

	TITLE : GENERAL TECHNICAL REQUIREMENTS FOR LV MOTORS	SPECIFICATION NO. PE-SS-999-506-E101
		VOLUME NO. : II-B
		SECTION : D
		REV NO. : 00 DATE : 29/08/2005
		SHEET : 3 OF 4
4.4. 4.5 4.6 4.7 4.7.1 4.7.2 4.7.3 4.7.4 4.7.5 4.7.6 4.7.7 4.7.8. 4.7.9 4.8 4.9	Motors shall not be provided with any electric or pneumatic operated external fan for cooling the motors. Frames shall be designed to avoid collection of moisture and all enclosures shall be provided with facility for drainage at the lowest point. In case Class 'F' insulation is provided for LV motors, temperature rise shall be limited to the limits applicable to Class 'B' insulation. In case of continuous operation at extreme voltage limits the temperature limits specified in table-1 of IS:325 shall not exceed by more than 10°C. Terminals and Terminal Boxes Terminals, terminal leads, terminal boxes, windings tails and associated equipment shall be suitable for connection to a supply system having a short circuit level, specified in the Data Sheet-A. Unless otherwise stated in Data Sheet-A, motors of rating 110 kW and above will be controlled by circuit breaker and below 110 kW by switch fuse-contactor. The terminal box of motors shall be designed for the fault current mentioned in data sheet "A". unless otherwise specified or approved, phase terminal boxes of horizontal motors shall be positioned on the left hand side of the motor when viewed from the non-driving end. Connections shall be such that when the supply leads R, Y & B are connected to motor terminals A B & C or U, V & W respectively, motor shall rotate in an anticlockwise direction when viewed from the non-driving end. Where such motors require clockwise rotation, the supply leads R, Y, B will be connected to motor terminals A, C, B or U W & V respectively. Permanently attached diagram and instruction plate made preferably of stainless steel shall be mounted inside terminal box cover giving the connection diagram for the desired direction of rotation and reverse rotation. Motor terminals and terminal leads shall be fully insulated with no bar live parts. Adequate space shall be available inside the terminal box so that no difficulty is encountered for terminating the cable specified in Data Sheet-A. Degree of protection for terminal boxes shall be IP 55 as per IS 4691. Separate terminal boxes shall be provided for space heaters.. If this is not possible in case of LV motors, the space heater terminals shall be adequately segregated from the main terminals in the main terminal box. Detachable gland plates with double compression brass glands shall be provided in terminal boxes. Phase terminal boxes shall be suitable for 360 degree of rotation in steps of 90 degree for LV motors. Cable glands and cable lugs as per cable sizes specified in Data Sheet-A shall be included. Cable lugs shall be of tinned Copper, crimping type. Two separate earthing terminals suitable for connecting G.I. or MS strip grounding conductor of size given in Data Sheet-A shall be provided on opposite sides of motor frame. Each terminal box shall have a grounding terminal. General	

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4.9.1 Motors provided for similar drives shall be interchangeable.

4.9.2 Suitable foundation bolts are to be supplied alongwith the motors.

4.9.3 Motors shall be provided with eye bolts, or other means to facilitate safe lifting if the weight is 20Kgs. and above.

4.9.4 Necessary fitments and accessories shall be provided on motors in accordance with the latest Indian Electricity rules 1956.

4.9.5 All motors rated above 30 kW shall be provided with space heaters to maintain the motor internal air temperature above the dew point. Unless otherwise specified, space heaters shall be suitable for a supply of 240V AC, single phase, 50 Hz.

4.9.6 Name plate with all particulars as per IS: 325 shall be provided

4.9.7 Unless otherwise specified, the colour of finish shall be grey to Shade No. 631 and 632 as per IS:5 for motors installed indoor and outdoor respectively. The paint shall be epoxy based and shall be suitable for withstanding specified site conditions.

5.0 **INSPECTION AND TESTING**

5.1 All materials, components and equipments covered under this specification shall be procured, manufactured, as per the BHEL standard quality plan No. PED-506-00-Q-006/0 and PED-506-00-Q-007/2 enclosed with this specification and which shall be complied.

5.2 LV motors of type-tested design shall be provided. Valid type test reports not more than 5 year shall be furnished. In the absence of these, type tests shall have to be conducted by manufacturer without any commercial implication to purchaser.

5.3 All motors shall be subjected to routine tests as per IS: 325 and as per BHEL standard quality plan.

5.4 Motors shall also be subjected to additional tests, if any, as mentioned in Data Sheet A.

6.0 **DRAWINGS TO BE SUBMITTED AFTER AWARD OF CONTRACT**

a) OGA drawing showing the position of terminal boxes, earthing connections etc.

b) Arrangement drawing of terminal boxes.

c) Characteristic curves:
(To be given for motor above 55 kW unless otherwise specified in Data Sheet).

i) Current vs. time at rated voltage and minimum starting voltage.

ii) Speed vs. time at rated voltage and minimum starting voltage.

iii) Torque vs. speed at rated voltage and minimum voltage.
For the motors with solid coupling the above curves i), ii), iii) to be furnished for the motors coupled with driven equipment. In case motor is coupled with mechanical equipment by fluid coupling, the above curves shall be furnished with and without coupling.

iv) Thermal withstand curve under hot and cold conditions at rated voltage and max. permissible voltage.

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	MOTOR DATA SHEET - C	VOLUME	II B
		SECTION D	
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		SHEET	2 OF 7

- a. Voltage (Volts)
 - b. Frequency (Hz)
 - c. Combined voltage and frequency
14. Rated speed at rated voltage and frequency(RPM)
15. At rated Voltage and frequency:
 - a. Full load current
 - b. No load current
16. Power Factor at
 - a. 100% load
 - b. NO load
 - c. Starting.
17. Efficiency at rated voltage and frequency,
 - a. 100% load
 - b. 75% load
 - c. 50% load
18. Starting current (amps) at
 - a. 100 % voltage
 - b. 85% voltage
 - c. 80% voltage
19. Minimum permissible starting Voltage (Volts)
20. Starting time with minimum permissible voltage
 - a. Without driven equipment coupled
 - b. With driven equipment coupled

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

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21. Safe stall time with 100% and 110% of rated voltage
 - a. From hot condition
 - b. From cold condition
22. Torques :
 - a. Starting torque at min. permissible voltage(kg-mtr.)
 - b. Pull up torque at rated voltage.
 - c. Pull out torque
 - d. Min accelerating torque (kg.m) available
 - e. Rated torque (kg.m)
23. Stator winding resistance per phase (ohms at 20 Deg.C.)
24. GD^2 value of motors
25. No of permissible successive starts when motor is in hot condition
26. Locked Rotor KVA Input
27. Locked Rotor KVA/KW
28. Vibration limit :Velocity (mm/s)
29. Noise level limit (dBA)

C. CONSTRUCTIONAL FEATURES

1. Stator winding insulation
 - a. Class & Type
 - b. Winding Insulation Process
 - c. Tropicalised (Yes/No)

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NAME	SIGNATURE	DATE			

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- d. Temperature rise over specified maximum ambient temperature of 50 deg C
- e. Method of temperature measurement
- f. Stator winding connection
- 2. Main Terminal Box
 - a. Type
 - b. Location (viewed from NDE side)
 - c. Entry of cables(bottom/side)
 - d. Recommended cable size (To be matched with cable size envisaged by owner)
 - e. Fault level (MVA), Fault level duration (sec)
 - f. Cable glands & lugs details (shall be suitable for power cable)
- 3. Type of DE/NDE Bearing
- 4. Motor Paint shade
- 5. Weight of
 - a. Motor stator (KG)
 - b. Motor Rotor (KG)
 - c. Total weight (KG)

D. List of accessories.

- 1. Space Heaters (Applicable for 30 KW & above motor) (Nos./Power in watts/supply voltage)
- 2. Terminal Box for Space Heater (Yes/No)
- 3. Speed switch (Yes/No)
No of contacts and contact ratings of speed switch

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4. Insulation of bearing (Yes/No)

5. Noise reducer(Yes/No)

6. Grounding pads

i) No and size on motor body

ii) Nos on terminal Box

7. Vibration pads

i) Nos and size

ii) Location

8. Any other fitments

E. List of curves.

1. Torque speed characteristic of the motor

2. Thermal withstand characteristic

3. Starting. current Vs. Time

4. Starting. current Vs speed

5. P.F. and Effi. Vs Load

F. Additional Data to be filled for each rating of DC Motor

1. Rated armature voltage (Volt)

2. Rated field excitation (Amp)

3. Permissible % variation in voltage

4. Minimum Permissible Starting voltage (volt)

5. At rated voltage

i) Full load Armature current.(Amp)

ii) Full load Field current (Amp)

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	TITLE MOTOR DATA SHEET - C	SPECIFICATION NO.
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- iii) No load Armature current (Amp)
6. Full load Field current (Amp)
7. No load Aramature current (Amp)
8. Minimum permissible field current(Amp) to avoid overspeeding at
 - i) Maximum permissible voltage
 - ii) Rated voltage
 - iii) Minimum Permissible Voltage
9. Resistance (indicative Values) in ohm
 - i) Armature winding (Arm + IP + Series) at 25 deg.C
 - ii) Field Winding at 25 deg. C
10. Inductance (indicative values)
 - i) Armature winding
 - ii) Field winding
11. Value of trimmer resistance (ohm) to be connected in series with the shunt field to obtain rated speed at
 - i) 220 V DC
 - ii) 250 V DC
 - iii) 187 V DC
12. Value of the external resistance (ohm) required to be connected in series with armature during starting only
13. Technical data sheet for external resistance box
14. GA drawing of motor
15. Starting time calculation

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16. Starter resistance design calculation
17. Electrical connection diagram of motor

NAME OF VENDOR			SEAL	REV.	
NAME	SIGNATURE	DATE			

	MANUFACTURER/ SUPPLIER NAME & ADDRESS		BIDDER/		STANDARD QUALITY PLAN		SPEC. NO. :	DATE:
	CUSTOMER :				QP NO.: PE-QP-999-Q-006, REV-02		DATE: 17.04.2020	
	PROJECT:				PO NO.:		DATE:	
	ITEM: AC ELECT. MOTORS UPTO 50 KW (415V)		SYSTEM:		SECTION: II		SHEET 1 of 2	

S. 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.WORKMANSHIP	MA	VISUAL	100%	MFG. SPEC.	MFG. SPEC.	LOG BOOK	P -	
		2.DIMENSIONS	MA	VISUAL	100%	MFG. DRG./ MFG. SPEC.	MFG. DRG./ MFG. SPEC.	LOG BOOK	P -	
1.0	ASSEMBLY	3.CORRECTNESS/ COMPLETENESS/ TERMINATIONS/ MARKING/ COLOUR CODE	MA	VISUAL	100%	MFG.SPEC./	MFG.SPEC.	LOG BOOK	P -	
2.0	PAINTING	1.SHADE	MA	VISUAL	SAMPLE	MFG. SPEC/ APPROVED DATASHEET	MFG. SPEC/ APPROVED DATASHEET	LOG BOOK	✓ P V -	
3.0	TESTS	1.ROUTINE TEST INCLUDING SPECIAL TEST	MA	VISUAL	100%	IS-325 / IS-12615/ APPROVED DATA SHEET	IS-325 / IS-12615/ APPROVED DATA SHEET	TEST/ INSPN. REPORT	✓ P V *	* NOTE -1
		2.OVERALL DIMENSIONS & ORIENTATION	MA	MEASUREMENT & VISUAL	100%	APPROVED DRG/ DATA SHEET	APPROVED DRG/ DATA SHEET	TEST/ INSPN. REPORT	✓ P V *	* NOTE -1 & NOTE-2

BHEL				BIDDER/ SUPPLIER				FOR CUSTOMER REVIEW & APPROVAL			
ENGINEERING		QUALITY		Sign & Date		Sign & Date		Doc No:		Sign & Date	
Prepared by:	HEMA KUSHWAHA	Checked by:	KUNAL GANDHI	Seal		Reviewed by:		Seal		Approved by:	
Reviewed by:	PRAVEEN DUTTA	Reviewed by:	RITESH KUMAR JAISWAL								

