BHARAT HEAVY ELECTRICALS LIMITED, JHANSI

ON-CUM COMPLIANCE CERTIFICATE FOR RENOVATION ,RETROFITTING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118

M DRYING PLANT 2293

--7197with Annex. I-IV

PECIFICATION No

BAY-9

OCATION

01SET

UANTITY

NOTE :

1. VENDOR must submit complete information against clause No. 13 (Qualifying condition). The offer meeting this clause would only be processed.
2. The " offered" Column and where applicable, the " Deviations" Column of this format shall be filled in by the VENDOR and submitted along with the offer.Technical details also submitted with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specification / requirements shall be treated as non - compliance.
3. The offer and all documents enclosed with offer should be in English language only.

NAME & ADDRESS OF THE SUPPLIER :

CONTACT PERSON'S NAME

TELEPHONE NOS.:

E-MAIL ADDRESS :

SCOPE :

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
1.0	**WORK PIECE MATERIAL**		VENDOR TO NOTE			
	Details of Existing Three vessels (2117,2118 & 2293),System & process are as per attached Annex.I & II					
2.0	**SCOPE**					
2.1	This specification governs the quality requirements of design, manufacturing,supply,installation ,commissioning & proving of job at BHEL JHANSI PLANT(with material/scope of supply) in all respect for RENOVATION AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293		VENDOR TO CONFIRM			
2.2	**RENOVATION ,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293 USED FOR THE PROCESSING OF TRASFORMER AS PER DETAILS GIVEN BELOW** A. SCOPE OF SUPPLY: B. MAKE OF ITEMS C. SCOPE OF WORK:		VENDOR TO CONFIRM			
2.3	**OPTIONAL PRICE IS REQUESTED FOR FOLLOWING ITEMS SEPERATELY**					
(a)	Compressed Air as per DIN - ISO 8573-1 — Supply, installation & commissioning of Refrigerant type Air dryer of suitable capacity for VPD 2117 & 2118	1	VENDOR TO CONFIRM			
(b)	Heat Insulation — Supply & installation of Heat Insulation & aluminium cladding of VDP 2293 in totality	1	VENDOR TO CONFIRM			
©	Winch Drive for Job Loading Trolley — Supply, installation & commissioning of winch drive with wire rope for 150 Ton capacity Job Trolley of VPD 2118 & 2118.	2	VENDOR TO CONFIRM			
3.0	**SPECIFICATION**					
A. SCOPE OF SUPPLY:						
a) VAPOUR PHASE DRYING PLANT 2117 & 2118(SCOPE OF SUPPLY)						
Sr.No	Items			Qty. Reqd. (Min.)		
1	Solvent storage tank with piping up to plant (Common for both Autoclave)	1.1	level sensor for continuous level measurement (Suitable for tank height.)	1	VENDOR TO CONFIRM	
		1.2	line isolation E.P on/off valve (for solvent application)	1	VENDOR TO CONFIRM	
		1.3	Line flow control valve for Solvent application	1	VENDOR TO CONFIRM	
2	Evaporator system appro.300KW with interconnecting piping. (Common for both Autoclave)	2.1	Evaporator - 300 KW (Falling Thin film Evaporator with visual flow indicator). To optimize system should run this Evaporator from 50 KW to 300 KW. Distillation with autoclave in circuit & distillation without autoclave in circuit. No explosion proof room req.)	1	VENDOR TO CONFIRM	
		2.2	Solvent flow control E.P valve with Positioner control.	1	VENDOR TO CONFIRM	
		2.3	Flow meter. (for solvent Flow measurement.)	1	VENDOR TO CONFIRM	
		2.4	E.P. Shut off valve.	2	VENDOR TO CONFIRM	
		2.5	PT-100 temperature sensor for evaporator	1	VENDOR TO CONFIRM	
		2.6	E.P. ball Valve for distillation	1	VENDOR TO CONFIRM	
		2.7	Evaporator isolation valve (E.P on/off valve)	1	VENDOR TO CONFIRM	
3	Condensation & separation System with inter connecting piping (Common for both Autoclave)	3.1	Main Condenser with auto drain system. (Capacity 240 KW, shell & tube type, design pr. 0.1 mbar)	1	VENDOR TO CONFIRM	
		3.2	On/Off valves (E.P ball valves for solvent application)	3	VENDOR TO CONFIRM	
		3.3	Positioners for butterfly valve (Autoclave pressure control.)	2	VENDOR TO CONFIRM	
		3.4	Pressure transmitter for Condenser pressure measurement (Range 0 to 1000 mbar.)	1	VENDOR TO CONFIRM	
		3.5	EP butterfly valves with Viton seal (From Autoclave to Main condenser)	2	VENDOR TO CONFIRM	
		3.6	Level switch for main condenser (Vibrating type level fork)	1	VENDOR TO CONFIRM	
		3.7	EP ball valve with positioner control (For main condenser pressure control.)	1	VENDOR TO CONFIRM	
		3.8	Sight glass assembly (toughened glasses for flow display)	1	VENDOR TO CONFIRM	
		3.9	Separating vessel (SS 304 tank with min. 1700 ltrs capacity)	1	VENDOR TO CONFIRM	
		3.10	Water level sensor for Continuous level measurement	1	VENDOR TO CONFIRM	
		3.11	Solvent high & low level switch (Vibrating type level fork)	2	VENDOR TO CONFIRM	
		3.12	Water drain system (Feeder pump, E.P on/off ball valve, Manual ball valve,PRV,Pressure gauge etc.)	1 no. each	VENDOR TO CONFIRM	
		3.13	Solvent drain system (Feeder pump, E.P on/off ball valve, Manual ball valve,PRV,Pressure gauge etc.)	1 no. each	VENDOR TO CONFIRM	
		3.14	Pressure transmitter Separator tank pressure measurement range 0 to 1000 mbar	1	VENDOR TO CONFIRM	
		3.15	Dial type Thermometer for Separator tank temp. measurement	1	VENDOR TO CONFIRM	
		3.16	Airing valve (Manually operated ball valve)	1	VENDOR TO CONFIRM	
4	Leakage Air / Pressure reduction pumping system (Common for both Autoclave)	4.1	Pump main isolation Valve (EP Ball valve)	1	VENDOR TO CONFIRM	
		4.2	Throttling valves (EP Ball valve)	1	VENDOR TO CONFIRM	
		4.3	Airing valve (Solenoid/EP valve for Vacuum pump)	1	VENDOR TO CONFIRM	
		4.4	Pt-100 Temp.sensor for vacuum pump temp. measurement	1	VENDOR TO CONFIRM	

