	✓	P	W	V	NOTE-5,8
5.6	Quality Dossier	Document	MA	Visual	100%	100%	Compilation of documents	Compilation of documents	Quality Dossier	✓	P	V	V	

LEGENDS:

*RECORDS, IDENTIFIED WITH "TICK"(✓) SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION.

** M: SUPPLIER/MANUFACTURER/ SUB-SUPPLIER, C: MAIN SUPPLIER/ BHEL/ THIRD PARTY INSPECTION AGENCY, N: CUSTOMER,

P: PERFORM, W: WITNESS, V: VERIFICATION, AS APPROPRIATE

MA: MAJOR, MI: MINOR, CR: CRITICAL

IR: INTERNAL REPORT D: DOCUMENTATION

RT: RADIOGRAPHY TEST UT: ULTRASONIC TEST DPT: DIE PENETRANT TEST MPI: MAGNETIC PARTICLE INSPECTION

ENGINEERING				BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
Sign & Date		Name		Sign & Date		Name		Sign & Date		Name		Sign & Date		Name	
Prepared by:	RAJESH RANJAN	Checked by:	ASHISH PANIGRAHI	Sign & Date		Sign & Date		Reviewed by:		Reviewed by:		Approved by:		Approved by:	
Reviewed by:	SUBHASHISH GUPTA	Reviewed by:	RK JAISWAL	Sign & Date		Sign & Date		Approved by:		Approved by:		Approved by:		Approved by:	



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MANUFACTURER/ BIDDER/ SUPPLIER
NAME & ADDRESS

part of Technical Specification, PE-TS-434-571-A001

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

DATE:

CUSTOMER : M/s PVUNL (A JV of M/s NTPC & M/s JBVNL)

DATE: 24.09.2020

PROJECT : 3x800 MW PATRATU STPS

DATE:

ITEM: GYPSUM DEWATERING SYSTEM

SYSTEM: FGD

SECTION:

SHEET 9 of 10



**3x800 MW PATRATU TPS
GYPSUM DEWATERING SYSTEM**

TECHNICAL SPECIFICATION

INPUT DRAWING LIST

SPECIFICATION No: PE-TS-434-571-A001

SECTION : I

SUB-SECTION : D

REV 01

SHEET 1 OF 1

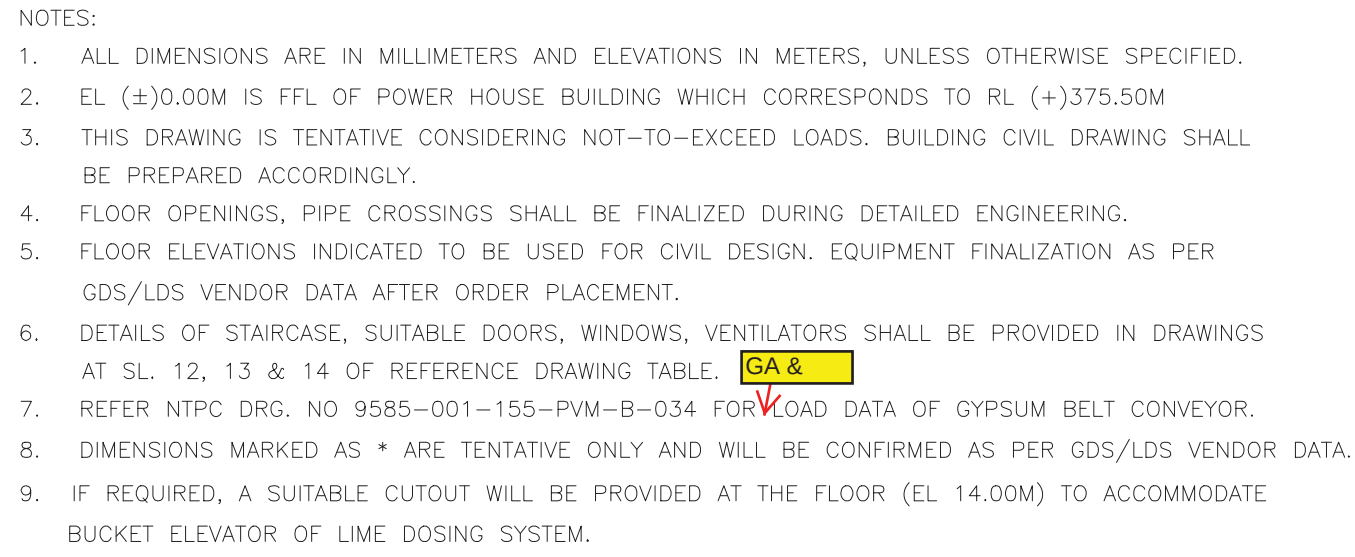
ANNEXURE-IV

INPUT DRAWINGS BY BHEL

Sl.No.	Drawing Title	PVUNL/NTPC Drawing No.
1.	General arrangement of Dewatering building	9585-001-109-PVM-B-046
2.	P&ID - Legends & Notes	9585-001-109-PVM-F-025
3.	P&ID of Primary Hydrocyclone with Dewatering System	9585-001-109-PVM-F-011
4.	P&ID of Vacuum Belt filter & Wash Tanks	9585-001-109-PVM-F-029
5.	Typical Scheme of Filtrate Extraction Pump	PE-FEP-00
6.	P&ID of Secondary Hydrocyclone	9585-001-109-PVM-F-026
7.	P&ID of Filtrate Water System	9585-001-109-PVM-F-015
8.	P&ID of Waste Water Discharge System	9585-001-109-PVM-F-014
9.	GA of Gypsum Handling Conveyor	9585-001-155-PVM-B-034
10.	Plant Layout of FGD System	9585-001-109-PVM-F-001
11.	Plot Plan	9585-001-999-POC-F-001