	MANUFACTURER/ SUPPLIER NAME & ADDRESS		BIDDER/		STANDARD QUALITY PLAN		SPEC. NO :	DATE:
	CUSTOMER :		PROJECT:		SYSTEM:		QP NO.: PE-QP-999-Q-006, REV-02	DATE: 17.04.2020
							PO NO.:	DATE:
	ITEM: AC ELECT. MOTORS UPTO 50 KW (415V)						SECTION: II	

	3.NAMEPLATE DETAILS	MA	VISUAL	100%	-	IS-325 / IS-12615 / APPROVED DATA SHEET	SAME AS COL. 7	TEST/ INSPN. REPORT	✓	P	V	-
4.0	PACKING	MA	VISUAL	100%	100%	AS PER MFG. STANDARD / (#)	AS PER MFG. STANDARD / (#).	INSPC. REPORT	✓	P	W	-
- (#) REFER NOTE-8												

NOTES:

- Routine tests on 100% motors shall be done by the vendor. However, BHEL/ Customer shall witness routine tests on random samples. The sampling plan shall be mutually agreed upon.
- For exhaust/ventilation fan motors of rating up to 1.5 KW, only routine test certificates shall be furnished for scrutiny.
- In case test certificates for these tests on similar type, size and design of motor from independent laboratory are available, the same is valid for 5 years.
- BHEL reserves the right to perform repeat test, if required.
- After packing and prior to issue MDCC, photographs of items to be despatched shall be sent to BHEL for review.
- In case of any changes in QP commented by customer at contract stage, same shall be carried out by bidder without any implication to BHEL/ Customer.
- Project specific QP to be developed based on customer requirement.
- For export job, BHEL technical specification for seaworthy packing to be followed.
- Packing shall be suitable for storage at site in tropical climate conditions.
- Latest revision/ year of issue of all the standards (IS/ ASME/ IEC etc.) indicated in QP shall be referred.

LEGENDS:

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

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

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

MA: MAJOR, MI: MINOR, CR: CRITICAL

D: DOCUMENTATION

BHEL			
ENGINEERING		QUALITY	
Prepared by:	HEMA KUSHWAHA	Sign & Date	Name
Reviewed by:	PRAVEEN DUTTA	Checked by:	KUNAL GANDHI
		Reviewed by:	RITESH KUMAR JAISWAL
		Approved by:	

BIDDER/ SUPPLIER			
Sign & Date	Seal		
Reviewed by:	Sign & Date	Name	Seal
Approved by:			

FOR CUSTOMER REVIEW & APPROVAL			
Doc No:			
Reviewed by:	Sign & Date	Name	Seal
Approved by:			



CLAUSE No.

CHAPTER NAME

MOTOR

TESTS/CHECKS	Visual	Dimensional	Make/Type/Rating /General Physical Inspection	Mech/Chem. Properties	NDT /DP/MPI/UT	Metalllography	Electrical Characteristics	Welding/Brazing(WPS/PQR)	Heat Treatment	Magnetic Characteristics	Hydraulic/Leak/Pressure Test	Thermal Characteristics	Run out	Dynamic Balancing	Routine & Acceptance tests as per IS-4722 /IS- 9283/IS- 2148/IEC60034/IEC 60079-I/ IS- 12615	Vibration	Over speed	Tan delta, shaft voltage & polarization index test	Paint shade, thickness & adhesion
TEMS/COMPONENTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

SUPER THERMAL POWER PROJECT STAGE-II (2X800 MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION – VI	PART - B SUB-SECTION-VI E-42	Page 1 of 2
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[illegible]

Note:

1. The manufacturer is to furnish a detailed Quality Plan indicating the practices & Procedure followed along with relevant supporting documents during QP finalization. However, following methodology to be followed for Inspection Categorization:

Note for LT Motor:

i) **Motor rating up to 50 KW: Inspection CAT-III :** Acceptance of Motor up to 50 KW is based on COC of the Manufacturer and Main Contractor confirming as follows:
 “It is hereby confirmed that the above mentioned motor /motors was/ were manufactured taking care of NTPC specific requirements regarding ambient temp., voltage frequency variation, hot KVA/KW, temperature rise, distance between center of stud gland plate and tested in accordance with approved drawing /data sheets.”

ii) **Motor rating above 50 KW & less than 75 KW approved MQP:** Acceptance of Motor rating above 50 KW & less than 75 KW is based on NTPC report as per [S: 2615 - 2018 (including latest revision) duly witnessed by main contractor along with COC of the Manufacturer and Main Contractor confirming as follows:

"It is hereby confirmed that the above mentioned motor /motors was/ were manufactured taking care of NTPC specific requirements regarding ambient temp., voltage frequency variation, hot KVA/KW, temperature rise, distance between center of stud gland plate, space heater and tested in accordance with approved drawing /data sheets."

iii) Motor rating 75 KW & above: Inspection CAT-I: As per NTPC approved MQP.

2. Additional routine tests for Flame proof motors shall be applicable as per relevant standard

3. Makes of major bought out items for HT motors will be subject to NTPC approval.

4. Y1 = for HT Motor / Machines only.

5. For LT Motors, stator core stack length & grade, no load loss and winding resistance w.r.t. type tested motor for IE2/IE3 shall be checked/verified in addition to Compliance of relevant standard IS:12615/IEC requirement. In case actual results are not within the tolerance limit as declared by manufacturer during QP submission, the motor shall be subjected to efficiency test.

SUPER THERMAL POWER PROJECT STAGE-II (2X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION – VI	PART - B SUB-SECTION-VI E-42	Page 2 of 2
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[illegible]

ANNEXURE III

[illegible]

Explanatory notes for filling up cable list for routing through WinPath, the cable routing program (developed by Corporate R&D) being used in PEM.

1. For the purpose of clarity, it may please be noted that the information given in regard to the cables to be routed through WinPath as per the system elaborated below is called "Cable List", while the term "Cable Schedule" applies to the cable list with routing information added after routing has been carried out.
2. The cable list shall be entered as an MS Excel file in the format as per enclosed template EXT_CAB_SCH_FORMAT.XLS. No blank lines, special characters, header, footer, lines, etc. shall be introduced in the file. No changes shall be made in the title line (first line) of the template.
3. The field properties shall be as under:
 - a. UNITCABLENO: A/N, up to sixteen (16) characters; each cable shall have its own unique, unduplicated cable number. In case this rule is violated, the cable cannot be taken up for routing.
 - b. FROM: A/N, up to sixty (60) characters; the "From" end equipment/ device description and location to be specified here. Information in excess of 60 characters will be truncated after 60 characters.
 - c. TO: A/N, up to sixty (60) characters; the "To" end equipment/ device description and location to be specified here. Information in excess of 60 characters will be truncated after 60 characters.
 - d. PURPOSE: A/N, up to sixty (60) characters; the purpose (i.e. power cable/ indication/ measurement, etc.) to be specified here. Information in excess of 60 characters will be truncated after 60 characters.
 - e. REMARKS: A/N, up to forty (40) characters; Any information pertinent to routing to be specified here (e.g., cable number of the cable redundant to the cable number being entered). Information in excess of 40 characters will be truncated after 40 characters.
 - f. CABLESIZE: A/N, 7 characters exactly as per the codes indicated below shall be specified here. The program cannot route cables described in any other way/ format.
 - g. PATHCABLENO: Field reserved for utilization by the program. User shall not enter any information here.
4. One list shall be prepared for each system/ equipment (i.e., separate and unique cable lists shall be prepared for each system).
5. The cables shall be described as per the scheme listed below:

A	NN	A	NNN
Cable	No. of cores	Cable code	Cable size
Voltage	(e.g. 01,03,3H, 07)	(See C below)	(e.g. 035,185,2.5, 0.5)
Code (see B below)			

(A) **SYSTEM VOLTAGE CODES:**

(ac) A = 11KV, B = 6.6KV, C = 3.3KV, D = 415V, E = 240V, F = 110V

(dc) G = 220V, H = 110V, J = 48V, K = +24V, L = -24V

(B) **CABLE VOLTAGE CODES:**

A = 11KV (Power cables)

Explanatory notes for filling up cable list for routing through WinPath, the cable routing program (developed by Corporate R&D) being used in PEM.

B = 6.6KV (Power cables)
C = 3.3KV (Power cables)
D = 1.1KV (LV & DC system power & control cables)
E = 0.6KV (0.5 sq. mm. Control cables)

(C) CABLE CODES

PVC Copper

A = Armoured FRLS	B = Armoured Non-FRLS
C = unarmoured FRLS	D = Unarmoured Non-FRLS

PVC Aluminium

E = Armoured FRLS	F = Armoured Non-FRLS
G = unarmoured FRLS	H = Unarmoured Non-FRLS

XLPE Copper

J = Armoured FRLS	K = Armoured Non-FRLS
L = unarmoured FRLS	M = Unarmoured Non-FRLS

XLPE Aluminium

N = Armoured FRLS	P = Armoured Non-FRLS
Q = unarmoured FRLS	R = Unarmoured Non-FRLS

S = FIRE SURVIVAL CABLES
T = TOUGH RUBBER SHEATH
U = OVERALL SCREENED
V = PAIRED OVERALL SCREENED
W = PAIRED INDIVIDUAL SCREENED
Y = COMPENSATING CABLES
I = PRE-FABRICATED CABLES
Z = JELLY FILLED CABLES



**1X800 MW SIPAT STPP (STAGE-III)
HVAC SYSTEM
TECHNICAL SPECIFICATION
(C&I PORTION)**

SPECIFICATION No: PE-TS-520-553-002-A001

SECTION : I

SUB-SECTION : C-4

REV. 00

OCT 2025

SECTION: I

**SUB-SECTION: C-4
TECHNICAL SPECIFICATION (C&I PORTION)**



1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

SECTION: C
SUB SECTION: C&I

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4	LIST OF DOCUMENTS/DELIVERABLES
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6	GENERAL REQUIREMENTS FOR FIELDBUS INSTRUMENTS, ACTUATORS & IMCs
7	ELECTRIC ACTUATORS
8	PROCESS CONNECTION AND PIPING
9	REFERENCE CODES AND STANDARDS FOR CONTROL AND INSTRUMENTATION
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12	INSTRUMENT CABLE INTERCONNECTION AND TERMINATION PHILOSOPHY
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	1X800 MW SIPAT EPC, STAGE III	SECTION: C SUB SECTION: C&I
	CONTROL AND INSTRUMENTATION TECHNICAL SPECIFICATION FOR HVAC SYSTEM	
C&I SPECIFIC TECHNICAL REQUIREMENTS Complete Control & Instrumentation system along with necessities fittings & accessories for Air Conditioning & Ventilation System is in bidder scope of supply. Items not specifically mentioned however required for the completeness of the system shall be supplied by bidder without any commercial and time implication. The requirements given are to be read in conjunction with detailed Technical specification. Further in case of any discrepancy in the requirement, the more stringent requirement as per interpretation of customer shall prevail without any commercial and time implication. - Air Conditioning & Ventilation System shall be operated from DDCMIS (BHEL's scope) for Area's/Building indicated elsewhere in the specification. - Microprocessor based controls of Chiller units, Air cooled condensing unit (D-X type), PAC (if applicable) etc. shall be provided with local display along with facilities to Soft link & Hardwired interface with DDCMIS and to meet the requirement of all system operations and controls. Soft link communication between Microprocessor (MP) based control panels & DDCMIS shall be redundant Bi-directional via TCP/IP on OPC or MODBUS with RS485 link. Bidder shall include required hardware at MP end. - Time synchronization of Microprocessor (MP) with DCS is to be carried out. Necessary hardware/software for same at MP end to be provided by bidder. - Each Screw /centrifugal Chiller units (as applicable) shall be provided with local start / stop & indication in addition to DDCMIS based Control system of A/C plant. - Bidder shall provide configuration diagram of the chiller showing its interface with DCS. Start/stop signal from DCS to the chiller, ON/OFF/TRIP feedbacks, permissive & protection signals from chiller shall be hardwired to DCS. Write-up along with setpoints and recommended control logic shall be provided by bidder for implementation in DCS. - Bidder's presence is required for 3 Man days (Excluding travel time) at EDN Bangalore during FAT of DDCMIS for certifying correctness & completeness of implementation of Control logic. - All motorized valves shall be supplied with Non-intrusive Profibus based Electric Actuator (with integral starter) for HVAC system along with necessary interface units for linking to corresponding Control System as applicable. The interface of these actuators with DCS shall be with PROFIBUS DP interface. All actuator settings including torque, limit shall be possible without opening the actuator cover and LCD indication shall be available integral to actuator body. Open/Close command termination logic suitably built inside the actuator Details shall be referring in the specification. - All ON, OFF, INCHING type electric actuators shall be PROFIBUS DP compatible. PROFIBUS DP protocol-based actuators shall have two (redundant) PROFIBUS DP ports for connecting the redundant PROFIBUS DP cables. That is if one PROFIBUS DP cable is cut or not working/not available, then complete actuator functionality shall be available through the second redundant cable without any manual intervention.		