21-6-2018 21/6/18 21.06.18 21/6/18

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
		4.5	Oil level switch for vacuum pump	1	VENDOR TO CONFIRM			
		4.6	Bellow for Rotary vacuum pump (Corrugated SS bellow with FE connection)	1	VENDOR TO CONFIRM			
		4.7	Exhaust condenser (0.5 M^2)	1	VENDOR TO CONFIRM			
		4.8	G.I piping up to pump		VENDOR TO CONFIRM			
5	Vacuum Pumping Unit for Autoclave 1 (2117)	5.1	Pre-condenser (9 M^2 condenser, Shell & tube type)	1	VENDOR TO CONFIRM			
		5.2	Inter-mediate condenser (6 M^2 condenser, Shell & tube type)	1	VENDOR TO CONFIRM			
		5.3	Automated Condenser drain system (EP ball valves 3 nos., Level switch 01 no. condenset Collecting tank 1 no.& condenset drain pump etc.)	1 set	VENDOR TO CONFIRM			
		5.4	Pump isolation valve (E.P Operated for vacuum application)	1	VENDOR TO CONFIRM			
		5.5	Throttling valves (E.P Operated for vacuum application)	1	VENDOR TO CONFIRM			
		5.6	Bellow for Rotary vacuum pump (Corrugated SS bellow with FE connection)	1	VENDOR TO CONFIRM			
		5.7	Exhaust condenser 0.5 m^2 area (Shell & tube type)	1	VENDOR TO CONFIRM			
		5.8	Inter connecting piping with pumping skid.	1 set	VENDOR TO CONFIRM			
		5.9	Autoclave main isolation valve (E.P butterfly valve with viton seal) for vcauum application	1	VENDOR TO CONFIRM			
		5.10	Airing valve (Solenoid/EP valve for Vacuum pump)	1	VENDOR TO CONFIRM			
		5.11	PT-100 Temp.sensor for vacuum pump temp. measurement	1	VENDOR TO CONFIRM			
		5.12	Oil level switch for vacuum pump	1	VENDOR TO CONFIRM			
		5.13	Pressure transmitter 1 to 1000 mbar for autoclave pressure measurement (during heating,IPR & Evacuation cycle)	1	VENDOR TO CONFIRM			
		5.14	PT-100 Temp.sensor for roots pump temp. measurement	1	VENDOR TO CONFIRM			
		5.15	Hygrometer (Dew Point sensor)	1	VENDOR TO CONFIRM			
		5.16	EP butterfly valve (Viton seal) below roots pump	1	VENDOR TO CONFIRM			
		5.17	Pressure transmitter (Fine vacuum measurement 0.1 mbar) for autoclave pressure measurement	1	VENDOR TO CONFIRM			
		5.18	Digital water extraction rate measuring instrument (10 ml/T/hr)	1 set	VENDOR TO CONFIRM			
		5.19	Measuring jar of 5 ml List count with isolation valves	1	VENDOR TO CONFIRM			
	Vacuum Pumping Unit for Autoclave 2 (2118)	6.1	Pre-condenser (9 M^2 condenser, Shell & tube type)	1'	VENDOR TO CONFIRM			
		6.2	Inter-mediate condenser (6 M^2 condenser, Shell & tube type)	1	VENDOR TO CONFIRM			
		6.3	Automated Condenser drain system (EP ball valves 3 nos., Level switch 01 no. condenset Collecting tank 1 no.& condenset drain pump etc.)	1 set	VENDOR TO CONFIRM			
		6.4	E.P Operated Pump isolation valve for Vacuum application	1	VENDOR TO CONFIRM			
		6.5	E.P Operated Throttling valves for Vacuum application	1	VENDOR TO CONFIRM			
		6.6	Bellow for Rotary vacuum pump (Corrugated SS bellow with FE connection)	1	VENDOR TO CONFIRM			
		6.7	Exhaust condenser 0.5 m^2 area (Shell & tube type)	1	VENDOR TO CONFIRM			
		6.8	Inter connecting piping with pumping skid.	1 set	VENDOR TO CONFIRM			
		6.9	Autoclave main isolation valve (E.P butterfly valve with viton seal) for vcauum application	1	VENDOR TO CONFIRM			
		6.10	Airing valve (Solenoid/EP valve for Vacuum pump)	1	VENDOR TO CONFIRM			
		6.11	Pt-100 Temp.sensor for vacuum pump temp. measurement	1	VENDOR TO CONFIRM			
		6.12	Oil level switch for vacuum pump	1	VENDOR TO CONFIRM			
		6.13	Pressure transmitter 1 to 1000 mbar for autoclave pressure measurement (during heating,IPR & Evacuation cycle)	1	VENDOR TO CONFIRM			
		6.14	PT-100 Temp.sensor for roots pump temp. measurement	1	VENDOR TO CONFIRM			
		6.15	Hygrometer (Dew Point sensor)	1	VENDOR TO CONFIRM			
		6.16	EP butterfly valve (Viton seal) below roots pump	1	VENDOR TO CONFIRM			
		6.17	Pressure transmitter (Fine vacuum measurement 0.1 mbar) for autoclave pressure measurement	1	VENDOR TO CONFIRM			
		6.18	Digital water extraction rate measuring instrument (10 ml/T/hr)	1 set	VENDOR TO CONFIRM			
		6.19	Measuring jar of 5 ml List count with isolation valves	1	VENDOR TO CONFIRM			
7	Autoclave 1 (2117) (7 M X 4.5 M X 5 M) LBH	7.1	Door movement hydraulic cylinder	1	VENDOR TO CONFIRM			
		7.2	chain,sprocket,roller bearings, limit switches, rollers with pins.	1 set	VENDOR TO CONFIRM			
		7.3	Door clamping cylinders (push-pull cylinders with Viton seal kit)	8	VENDOR TO CONFIRM			
		7.4	Lifting cylinders (cylinders with Viton seal kit)	4	VENDOR TO CONFIRM			
		7.5	Power pack With inter connecting piping for door clamping/de-clamping, open/close (120 ltrs oil tank, gear pump, relief valve,strainer,breather,check valve.accumalator,direction control valve, pressure switches etc.) working pr. 120 bar. Powerpack should have unloading feature with minimus points at various location to check hydraulic pressure.	1 set	VENDOR TO CONFIRM			
		7.6	Hose pipes & niddle valves for cylinder isolation	26	VENDOR TO CONFIRM			
		7.7	Limit switches for door open/close	2	VENDOR TO CONFIRM			
		7.8	limit switches for clamp/de clamp	2	VENDOR TO CONFIRM			
		7.9	limit switch for lifting cylinders	4	VENDOR TO CONFIRM			
		7.10	20430X30 mm dia. Viton O ring for autoclave door sealing to with stand 130 deg.C	1	VENDOR TO CONFIRM			
		7.11	Toughend Glass (Vessel inspection) with O rings	2 each	VENDOR TO CONFIRM			
		7.12	Epoxy type lead through of 12 terminal (For Job & wall temp. Sensors.)	3	VENDOR TO CONFIRM			
		7.13	Autoclave drain, Vapor in nozzle.	1	VENDOR TO CONFIRM			
		7.14	EP ball valve for vacuum break	1	VENDOR TO CONFIRM			
		7.15	McLeod gauge range 10 to 0.01 torr with isolation valve for vacuum measurement	2	VENDOR TO CONFIRM			
		7.16	PT-100 sensors for Job , wall Temp.& vapor temp (Three wire with PTFE cable)	8	VENDOR TO CONFIRM			
		7.17	Vessel internal illumintaion fitting with illumination light.	1 set	VENDOR TO CONFIRM			
8	Autoclave 2 (2118) (7 M	8.1	Door movement hydraulic cylinder	1	VENDOR TO CONFIRM			

21.6.2018 21/6/18 21.06.18 21/6/18

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	X 4.5 M X 5 M) LBH	8.2	chain,sprocket,roller bearings, limit switches, rollers with pins.	1 set	VENDOR TO CONFIRM			
		8.3	Door clamping cylinders (push-pull cylinders with Viton seal kit)	8	VENDOR TO CONFIRM			
		8.4	Lifting cylinders (cylinders with Viton seal kit)	4	VENDOR TO CONFIRM			
		8.5	Power pack With inter connecting piping for door clamping/de-clamping, open/close (120 ltrs oil tank, gear pump, relief valve,strainer,breather,check valve.accumalator,direction control valve, pressure switches etc.) working pr. 120 bar. Powerpack should have unloading feature with minimus points at various location to check hydraulic pressure.	1 set	VENDOR TO CONFIRM			
		8.6	Hose pipes & niddle valves for cylinder isolation	26	VENDOR TO CONFIRM			
		8.7	Limit switches for door open/close	2	VENDOR TO CONFIRM			
		8.8	limit switches for clamp/de clamp	2	VENDOR TO CONFIRM			
		8.9	limit switch for lifting cylinders	4	VENDOR TO CONFIRM			
		8.10	20430X30 mm dia. Viton O ring for autoclave door sealing to with stand 130 deg.C	1	VENDOR TO CONFIRM			
		8.11	Toughend Glass (Vessel inspection) with O rings	2 each	VENDOR TO CONFIRM			
		8.12	12 terminal Epoxy type lead through for Job & wall temp. Sensors.	3	VENDOR TO CONFIRM			
		8.13	Autoclave drain, Vapor in nozzle.	1	VENDOR TO CONFIRM			
		8.14	Vacuum break EP ball valve for vacuum break	1	VENDOR TO CONFIRM			
		8.15	McLeod gauge range 10 to 0.01 torr with isolation valve for vacuum measurement	2	VENDOR TO CONFIRM			
		8.16	Three wire PT-100 sensors with PTFE cable For Job , wall Temp.& vapor temp	8	VENDOR TO CONFIRM			
		8.17	Vessel internal illumintaion fitting with illumination light.	1 set	VENDOR TO CONFIRM			
9	Solvent drain system from Autoclave 1 (2117) & 2 (2118)	9.1	EP ball valve for Autoclave 1 (2117) & 2 solvent drain	4 no's	VENDOR TO CONFIRM			
		9.2	Dry run protection switch for pump (Vibrating fork type level switch)	1	VENDOR TO CONFIRM			
		9.3	Level switch for Autoclave (2117) & (2118)	2	VENDOR TO CONFIRM			
		9.4	Manual ball valve at pump out let	1	VENDOR TO CONFIRM			
~~10~~			BLANK					
11	Solvent feeding system (Common for both Autoclave)	11.1	Collecting vessel (3000 liters capacity, Operating temp.135 deg.C, Operating press.45 mbar.)	1	VENDOR TO CONFIRM			
		11.2	level sensor for continuous level measurement Suitable for tank height.	1	VENDOR TO CONFIRM			
		11.3	3 wire connection PT-100 sensors for tank temp.	1	VENDOR TO CONFIRM			
		11.4	Solvent high level switch (Vibrating type level fork)	1	VENDOR TO CONFIRM			
		11.5	Filter bags of 10 micron suitable for 135 deg.C	4	VENDOR TO CONFIRM			
		11.6	Dry run protection switch for pump dry run protection (Vibrating fork type level switch)	1	VENDOR TO CONFIRM			
		11.7	Solvent cooler (Appro.150 kw)	1	VENDOR TO CONFIRM			
		11.8	By pass valve (Manually operated)	1	VENDOR TO CONFIRM			
		11.9	On/Off valves (E.P valve)	4	VENDOR TO CONFIRM			
		11.10	Level switch (Appro.5000 lits. Capacity.)	1	VENDOR TO CONFIRM			
12	Autoclave 1 (2117) heating system	12.1	Pressure reducing valve (IBR approved)	1	VENDOR TO CONFIRM			
		12.2	Steam control valve (IBR approved)	1	VENDOR TO CONFIRM			
		12.3	Condenset trap module (IBR approved)	1	VENDOR TO CONFIRM			
		12.4	Pressure safety valve (IBR approved)	1	VENDOR TO CONFIRM			
		12.5	Pressure gauge (Bourdon tube)	2	VENDOR TO CONFIRM			
		12.6	Manual steam isolation valves (Gate valve)	2	VENDOR TO CONFIRM			
		12.7	Steam pressure measuring transmitter (range 0 to 6 kg/Cm^2)	1	VENDOR TO CONFIRM			
		12.8	Steam By-pass valve (IBR approved)	1	VENDOR TO CONFIRM			
		12.9	3 wire connection Resi.type Thermometer	1	VENDOR TO CONFIRM			
		12.10	Steam heating coils for wall temp.	1 set	VENDOR TO CONFIRM			
		12.11	Door heating blower of suitable capacity(Blower for door heating with acoustic enclosure)	1 no	VENDOR TO SPECIFY			
		12.12	Heat insulation for Autoclave, door & Aluminum cladding Insulation material: Padded mineral wool Insulation thickness: min. 100 mm	1 set	VENDOR TO CONFIRM			
13	Autoclave 2 (2118) Heating system	13.1	Pressure reducing valve (IBR approved)	1	VENDOR TO CONFIRM			
		13.2	Steam control valve (IBR approved)	1	VENDOR TO CONFIRM			
		13.3	Condenset trap module (IBR approved)	1	VENDOR TO CONFIRM			
		13.4	Pressure safety valve (IBR approved)	1	VENDOR TO CONFIRM			
		13.5	Pressure gauge (Bourdon tube)	2	VENDOR TO CONFIRM			
		13.6	Manual steam isolation valves (Gate valve)	2	VENDOR TO CONFIRM			
		13.7	Steam pressure measuring transmitter (range 0 to 6 kg/Cm^2)	1	VENDOR TO CONFIRM			
		13.8	Steam By-pass valve (IBR approved)	1	VENDOR TO CONFIRM			
		13.9	Resi.type Thermometer (3 wire connection)	1	VENDOR TO CONFIRM			
		13.10	Steam heating coils for wall temp.	1 set	VENDOR TO CONFIRM			
		13.11	Door heating blower (Blower for door heating with acoustic enclosure)	1 no	VENDOR TO CONFIRM			
		13.12	Heat insulation for Autoclave, door & Aluminum cladding Insulation material: Padded mineral wool Insulation thickness: min. 100 mm	1 set	VENDOR TO CONFIRM			
14	Evaporator heating system (Common for both Autoclave)	14.1	Steam control valve (IBR approved)	1	VENDOR TO CONFIRM			
		14.2	Condenset trap module (IBR approved)	1	VENDOR TO CONFIRM			
		14.3	Pressure safety valve (IBR approved)	1	VENDOR TO CONFIRM			
		14.4	Pressure gauge (Bourdon tube)	2	VENDOR TO CONFIRM			
		14.5	Manual steam isolation valves (Gate valve)	2	VENDOR TO CONFIRM			
		14.6	Steam pressure measuring transmitter (range 0 to 6 kg/Cm^2)	1	VENDOR TO CONFIRM			
		14.7	Steam By-pass valve (IBR approved)	1	VENDOR TO CONFIRM			
		14.8	Resi.type Thermometer (3 wire connection)	1	VENDOR TO CONFIRM			