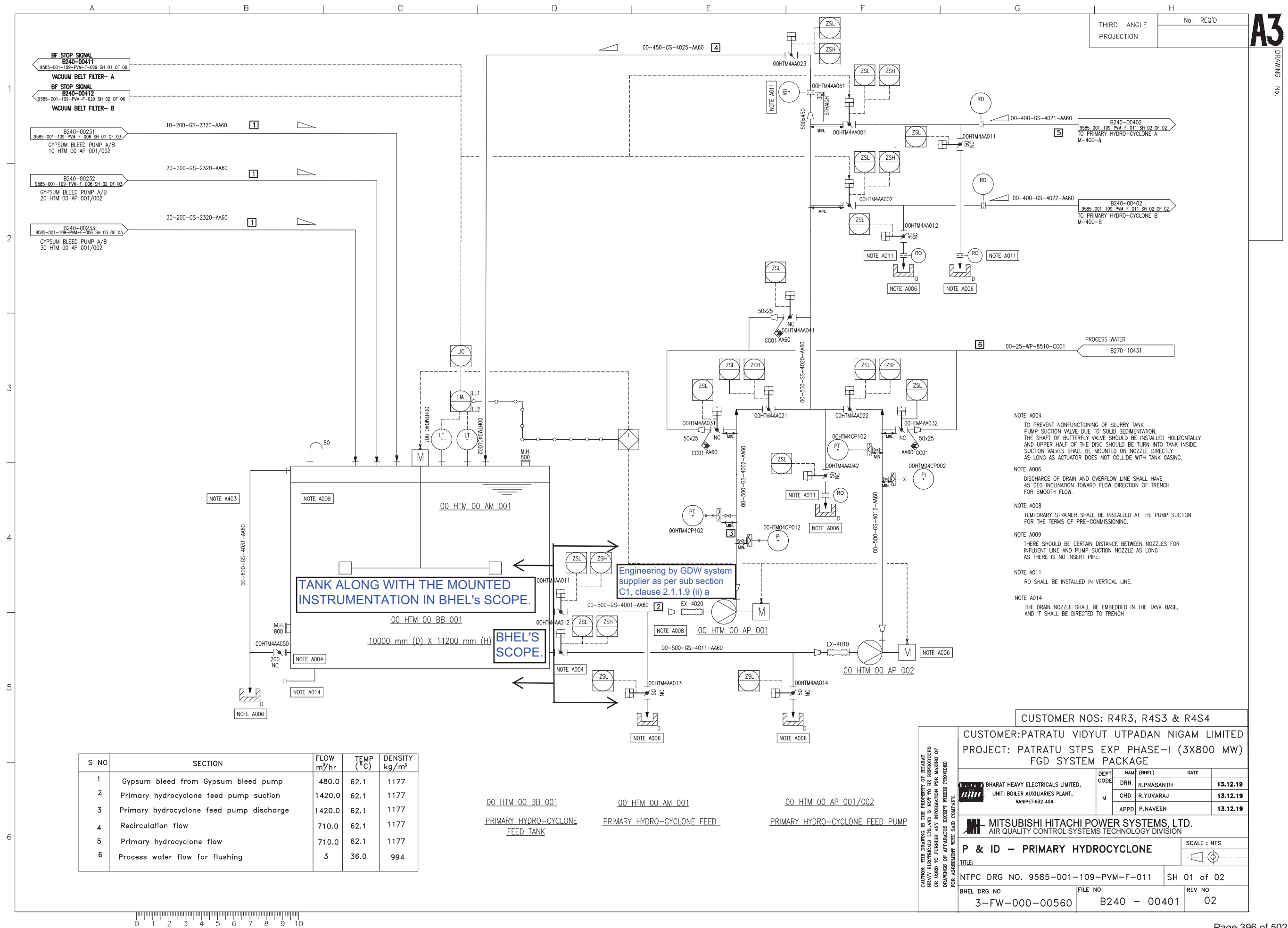
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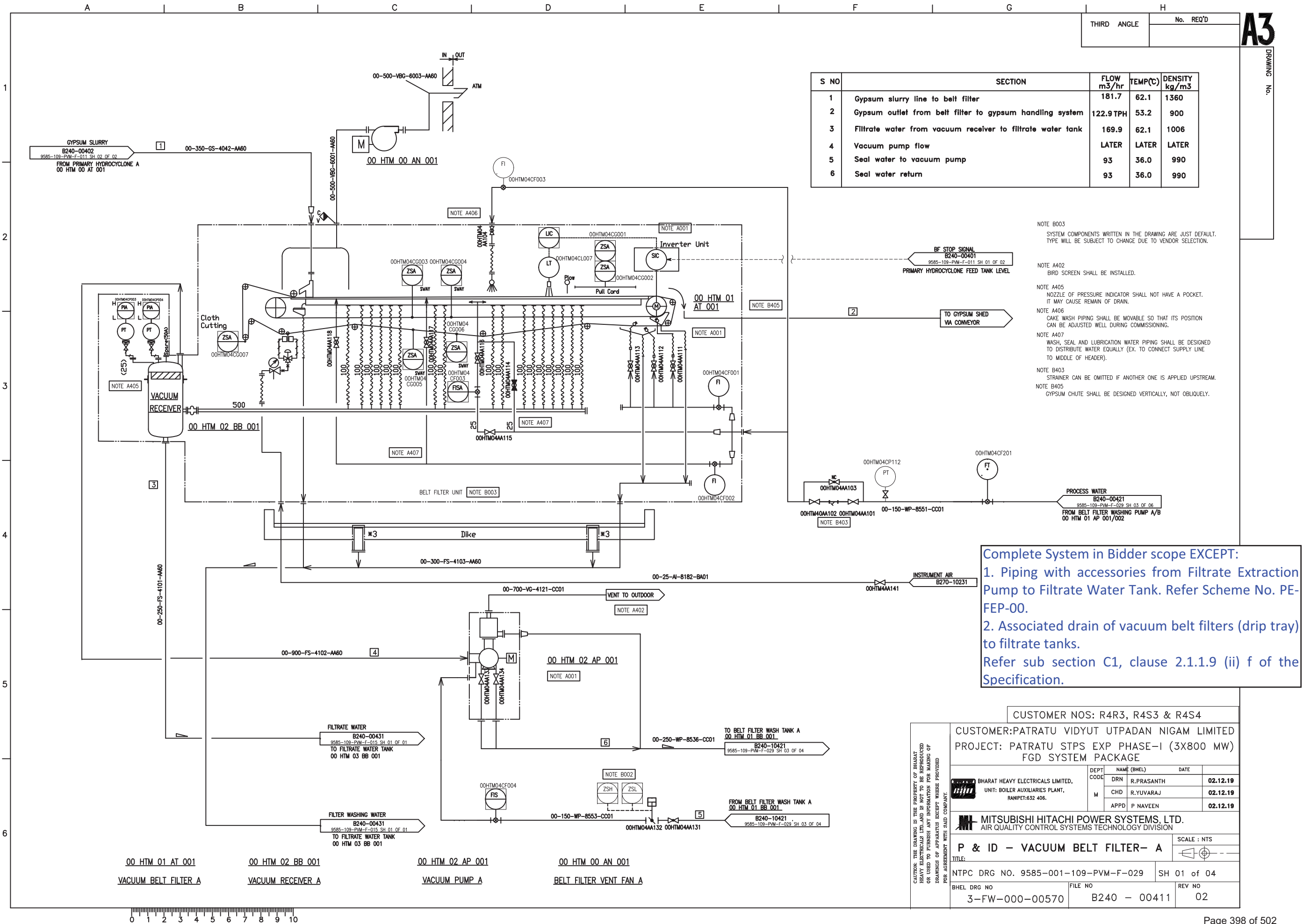
LIST OF REFERENCE DRAWINGS			
S/L NO	DRAWING NO.	DRAWING TITLE	AGENCY
1	9585-001-109-PWM-F-001	PLANT LAYOUT OF FGD SYSTEM	PEM/BAP
2	9585-001-109-PWM-V-037	GENERAL ARRANGEMENT & DATA SHEET OF LIME DOSSING SYSTEM INCLUDING SCHEME	PEM/VENDOR
3	9585-001-109-PWM-B-022	DATA SHEET & GENERAL ARRANGEMENT OF VACUUM BELT FILTER	PEM/VENDOR
4	9585-001-109-PWM-B-020	GA & DATA SHEET OF PRIMARY & SECONDARY DEWATERING HYDROCYCLONES	PEM/VENDOR
5	9585-001-155-PWM-L-003	FLOW DIAGRAM OF GYPSUM HANDLING SYSTEM	ISG
6	9585-001-155-PWM-B-034	GA OF CONVEYOR GBC 1A/1B	ISG/VENDOR
7	9585-001-155-PWM-B-019	GA DRAWING OF PRIMARY HYDRO CYCLONE FEED TANK	PEM/VENDOR
8	9585-001-155-PWM-B-023	GA DRAWING OF FILTRATE WATER TANK	PEM/VENDOR
9	9585-001-109-PWM-B-016	GA DRAWING OF SECONDARY HYDRO CYCLONE FEED TANK	PEM/VENDOR
10	9585-001-109-PWM-B-027	GA DRAWING OF WASTE WATER TANK	PEM/VENDOR
11	9585-001-109-PWM-B-023A (SHEET 3&4 OF 4)	GA DRAWING OF CAKE/BELT FILTER WASH TANKS	PEM/VENDOR
12	9585-001-315-PVC-C-1603	GYPSUM DEWATERING BLDG.- ARCHITECTURAL PLANS & FINISHING SCHEDULE	PEM
13	9585-001-315-PVC-C-1602	GYPSUM DEWATERING BLDG.- ARCHITECTURAL ELEVATIONS	PEM
14	9585-001-315-PVC-C-1604	GYPSUM DEWATERING BLDG.- ARCHITECTURAL SECTIONS	PEM