	1X800 MW SIPAT EPC, STAGE III	SECTION: C SUB SECTION: C&I
	CONTROL AND INSTRUMENTATION TECHNICAL SPECIFICATION FOR HVAC SYSTEM	
10. All the Electronic Transmitter for Pressure, Temperature, Differential Pressure and DP based Flow /Level measurements shall be genuine, verifiable PROFIBUS PA protocol compatible instruments. The transmitters shall be connected to DDCMIS through PROFIBUS PA protocol complying to IEC 61158 directly from transmitter. This is subject to customer approval and BHEL decision shall be final. 11. Profibus DP based IMC in LV SWGR/MCC (BHEL's scope) shall be provided. 12. Bidder shall provide the following: - a) Configuration/ diagnostic tool for Non-intrusive profibus based actuators – 5 Nos. or 5% of total quantity of actuator whichever is more. b) Configuration/ diagnostic tool for all Profibus based instruments – 2 Nos of each make. Bidder shall also provide all required software (lifetime licensed) and hardware (cables/connectors, Tablet/ Laptop etc.) along with these tools. 13. The quantity of instruments for the system shall be as per tender P &ID wherever provided of the respective system as a minimum, for bidding purpose. However, Bidder shall also include in his proposal all the instruments and devices that are needed for the completeness of the plant auxiliary system/ equipment supplied by the bidder, even if the same is not specifically appearing in the P & ID. During detail engineering if any additional instruments are required for safe & reliable operation of plant, bidder shall supply the same without any price implication. 14. Redundancy of sensors shall be provided by bidder: (i) Triple redundancy for all Analog and binary inputs required for protection of system/drives. (ii) For all other control functions dual redundancy of the sensors shall be provided by the bidder. 15. All Temperature sensors shall be Duplex type and temperature transmitter shall be provided for all temperature measurement applications. Bidder to provide temperature transmitter along with compensating cable, JB/Rack & other erection hardware. 16. Use of process actuated switch shall be avoided unless unavoidable. 17. Scope of Instrumentation cables (Screened Control Cables), Fibre Optic cable & Control cables shall be as per Electrical Cable scope matrix in Electrical portion of specification. Any cable in Bidder's scope shall be as per specification. 18. Instruments used for PG test: The control system and devices (Actuators, instruments) shall be conventional for this areas/ application. Scope of supply of PG instrument, if applicable, shall be in bidder's scope. 19. The Profibus protocol design shall be further validated by BHEL and approved by NTPC during detailed engineering and any variation/changes required based on DDCMIS system requirements and actual field installation, operational philosophy etc. shall be considered by bidder without any implications. 20. STANDARDISATION AND UNIFORMITY OF HARDWARE:		

	1X800 MW SIPAT EPC, STAGE III	SECTION: C SUB SECTION: C&I
	CONTROL AND INSTRUMENTATION TECHNICAL SPECIFICATION FOR HVAC SYSTEM	
Bidder shall ensure that various C&I instruments /equipment like 4-20mA electronic transmitters / transducers, Temperature elements and other instruments/ local devices etc. that are being furnished by the Bidder, are of the same make, series and family of hardware to the extent possible so as to ensure smooth and optimal maintenance, easy interchangeability and efficient spare parts management. 21. The contacts of equipment mounted instruments, sensors, switches etc. for external connection including spare contacts shall be wired out in flexible/rigid conduits, independently to suitably located common junction boxes. 22. Power supply derived for Transmitters, contact interrogation, interposing relay and solenoid shall generally be ungrounded 24V D.C only. In all cases redundancy in power modules shall be considered. 23. The solenoid operated valves shall have limit switches for open/close feedback. 24. Limit switches shall be silver plated with high conductivity and non-corrosive type Contact rating shall be sufficient to meet the requirement of DDCMIS subject to a minimum of 60 V, 6 VA rating. Protection class shall be IP 55. 25. For all profibus devices GSD and DTM files are to be provided for configuration/ testing in the DCS for proper interfacing and diagnostics. 26. Diaphragm seal shall be provided with Instruments having contact with corrosive media. 27. The redundancy in sensor, cable, control system component, power supply system component shall be designed by the Contractor to ensure that malfunction of any single sensor/ cable / Control system component/ power supply system component etc. shall not lead to loss of any Major Auxiliary (all HT Drives and Critical LT drives) or loss of Generation or loss of control function or loss of protection function. 28. All instruments other than profibus type shall be terminated on JB/LIE/LIR/LCP in field. Number of Junction Boxes shall be sufficient and positioned in the field to minimize local cabling (max 12-15 mtrs) and trunk cable. In case grouping is not possible and these are to be installed individually, canopy with suitable mounting arrangement shall be provided. 29. Temperature transmitter shall be provided for all temperature measurement applications (as applicable). All temperature transmitters shall be suitably grouped together and mounted inside (i) Enclosures in case of open areas of the plant (ii) Racks in case of covered areas on as required basis. (iii) In case grouping is not possible and temperature transmitter is to be installed individually, canopy with suitable mounting arrangement shall be provided. 30. All transmitters and switches shall be suitably grouped together and mounted inside (i) Local Instruments Enclosures (LIE) in case of Open Areas of the Plant (ii) Local Instrument Racks (LIR) in case of covered areas (iii) Local Indicators/Gauges shall also be suitably grouped in Local Instrument Racks. In case grouping is not possible and these are to be installed individually, canopy with suitable mounting arrangement shall be provided.		

	1X800 MW SIPAT EPC, STAGE III	SECTION: C SUB SECTION: C&I
	CONTROL AND INSTRUMENTATION TECHNICAL SPECIFICATION FOR HVAC SYSTEM	
31. All the outdoor field instruments such as analysers/transmitters/meters etc. shall be provided with suitable Free-standing cabinet(s)/panel/rack so that the equipment is protected against rain/ sunlight etc. 32. All electric actuators, pneumatic control valves, Junction Boxes, Solenoid boxes and Local control panels which are not installed inside building, suitable canopy shall be provided and design of canopy shall be approved by Employer during detailed engineering. 33. Bidder to provide Junction Boxes & SOV box in field for termination of all the instruments & solenoids respectively. For termination of single transmitters 5 nos. of TB to be used & for termination of switch 9 TBs to be used in Junction box. 34. Provision for separate Terminal block/wiring diagram for power and control blocks of control panel to be ensured. 35. The necessary root valves, impulse piping, drain cocks, gauge-zeroing cocks, valve manifolds and all the other accessories required for mounting/erection of these local instruments shall be furnished, even if not specifically asked for, on as required basis. Double root valves shall be provided for all pressure tapping where the pressure exceeds 40 Kg./sq.cm. 36. Bidder to provide erection hardware including junction boxes, canopies, structural steel as required. 37. 415V AC/ 230V UPS Power supply shall be provided by BHEL at a single point, further distribution to various instruments/equipment of the system shall be in bidder scope. Bidder to include necessary power distribution board/change over switch in his scope. Any power supply other than the above, if required by any instrument/equipment has to be derived by the bidder from the above supply & all necessary hardware for the same shall be in bidder scope. Bidder to submit the power requirement along with the bid. 38. Bidder to furnish electrical load/UPS load data during bidding stage on not to exceed basis. 39. VAV box shall be provided for optimum use of AHU through VFD.VAV box shall be regulated by Temperature sensor & occupancy sensor provided in respective rooms of service building and other areas specified elsewhere in the specification. Adequate nos. of occupancy sensor and day light sensor shall be provided. CO2 sensor shall be provided in each AHU room to regulate the fresh air fan damper. 40. AHUs shall be provided with modulating fresh air dampers (with filters) to regulate fresh air based on feedback from CO2 Sensors. 41. Temperature sensor(TS) and Relative Humidity sensor shall be provided in each AHU room. Relative humidity and temp. measurement for main plant control room and CERs to be available in multiple numbers. 42. LCP (If applicable) shall have the provision of command (start/stop) & feedback interface with DDCMIS.		

	1X800 MW SIPAT EPC, STAGE III	SECTION: C SUB SECTION: C&I
	CONTROL AND INSTRUMENTATION TECHNICAL SPECIFICATION FOR HVAC SYSTEM	
43. Every panel-mounted instrument, requiring power supply, shall be provided with a pair of easily replaceable glass cartridge fuses of suitable rating. Every instrument shall be provided with a grounding terminal and shall be suitably connected to the panel grounding bus. 44. Provision for separate Terminal block/wiring diagram for power and control blocks of control panel to be ensured. 45. Separate emergency local stop push button shall be provided for each pump, fans, compressor etc. of Air conditioning & ventilation system. 46. VFD panels for applicable drives are in Bidders scope. Typical signal exchange with DCS has been indicated in the specification elsewhere. 47. All panels, cabinets shall be provided with a continuous bare copper ground bus. The ground bus shall be bolted to the panel structure on bottom on both sides. The bolts shall face inside of panels. The system ground shall be isolated from the panel ground with suitable isolators. All internal component grounds or common shall be connected to the system ground, which shall be fabricated of copper flat (size 25mm x 6mm min., length as applicable). 48. Instrument air filters cum regulator set with mounting accessories shall be provided for pneumatic device requiring air supply. 49. Bidder shall furnish Instrument Schedule, Control Schemes, I/O list, Drive list, Root valve schedule, JB grouping (including non-profibus JB grouping, profibus JB grouping, Solenoid valve grouping), Cable Schedule, Cable interconnection (for local cabling & from JB to DCS, DCS end TB detail shall be provided to the successful bidder during detail engineering to incorporate in cable interconnection), Instrument/SOV/Analyzers Installation diagram, Instrument/Analyzer datasheets, Annunciation list, List of Instruments/devices for Profibus/HART, configuration diagram for Profibus based actuators/instruments in BHEL approved format. Also, editable database format like MS Excel, MS Access etc. of these documents shall also be provided by Bidder. Soft copy of the formats shall be provided to the successful bidder. 50. Where ever in the specification, Bidder's offering as per his "standard and proven practice" are identified to be acceptable, the same shall be accepted (with project/plant specific customisation as necessary) based on the documentary evidence of the reference project/plant indicated in the bid document. Any other reference project, if proposed by the bidder during detailed engineering, shall be strictly as agreed by the employer during detailed engineering. 51. All field equipment including local instruments, transducers, valves, actuators, sensors, junction boxes and cabinets shall have nameplates with the instrument tag number and descriptor in English language. The nameplates shall be fixed to the mounting plate, the mounting brackets or junction box. Loosely attached nameplates by wires are not acceptable. Label material and writing shall be selected to withstand the environmental conditions where they are mounted. The label size and fixing place shall be selected to allow easy reading. 52. Bidder to provide mandatory spares as per mandatory spares list. 53. At least 20% spare unused terminals shall be provided everywhere including local junction boxes, instrument racks/enclosures, termination/marshalling cabinets, etc.		