21/6/18 21/6/18 21.06.18 21/6/18

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
15	Chilling system (Common for Both Autoclave)	15.1	Chiller unit: Minimum 75 TR (total) (2 nos. chillers (20 TR cap. Each) shall be provided by BHEL, 1 no. chiller (35 TR cap. Minimum, refrigerant R 407/R 22/R 134a) to be supplied by vendor) complete with suitable capacity cooling tower (suitable for 75 TR chiller and other cooling water requirements).	1	VENDOR TO CONFIRM			
		15.2	GI piping with Cold insulation (Nitrile rubber) from cooling tower to chiller & Vice- Versa	1	VENDOR TO CONFIRM			
		15.3	Secondary pump for system out let (Centrifugal pump of 25 M^3/hr. flow rate)	1	VENDOR TO CONFIRM			
		15.4	GI piping with Cold insulation (Nitrile rubber) from secondary pump to system in & out	1	VENDOR TO CONFIRM			
		15.5	Secondary pump inlet & outlet valve (Gate/ ball valves)	2	VENDOR TO CONFIRM			
		15.6	Pressure gauge at pump out let/in let (Bourdon tube (0 to 9 kg/cm^2))	2	VENDOR TO CONFIRM			
		15.7	Pressure/flow switch	6	VENDOR TO CONFIRM			
		15.8	3 wire connection Resi.type Thermometer	3	VENDOR TO CONFIRM			
		15.9	Glass tube type flow indicator	3	VENDOR TO CONFIRM			
		15.10	temp. gauges at in/out let line (Dial type thermometer 0 to 50 °C)	6	VENDOR TO CONFIRM			
		15.11	Valve for condensers isolation (EP ball valves 3 nos., Level switch 01 no. condenset Collecting tank 1 no.& condenset drain pump etc.)	6	VENDOR TO CONFIRM			
		15.12	Manual ball vales for condenser in/outlet	9	VENDOR TO CONFIRM			
		15.13	Header line with isolation valve at system out let pump (Manual ball valve)	3	VENDOR TO CONFIRM			
16	Cooling system (common for All vacuum pumps)	16.1	GI piping with Cold insulation (Nitrile rubber) from cooling tower to all rotary pumps	1	VENDOR TO CONFIRM			
17	**Compressed Air as per DIN - ISO 8573-1 (common for both Autoclave)**	17.1	BLANK					
		17.2	Automated moisture trap	1	VENDOR TO CONFIRM			
		17.3	Suitable capacity Air lubricator	1	VENDOR TO CONFIRM			
		17.4	Digital pressure gauge & actuated air inlet valve	1	VENDOR TO CONFIRM			
		17.5	Piping, tubing, FRL & isolation valves for all actuated valves	1 set	VENDOR TO CONFIRM			
		17.6	Pressure switch (0 to 9 kg/Cm^2)	2	VENDOR TO CONFIRM			
18	Oil filling system for both Autoclaves	18.1	EP valves for oil filling (EP ball valves)	6	VENDOR TO CONFIRM			
		18.2	High level switch (Fork type high level switch)	2	VENDOR TO CONFIRM			
19	Control system 2117 & 2118	19.1	MCC & Control Panel (Rittal make)	1	VENDOR TO CONFIRM			
		19.2	Industrial PC with configuration as below /or better: Processor: intel core I 5, RAM 4 GB or above, Hard Disk 1TB, Motherboard: intel /ASUS, Keyboard and mouse, LED Screen 19" or above, Fully loaded with Licensed SCADA for Plant operation & Maintenance, PLC programming licensed software (for supplied PLC)	1	VENDOR TO CONFIRM			
		19.3	UPS (2 KVA)	1	VENDOR TO CONFIRM			
		19.4	PLC : The PLC should be of Siemens/ABB/Alen-bradley make only.The PLC system should have facility for uploading and down loading of application logic program through remote PC.	1	VENDOR TO CONFIRM			
		19.5	The PLC Programming Licensed software for supplied PLC for troubleshooting/Backup/ prog restoration					
		19,6	AI : 24 (Minimum)		VENDOR TO CONFIRM			
		19.7	AO : 16 (Minimum)		VENDOR TO CONFIRM			
		19.8	DI : 160 (Minimum)		VENDOR TO CONFIRM			
		19.9	RTD : 48 (Minimum)		VENDOR TO CONFIRM			
		19.10	DO : 96 (Minimum)		VENDOR TO CONFIRM			
		19.11	MMIC (A0/A1 size with LED MIMIC)	1	VENDOR TO CONFIRM			
		19.12	Incomer panel (400 Amps)	1	VENDOR TO CONFIRM			
		19.13	Manual switches (To operate plant in manual mode)	1 Lot.	VENDOR TO CONFIRM			
		19.14	Printer (A4 size B&W Laser printer)	1	VENDOR TO CONFIRM			
		19.15	Control ,Power wiring With cable & cable tray (For all sensors & instruments)	1 Lot.	VENDOR TO CONFIRM			
		19.16	Audio visual alarm for all the faults/interruption	2 Lot.	VENDOR TO CONFIRM			
		19.17	The Programming cables along with adapters required for communicating PC with both PLC as well as SCADA system shall be supplied.	3 Lot.	VENDOR TO CONFIRM			
		19.18	The PC-PLC communication cable with necessary hardware/line drivers for remote operation/ monitoring of both plant and PLC system	4 Lot.	VENDOR TO CONFIRM			
		19.19	Pressure measuring system (vacuum transmitter) with filter mesh, Measurement range : 1000 m Bar – 0.001mBar A. EDWARDS/LEYBOLD MAKE FOR FINE VACUUM MEASUREMENT OF MAIN VESSEL TANK.	4.nos	VENDOR TO CONFIRM			
		19.20	B. JUMO / WIKA MAKE FOR COURSE MEASUREMENT AND ROOT PUMP SWITCHING WITH MOUNTING AND FITTING ACCESSORIES.	8 nos.	VENDOR TO CONFIRM			
		19.21	Vacuum sensor supply cable	400 Meters	VENDOR TO CONFIRM			
		19.22	Clamping Ring and centring ring with filter for Edward/Leybold Vacuum transmitter	6 Nos. each	VENDOR TO CONFIRM			
		19.23	Control panel (HMI) with 14"touch screen having full operational control	1 Nos.	VENDOR TO CONFIRM			
		19.24	Temperature measuring through RTD Sensors for vessel/job/steam etc.	30 Nos.	VENDOR TO CONFIRM			
		19.25	Lead through terminal with 12 terminals for PT-100 Sensor with suitable sealing kits and mounting accessories.	6 Nos.	VENDOR TO CONFIRM			
		19.26	Compensating cable for RTD sensor Extension	500 Meters	VENDOR TO CONFIRM			