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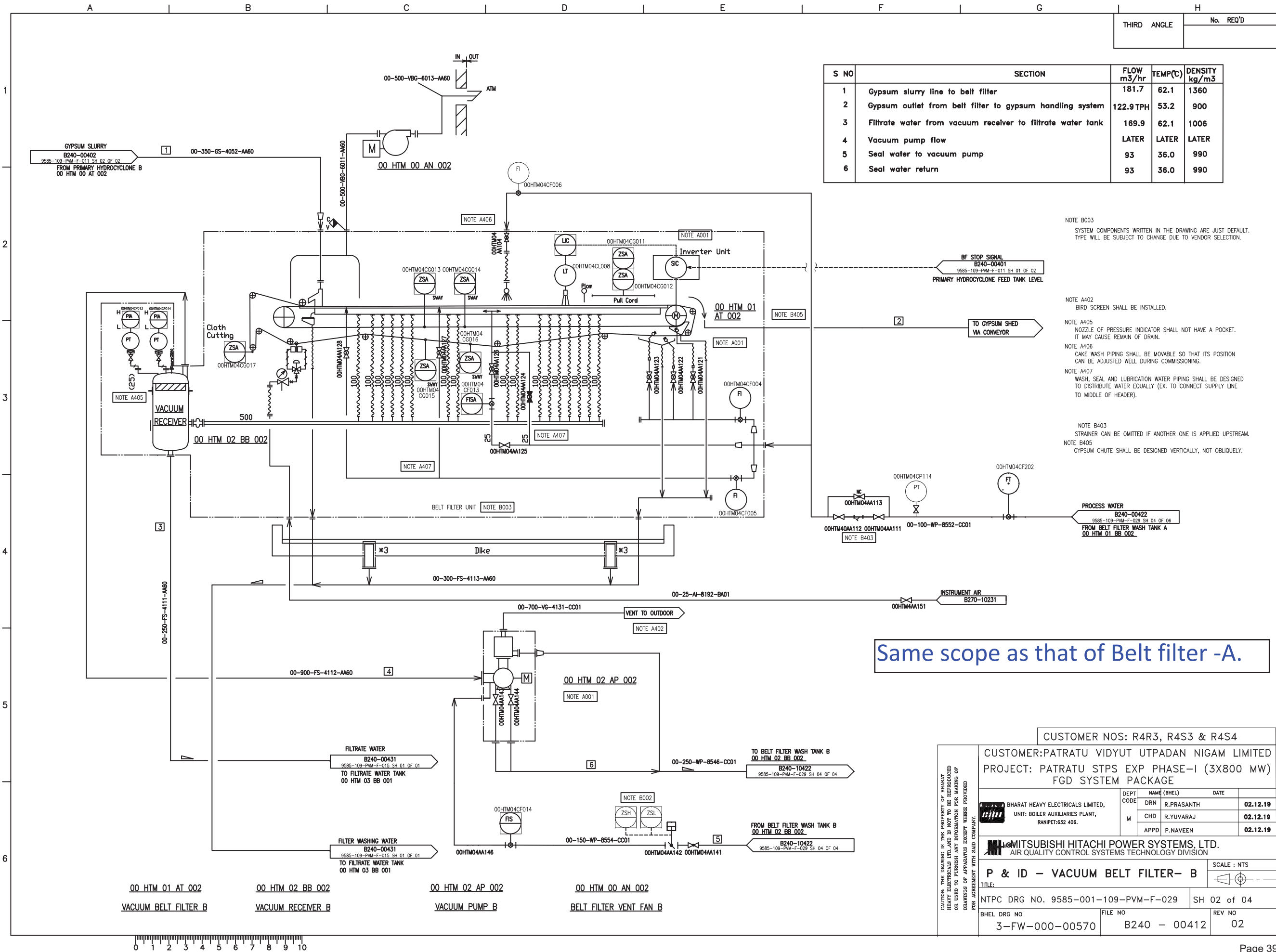