	1X800 MW SIPAT EPC, STAGE III	SECTION: C SUB SECTION: C&I
	CONTROL AND INSTRUMENTATION TECHNICAL SPECIFICATION FOR HVAC SYSTEM	
54. Number of pairs to be selected for Screen /Control cable (Size : 0.5 mm²) a) F-Type: 2P/4P/8P/12P b) G-Type: 2P/4P/8P/12P 55. Number of cores to be selected for Control cable: a) 3 Core (Size: 2.5 mm²): b) 5 Core (Size: 2.5 mm²): c) 12 Core (Size: 1.5 mm²): 56. ANNUAL MAINTAINENCE SERVICE (AMS) FOR PROFIBUS INSTRUMENTS: a) The requirements specified below are applicable for warranty (defect liability period) and 3 years AMS period. b) The Contractor's scope shall also include providing Post Warranty Maintenance for 3 years after completion of warranty period of the offered wireless systems and all associated components as per specification. The AMS shall include tools and tackle as required; travel, boarding & lodging of service engineer. In the event of any malfunction of the system hardware/system software, experienced service engineer shall be made available at site within 48 hours on the receipt of such information from Employer. c) The services under Post Warranty Maintenance Agreement, shall broadly comprise of the following: i) Periodic Maintenance Site visits, minimum four (4) times in a year (total days expected 16 in a year), schedule of visits to be discussed and finalized jointly between Contractor and client after placement of order/ delivery. It shall include inspection of general healthiness of the system, study and advice on daily maintenance, inspection of Hardware & Software, if any problem is reported, running of test programs, on-line servicing and solving reported problems. System shall be checked online. ii) Software Maintenance/ Support Contractor shall maintain the existing operating & application software for any debugging requirements to have consistent performance of the system. iii) Emergency Service In the event of any malfunction of the wireless system hardware/system software during this period, Service Engineer must report at site within 48 hrs. of report of failure. The system must be brought back within 48 hours after reporting at site. iv) Contractor shall note that while carrying out the Annual Maintenance Contract activities, Employer's engineers shall associate with the Contractor. On-job training of these associated engineers shall be covered under this scope. This shall include all items being supplied by Contractor, including any bought-out items but not limited to the following: Labour, at no additional cost, to repair any system devices, to provide tests, and adjustment to system devices.		



1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

SECTION: C
SUB SECTION: C&I

LIST OF DOCUMENTS/DELIVERABLES

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1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

SECTION: C
SUB SECTION: C&I

LIST OF DELIVERABLES OF PEM - C&I DEPARTMENT

Sl. No.	DRAWING NO.	DRAWING/DOCUMENT TITLE	CATEGORY
1	PE-V1-520-145-H901	CONTROL & OPERATIONAL WRITE-UP FOR THE SYSTEM WITH SET POINTS	A
2	PE-V1-520-145-H902	CONTROL SCHEME/LOGIC DIAGRAM (TO BE IMPLEMENTED IN DDCMIS)	A
3	PE-V1-520-145-H903	HMI PICTURES/PLANT SCHEMATICS	A
4	PE-V1-520-145-H904	INSTRUMENT SCHEDULE WITH SET POINTS	A
5	PE-V1-520-145-H905	I/O LIST (ANALOG & BINARY)	A
6	PE-V1-520-145-H906	DRIVE LIST/SOLENOID/ACTUATOR VALVE LIST WITH LOCATION DATA	A
7	PE-V1-520-145-H907	FIELD JB/LIE/LIR, DRIVES TERMINATIONS	A
8	PE-V1-520-145-H908	DATASHEETS FOR INSTRUMENTS, JBs, etc.	A
9	PE-V1-520-145-H909	QUALITY PLANS (INSTRUMENTS, VMS, etc.)	A
10	PE-V1-520-145-H910	INSTRUMENT HOOK-UP DRAWING	A
11	PE-V1-520-145-H911	THERMOWELL SIZING CALCULATION	A
12	PE-V1-520-145-H912	CABLE SCHEDULE & INTERCONNECTION	A
13	PE-V1-520-145-H913	ANNUNCIATION & SOE LIST	A
14	PE-V1-520-145-H914	CALIBRATION CERTIFICATES	A

NOTES:

ANY OTHER DOCUMENT DECIDED DURING DETAILED ENGINEERING SHALL BE PROVIDED BY BIDDER WITHOUT ANY COMMERCIAL/TECHNICAL IMPLICATION.

CONTRACTOR TO SUBMIT REUSABLE DATABASE FORMATS IN BHEL/CUSTOMER APPROVED FORMATS LIKE MS EXCEL, MS ACCESS OF DOCUMENTS LIKE INSTRUMENT SCHEDULE, I/O LIST, DRIVE LIST, FIELD JB TERMINATIONS, CABLE SCHEDULE & INTERCONNECTION, etc. SOFT COPY OF FORMATS SHALL BE PROVIDED TO SUCCESSFUL BIDDERS.

SUB-SECTION – IIIC – 04

MEASURING INSTRUMENTS

(PRIMARY & SECONDARY)

SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1X800 MW)
EPC PACKAGE

TECHNICAL SPECIFICATIONS
SECTION – VI, PART-B
BID DOC. NO.

CLAUSE NO.	TECHNICAL REQUIREMENTS		
1.00.00	MEASURING INSTRUMENTS (PRIMARY AND SECONDARY)		
1.01.00	Measuring instruments/equipment and subsystems offered by the Bidder shall be from reputed experienced manufacturers of specified type and range of equipment, whose guaranteed and trouble free operation has been proven. Refer Sub-section Basic Design Criteria. Further, all instruments shall be of proven reliability, accuracy, and repeatability requiring a minimum of maintenance and shall comply with the acceptable international standards and shall be subject to Employer's approval.		
1.02.00	Every panel-mounted instrument requiring power supply shall be provided with easily replaceable glass cartridge fuses of suitable rating. Every instrument shall be provided with a grounding terminal and shall be suitably connected to the panel grounding bus.		
1.03.00	All transmitters, sensors, switches and gauges for parameters like pressure, temperature, level, flow etc. as required for the safe and efficient operation and maintenance as well as for operator and management information (including all computation) of equipment in the system under the scope of specification shall be provided on as required basis with in quoted lump sum price. The Contractor shall furnish all Instrumentation / Control equipment & accessories under this specification as per technical specification, ranges, makes & model as approved by the Employer during detailed engineering.		
1.04.00	The necessary root valves, impulse piping, drain cocks, gauge-zeroing cocks, valve manifolds and all the other accessories required for mounting/erection of these local instruments shall be furnished, even if not specifically asked for, on as required basis. The contacts of equipment mounted instruments, sensors, switches etc. for external connection including spare contacts shall be wired out in flexible/rigid conduits, independently to suitably located common junction boxes. The proposal shall include the necessary cables, flexible conduits, junction boxes and accessories for the above purpose. Double root valves shall be provided for all pressure tapping where the pressure exceeds 40 Kg./sq.cm.		
1.05.00	All instruments envisaged for sea water applications, shall be provided with wetted parts made of Monel/ Hastelloy C or any other material (if provenness experience of the proposed material for such applications is established by contractor). For Chlorine application: Instruments shall be provided with wetted parts (e.g. diaphragm seal, etc.) made of Hastelloy C. Also, filled liquid shall be Fluorolube oil/ Inert Hydrocarbon / CTFE etc., for these applications. For applications of FECL3 solution: Instruments shall be provided with wetted parts (e.g. diaphragm seal, etc.) made of Tantalum.		
1.06.00	For coastal areas, all instruments shall be provided with durable epoxy/ polyurethane coating for housings and all exposed surfaces of the instruments.		
1.07.00	The instruments which are proposed to be used for PG test as indicated in the tender P&IDs shall meet the minimum requirements specified in ASME PTC or subsequent clauses in this chapter whichever is better.		
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)
			PAGE 1 OF 36

CLAUSE NO.	TECHNICAL REQUIREMENTS																						
2.00.00	SPECIFICATION FOR ELECTRONIC TRANSMITTERS																						
2.01.00	SPECIFICATION FOR ELECTRONIC TRANSMITTER FOR PRESSURE, DIFF PRESS AND DP BASED FLOW / LEVEL MEASUREMENTS Microprocessor based 2 wire loop powered electronic transmitter with 4-20 mA DC HART/ Fieldbus (Foundation Fieldbus /Profibus PA complying to IEC 61158.) output signal shall be provided. <table><tr><th>Range</th><th>Accuracy (For calibrated Range)</th><th>Turndown (For span)</th><th>Stability (% of Calibrated range)</th></tr><tr><td><=400mmwc</td><td>0.1%</td><td>20:1</td><td>+/-0.2% for 1 year</td></tr><tr><td>>400mmwc</td><td>0.060%</td><td>50:1</td><td>+/-0.25 % for 10 year</td></tr><tr><td>>250 kg/cm2</td><td>0.065%</td><td>10:1</td><td>+/- 0.15 % for 5 years</td></tr><tr><td>static pressure >420 kg/cm2</td><td>0.1%</td><td>10:1</td><td>+/- 0.2 % for 5 years</td></tr></table> Above parameters/features of offered models shall be strictly as defined in standard published catalogue of the manufacturer only. Transmitter shall have weatherproof IP-67 metallic housing with durable corrosion resistant coating, integral digital display with self-indicating diagnostics, Plug and socket type electrical connection for HART and ½ "NPT (F) for Fieldbus type Transmitter, calibration using HART/Fieldbus calibrator, 2/3/5 Valve non integral manifold and rack with canopy. For HART transmitter SIL 2 certification is required. For primary air and flue gas applications, DPT shall be provided for pressure measurement below range of 2000 mmWC. For corrosive, viscous, solid bearing, slurry type process fluids, suitable diaphragm seal shall be provided. Parts below seal shall be removable for cleaning. Entire volume shall be completely filled with inert liquid suitable for instruments. LVDT type transmitter is not acceptable.			Range	Accuracy (For calibrated Range)	Turndown (For span)	Stability (% of Calibrated range)	<=400mmwc	0.1%	20:1	+/-0.2% for 1 year	>400mmwc	0.060%	50:1	+/-0.25 % for 10 year	>250 kg/cm2	0.065%	10:1	+/- 0.15 % for 5 years	static pressure >420 kg/cm2	0.1%	10:1	+/- 0.2 % for 5 years
Range	Accuracy (For calibrated Range)	Turndown (For span)	Stability (% of Calibrated range)																				
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>250 kg/cm2	0.065%	10:1	+/- 0.15 % for 5 years																				
static pressure >420 kg/cm2	0.1%	10:1	+/- 0.2 % for 5 years																				
2.02.00	GUIDED WAVE RADAR TYPE LEVEL TRANSMITTER <table><tr><td>Type</td><td>Microprocessor based 2 wire type (loop powered), HART protocol compatible Guided wave radar transmitter.</td></tr><tr><td>Principle</td><td>TDR (Time domain reflectometry)</td></tr><tr><td>Probe Type & Material</td><td>(i) Coaxial probe of SS316/316L. If required, probe shall be suitable for overfill prevention. (ii) Rod probe, cable probe of SS316/SS316L can be used for applications wherever coaxial probe is not suitable.</td></tr><tr><td>Output signal</td><td>4-20 mA DC along with superimposed digital signal (based on HART protocol), suitable for over fill prevention.</td></tr><tr><td>Accuracy</td><td>+/- 0.5% of calibrated span or minimum 5mm.</td></tr><tr><td>Power supply</td><td>24 VDC +/- 10%.</td></tr><tr><td>Housing</td><td>Weatherproof as per IP-65, metallic housing with durable corrosion</td></tr></table>			Type	Microprocessor based 2 wire type (loop powered), HART protocol compatible Guided wave radar transmitter.	Principle	TDR (Time domain reflectometry)	Probe Type & Material	(i) Coaxial probe of SS316/316L. If required, probe shall be suitable for overfill prevention. (ii) Rod probe, cable probe of SS316/SS316L can be used for applications wherever coaxial probe is not suitable.	Output signal	4-20 mA DC along with superimposed digital signal (based on HART protocol), suitable for over fill prevention.	Accuracy	+/- 0.5% of calibrated span or minimum 5mm.	Power supply	24 VDC +/- 10%.	Housing	Weatherproof as per IP-65, metallic housing with durable corrosion						
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SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 2 OF 36																			