21-6-2018 21/6/18 21.06.18 21/6/18

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
		19.27	Dial Type temperature gauges with thermo well for pipe line mounting.Range 0 to 150 Deg.Cen. Range 0 to 50 Deg.Cen.	10.nos 10 nos.	VENDOR TO CONFIRM			
		19.28	Control panel with Suitable contactors, fuses, MCB's, push buttons, indication lamps, switchgears etc. , PLC, HMI and RTD converters as per requirement.	1 set	VENDOR TO CONFIRM			
		19.29	Field Control wiring and control panel wiring with cable tray and accessories as required	1 set	VENDOR TO CONFIRM			
		19.30	Limit switches for door open / close detection	10 Nos.	VENDOR TO CONFIRM			
		19.31	Pressure gauge for air and steam pressure , Range : 0-10 Kg/cm sq. with mountings and fittings	6 Nos. each	VENDOR TO CONFIRM			
		19.32	Water flow switch (in main cooling water outlet line)	6 Nos.	VENDOR TO CONFIRM			
		19.33	Temperature Gauges pipe line mounted for chilling water inlet /outlet (0 to 50 °C.)	6 Nos.	VENDOR TO CONFIRM			
		19.34	Interlocking Temperature sensor for monitoring Vacuum pump surface temperature	6 Nos.	VENDOR TO CONFIRM			
		~~19.35~~	~~BLANK~~					
		19.36	Steam pressure transmitter for steam line mounting and recording of steam pressure in SCADA system. Accessories required (SS Syphon / clamps) for mounting of transmitter is to supplied.	2 Nos.	VENDOR TO CONFIRM			
		19.37	The SCADA Programming Licensed software for supplied SCADA for troubleshooting/Backup/ Prog restoration.	1 set	VENDOR TO CONFIRM			
~~20~~		20.1	3.5 digit True RMS digital multi meters (Fluke/keysight/hioki only)	1No.	VENDOR TO CONFIRM			

) VACUUM DRYING PLANT 2293(SCOPE OF SUPPLY)

Sr.No	Items		Savas Scope	Qty.				
21	VDP Autoclave (2293) (10 M X 4.5 M X 5.5 M) LBH	21.1	Door drive winch assembly, door slide rollers (08),Bearing & pins (08 sets), Limit switches (2)	1 set	VENDOR TO CONFIRM			
		21.2	Door clamping cylinders (push-pull cylinders with Viton seal kit, Make veljan)	8	VENDOR TO CONFIRM			
		21.3	Lifting cylinders (cylinders with Viton seal kit)	4	VENDOR TO CONFIRM			
		21.4	Power pack With inter connecting piping for door clamping/de-clamping, (120 ltrs oil tank, gear pump, relief valve,strainer,breather,check valve.accumalator,direction control valve, pressure switches etc.) working pr. 120 bar. Powerpack should have unloading feature with minimus points at various location to check hydraulic pressure.	1 set	VENDOR TO CONFIRM				
		21.5	Hose pipes & valves for cylinder isolation	24	VENDOR TO CONFIRM			
		21.6	limit switches for clamp/de clamp	6	VENDOR TO CONFIRM			
		21.7	limit switch for lifting cylinders	2	VENDOR TO CONFIRM			
		21.8	22333X32 mm dia. & 21893X32 mm dia Viton O ring for autoclave door sealing to with stand 130 deg.C	2	VENDOR TO CONFIRM			
		21.9	Toughend Glass with O rings	6	VENDOR TO CONFIRM			
		21.10	Epoxy type 12 terminal lead through for Job & wall temp. Sensors.	2	VENDOR TO CONFIRM			
		21.11	Main isolation valve (EP butterfly valve with viton seal)	1	VENDOR TO CONFIRM			
		21.12	Vacuum break EP valve	1	VENDOR TO CONFIRM			
		21.13	McLeod gauge for vacuum measurement (10 torr to 0.01 torr)	2	VENDOR TO CONFIRM			
		21.14	Three wire PT-100 sensors with PTFE cable for Job, wall temp. & Air temp. Sensors.	8	VENDOR TO CONFIRM			
22	Heating system for VDP Autoclave (2293)	22.1	Pressure reducing valve (IBR approved)	1	VENDOR TO CONFIRM			
		22.2	Steam control valve (IBR approved)	1	VENDOR TO CONFIRM			
		22.3	Condenset trap module (IBR approved)	1	VENDOR TO CONFIRM			
		22.4	Pressure safety valve (IBR approved)	1	VENDOR TO CONFIRM			
		22.5	Pressure gauge (Bourdon tube)	2	VENDOR TO CONFIRM			
		22.6	Manual steam isolation valves (Gate valve)	1	VENDOR TO CONFIRM			
		22.7	Steam By-pass valve (IBR approved)	1	VENDOR TO CONFIRM			
		22.8	3 wire connection Resi.type Thermometer	1	VENDOR TO CONFIRM			
		22.9	Steam Heating coils (Radiator coils inside the Autoclave to heat the charge)	1 set	VENDOR TO CONFIRM			
		22.10	Air circulating Fans with all necessary arrangments for air circulation eg. Baffle plates etc. (Plug type Air circulating Fans of Air flow12000 M^3/hr,3.7 KW, With H class Motor, With Direct coupled, Fan Speed 1440 RPM)	4	VENDOR TO CONFIRM			
		22.11	Door heating blower (Blower for door heating with acoustic enclosure)	1 no	VENDOR TO SPECIFY			
		22.12	Repairing of damaged heat insulation with aluminium cladding of autoclave icluding door.	1 set	VENDOR TO CONFIRM			
23	Vacuum Pumping Unit for VDP Autoclave (2293)	23.1	Main condenser (6 M^2 condenser, Shell & tube type)	1	VENDOR TO CONFIRM			
		23.2	Inter-mediate condenser (9 M^2 condenser, Shell & tube type)	1	VENDOR TO CONFIRM			
		23.3	Automated Condenser drain system (EP ball valves 3 nos., Level switch 01 no. condenset Collecting tank 1 no.& condenset drain pump etc.) One for Main & other for intermediate drain	2 set	VENDOR TO CONFIRM			
		23.4	E.P Operated Pump isolation valve for Vacuum application	2	VENDOR TO CONFIRM			
		23.5	E.P Operated Throttling valves for Vacuum application	2	VENDOR TO CONFIRM			
		23.6	Bellow for Rotary vacuum pump (Corrugated SS bellow with FE connection)	2	VENDOR TO CONFIRM			
		23.7	Exhaust condenser (1 M^2)	1	VENDOR TO CONFIRM			
		23.8	Inter connecting piping with pumping skid.	1 set	VENDOR TO CONFIRM			
		23.9	Pirani Gauge Fine vacuum measurement 1000 to 0.01 mbar for autoclave pressure measurement	1	VENDOR TO CONFIRM			
		23.10	Airing valve (Solenoid/EP valve for Vacuum pump)	2	VENDOR TO CONFIRM			
		23.11	PT-100 Temp.sensor for vacuum pump temp. measurement	2	VENDOR TO CONFIRM			
		23.12	Oil level switch for vacuum pump	2	VENDOR TO CONFIRM			
		23.13	Pressure transmitter Rough vacuum measurement 1 to 1000 mbar for roots pumps cut off	1	VENDOR TO CONFIRM			