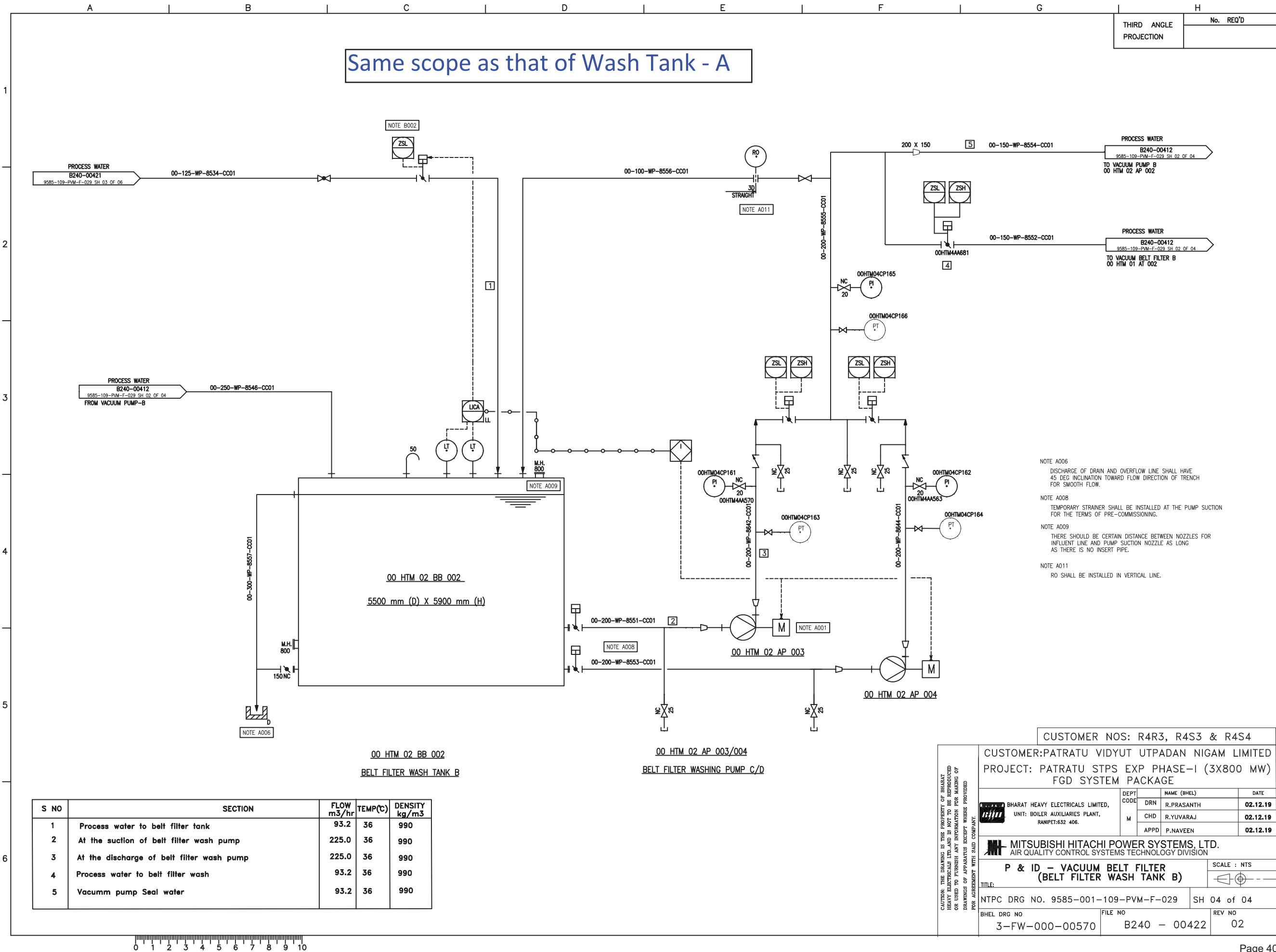
This is part of Technical Specification No. PE-TS-434-571-A001, Rev 01