CLAUSE NO.	TECHNICAL REQUIREMENTS																															
2.03.00		resistance coating.																														
	Adjustment/ calibration	Using handheld HART calibrator/ centralized PC based system (as applicable).																														
	Zero & span adjustment	Continuous, temper proof, remote as well as manual adjustability from instrument. It should be possible to calibrate the instrument without any level in the tank/sump etc.																														
	Display	Integral digital display.																														
	Load Impedance	500 ohms (minimum).																														
	Electromagnetic compatibility	Shall meet EN 61326-1 (2021) and AmdtA1, class A equipment/EN 50081-2 & EN 5008 1-2 & EN 50082-2																														
	Mounting	(i) External cage shall be provided wherever side mounting is required. External cage and other mounting accessories to be provided by the contractor. (ii) Wherever top mounting is required, all mounting accessories, stilling well (as required) etc., shall be provided by the contractor. (iii) All weather canopy shall be provided for protection from direct sunlight and direct rain for open locations.																														
	Note: Four wire type transmitters can also be provided for applications where 2- wire transmitter has some technical limitations, subject to employer's approval during detailed engineering stage. However, in such cases isolated 4-20 mA DC (analog) output shall be provided. Power supply required for such transmitters shall be 240V AC / 24V DC.																															
	Ultrasonic Type level Transmitter																															
	<table><tr><th>S.No.</th><th>Features</th><th>Essential/Minimum requirement</th></tr><tr><td>1.</td><td>Type of Transmitter</td><td>Non-contact Microprocessor based 2 wire type (loop powered), HART protocol compatible Ultrasonic transmitter.</td></tr><tr><td>2.</td><td>Output signal</td><td>4-20 mA DC (Analog) along with superimposed digital signal (based on HART protocol).</td></tr><tr><td>3.</td><td>Accuracy</td><td>+/- 0.5% of calibrated span or minimum 5mm.</td></tr><tr><td>4.</td><td>Power supply</td><td>24 V DC +/- 10%.</td></tr><tr><td>5.</td><td>Temperature compensation</td><td>To be provided within transducer.</td></tr><tr><td>6.</td><td>Housing</td><td>Weatherproof as per IP-65, metallic housing with durable corrosion resistance coating.</td></tr><tr><td>7.</td><td>Adjustment/calibration/ maintenance</td><td>Using handheld HART calibrator/ centralized PC based system (as applicable).</td></tr><tr><td>8.</td><td>Zero and Span adjustment</td><td>Continuous, tamper proof, remote as well as manual adjustability from instrument. It should be possible to calibrate the instrument without any level in the tank/sump etc.</td></tr><tr><td>9.</td><td>Sensor Material</td><td>Corrosion resistant material to suit individual</td></tr></table>			S.No.	Features	Essential/Minimum requirement	1.	Type of Transmitter	Non-contact Microprocessor based 2 wire type (loop powered), HART protocol compatible Ultrasonic transmitter.	2.	Output signal	4-20 mA DC (Analog) along with superimposed digital signal (based on HART protocol).	3.	Accuracy	+/- 0.5% of calibrated span or minimum 5mm.	4.	Power supply	24 V DC +/- 10%.	5.	Temperature compensation	To be provided within transducer.	6.	Housing	Weatherproof as per IP-65, metallic housing with durable corrosion resistance coating.	7.	Adjustment/calibration/ maintenance	Using handheld HART calibrator/ centralized PC based system (as applicable).	8.	Zero and Span adjustment	Continuous, tamper proof, remote as well as manual adjustability from instrument. It should be possible to calibrate the instrument without any level in the tank/sump etc.	9.	Sensor Material
S.No.	Features	Essential/Minimum requirement																														
1.	Type of Transmitter	Non-contact Microprocessor based 2 wire type (loop powered), HART protocol compatible Ultrasonic transmitter.																														
2.	Output signal	4-20 mA DC (Analog) along with superimposed digital signal (based on HART protocol).																														
3.	Accuracy	+/- 0.5% of calibrated span or minimum 5mm.																														
4.	Power supply	24 V DC +/- 10%.																														
5.	Temperature compensation	To be provided within transducer.																														
6.	Housing	Weatherproof as per IP-65, metallic housing with durable corrosion resistance coating.																														
7.	Adjustment/calibration/ maintenance	Using handheld HART calibrator/ centralized PC based system (as applicable).																														
8.	Zero and Span adjustment	Continuous, tamper proof, remote as well as manual adjustability from instrument. It should be possible to calibrate the instrument without any level in the tank/sump etc.																														
9.	Sensor Material	Corrosion resistant material to suit individual																														
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)																													
			PAGE 3 OF 36																													

CLAUSE NO.	TECHNICAL REQUIREMENTS 		
2.04.00			application requirement.
	10.	False signal tolerance	Transmitter shall be capable of ignoring false echoes from internal tank/sumps obstructions such as pipes, heating coils or agitator blades. Also, transmitter shall have adjustable damping circuitry.
	11.	Range	Range of transmitter shall be capable of covering the complete level span of tank taking care of blocking distance, frequency attenuation due to surface, obstructions, vapors etc.
	12.	Display	Integral digital display
	13.	Diagnostics	Loss of echo alarm etc.
	14.	Load Impedance	500 ohms (minimum).
	15.	Electrical Connection	Plug and socket
	16.	Accessories	• All weather canopy shall be provided for protection from direct sunlight and direct rain for open locations. • All mounting accessories required for erection and commissioning shall be provided. • For hazardous area, explosion proof enclosure as described in NEC article 500
	Note: 1) Contractor can also provide Radar type transmitter as per above specification in place of ultrasonic transmitter subject to approval by Employer during detailed Engineering. Sonic frequency-based transmitters can also be provided under "ultrasonic transmitters" category for fly ash silo level. 2) Four wire type transmitters can also be provided for applications where 2- wire transmitter has some technical limitations, subject to employer's approval during detailed engineering stage. However, in such cases isolated 4-20 mA DC (analog) output shall be provided. Power supply required for such transmitters shall be 240V AC / 24V DC. 3) For applications where transmitter location is not accessible, the transmitter shall have separate sensor unit and electronic unit for such applications. It shall be possible to mount the electronic unit at accessible location.		
	HART Handheld Calibrator Handheld calibrator shall be provided for adjustment/calibration/maintenance of the HART/Foundation Fieldbus/Profibus/Profibus Pa compatible transmitters. The handheld calibrator shall be suitable for all types of transmitters supplied in the package. If one type of handheld type calibrator is not suitable for communicating with all types of transmitters, then separate hand held calibrator will be provided for that specific type of transmitter.		
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-III-C-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY) PAGE 4 OF 36

CLAUSE NO.	TECHNICAL REQUIREMENTS			
3.04.00	Thermo well (for all process temp. elements) (a) Shall be one-piece solid bored type of 316 SS of step-less tapered design. (As per ASME PTC 19.3, 2016) (b) For Mill classifier outlet long life solid sintered tungsten carbide material of high abrasion resistance shall be provided. (c) For Air & Flue gas 316 SS protecting tube with welded cap. (However, contractor shall provide better material for Flue gas service if required based on the specified boiler design parameters). (d) For furnace zone, impervious ceramic protecting tube of suitable material along with Incoloy supporting tubes and adjustable flanges.			
3.05.00	Not Used			
3.06.00	TEMPERATURE TRANSMITTER Minimum technical requirements shall be as follows: Single input/Dual input temperature transmitter shall be 2-wire loop powered directly from 4-20mA input cards of DDCMIS. Transmitter shall be fully compatible with thermocouples and RTDs being provided. It shall be capable to handle Pt-100 RTD, Thermocouple –K, R & S types (selectable through HART/Fieldbus terminal/calibrator). Temperature compensation for T/C shall be performed in the transmitter itself. In case of failure (open or burn-out) of RTD/thermocouple, transmitter shall provide low temperature output. Transmitter shall be HART/Fieldbus (Profibus PA/Foundation Fieldbus complying to IEC 61158)compatible, have EMC compatibility as per EN 61326, weather proof IP-67 metallic housing with durable corrosion resistant coating, plug and socket type electrical connection for HART and 1/2" NPT(F) connection for Fieldbus , integral digital display with self-indicating diagnostics, operating ambient temperature of 85 deg C without display & 70 deg C with display, suitable for 2 inch pipe mounting in enclosure/rack . Composite Accuracy shall be as follows: RTD =<0.25% of 0-250 deg C span, T/C -K type			
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 7 OF 36

CLAUSE NO.	TECHNICAL REQUIREMENTS			
3.07.00	=<0.2 % of 0-600 deg C span, CJC accuracy (for T/C) shall be < 1 deg C. Notes : 1. Dual input temperature transmitter shall have bump less changeover facility to second sensor in case first sensor fails. This changeover is to be alarmed in control system. 2. Composite accuracy is to be calculated as summation of all applicable accuracies of temperature transmitter for converting sensor input to output (e.g., A/D accuracy, basic accuracy, digital accuracy, etc.) and temperature effect on these accuracies at ambient temperature of 50 deg C, based on the figure/ formula given in the standard product catalogue for span as specified above for various types of temperature elements specified. 3. Above mentioned parameters/features of offered models shall be strictly as defined in standard published catalogue of the manufacturer only. 4. Dual input temperature transmitters can also be accepted in place of single input TT.			
	Din rail temperature transmitter 4-20mA HART based suitable for mounting on DIN-rails in JB's. The specifications of the JB's shall be same as indicated in Subsection INST CABLE with additional DIN-rails and IP 65 Protection class. This temperature transmitter shall be the ones which are especially designed for DIN-rail mounting with IP 20 protection class. These shall have terminals for input/output provided on front side when mounted on DIN-rail. Head mounted temperature transmitter with clamps to make it suitable for DIN-rail mounting shall not be acceptable under this category. Accuracy of Din rail should be: RTD =<0.4% of 0-250 deg C span, T/C -K type =<0.4 % of 0-600 deg C span, CJC accuracy (for T/C) shall be < 1 deg C. Other specifications shall be as mentioned in clause 3.06.00. Exact applications shall be as defined in PART-A of specifications.			
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 8 OF 36

CLAUSE NO.	TECHNICAL REQUIREMENTS																																															
13.04.00	NOT USED																																															
14.00.00	NOT USED																																															
15.00.00	PROCESS ACTUATED SWITCHES																																															
	<table><tr><th>FEATURES</th><th colspan="3">ESSENTIAL / MINIMUM REQUIREMENTS</th></tr><tr><td></td><td>Pressure/ Draft Switches/ DP Switches</td><td>Temperature switches</td><td>Level switches</td></tr><tr><td>Sensing Element</td><td>Piston actuated for high pressure and diaphragm or bellows for low pr./ vacuum</td><td>Vapor pressure sensing, liquid filled bellow type with SS bulb and capillary (5 m minimum, to suit application)</td><td>Capacitance types, float type, conductivity type, RF type, Ultrasonic type as per suitability to the application. .</td></tr><tr><td>Material</td><td>316 SS</td><td>Bulb 316 SS/ capillary 304 SS</td><td>316 SS</td></tr><tr><td>End connection</td><td>½ inch NPT (F)</td><td>½ inch NPT (F)</td><td>Manufacturer standard</td></tr><tr><td>Over range/ proof pressure</td><td>150% of maximum operating pr.</td><td>-</td><td>150% of maximum operating pr.</td></tr><tr><td>Repeatability</td><td colspan="3">+/- 0.5% of full range</td></tr><tr><td>No. of contacts</td><td colspan="3">2 No.+2NC. SPDT snap action dry contact</td></tr><tr><td>Rating of contacts</td><td colspan="3">60 V DC, 6 VA (or more if required by DDCMIS)</td></tr><tr><td>Elect. Connection</td><td colspan="3">Plug in socket.</td></tr><tr><td>Set point adjustment</td><td colspan="3">Provided over full range.</td></tr></table>				FEATURES	ESSENTIAL / MINIMUM REQUIREMENTS				Pressure/ Draft Switches/ DP Switches	Temperature switches	Level switches	Sensing Element	Piston actuated for high pressure and diaphragm or bellows for low pr./ vacuum	Vapor pressure sensing, liquid filled bellow type with SS bulb and capillary (5 m minimum, to suit application)	Capacitance types, float type, conductivity type, RF type, Ultrasonic type as per suitability to the application. .	Material	316 SS	Bulb 316 SS/ capillary 304 SS	316 SS	End connection	½ inch NPT (F)	½ inch NPT (F)	Manufacturer standard	Over range/ proof pressure	150% of maximum operating pr.	-	150% of maximum operating pr.	Repeatability	+/- 0.5% of full range			No. of contacts	2 No.+2NC. SPDT snap action dry contact			Rating of contacts	60 V DC, 6 VA (or more if required by DDCMIS)			Elect. Connection	Plug in socket.			Set point adjustment	Provided over full range.		
FEATURES	ESSENTIAL / MINIMUM REQUIREMENTS																																															
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SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....-001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 24 OF 36																																												