21/6/18 21/6/18 21.06.18 Sajeev Agarwal 21/6/18

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
		23.14	PT-100 Temp.sensor for roots pump temp. measurement	1	VENDOR TO CONFIRM			
		23.15	Pressure transmitter fine vacuum measurement(0.1 mbar) for autoclave pressure measurement	1	VENDOR TO CONFIRM			
		23.16	Exhaust condenser 0.5 m^2 area (Shell & tube type)	1	VENDOR TO CONFIRM			
		23.17	Hygrometer (Dew Point sensor)	1	VENDOR TO CONFIRM			
		23.18	Digital water extraction rate measuring instrument (10 ml/T/hr)	1 set	VENDOR TO CONFIRM			
		23.19	Measuring jar of 5 ml List count with valves	1	VENDOR TO CONFIRM			
~~24~~			~~BLANK~~					
25	Chilling system	25.1	GI piping with Cold insulation (Nitrile rubber)from cooling tower to chiller & Vice- Versa	1	VENDOR TO CONFIRM			
		25.2	GI piping with Cold insulation (Nitrile rubber) from chiller to Storage tank & Vice- Versa	1	VENDOR TO CONFIRM			
		25.3	Secondary pump for system out let (Centrifugal pump)	1	VENDOR TO CONFIRM			
		25.4	GI piping with Cold insulation (Nitrile rubber) from secondary pump to system in & out	1	VENDOR TO CONFIRM			
		25.5	Secondary pump inlet & outlet valve (Gate/ ball valves)	2	VENDOR TO CONFIRM			
		25.6	Pressure gauge at pump out let/in let (Bourdon tube (0 to 9 kg/cm^2))	2	VENDOR TO CONFIRM			
		25.7	Flow switch (Pressure/flow switch)	1	VENDOR TO CONFIRM			
		25.8	3 wire connection Resi.type Thermometer	2	VENDOR TO CONFIRM			
		25.9	Glass tube type flow indicator	1	VENDOR TO CONFIRM			
		25.10	temp. gauges at in/out let line (Dial type thermometer 0 to 50 °C)	4	VENDOR TO CONFIRM			
		25.11	Valve for condensers isolation (EP ball valves 3 nos., Level switch 01 no. condenset Collecting tank 1 no.& condenset drain pump etc.)	2	VENDOR TO CONFIRM			
		25.12	Manual ball vales for condenser in/outlet	4	VENDOR TO CONFIRM			
26	Cooling system Rotary vacuum pumps	26.1	GI piping with Cold insulation (Nitrile rubber) from cooling tower to all rotary pumps	1	VENDOR TO CONFIRM			
27	**Compressed Air as per DIN - ISO 8573-1**	27.1	Refrigerant type Air dryer of suitable capacity	1	VENDOR TO CONFIRM			
		27.2	Automated moisture trap	1	VENDOR TO CONFIRM			
		27.3	Suitable capacity Air lubricator	1	VENDOR TO CONFIRM			
		27.4	Digital pressure gauge & actuated air inlet valve	1	VENDOR TO CONFIRM			
		27.5	Piping, tubing, FRL & isolation valves for all actuated valves	1 set	VENDOR TO CONFIRM			
		27.6	Pressure switch (0 to 9 kg/Cm^2)	2	VENDOR TO CONFIRM			
~~28~~	Scavenging system	28.1	Scavenging blower to replace Humid air during heating cycle (Suitable capacity)	1	VENDOR TO CONFIRM			
		28.2	Heaters (to heat air up to 60 deg.C)	1	VENDOR TO CONFIRM			
		28.3	Activated Alumina & Silica Jel (Suitable capacity)	1	VENDOR TO CONFIRM			
		28.4	Scavenging chamber (Suitable capacity)	1	VENDOR TO CONFIRM			
		28.5	3wire temp. sensor for temp. Measurement	1	VENDOR TO CONFIRM			
		28.6	Valve for regeneration (EP ball valve)	1	VENDOR TO CONFIRM			
		28.7	Inlet & out let valve (Manual & EP ball Valve)	1 each	VENDOR TO CONFIRM			
		28.8	Thermostat (Piping, tubing, FRL & isolation valves for all actuated valves)	1 set	VENDOR TO CONFIRM			
		~~28.9~~	~~BLANK~~					
29	Oil filling & drain system	29.1	EP valves for oil filling & drain valves (EP ball valves)	12	VENDOR TO CONFIRM			
		29.2	drain pump (Leak proof centrifugal pump of 84 LPM flow rate, head 30 m.)	1	VENDOR TO CONFIRM			
		29.3	High level switch (Fork type high level switch)	2	VENDOR TO CONFIRM			
30	Control system	30.1	MCC & Control Panel (Rittal/BCH make)	1	VENDOR TO CONFIRM			
		30.2	Industrial PC with configuration as below /or better: Processor: intel core I 5, RAM 4 GB or above, Hard Disk 1TB, Motherboard: intel /ASUS, Keyboard and mouse, LED Screen 19" or above, Fully loaded with Licensed SCADA for Plant operation & Maintenance, PLC programming licensed software(for supplied PLC)	1	VENDOR TO CONFIRM			
		30.3	UPS (2 KVA)	1	VENDOR TO CONFIRM			
		30.4	PLC : The PLC should be of Siemens/ABB/Alen-bradley make only.The PLC system should have facility for uploading and down loading of application logic program through remote PC.	1	VENDOR TO CONFIRM			
		30.5	The PLC Programming Licensed software for supplied PLC for troubleshooting/Backup/ prog restoration		VENDOR TO CONFIRM			
		30.5	AI : 8 (Minimum)		VENDOR TO CONFIRM			
		30.6	AO : 8 (Minimum)		VENDOR TO CONFIRM			
		30.7	DI : 80 (Minimum)		VENDOR TO CONFIRM			
		30.8	RTD : 48 (Minimum)		VENDOR TO CONFIRM			
		30.9	DO : 24 (Minimum)		VENDOR TO CONFIRM			
		30.10	MMIC (A0/A1 size with LED MIMIC)	1	VENDOR TO CONFIRM			
		30.11	Incomer panel (200 Amps)	1	VENDOR TO CONFIRM			
		30.12	Manual switches (To operate plant in manual mode)	1 set	VENDOR TO CONFIRM			
		30.13	Printer (A4 size B&W Laser printer)	1	VENDOR TO CONFIRM			
		30.14	Control ,Power wiring With cable & cable tray (For all sensors & instruments)	1 set	VENDOR TO CONFIRM			
		30.15	Audio visual alarm for all the faults/interruption	1 set	VENDOR TO CONFIRM			
		30.16	The Programming cables along with adapters required for communicating PC with both PLC as well as SCADA system shall be supplied.	1 set	VENDOR TO CONFIRM			
		30.17	PLC-PC Communication cable with necessary hardware / line drivers for remote operation / monitoring of plant and PLC system.	100 meters	VENDOR TO CONFIRM			
		30.18	Pressure measuring system (vacuum transmitter) with filter mesh, Measurement range : 1000 mBar – 0.001mBar EDWARDS/LEYBOLD make for fine vaccumm measurement of main vessel tank.	2 nos	VENDOR TO CONFIRM			
		30.19	JUMO / WIKA make for coarse measurement and root pump switching with mounting and fitting accessories.	4 nos	VENDOR TO CONFIRM			

21-6-2018 21/6/18 21.06.18 Rajeev Agarwal 21/6/18

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
		30.20	Vacuum sensor supply cable	200 mtrs	VENDOR TO CONFIRM			
		30.21	Clamping Ring and centring ring with filter for Edward/Leybold Vacuum transmitter	4nos each	VENDOR TO CONFIRM			
		30.22	Control panel (HMI) with 6"touch screen having full operational control	1 Nos.	VENDOR TO CONFIRM			
		30.23	Temperature measuring through RTD Sensors for vessel/job/steam etc.	20 Nos.	VENDOR TO CONFIRM			
		30.24	Lead through terminal with 12 terminals for PT-100 Sensor with suitable sealing kits and mounting accessories.	4 Nos.	VENDOR TO CONFIRM			
		30.25	Compensating cable for RTD sensor Extension	250 Meters	VENDOR TO CONFIRM			
		30.26	Dial Type temperature gauges with thermo well for pipe line mounting.		VENDOR TO CONFIRM			
			Range 0 to 150 Deg. Cen.	10 Nos.				
			Range 0 to 50 Deg. Cen.	10 Nos.				
		30.27	Control panel with Suitable contactors, fuses, MCB's, push buttons, indication lamps, switchgears etc., PLC, HMI and RTD converters as per requirement.	1 set	VENDOR TO CONFIRM			
		30.28	Field Control wiring and control panel wiring with cable tray and accessories as required	1 set	VENDOR TO CONFIRM			
		30.29	3 Phase supply isolator switch for main ON/OFF on panel (200 amperes)	1 Nos.	VENDOR TO CONFIRM			
		30.30	3.5 digit True RMS digital multi meters (Fluke/keysight/hioki only)	1	VENDOR TO CONFIRM			
31	Centralized Control system for VPD & VDP Plant	31.10	19" industrial SCADA PC for remote operating of VPD & VDP plant through LAN Cable equipped with PLC and SCADA software (Licenses copy).	1	VENDOR TO CONFIRM			

MAKE OF ITEMS (UNLESS SPECIFIED): FOR VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

Sr.No	ITEM	MAKE		
1	Ball Valve in vacuum lines	Vass/Klinger		VENDOR TO CONFIRM
2	Ball Valve in Solvent lines	Vass/L& T/Klinger		VENDOR TO CONFIRM
3	Double Acting Actuators for all EP Valves	Flowserve/Vass/Rotex/ Klinger		VENDOR TO CONFIRM
4	Solenoid coils of 24 DC & limit switches	Rotex/ honeywell		VENDOR TO CONFIRM
5	Pneumatic valves, tubings and accessories	FESTO		VENDOR TO CONFIRM
6	AFR	Shavo Norgen		VENDOR TO CONFIRM
7	Hydraulic cylinder	Veljan/Boschrexroth/Vickers		VENDOR TO CONFIRM
8	Power Pack	Rexroth/Orion/ Vickers		VENDOR TO CONFIRM
9	Hoses	Parker/ Gates		VENDOR TO CONFIRM
10	hydraulic accessories	Vickers/ Veljan/ boschrexroth		VENDOR TO CONFIRM
11	Hydraulic fitting and tubings	Swagelok/ butech		VENDOR TO CONFIRM
12	Vacuum transmitters	Jumo/Wika/leybold/Edward		VENDOR TO CONFIRM
13	Pirani/capacitance gauges	Leybold/Edward/Pfeiffer		VENDOR TO CONFIRM
14	Pt-100 sensors	Baumer/radix/Wika		VENDOR TO CONFIRM
15	Dial type thermometer	Baumer/radix/Wika		VENDOR TO CONFIRM
16	Compound Pressure Gauges	Baumer/radix/Wika		VENDOR TO CONFIRM
17	McLeod Gauge	Basic & Synthetic		VENDOR TO CONFIRM
18	Butterfly valves	Crane/Gefa		VENDOR TO CONFIRM
19	Pressure switch	Danfoss		VENDOR TO CONFIRM
20	Thermostat	Egotherm/MICROTECK/SUKAM/		VENDOR TO CONFIRM
21	Solvent Flow meter	E & H		VENDOR TO CONFIRM
22	Level Transmitters VPD	E & H		VENDOR TO CONFIRM
23	Level Switches	E & H/True man		VENDOR TO CONFIRM
24	Level Transmitters VDP	Pune Techtrol		VENDOR TO CONFIRM
25	PLC /HMI/scada	SEIMENS/ABB/allen-Bradley		VENDOR TO CONFIRM
26	UPS	Emerson		VENDOR TO CONFIRM
27	Switch gears	Schneider/Siemens/ ABB		VENDOR TO CONFIRM
28	gital Multimeter	Fluke/hioki/keysight		VENDOR TO CONFIRM
29	solvent flow control valve	Samson		VENDOR TO CONFIRM
30	Steam control valve	Samson/ Forbe Marshall/ Thermax		VENDOR TO CONFIRM
31	Steam line valves	Uniklinger/ Forbe Marshall/ Thermax		VENDOR TO CONFIRM
32	Water line valves	L & T/Siemens		VENDOR TO CONFIRM
33	Hygrometer	Vaisala/E + E		VENDOR TO CONFIRM
34	Limit switches	BCH, Siemens, Cutler hammer		VENDOR TO CONFIRM
35	Control Panel	Rittal		VENDOR TO CONFIRM
36	Positioners	YTC/Burkert		VENDOR TO CONFIRM
37	Motors	ABB/ Siemens/ CG/ Havells/Bharat Bijli		VENDOR TO CONFIRM