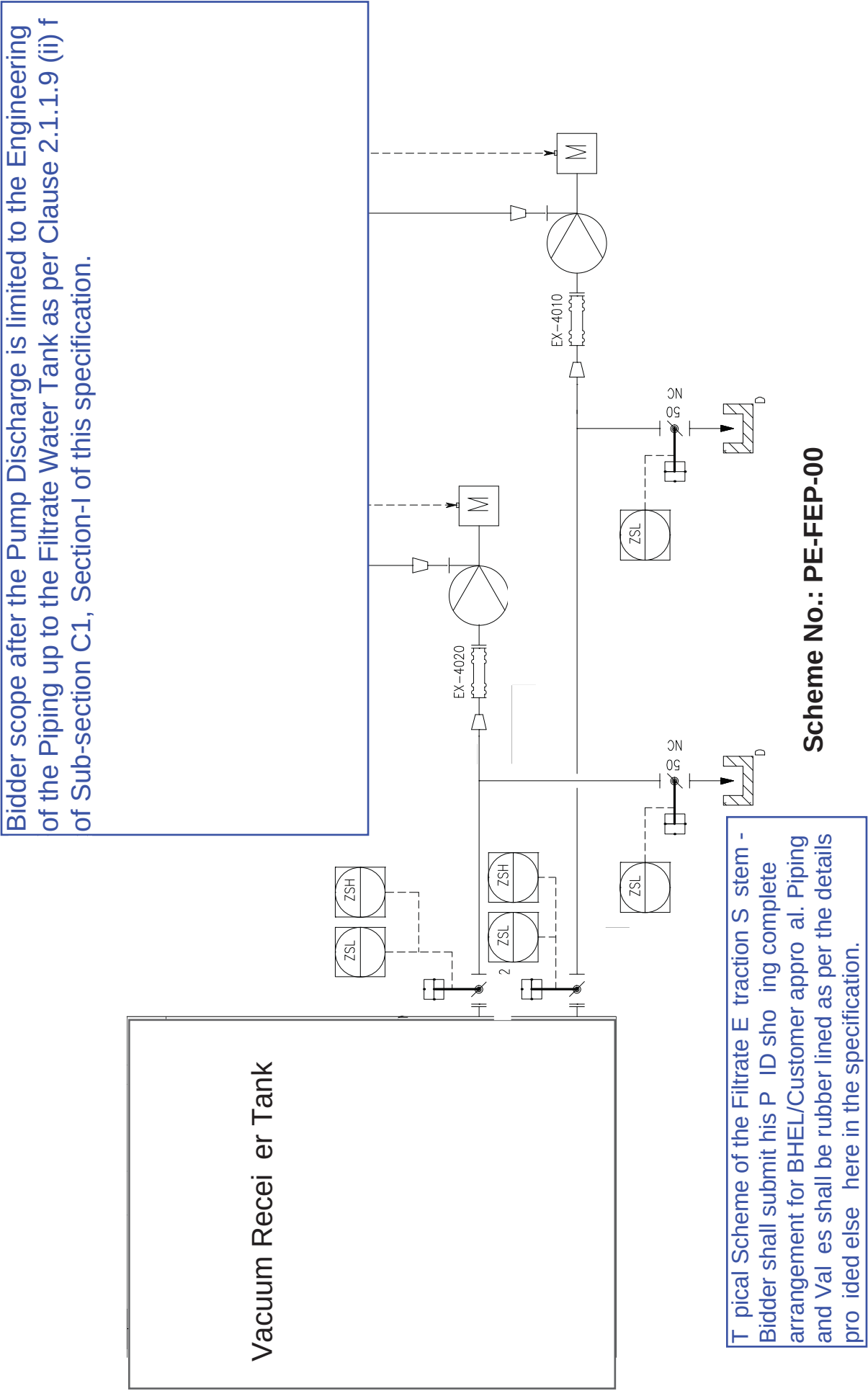
This is part of Technical Specification No. PE-TS-434-571-A001, Rev 01