CLAUSE NO.	TECHNICAL REQUIREMENTS				
	Dead band adjustment	Adjustable/ fixed as per requirement of application.			
	Enclosure	Weather and dust proof as per IP-55, metallic housing.			
	Accessories	Siphon, snubber, chemical seal, pulsation dampeners as required by process	Thermo well of 316 SS and packing glands	All mounting accessories	
	Mounting	Suitable for enclosure/ rack mounting or direct mounting	Suitable for rack mounting or direct mounting	-	
	Power Supply (wherever required)	As per Contractor's Standard practice.			
	Notes :- 1) Where the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application. 2) Pressure/ Diff pressure switches for very low press/ DP measurements can have sensor material other than SS316 in case of any technical limitation and the offered product is standard product of the manufacture for very low-pressure applications. 3) Repeatability can be upto +/-1% of full range in case of switches with diaphragm seals or very low pressure/DP range. 4) The specifications of switches for air conditioning & ventilation system / process can be as per system manufacturer's standards. The manufacturer shall submit the adequate supporting documents for establishing their standard practice. 5) For ESP Level Switches following requirements are to be met: i) ESP Level Switches calibration shall not be affected by changes in ambient temperature. ii) Active build up compensation to be provided to sense and auto correct the effect of ash deposition on level probe. iii) Self- -diagnostic features like health status, maintenance requirement, instrument failure, false alarm etc. to be provided. The manufacturer shall submit adequate supporting documents, catalogues for establishing the above features. 6) Vibration Rod type switches to be provided for first two fields of ESP.				
	SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2		SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)

CLAUSE NO.	TECHNICAL REQUIREMENTS			
20.00.00	AC PLANT RELATED SPECIAL INSTRUMENTS			
20.01.00	HUMIDITY SENSOR			
	Sensor : Capacitance type			
	Accuracy : +/-3% R.H			
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....-001A-2		SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)
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CLAUSE NO.	TECHNICAL REQUIREMENTS 		
20.02.00	Range : 0-100% R.H Output : 4-20 ma Time constant : 2 mins. Output from the sensor is to be connected to respective control system. Contractor can also provide combined instrument for measurement of humidity and temperature subject to Employer's approval during detailed engineering. In all such cases, 4-20 ma outputs, each for temperature and humidity measurements are to be provided.		
	TEMPERATURE/ HUMIDITY INDICATOR Sensor : RTD for(Pt 100) for temperature : Capacitance Type for Humidity (specs for humidity and temperature shall be as mentioned above) Display : Combined enclosure with two three-digit seven segments LED display with decimal point after two digits. LED height shall be 4 inches, clearly legible from a distance of at least 10 meters. Range : 0-60 Deg C for temperature. : 0-95.0 % for Relative Humidity. Accuracy : Better than +/-0.5 % for Temperature : Better than +/-2.5 % for Relative Humidity Mounting : Tabletop/ wall mounting. Power supply : 240 V AC, 50 Hz. Output : 4-20 mA signal each for temperature. Qty. : 15 nos. each of temperature & Humidity indicators (combined indicators for Humidity and temperature is also applicable). One Set of output signal is to be connected to respective control system. Apart from displaying the temperature/humidity values on indicator.		
SIPAT DUPER THERMAL POWER STATION, STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC. NO.:CS-.....001A-2	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
21.00.00	Limit switches			
	For offsite plant (except PT, DM, Chlorination, chemical treatment, Liquid effluent treatment) application Limit switches shall be silver plated with high conductivity and non-corrosive type. Contact rating shall be sufficient to meet the requirement of DDCMIS subject to a minimum of 60 V, 6 VA rating. Protection class shall be IP 55.			
	For main plant application limit switches are to be provided as per contractor standard and proven practice.			
	For PT, DM, Chlorination system, chemical treatment, Liquid effluent treatment plant , limit switches of manual valves and solenoid operated on-off valves shall be of inductive proximity type and shall be mounted inside the enclosure: pl. refer the minimum specification requirement below .			
	Operating voltage Range		10-40 V DC	
	Sensing system		Inductive Proximity type, 2 Wire	
	Sensor Contact Type		NO	
	Reverse polarity and short circuit protection		Yes	
	IP Class-Sensor		IP67	
	IP Class-Enclosure(Switch box)		IP67	
	Cable entry-Enclosure(Switch box)		2no-1/2" NPT	
	Casing material-Sensor		Brass /SS	
	Enclosure(Switch box) Housing material		FRP or SS	
Operating Ambient temp(sensors)		-5 to 70 deg C		
Max allowed Voltage Drop across sensor		5 V		
Standard applicable		EN 60947-5-2 or equivalent.		

CLAUSE NO.	TECHNICAL REQUIREMENTS			एनटीपीसी NTPC
6.00.00	FIELD MOUNTED LOCAL JUNCTION BOXES (AS PER STANDARD AND PROVEN Practice of vendor) (i) No. of ways 12/24/36/48/64/72/96/128 with 20% spares terminals. (ii) Material and Thickness 4mm thick Fiberglass Reinforced Polyester (FRP). (iii) Type of terminal blocks Rail mounted cage-clamp type suitable for conductor size upto 2.5 mm². A M6 earthing stud shall be provided. (iv) Protection Class IP: 55 min. for indoor & IP-65 min for outdoor applications. (v) Grounding To be provided. (vi) Color RAL 7035			
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.: CS	SUB-SECTION-IIIC-07 INSTRUMENTATION CABLES	PAGE 6 OF 6

SPECIFICATIONS FOR PR. GAUGE, D.P. GAUGE, TEMP. GAUGE AND LEVEL GAUGE.

SI. No	FEATURES	ESSENTIAL/MINIMUM REQUIREMENTS		
		Pr. Gauge/ DP Gauge/ Draught gauges	Temperature Gauge	Level Gauge
1	Sensing Element and material	Bourdon for high pressure, Diaphragm/Bellow for low pr. Of 316 SS	Mercury in steel for below 450°C and inert gas actuated for above 450°C of SS bulb and capillary.	Tempered * toughened Borosilicate gauge glass steel armoured reflex or transparent type.
2	Body material	SS 316	SS 316	Forged carbon steel/304 SS
3	Dial size	150mm	150 mm	Tubular covering entire range
4	End connection	1/2 inch NPT (M)	3/4" NPT (M)	Process connection as per ASME PTC and drain/vent 15 NB
5	Accuracy	±1% of span	± 1% of span	± 2%
6	Scale	Linear, 270° arc graduated in metric units	Linear, 270° arc graduated in °C	Linear vertical
7	Range selection	Cover 125% of max. of scale	Cover 125% of max. of scale	Cover 125% of max. of scale
8	Over range test	Test pr. for the assembly shall be 1.5 to the max. Design pr. at 38°C.		
9	Housing	Weather and dust proof as per IP-55	Weather and dust proof as per IP-55	CS/304 SS leak proof
10	Zero/span adjustment	Provided	Provided	--
11	Identification	Engraved with service legend or laminated phenolic name plate		

12	Accessories	Blow out disc, SS Thermowell siphon, snubber, pulsation dampener, chemical seal (if required by process) gauge isolation valve	Gasket for all KEL-F shield for transparent type vent and drain valves of Steel/SS as per CS/Alloy process Requirement.
13	Material of Bourdon/ movement	316 SS / 304 SS	316 SS / 304 SS

Notes:-

*Bicolour type level gauges will be provided for applications involving steam and water except for condensate and feed water services.

Length of gauge glass shall not be more than 1400 mm. If the vessel is higher, multiple gauge glasses with 50 mm overlapping shall be provided.

Where the process fluids are corrosive, viscous, solid bearing or slurry type, diaphragm seals shall be provided. Parts below the diaphragm shall be removable for cleaning. The entire volume above the diaphragm shall be completely filled with an inert liquid suitable for the application.



1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

SECTION: C
SUB SECTION: C&I

**GENERAL REQUIREMENTS FOR FIELDBUS
INSTRUMENTS, ACTUATORS & IMCs**

I

CLAUSE NO.	TECHNICAL REQUIREMENTS				
1.04.02	All required libraries to execute various tasks like data acquisition, control/protection etc. shall be provided.				
	In fieldbus system following spare capacity in each FG shall be provided :				
	Sr. No (1)	Item (2)	Sub-Item (including description) (3)	Spare Capacity (4)	Spare Space (5)
	1	Foundation Fieldbus	Wired-in space for mounting FF Host modules along with space for FF power supply backplane / base / rack for future expansion.		20 % of Engineered quantity of Host modules
			Spare capacity in the redundant bulk power supplies for fieldbus system	20 % over and above Engineered capacity	-
			FF Segment Loading (Limited to a maximum of 12 nos. devices with a minimum voltage across each device of 11 V DC)	Out of each segment capacity calculated as per column (3), spare capacity of 2 nos. as a minimum for future expansion per segment shall be provided	-
			Spare spur in the field mounted FF Segment Distributor	Minimum 2 nos. in each Segment Distributor	-
	2	Profibus DP	Wired in space for Redundant DP masters with required backplane / rack / base for expansion		Space for 1 set
			Capacity in redundant DP masters	20 % of Engineered DP segment capacity for DP devices	
	3	Profibus PA	Wired-in space for mounting PA segment modules along with required backplane / rack / base for future expansion		20 % of supported PA segment modules by each DP/PA coupler/link
			Capacity in the redundant DP / PA coupler / link modules and corresponding DP masters for future expansion	20 % over and above engineered capacity	-

CLAUSE NO.	TECHNICAL REQUIREMENTS 				
			Spare capacity in the redundant bulk power supplies for fieldbus system	20 % over and above designed rating	-
			PA Segment Loading (Limited to a maximum of 12 nos. devices with a minimum voltage across each device of 11 V DC)	Out of each segment capacity calculated as per column (3), spare capacity of 2 nos. as a minimum for future expansion per segment shall be kept	-
			Spare spur in the field mounted Profibus PA Segment Distributor	Minimum 2 nos. in each Segment Distributor	-
	4	Controller(s) / system module(s)	These shall have spare hardware and software capacities, over and above engineered capacities, to cater to spare requirements defined above, for applicable items of S.No.1,2,3 along with their spare capacities defined in column (4) & (5)		
	The spare functional capacity of controller defined in Annexure-C to sub-section-IIIC, Part-A of Technical Specification will be applicable for both conventional and fieldbus based system (combined together).				
	1.04.03 The contractor shall present complete implementation scheme, including wiring scheme during detailed engineering stage for review and approval by Employer.				
	1.05.00 Fieldbus cable (specifically used for Foundation Fieldbus/ Profibus PA and Profibus DP) shall be individually shielded twisted pair, with round steel wired amour (SWA) complying with IEC 61158, Type A. The cable construction shall meet EN 50288-7 standard for physical properties and the outer sheath shall be of PVC-TM53 as per EN 50290-2-22. Continuous operating temperature of Fieldbus cable shall be minimum 90 Deg C. The contractor shall furnish comparison of major electrical and physical properties of offered cables w.r.t specified standards to establish compliance of offered cables with this technical specification. For laying of fieldbus cables, cable trays envisaged for instrumentation cable with all the accessories shall be used by the contractor. Minimum 300 mm spacing to be kept between the fieldbus trays and other high voltage cables to avoid any interference. Fieldbus Junction boxes made of SS 316 and specially designed for fieldbus application shall be provided from fieldbus component manufacturer on as required basis. These Fieldbus JB's shall house field mounted fieldbus components like distributors, tee, etc. These Fieldbus JB's				
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE			TECHNICAL SPECIFICATIONS SECTION VI, PART-B BID DOC. NO.: CS	SUB-SECTION - IIIC-02 DDCMIS ANNEXURE IIIC-02F	PAGE 3 OF 5