COPE OF WORK:

APOUR PHASE DRYING PLANT 2117 & 2118 (SCOPE OF WORK)

:.No	Items				
1	Solvent Storage Tank (Common for both autoclaves)		Installation of level sensor, isolation valve, line flow control valve and re-insulation of solvent storage tank.		VENDOR TO CONFIRM
2	Evaporator system (Common for both autoclaves)		Installation of supplied falling thin film evaporator, solvent flow control valve with positioner control, flow meter for solvent flow measurement, EP shut off valve, PT 100 sensor for evaporator, EP ball valve for distillation, Evaporator EP isolation valve and Modification in required interconnecting piping.		VENDOR TO CONFIRM

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
3	Solvent Condensation and Water separation system		Installation of main condensor with auto drain system, EP on-off valve with positioner, pr transmitter, butterfly valves, level switches for main condensor, EP control valve with positioner for main condensor pr control, sight glass assembly for flow display. Installation of seprating vessel, water level sensor, solvent high-low level switch, water drain system, solvent drain system, pressure transmitter, thermomneter and airing valve.		VENDOR TO CONFIRM			
4	Leakage Air / Pressure reduction pumping system (Common for both Autoclave)		Installation of Pump main isolation EP Ball valve, Throttling valves, Airing valve, PT-100 Temp. sensor for vacuum pump temp. measurement, Oil level switch for vacuum pump, Bellow for Rotary vacuum pump, Exhaust condenser and cooling water G.I piping up to pump.		VENDOR TO CONFIRM			
5	Vacuum Pumping Unit for Autoclave (2117 & 2118)		Installation of Pre-condenser, Inter-mediate condenser, Automated Condenser drain system, Pump isolation valve, Throttling valves, Bellow for Rotary vacuum pump, Exhaust condenser, Inter connecting piping with pumping skid, Autoclave main isolation valve, Airing valve, PT-100 Temp.sensor for vacuum pump temp. measurement, Oil level switch for vacuum pump, Pressure transmitter 1 to 1000 mbar for autoclave pressure measurement, PT-100 Temp.sensor for roots pump temp. measurement, Hygrometer (Dew Point sensor), EP butterfly valve (Viton seal) below roots pump, Pressure transmitter (Fine vacuum measurement 0.1 mbar) for autoclave pressure measurement, Exhaust condenser, Digital water extraction rate measuring instrument (10 ml/T/hr), Measuring jar of 5 ml List count with isolation valves.		VENDOR TO CONFIRM			
6	Autoclave (2117 & 2118)		Installation of Door movement hydraulic cylinder and reconditioning of door drive system replacing chain,sprocket,roller bearings, limit switches, rollers with pins. Replacement and installation of Door clamping cylinders, Lifting cylinders, Power pack With inter connecting piping, Hose pipes & niddle valves for cylinder isolation, Limit switches for door open/close, limit switches for clamp/de clamp, limit switch for lifting cylinders, autoclave door sealing, Toughend Glass (Vessel inspection) with O rings, illumination lights, Epoxy type lead through of 12 terminal, Autoclave drain, Vapor in nozzle, EP ball valve for vacuum break, McLeod gauge range 10 to 0.01 torr with isolation valve for vacuum measurement, PT-100 sensors for Job , wall Temp.& vapor temp (Three wire with PTFE cable).		VENDOR TO CONFIRM			
7	Solvent drain system from Autoclave 2117 & 2118		Installation of EP ball valve for solvent drain, Dry run protection switch for pump, Level switch for Autoclave, Manual ball valve at pump out let.		VENDOR TO CONFIRM			
8			~~BLANK~~					
9	Solvent feeding system (Common for both Autoclave)		Installation of Collecting vessel, level sensors, PT-100 sensors for tank temp, Solvent high level switch, Filter bags, Dry run protection switch for pump, Solvent cooler, By pass valve, On/Off valves, level switch for waste oil tank and interconnecting piping.		VENDOR TO CONFIRM			
10	Autoclave heating system for 2117 & 2118		Installation of Pressure reducing valves, Steam control valves, Condenset trap modules, Pressure safety valves, Pressure gauges, Manual steam isolation valvess, Steam pressure measuring transmitters, Steam By-pass valves, Resi.type Thermometers, Steam heating coils for wall temp, Door heating blowers and Heat insulation for Autoclave, door & Aluminum cladding		VENDOR TO CONFIRM			
11	Evaporator heating system (Common for both Autoclave)		Installation of Steam control valve, Condenset trap module, Pressure safety valve, Pressure gauge, Manual steam isolation valves, Steam pressure measuring transmitter, Steam By-pass valve and Resi.type Thermometer		VENDOR TO CONFIRM			
12	Chilling system (Common for Both Autoclave)		Installation of chiller unit with cooling tower. Installation of GI piping with Cold insulation (Nitrile rubber) from cooling tower to chiller & Vice- Versa, Secondary pump for system out let, GI piping with Cold insulation (Nitrile rubber) from secondary pump to system in & out, Secondary pump inlet & outlet valve, Pressure gauge at pump out let/in let, Pressure/flow switch, Resi.type Thermometer, Glass tube type flow indicator, temp. gauges at in/out let line, Valve for condensers isolation, Manual ball vales for condenser in/outlet, Header line with isolation valve at system out let pump.		VENDOR TO CONFIRM			
13	Cooling system (common for All vacuum pumps)		Installation of GI piping with Cold insulation (Nitrile rubber) from cooling tower to all rotary pumps		VENDOR TO CONFIRM			
14	Compressed Air (common for both Autoclave)		Dismantling of existing pneumatic control panel and lines . Installation of Automated moisture trap, Air lubricator, Digital pressure gauge & actuated air inlet valve, Piping, tubing, FRL & isolation valves for all actuated valves, Pressure switches with existing Air dryer.		VENDOR TO CONFIRM			
15	Oil filling system for both Autoclaves		Installation of EP valves for oil filling and High level switch		VENDOR TO CONFIRM			

21/6/18 21/6/18 21.06.18 21/6/18

DESIGN, MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
16	Control system		ELECTRICAL. 1. All supply and control wiring in and out of vessel and accessories to be replaced with proper lay out. 2. All control switch gears to be replaced. 3. Electrical panel with all interlocks in-line with existing scheme to be replaced. 4. Complete commissioning of supplied PLC system and MIMIC with the load trials and proving of the system. 5. Complete MIMIC of the plant has to be developed and displayed on the touch panel HMI and SCADA system. Touch panel shall control the complete process cycle in fully AUTO & MANUAL mode. 6. The PLC system shall have complete control over the complete operation of the process plant and configured as master control of whole process vessel. The touch panel HMI shall have facility to load process set point values, recipe for process cycle and AUTO/MANUAL operations for operator control. 7. Process cycle recipe shall be editable as per the requirement through touch panel and SCADA PC both. The user/operator should able to create new recipe for new process cycle and same could be saved for future applications. 8. MIMIC graphics shall be developed for operator friendly operations and control of the process vessel.		VENDOR TO CONFIRM			
			9. Complete LED MIMIC with graphical representation of the plant shall be developed and has to be fitted on the control panel. The LED MIMIC should be laminated with clear glass /acrylic protection sheet. The LED shall be dual colour LED for ON/OFF indication. 10. SCADA system shall record all the process parameters and should generate a consolidated report with date/time and process parameter punching. 11. The desktop PC should have PLC diagnostic software for troubleshooting and uploading/downloading of application program. 12. Fully automated temperature control of vessel as per the Job temperature set point shall be provided through steam control valves. The desired accuracy for the temperature control shall be min. 5% of FS. 13. Interlocking of following valves : A. Root pump should operate after vacuum reaches 20-25 mBAR B. Main vacuum valve and Hot air valve interlocking for auto operation. C. Vacuum pump tripping above 80 Deg. Cen. of Vacuum pump temperature and shall restart at 50 deg. D. Vacuum pump operation interlocking with water flow switch		VENDOR TO CONFIRM			
			14. Conversion of manual operated valve to electro pneumatic operated vales : A. Steam inlet valve B. Main vacuum valve C. Pump valve D. Suck back valve E. Hot air valve (scavenging) F. Aeration valve. G. Any other valve required for functional operation shall be supplier's scope. 15. Apart from total AUTO operation of the process cycle, provision for manual operation of plant for complete process cycle shall be provided through manual switches fitted on control panel. 16. Dismantling of existing control system along with I/O wiring 17. Necessary arrangement shall be made for mounting of new PLC system and -wiring, switch gears for Integrating the new control system. 18. Complete integration of New PLC System with existing process cycle of the subject process plant shall be properly done for trouble free operation of plant.		VENDOR TO CONFIRM			
			19. General assembly Drawings (GA) / schematic for interfacing of New PLC system with existing plant and its components shall be required submitted before starting of project. 20. Demonstration of PLC project upload/download operation through supplied diagnostic laptop with licensed PLC system software. 21. All software back-up for PLC system (Ladder Logic back-up) is to be provided in hard & soft copies with cross reference and I/O listing / symbol details. PLC back-up is to be provided for restoration of any future system crash during operation of plant in long run. 22. Fixing of new electrical panel and Laying / termination of electrical of electrical cables, pneumatic pipe lines, control wiring etc. 23. Fixing of new pneumatic valves with modification in vacuum /steam pipe line.		VENDOR TO CONFIRM			