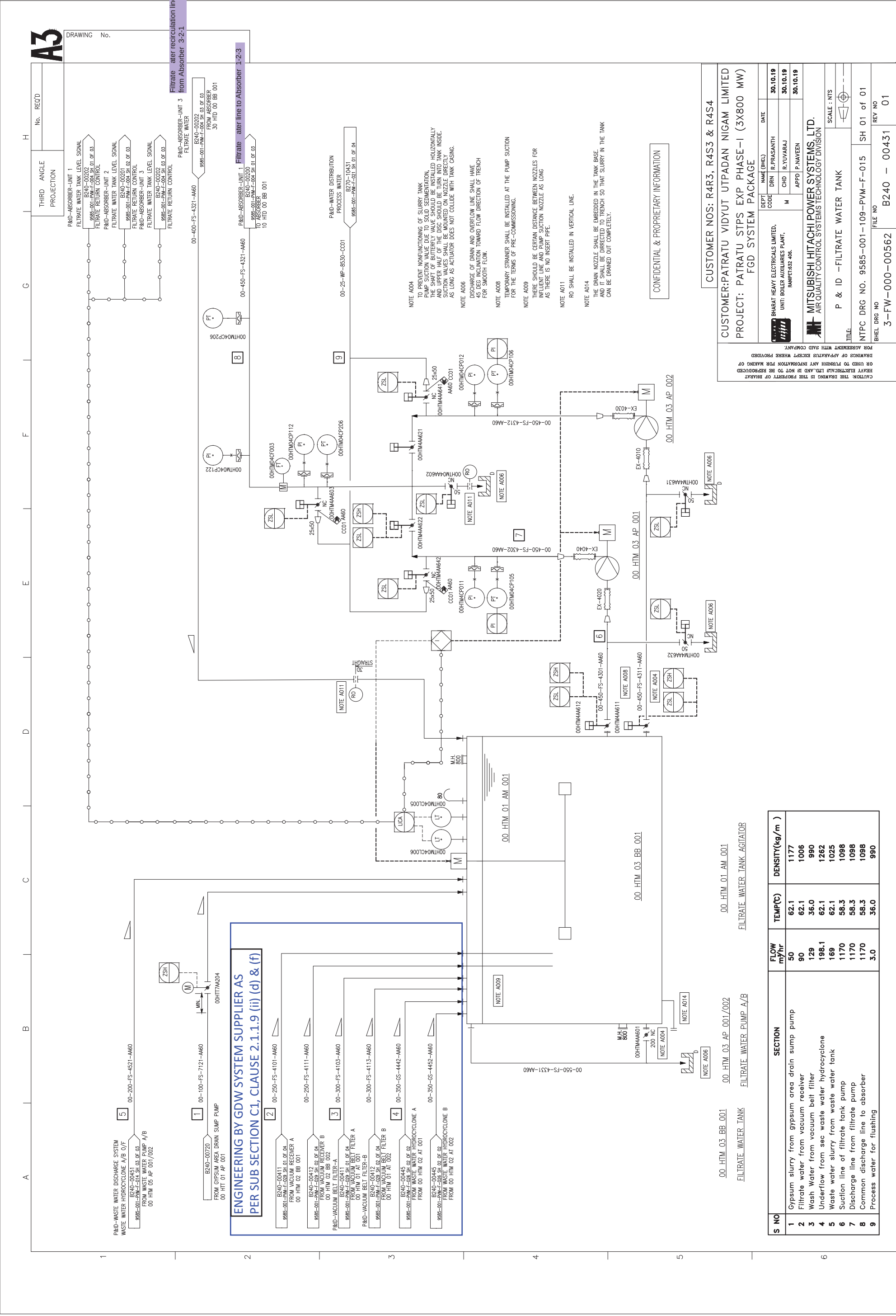


This is part of Technical Specification No. PE-TS-434-571-A001, Rev 01



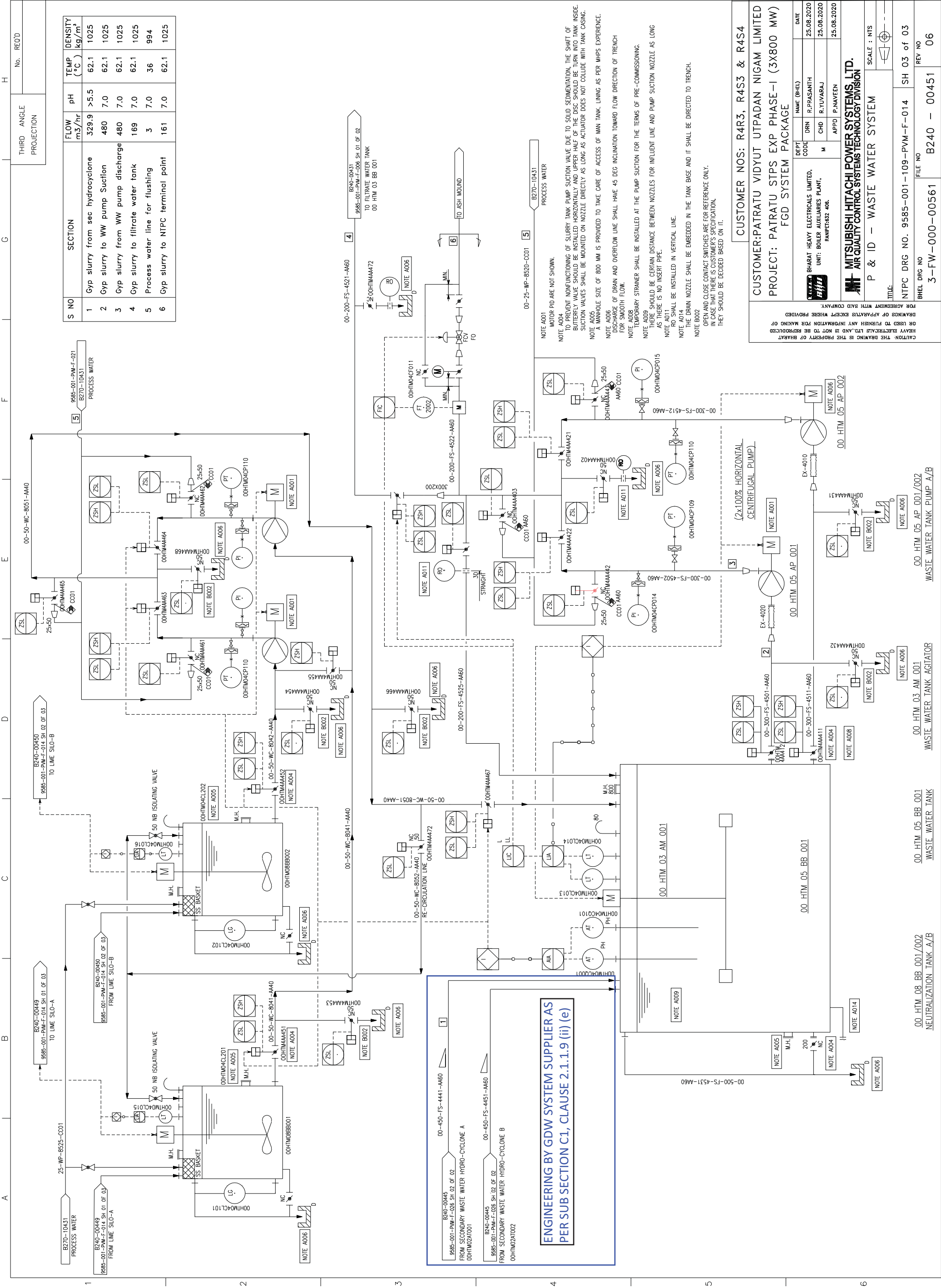






THIRD ANGLE PROJECTION	No. REQ'D

S NO	SECTION	FLOW m ³ /hr	pH	TEMP (°C)	DENSITY kg/m ³
1	Gyp slurry from sec hydrocyclone	323.9	>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



CUSTOMER NOS: R4R3, R4S3 & R4S4

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

DEPT CODE	NAME (BHEL)	DATE
DRN	R.PRASANATH	25.08.2020
CHD	R.YUVARAJ	25.08.2020
APPD	P.NAVEEN	25.08.2020



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