CLAUSE NO.	TECHNICAL REQUIREMENTS			
	shall have suitable cover and gasket and shall have protection class of IP-66 or better. SS Cable glands and blind plugs shall be provided by the Contractor.			
1.06.00	Comprehensive Fieldbus Maintenance and Diagnostic software shall be provided. This software shall be capable of collecting complete diagnostic information from fieldbus network and all fieldbus devices and presenting in user friendly interface for detailed diagnostic and troubleshooting of the system. It shall be possible to completely configure parameters of fieldbus network and fieldbus devices from centralized system through this software. This software shall have feature of providing data related to maintenance of fieldbus devices as available through fieldbus system. This system/ software shall have provision to get updated to latest version/ release of various fieldbus devices.			
1.07.00	During FAT suitable arrangement shall be made by Contractor to test Fieldbus modules including field devices as per approved FAT procedure.			
1.08.00	The contractor shall use fieldbus segment design tool / software to design complete network verifying various design parameters like device voltage, total cable length, spur length, system power requirements etc. the contractor shall provide device voltage calculations for all segments, based on calculation in software package. All these calculations shall be handed over during detailed engineering in electronic format in a way that Employer can thoroughly verify design basis/ calculations carried out by Contractor.			
1.09.00	Suitable short circuit protection, surge protection, grounding requirements shall be provided for all devices, so that fault in one device shall not impact the availability of other devices in the segment.			
1.10.00	All required diagnostic and configuration tools/ hand held devices shall be provided for configuration and troubleshooting of devices and network.			
1.11.00	Specific requirements for Profibus DP based interface with IMCs (Intelligent Motor Controllers)			
1.11.01	All IMC modules in LV SWGR/ MCC are to be interfaced with DDCMIS through Profibus DP protocol.			
1.11.02	All requisite hardware & software for seamless integration and interface of Profibus DP based IMC modules with fieldbus based DDCMIS system, even if not explicitly indicated in the Technical Specifications are to be supplied and engineered.			
1.11.03	DDCMIS System design shall ensure adequacy of built in redundancy such that no single component failure leads to the failure of a part / total system.			
1.11.04	The total no. of IMC modules in one Profibus DP segment and their response time shall be governed by Process requirement and other relevant clauses specified elsewhere in the Technical Specifications. The same shall be finalized during detailed engineering and submitted to the Employer for prior approval before implementation. However the total no. of IMC modules per segment shall in no case exceed 24.			
1.11.05	All IMCs modules in a Profibus DP segment shall be linked to each other in a Daisy chain fashion using PG/PG connectors.			
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CLAUSE NO.	TECHNICAL REQUIREMENTS 			
1.11.07	All active electronic components / modules like OLMs / Y-links etc. required for the interface of Profibus based IMCCs with DDCMIS system to be installed in the CER / MCC /RIO room, shall be powered by redundant 24V DC feeders from chargers installed at the respective CER / RIO room The loss / power supply failure of any IMC shall not disrupt the network including the last IMC module in the segment. To meet this functional requirement any additional component / power supply shall be provided by the contractor.			
1.11.08				
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE	TECHNICAL SPECIFICATIONS SECTION VI, PART-B BID DOC. NO.: CS	SUB-SECTION - IIIC-02 DDCMIS ANNEXURE IIIC-02F	PAGE 5 OF 5	

SUB-SECTION – IIIC - 06

PROCESS CONNECTION AND PIPING

SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1X800 MW)
EPC PACKAGE

TECHNICAL SPECIFICATIONS
SECTION – VI, PART-B
BID DOC. NO.

CLAUSE NO.	TECHNICAL REQUIREMENTS											
	PROCESS CONNECTION AND PIPING											
1.00.00	PROCESS CONNECTION PIPING Process connection & piping including all impulse piping, sample piping, pneumatic piping/tubing, valves, valve manifolds, fittings and all other accessories required for proper installation & completeness of impulse piping system, sampling piping system and air supply system shall be provided by the Contractor on as required basis. The rating of material of impulse pipes, tubes, fittings, valves and their installation thereof shall conform to the latest edition of standards as per following table: <table><tr><td>Impulse Pipes, Tubes (Material, Rating)</td><td>ANSI B31.1, ANSI B31.1a, ANSI/ISA 77.70</td></tr><tr><td>Valves (Material, Pr. Class, Size)</td><td>ASTM A182/ASTM A105 as per ASME 16.34</td></tr><tr><td>Fittings (Size, Rating, Material)</td><td>ANSI B31.1, ANSI B31.1a, ASME B16.11-2009</td></tr><tr><td>Installation Schemes</td><td>BS 6739-2009, ANSI/ISA 77.70</td></tr></table> Instrument air filters cum regulator set with mounting accessories shall be provided for pneumatic device requiring air supply.				Impulse Pipes, Tubes (Material, Rating)	ANSI B31.1, ANSI B31.1a, ANSI/ISA 77.70	Valves (Material, Pr. Class, Size)	ASTM A182/ASTM A105 as per ASME 16.34	Fittings (Size, Rating, Material)	ANSI B31.1, ANSI B31.1a, ASME B16.11-2009	Installation Schemes	BS 6739-2009, ANSI/ISA 77.70
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Fittings (Size, Rating, Material)	ANSI B31.1, ANSI B31.1a, ASME B16.11-2009											
Installation Schemes	BS 6739-2009, ANSI/ISA 77.70											
1.01.00	All transmitters and switches (except for fuel oil applications) shall be suitably grouped together and mounted inside (i) Local Instruments Enclosures (LIE) in case of Open Areas of the Plant like Boiler Area, Coal Handling, Chimney Area, FGD area, CW Pump House, DM Plant, PT Plant, Ash Handling Plant etc. (ii) Local Instrument Racks (LIR) in case of covered areas like Turbine Area, Generator Area etc. (iii) Local Indicators/Gauges shall also be suitably grouped in Local Instrument Racks In case grouping is not possible and these are to be installed individually, canopy with suitable mounting arrangement shall be provided. All electric actuators, pneumatic control valves, Junction Boxes, Solenoid boxes and Local control panels which are not installed inside building, suitable canopy shall be provided and design of canopy shall be approved by Employer during detailed engineering.											
1.02.00	Local Instrument Enclosures (LIEs) and Local Instrument Racks (LIRs) complete with all fittings, mountings & accessories, drains and Utility Lighting, Cable & Grounding cable etc. shall be provided by the Contractor on as required basis. The Degree of Protection of LIE and JB of LIE/LIR shall be IP-55. The instrument racks shall be constructed from 1.6 mm sheet plate and shall be free standing type constructed of suitable 3 mm thick channel frame of steel and shall be provided with a canopy to protect the equipment mounted in racks from falling objects, water etc. The canopy shall not be less than 3 mm thick steel and extended beyond the ends of the rack.											
1.03.00	All temperature transmitters shall be suitably grouped together and mounted inside (i) Enclosures in case of open areas of the plant like Boiler Area, Coal Handling,											
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.	SUB-SECTION-IIIC-06 PROCESS CONNECTION AND PIPING	PAGE 1 OF 2								

CLAUSE NO.	TECHNICAL REQUIREMENTS						
1.04.00 1.05.00 1.06.00	Chimney Area, FGD area, CW Pump House, DM Plant, PT Plant, Ash Handling Plant etc. and (ii) Racks in case of covered areas like Turbine Area, Generator Area etc. on as required basis. In case grouping is not possible and temperature transmitter is to be installed individually, canopy with suitable mounting arrangement shall be provided.						
	For skid mounted instruments and instruments integral to equipments, process connection and piping can be in line with bidder's standard and proven practice.						
	Contractor shall furnish "Certificate of Compliance" of erection of PCP as per NTPC approved documents.						
	PAINTING COLOR SCHEME FOR IMPULSE PIPING						
	S. No.	Area / Equipment	Impulse Pipe Ground Color		Identification Tag/Band		
			Color	RAL	Color	ISC No.	RAL
	1)	Air	Grey	9002	Sky Blue	101	
	2)	Water	Grey	9002	Sea Green	217	
	3)	Steam	Aluminum		Signal Red	537	3001
	4)	Air Steam Mixture	Aluminum		Sky Blue	101	
	5)	Gas	Grey	9002	Canary Yellow	309	
	6)	Oils	Grey	9002	Light Brown	410	
7)	Pulverized Fuel	Grey	9002	Silver Grey	628		
8)	Fire Installations	Fire Red	536 (ISC) 3001 (RAL)	White		9010	
9)	HP Dosing	Grey	9002	Dark Admiralty Grey	632		
10)	LP Dosing / acid / alkali Piping	Grey	9002	Signal Red	537		
11)	Ash Piping	Grey	9002	French Blue	166		
Note: Ground color indicated against each piping shall be followed in case piping is not insulated /cladded.							
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.		SUB-SECTION-IIIC-06 PROCESS CONNECTION AND PIPING		PAGE 2 OF 2	



1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

SECTION: C
SUB SECTION: C&I

QUALITY ASSURANCE

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CLAUSE NO.	QUALITY ASSURANCE										एनटीपीसी NTPC																																																																																																																																																																				
<table><tr><th colspan="10">MEASURING INSTRUMENTS</th><th colspan="2">Page- 1/2</th></tr><tr><td rowspan="10">Item Components Sub System Assembly</td><th colspan="10">Attributes Characteristics</th><td rowspan="10"></td><td rowspan="10"></td></tr><tr><th>Dimensions (R)</th><th>Make, Model, Type, Rating (R)</th><th>Process / Electrical connection (R)</th><th>Calibration (R)</th><th>Test as per standard(R)</th><th>Insulation Resistance (R)</th><th>IBR Certification (As applicable)(R)</th><th>Hydro Test(R)</th><th>Material Test certificate ®</th></tr><tr><td>1. PR Gauge (IS-3624)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td><td></td></tr><tr><td>2. Temp. Gauge (BS-5235)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td><td></td></tr><tr><td>3. Pr./D.P.Switch(BS-6134)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>4. Electronic Transmitter(IEC-60770)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>5. Temp. Switch</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>6. Electrical Metering Instrument (IS-1248)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>7. Transducer (IS-14570)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>8. Thermocouples (IEC – 584 / ANSI-MC-96.1)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>9. RTD(IS-2848)</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td>Y</td><td></td><td></td><td></td></tr><tr><td>10. Thermowell</td><td>Y</td><td></td><td>Y</td><td></td><td></td><td></td><td>Y</td><td>Y</td><td>Y</td></tr><tr><td colspan="12">R-Routine Test A- Acceptance Test Y – Test applicable</td><td colspan="2"></td></tr><tr><td colspan="14">Note: 1) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted along with relevant supporting documents.</td></tr></table>														MEASURING INSTRUMENTS										Page- 1/2		Item Components Sub System Assembly	Attributes Characteristics												Dimensions (R)	Make, Model, Type, Rating (R)	Process / Electrical connection (R)	Calibration (R)	Test as per standard(R)	Insulation Resistance (R)	IBR Certification (As applicable)(R)	Hydro Test(R)	Material Test certificate ®	1. PR Gauge (IS-3624)	Y	Y	Y	Y	Y					2. Temp. Gauge (BS-5235)	Y	Y	Y	Y	Y					3. Pr./D.P.Switch(BS-6134)	Y	Y	Y	Y	Y	Y				4. Electronic Transmitter(IEC-60770)	Y	Y	Y	Y	Y	Y				5. Temp. Switch	Y	Y	Y	Y	Y	Y				6. Electrical Metering Instrument (IS-1248)	Y	Y	Y	Y	Y	Y				7. Transducer (IS-14570)	Y	Y	Y	Y	Y	Y				8. Thermocouples (IEC – 584 / ANSI-MC-96.1)	Y	Y	Y	Y	Y	Y				9. RTD(IS-2848)	Y	Y	Y	Y	Y	Y				10. Thermowell	Y		Y				Y	Y	Y	R-Routine Test A- Acceptance Test Y – Test applicable														Note: 1) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted along with relevant supporting documents.													
MEASURING INSTRUMENTS										Page- 1/2																																																																																																																																																																					
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SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE				TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.:				SUB-SECTION-E-51 MEASURING INSTRUMENT				PAGE 1 OF 2																																																																																																																																																																			