21-6-2018 21/6/18 21.06.18 21/6/18

DESIGN,MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
			24. Any type of pipe line (vacuum line / other auxiliary pipe lines) and other mechanical assemblies required to be replaced for trouble free auto-operation of plant shall be assessed by the vendors during the pre-visit and same shall be included in the techno-commercial offer. 25. All supply and control wiring in and out of vessel and accessories to be replaced with proper lay out. 26. All control switch gears to be replaced. 27. Electrical panel with all interlocks in-line with existing scheme to be replaced. **SYSTEM REQUIREMENT FOR VPD PLANT (2117-2118) AND VDP PLANT (2293):** Common centralised SCADA control system with independent PLC / HMI and MIMIC is to be retrofitted to control the operation of vapour phase plant (2117-2118) and vacuum drying plant (2293) in fully automatic mode. The existing vessel tanks shall be retained. All the actuated valves, manual valves, pressure gauges and other mechanical & electrical items are to be replaced for complete automation in line with functioning of the plants for each plant.		VENDOR TO CONFIRM			

b) VACUUM DRYING PLANT 2293(SCOPE OF WORK)

Sr.No	Items							
17	VDP Autoclave (2293)		Installation of Door drive winch assembly, door slide rollers,Bearing & pins, Limit switches, Door clamping cylinders, Lifting cylinders, Power pack With inter connecting piping, Hose pipes & niddle valves for cylinder isolation, limit switches for clamp/de clamp, limit switch for lifting cylinders, autoclave door sealing, Toughend Glass with O rings, Epoxy type 12 terminal lead through for Job & wall temp. Sensors, Main isolation valve, Vacuum break valve, McLeod gauge for vacuum measurement, Three wire PT-100 sensors with PTFE cable for Job, wall temp. & Air temp. Sensors.		VENDOR TO CONFIRM			
18	Heating system for VDP Autoclave (2293)		Installation Pressure reducing valve, Steam control valve, Condenset trap module, Pressure safety valve, Pressure gauge, Manual steam isolation valves, Steam By-pass valve, Resi.type Thermometer, Steam Heating coils, Air circulating Fans, Door heating blower, repairing of heat insulation for Autoclave, door & Aluminum cladding		VENDOR TO CONFIRM			
19	Vacuum Pumping Unit for VDP Autoclave (2293)		Installation of Main condenser, Inter-mediate condensers, E.P Operated Pump isolation valve, E.P Operated Throttling valves, Automated Condenser drain system, Bellow for Rotary vacuum pump, Exhaust condenser, Inter connecting piping with pumping skid, Pirani Gauge Fine vacuum measurement for autoclave pressure measurement, Airing valve, PT-100 Temp.sensor for vacuum pump temp. measurement, Oil level switch for vacuum pump, Pressure transmitter Rough vacuum measurement for roots pumps cut off, PT-100 Temp.sensor for roots pump temp. measurement, Pressure transmitter fine vacuum measurement for autoclave pressure measurement, Exhaust condenser, Digital water extraction rate measuring instrument and Measuring jar of 5 ml List count with valves		VENDOR TO CONFIRM			
~~20~~			~~BLANK~~					
21	Chilling system		Installation of GI piping with Cold insulation (Nitrile rubber)from cooling tower to chiller & Vice- Versa, GI piping with Cold insulation (Nitrile rubber) from chiller to Storage tank & Vice- Versa, Secondary pump for system out let, GI piping with Cold insulation (Nitrile rubber) from secondary pump to system in & out , Secondary pump inlet & outlet valve, Pressure gauge at pump out let/in let, Flow switch, Resi.type Thermometer, Glass tube type flow indicator, temp. gauges at in/out let line,Valve for condensers isolation , Manual ball vales for condenser in/outlet.		VENDOR TO CONFIRM			
22	Cooling system Rotary vacuum pumps		Installation of GI piping with Cold insulation (Nitrile rubber) from cooling tower to all rotary pumps		VENDOR TO CONFIRM			
	Compressed Air (common for both Autoclave)		Installation of Automated moisture trap, Suitable capacity Air lubricator, Digital pressure gauge & actuated air inlet valve, Piping, tubing, FRL & isolation valves for all actuated valves, Pressure switch.		VENDOR TO CONFIRM			
24	Scavenging system		Installation of Scavenging blowers, Heaters, Activated Alumina & Silica Jel chambers, Scavenging chamber, temp. sensors, Valve for regeneration, Inlet & out let valves, Thermostat, Piping, tubing, FRL & isolation valves .		VENDOR TO CONFIRM			
25	~~Oil filling & drain system~~		Installation of EP valves for oil filling & drain valves, drain pump and High level switch.		VENDOR TO CONFIRM			

21/6/18 21.06.18 21/06/18

(१८)

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
26	Control system		ELECTRICAL: 1. All supply and control wiring in and out of vessel and accessories to be replaced with proper lay out. 2. All control switch gears to be replaced. 3. Electrical panel with all interlocks in-line with existing scheme to be replaced. 4. Complete commissioning of supplied PLC system and MIMIC with the load trials and proving of the system. 5. Complete MIMIC of the plant has to be developed and displayed on the touch panel HMI and SCADA system. Touch panel shall control the complete process cycle in fully AUTO & MANUAL mode. 6. The PLC system shall have complete control over the complete operation of the process plant and configured as master control of whole process vessel. The touch panel HMI shall have facility to load process set point values, recipe for process cycle and AUTO/MANUAL operations for operator control. 7. Process cycle recipe shall be editable as per the requirement through touch panel and SCADA PC both. The user/operator should able to create new recipe for new process cycle and same could be saved for future applications. 8. MIMIC graphics shall be developed for operator friendly operations and control of the process vessel		VENDOR TO CONFIRM			
	Control system Contd..		9. Complete LED MIMIC with graphical representation of the plant shall be developed and has to be fitted on the control panel. The LED MIMIC should be laminated with clear glass /acrylic protection sheet. The LED shall be dual colour LED for ON/OFF indication. 10. SCADA system shall record all the process parameters and should generate a consolidated report with date/time and process parameter punching. 11. The Industrial desktop PC should have PLC diagnostic software for troubleshooting and uploading/downloading of application program. 12. Fully automated temperature control of vessel as per the Job temperature set point shall be provided through steam control valves. The desired accuracy for the temperature control shall be min. 5% of FS. 13. Interlocking of following valves : A. Root pump should operate after vacuum reaches 20-25 mBAR B. Main vacuum valve and Hot air valve interlocking for auto operation. C. Vacuum pump tripping above 80 Deg. Cen. of Vacuum pump temperature and shall restart at 50 deg. D. Vacuum pump operation interlocking with water flow switch.		VENDOR TO CONFIRM			
	Control system Contd..		14. Conversion of manual operated valve to electro pneumatic operated vales : A. Steam inlet valve B. Main vacuum valve C. Pump valve D. Suck back valve E. Hot air valve (scavenging) F. Any other valve required for functional operation shall be supplier's scope. 15. Apart from total AUTO operation of the process cycle, provision for manual operation of plant for complete process cycle shall be provided through manual switches fitted on control panel. 16. Dismantling of existing control system along with I/O wiring 17. Necessary arrangement shall be made for mounting of new PLC system and -wiring, switch gears for Integrating the new control system. 18. Complete integration of New PLC System with existing process cycle of the subject process plant shall be properly done for trouble free operation of the plant. 19. General assembly Drawings (GA) / schematic for interfacing of New PLC system with existing plant and its components shall be required submitted before starting of project		VENDOR TO CONFIRM			
	Control system contd..		20. Demonstration of PLC project upload/download operation through supplied diagnostic laptop with licensed PLC system software. 21. All software back-up for PLC system (Ladder Logic back-up) is to be provided in hard & soft copies with cross reference and I/O listing / symbol details. PLC back-up is to be provided for restoration of any future system crash during operation of plant in long run. 22. Fixing of new electrical panel and Laying / termination of electrical of electrical cables, pneumatic pipe lines, control wiring etc. 23. Fixing of new pneumatic valves with modification in vacuum /steam pipe line. 24. Installation and functional proving of oil flow meter. 25. Any type of pipe line (vacuum line / other auxiliary pipe lines) and other mechanical assemblies required to be replaced for trouble free auto-operation of plant shall be assessed by the vendors during the pre-visit and same shall be included in the techno-commercial offer.		VENDOR TO CONFIRM			