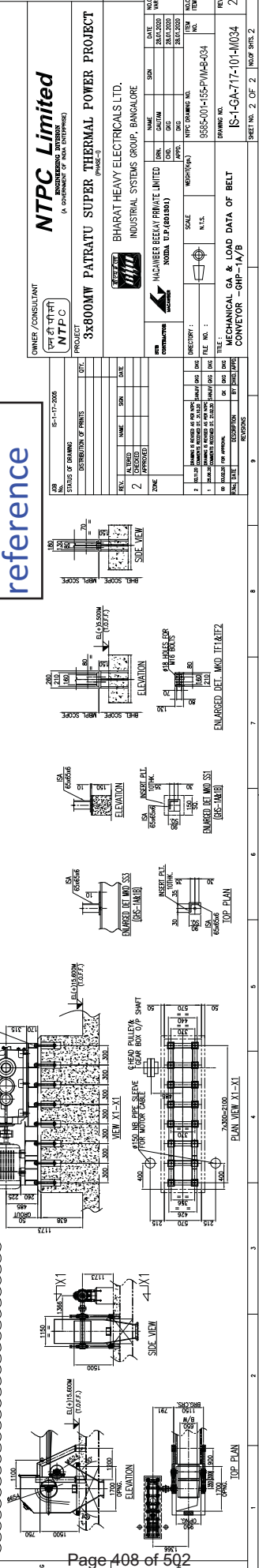
P & ID – WASTE WATER SYSTEM

NTPC DRG NO. 9585-001-109-PVM-F-014

PHL DRG NO	FILE NO
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IS-1-GA-717-101-M034

[illegible]

JOB	S-1-T-2008
STATUS OF BIDDING	
DATE OF BIDDING	
DISTRIBUTION OF PRINTS	DTL
PROJECT	
NTPC Limited ENGINEERING INTERIOR (A GOVERNMENT OF INDIA ENTERPRISE)	
PATRATU SUPER THERMAL POWER PROJECT (PHASE-I) 3x800MW	

REV.	NAME	SIGN	DATE			
2	AUTHORIZED CHECKED					



BHARAT HEAVY ELECTRICALS LTD.
INDUSTRIAL SYSTEMS GROUP, BANGALORE

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