21-6-2018 21/6/18 21-6-18 Lajer Agarwal 21/6/2018

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT			Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
27	Centralized Control system for VPD & VDP Plant		Installation of 17" industrial PC for remote operating of VPD & VDP plant through LAN Cable (17" industrial PC for remote operating of VPD & VDP plant through LAN Cable equipped with software (Licenses copy). Both PCS are equipped with VPD & VDP Plants SCADA screens & control all plants independently.)		VENDOR TO CONFIRM			
3.0	**TESTS/ PERFORMANCE PROVE OUT:**							
3.1	Following parameters should be checked and documented before start of work: (a) Ultimate vacuum test of the vessel. (b) Leak rate test of autoclave. (c) Temperature distribution inside vessel. (d) Autoclave skin temperature (e) Plant performance in process cycle.				VENDOR TO CONFIRM			
3.2	Following parameters should be checked and documented after completion of work: (a) Ultimate vacuum of the vessel.(should be ≤ 0.1 torr) (b) Leak rate should be to be ≤ 5 torr letes/ sec. (c) Job Temperature shoulfd be 125 deg C (+/-5 deg C) in VPD and 105 degC (+/-5 deg C) in VDP. (d) Uniformity of temperature distribution inside autoclave shall be checked and temperature distribution should be as per standard. (e) Autoclave skin temperature should not be more than 5 deg C than ambient temperature. (f) Job proving will be done as per attached Annex-IV for vessal 2293 and Annex.-III for vessal 2117 &2118 enclosed with spec. (g) Vacuum & pressure test of the components, piping etc.				VENDOR TO CONFIRM			
3.3	**Job Prove out:** (a) Performance and reliability prove out of individual plant to be done by processing the job (Power transformer) on the plant in auto mode as per our specific requirement for 3 complete uiterruppted job processing cycle.(Annex.- III & IV ,Process Sequence, for 2117,2118 & 2293, Total 03 Page)				VENDOR TO CONFIRM			
4.0	**ERECTION AND COMMISSIONING**							
4.1	All the erection and commissioning will be carried out by vendor with his own labour in BHEL-Jhansi.				VENDOR TO CONFIRM			
4.2	Tools & tackles, equipments and consumables like paint, welding electrodes, gas, hardwares etc required for work to be brought by supplier				VENDOR TO CONFIRM			
4.3	Supply, fabrication & erection of required structures, plat form and ladders to be done by vendor as per site requirement.				VENDOR TO CONFIRM			
4.4	Supply and application of various paints for lines and components as per the approved colour code and labeling (letter/number embosed metal plates) of the Plants to be done by vendor.				VENDOR TO CONFIRM			
4.5	Successful proving of job will be considered as a part of commissioning.				VENDOR TO CONFIRM			
4.6	**Erection and commissioning schedule must be submitted before start the work for approval. [Approx. time for E&C of VPDs (2117 & 2118)should be 3 months and VDP (2293) should be 2 months from the original date of handover of the plant for E&C] Complete activity Bar Chart with no. of days required to complete the desired work is to be submitted with the offer.**				VENDOR TO SUBMIT			
4.7	BHEL Scope: (a) BHEL will provide single point air,water, steam and electric supply near the plant as indicated by vendor. Distribution of these servicess will be in the scope of vendor. (b) Solvent storage tank (existing) (c) Water cooled water chiller (20 TR capacity) -02 nos. for 2117 & 2118 01 nos. for 2293 . (d) Rotary vacuum pump & roots pump. (e) Lubricants, solvent and vacuum pump oil. (f) **Civil work on submission of civil drawings by vendor in advance. (within 15 days of order placement.)** (g) Material handling support for shifting the material from BHEL store to work site shall be provided by BHEL.				VENDOR TO CONFIRM			
5.0	**GENERAL**							
	(a) Offer must be submitted with details and price break-up mentioning scope of supply and scope of work.				VENDOR TO CONFIRM			
	(b) Details of supplied items to be given with quantity in Nos.				VENDOR TO CONFIRM			
	(c) Any deviation to the scope and conditions to be mentioned pointwise.				VENDOR TO CONFIRM			
	(d) Time required for the retrofitting work to be given from the date of handing over of the plant.				VENDOR TO CONFIRM			
	(e) Plants shall be given for retrofitting/recondition in sequential phase subject to the availability.				VENDOR TO CONFIRM			
	(f) Order shall be placed on single source since all three plants are to be interlinked/integrated with common automation system.				VENDOR TO CONFIRM			
	(g) Vendor to submit all the schematic diagrams viz. G.A drawing, Civil drawing, Vacuum generation circuit, Steam Heating circuit , Solvent vapour and condensation circuit, Hydraulic circuit, pneumatic circuit, electrical schematic, chilling water and cooling water circuit, scavanging circuit, oil filling circuit, air circulation system and door heating blower arrangement within 15 days of order placement for BHEL concurrence and manufacturing work should only be started after concurrence of drawings by BHEL.				VENDOR TO CONFIRM			
	(h) Scope of supply is indicative only (quantity may increase to meet the specified process parameters.additional required items will be in the scope of vendor without any additional cost). Supplier to ensure supply of all required item to operate the plants in auto mode with operator's ease and to prove out the job.				VENDOR TO CONFIRM			
	(i) Scope of work includes dismantling of existing installed system, installation & commissioning of all supplied items/ items required and any additional work required to operate the plants in auto & manual mode with performnace proveout.				VENDOR TO CONFIRM			
	(j)vendor can visit the site before submitting the offer to asses the work, process sequence and system of existing plants and to analyses the technical requirment & quantum of work after upgration/reconditioning of plants.				VENDOR TO NOTE			
	(k) Out put report formate will be as per the requirement of BHEL ,and will be informed accordingly.				VENDOR TO CONFIRM			

MANUFACTURING ,SUPPLY,INSTALLATION ,COMMISSIONING AND TESTING/PROVING FOR RENOVATION,RECONDITIONING AND UP GRADATION OF VAPOUR PHASE DRYING PLANT 2117 & 2118 AND VACUUM DRYING PLANT 2293

S.NO.	DESCRIPTION FOR BHEL REQUIREMENT	Qty.	VENDOR TO CONFIRM/SPECIFY	OFFERED	DEVIATIONS	REMARK
	(l)Following confirmation is requested from vendor for the conrtrol intigration of all three no vessels(2117,2118 & 2293) **For 2117 &2118** (i)Comman electricals,common MIMIK, Individual HMI (ii) Auto/Manual selecter switch for auto/ manual mode selection. (iii) Selecter switchs form manual operation indivual funtion of indivial plant. (iv)Facility to select the individual vessel in either auto or manual mode irrespective of each other (v)Facility to operate in auto mode vide dedicated HMI of individual veaasel or vide common scada controller* **For 2293** (vi)Electricals, MIMIK, HMI (vii) Auto/Manual selecter switch for auto/ manual mode selection. (viii) Selecter switchs for manual operation of plant. (ix)Facility to operate in auto mode vide dedicated HMI of plant or vide common scada controller*. *** common scada controller- -** Common scada controller should be capable to control & operate all three number vessels (2117 ,2118 & 2293) individually in auto & manual mode. (x) One number standby/redenderent scada controller (fully equiped/ready to use)should also be provided (same as common scada controller) to operate all the three vessels(2117,2118 &2293) in case of break down of reguler scada controller/operational requirement.		VENDOR TO CONFIRM			
	(m) Supply schedule must be submitted with technical offer. (Supply should complete within 4 months from the date of issuance of Purchase order)		VENDOR TO SUBMIT & CONFIRM			
6	**DOCUMENTATIONS**					
	A. Complete electrical, mechanical, hydraulic, pneumatic, cooling water and steam circuit, electrical interfacing drawing (as commissioned) shall be provided in 03 nos. hard copies & 01 no's soft copy.		VENDOR TO CONFIRM			
	B. Complete technical literature /brochure with specifications of all supplied bought-out items shall be provided in 03 nos. hard copies		VENDOR TO CONFIRM			
	C. Operation, maintenance and Spare parts manual to be submitted alongwith supply in 03 nos. hard copies & 01 no's soft copy.					
	D. Complete back up of PLC (with english comments) and SCADA system (as commissioned) is to be provided for future restoration in hard bind print and soft copy(PDF) in CD.(03 SET)		VENDOR TO CONFIRM			
	E. Hard copy of complete PLC project with IO listing and cross references. – 3 Copies.		VENDOR TO CONFIRM			
	F. Drive/controller manual and program backup if any shall be supplied.(both hard and soft copies)		VENDOR TO CONFIRM			
	G.Ghost image file of the supplied SCADA PC as commissioned loaded in a hard drive as a backup. for use in case of system hard drive failure		VENDOR TO CONFIRM			
7.0	**GUARANTEE**					
7.1	Material(against any manufacturing and design defect) and work carried out & performence shall be guaranteed for the period of 24 months from the date of commissioning.		VENDOR TO CONFIRM			
8.0	**TRAINING**					
8.1	A. Plant operational training (auto and manual) to the operaters at site.					
8.2	B.Maintenance training shall be provided (Mechanical, Electrical and Electronics) to concerned persons.		VENDOR TO CONFIRM			
8.3	C. The supplier shall arrange in-depth programming & trouble shotting Training (min 5 days) for two BHEL Persons in Supplied PLC and SCADA Systems at the OEM Works/OEM's Authorized training centers within india for PLC and SCADA system separately.		VENDOR TO CONFIRM			
9.0	**QUALIFYING CONDITION**					
	(a) Only original equipment manufacturers (OEM),who has supplied , installed and commissioned new automatic PLC/DCS based VPD plant, having same or higher capacity for transformer processing application, minimum two Numbers VPD process plant within the past seven years from the date of opening of this enquiry shall quote. Relevant Document in this context for supply, successful installation and commissioning must be submitted along with technical offer. (P.O.COPY & COMMISSIONING CERTIFICATE ISSUED BY CUSTOMER/USER)		VENDOR TO SUBMIT			
	(b) Following Certificate regarding succesfull performance is also requested, issued by plant user. (i) Succesfull performance certificate of plant for two years after commissioning . (ii) Presently plant is working satisfactory (Performance certificate).		VENDOR TO SUBMIT			
10.0	BHEL reserves the right to verify information submited by VENDOR. In case the information is found to be false/ incorrect, the offer shall be rejected.		VENDOR TO CONFIRM			

K.D.Gupta
Sr. Mgr.(FCX)

21.06.18
Oscar Angel
A.G.M.(TRM-PT)

21/6/2018
Rajeev Agarwal
A.G.M.(WEX)

S.J.Chakraborty
A.G.M.(FCX,HSE & SAFETY)

21/6/18