MEASURING INSTRUMENTS

Page- 2/2

Item Components Sub System Assembly	Attributes Characteristics												
	GA, Dimensions, Paint Thickness	Make, Model, Type, Rating	Process / Electrical connection (R)	Calibration/Functional (R)	Requirement as per standard (R)	WPS approval (A)	Non-destructive testing (R)	Calculation for accuracy (R)	HV/ IR Test (R)	IBR Certification as applicable (R)	Hydro test (R)	Material test certificate (A)	Integral Testing of complete
11. Orifice plate(BS-1042)	Y	Y	Y	Y *	Y	Y **	Y **			Y	Y **	Y	
12. Flow nozzle(BS-1042)	Y	Y	Y	Y *	Y	Y	Y			Y	Y	Y	
13. Impact head type element	Y	Y	Y					Y				Y	
14. Electronics Water Level Indicator (EWLI)	Y	Y	Y		Y		Y		Y	Y	Y	Y	Y
15. Flue Gas & Ambient Air Analysers	Y	Y	Y	Y					Y				Y
16- SWAS System with Analyser & Chiller#	Y	Y	Y	Y			Y		Y	Y	Y	Y	Y
17- Dust emission monitors	Y	Y	Y	Y									
18- Containerised Room	Y	Y	Y						Y			Y	
R-Routine Test A- Acceptance Test Y – Test applicable													
*Calibration to be carried out on one flow element of each type and size if calibration carried out as type test same shall not be repeated.													
** As applicable													
#Vaccumination test of chiller assembly													
Note: 1) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted along with relevant supporting documents.													

CLAUSE NO.	QUALITY ASSURANCE													
	ELECTRICAL ACTUATOR WITH INTEGRAL STARTER													
	Test/Attributes Characteristics ITEM/ COPONENT/ SUB SYSTEM ASSEMBLY/ TESTING	RPM ®	No Load Current ®	IR & HV Test®	Mounting Dimension®	All routine Test as per Standard & Specification®	Correct Phase Sequence®	Operation & Setting of limit Switch/Torque Switch®	Stall Torque/Current (A)	Hand Wheel operation/ Auto de clutch function (A)	Function of Aux. like Potentiometer, space heater, position indicator ®	EPT output ®	Local/ Remote (Open-Stop-Close) Operation®	Safety check (Single phasing, Phase correction, Tripping etc.) (A)
	ELECTRICAL ACTUATOR with Integral Starter , Non-Intrusive Electrical Actuator (EN15714-2)													
	Motor	Y	Y	Y	Y	Y								
	Final Testing	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Note: 1) This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the practices and procedure adopted along with relevant supporting documents. - SIL 2 certificate if applicable ® - Routine Test (A) - Acceptance Test Y - Test applicable													
SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.:				SUB-SECTION-E-56 Electrical Actuator with Integral Starter				PAGE 1 OF 1				

CLAUSE NO.	QUALITY ASSURANCE														एन टी पी सी NTPC
	Process, Connection & piping FOR C&I SYSTEMS														
	TESTS ITEMS	Visual & Dimensions ®	GA, BOM, Layout of component & construction feature, Paint Shade/thickness ®	Flattening, flaring, hydrotest, hardness check as per ASTM standard (A)	Component Ratings ®	Wiring ®	Make, Model, Type, Rating®	IR & HV ®	Review of TC for instrument/devices (R)	Accessibility of TBs/Devices Illumination, grounding ®	Tubing ®	Leak/Hydro test(A)	Chemical/physical properties of material (A)	Proof pressure test, Dismantling & reassembly test, Hydraulic impulse and vibration test (R)	Tests as per standards & specification
		Local Instrument enclosure	Y	Y		Y	Y	Y	Y	Y	Y	Y			
		Local instruments racks	Y	Y		Y	Y	Y	Y	Y	Y	Y			
		Junction Box	Y	Y*		Y		Y	Y						
		Gauge Board	Y	Y		Y		Y		Y		Y	Y		
		Impulse pipes and tubes	Y		Y			Y						Y	
		Socket weld fittings ANSI B-16.11	Y					Y						Y	Y
		Compression fittings	Y					Y					Y	Y	Y
		Instrument valves & Valve manifolds	Y					Y					Y	Y	
		Copper tubings ASTM B75	Y					Y							Y
		*-applicable for painted junction boxes.													
		Note: R-Routine Test A- Acceptance Test Y – Test applicable													
		Note: This is an indicative list of tests/checks. The manufacturer is to furnish a detailed quality plan indicating the Practices and Procedure adopted alongwith relevant supporting documents.													
		SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE				TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.:				SUB-SECTION-E-57 PROCESS CONNECTION & PIPING				PAGE 1 OF 1	

CLAUSE NO.	TECHNICAL REQUIREMENTS						एनटीपीसी NTPC
3.00.00	TYPE TEST REQUIREMENT FOR OTHER C&I SYSTEMS						
	Sl. No	Item	Test Requirement	Standard	Test To Be Specifically Conducted	NTPC's Approval Req. On Test Certificate	
	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	
	1	Electronic transmitter	As per standard (col 4)	BS-6447 / IEC-60770	No	Yes	
	2	Instrumentation Cables Twisted & Shielded*					
		-Conductor	Resistance test	VDE-0815	No	Yes	
			Diameter test	IS-10810	No	Yes	
			Tin Coating test (Persulphate test)	IS-8130	No	Yes	
		-Insulation	Loss of mass	VDE 0472	No	Yes	
			Ageing in air ovens**	VDE 0472	No	Yes	
			Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes	
			Heat shock	VDE 0472	No	Yes	
			Hot deformation	VDE 0472	No	Yes	
			Shrinkage	VDE 0472	No	Yes	
			Bleeding & blooming	IS-10810	No	Yes	
		-Inner sheath***	Loss of mass	VDE 0472	No	Yes	
			Heat shock	VDE 0472	No	Yes	
			Cold bend/ cold impact test	VDE 0472	No	Yes	
	SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.:		SUB-SECTION-IIIC-10 TYPE TEST REQUIREMENTS		PAGE 4 OF 8

CLAUSE NO.	TECHNICAL REQUIREMENTS					एनडीपीसी NTPC
		Hot deformation	VDE 0472	No	Yes	
		Shrinkage	VDE 0472	No	Yes	
	-Outer sheath	Loss of mass	VDE 0472	No	Yes	
		Ageing in air ovens**	VDE 0472	No	Yes	
		Tensile strength and elongation test before and after ageing**	VDE 0472	No	Yes	
		Heat shock	VDE 0472	No	Yes	
		Hot deformation	VDE 0472	No	Yes	
		Shrinkage	VDE 0472	No	Yes	
		Bleeding & blooming	IS-10810	No	Yes	
		Colour fastness to water	IS-5831	No	Yes	
		Cold bend/ cold impact test	VDE-0472	No	Yes	
		Oxygen index test	ASTMD-2863	No	Yes	
		Smoke Density Test	ASTMD-2843	No	Yes	
		Acid gas generation test	IEC-60754-1	No	Yes	
	-fillers	Oxygen index test	ASTMD-2863	No	Yes	
		Acid gas generation test	IEC-60754-1	No	Yes	
	-AL-MYLAR shield	Continuity test		No	Yes	
		Shield		No	Yes	
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.:		SUB-SECTION-IIIC-10 TYPE TEST REQUIREMENTS		PAGE 5 OF 8

CLAUSE NO.	TECHNICAL REQUIREMENTS				एनडीपीसी NTPC
		thickness			
		Overlap test		No	Yes
	-Over all cable	Flammability Test	IEEE 383	No	Yes
		Swedish Chimney Test	SEN 4241475	No	Yes
		Noise interference	IEEE Trans-actions	No	Yes
		Dimensional checks	IS 10810	No	Yes
		Cross talk	VDE-0472	No	Yes
		Mutual capacitance	VDE-0472	No	Yes
		HV test	VDE-0815	No	Yes
		Drain wire continuity		No	Yes
	* 1.0 All cables to be supplied shall be of type tested quality. The Contractor shall submit for Owner's approval the reports of all the type tests as listed in this specification and carried out within last Ten years from the date of bid opening. These reports should be for the tests conducted on the equipment similar to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client. 2.0 In case the Contractor is not able to submit report of the type test(s) conducted within last Ten years from the date of bid opening, or in case the type test report(s) are not found to be meeting the specification requirements, the Contractor shall conduct all such tests either in an independent laboratory or at manufacturer's works in presence of Owner's representative under this contract free of cost to the Owner and submit the reports for approval. **These tests shall be carried out as per VDE0207 Part 6 & ASTM D-2116 for TEFLON insulated & outer sheathed cables ***Applicable for armoured cables only				
	3	DC Power Supply System (Applicable for each model and rating)			
		1)The Type Test reports for offered rectifier module and the controller module irrespective of the rectifier bank shall be acceptable			

SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.:	SUB-SECTION-IIIC-10 TYPE TEST REQUIREMENTS	PAGE 6 OF 8
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CLAUSE NO.	TECHNICAL REQUIREMENTS				एनडीपीसी NTPC
		Surge Withstand Capability(SWC)	(ANSI / IEEE No C37.90.1)or (IEC-61000-4-4, IEC-61000-4-5 and IEC-61000-4-18).	Yes	
		Dry Heat Test	IEC-60068-2-2 No or equivalent	Yes	
		Damp Heat test	IEC-60068-2-30 No or IEC-60068-2-78 or equivalent	Yes	
		Vibration test	IEC-60068-2-6 No or equivalent	Yes	
		Electrostatic discharge test	IEC 61000-4-2 No or equivalent	Yes	
		Radio frequency immunity test	IEC-61000-4-6 No or equivalent	Yes	
		Electromagnetic field immunity	IEC 61000-4-3 No or equivalent	Yes	
		Degree of Protection	IS-13947 or equivalent	Yes	
4	Battery ##	As per standard (col 4)	IS-10918 (Ni-Cd Batteries) IS-1652 (Lead Acid Plant Batteries)	No No	Yes
5	UPS (Applicable for each model and rating) 1) Type Test reports of same series of UPS with similar PCB's cards and controllers as the target UPS system shall be acceptable. 2) For Dry heat, Damp heat and vibration, the tests conducted on individual PCB's shall be acceptable.				
		Surge Withstand Capability(SWC)	(ANSI / IEEE No C37.90.1)or (IEC-61000-4-4, IEC-61000-4-5 and IEC-61000-	Yes	

SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.:	SUB-SECTION-IIIC-10 TYPE TEST REQUIREMENTS	PAGE 7 OF 8
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CLAUSE NO.	TECHNICAL REQUIREMENTS				एनटीपीसी NTPC		
	4-18).						
	Dry Heat Test	IEC-60068-2-2 or equivalent	No		Yes		
	Damp Heat test	IEC-60068-2-30 or IEC-60068-2-78 or equivalent	No		Yes		
	Vibration test	IEC-60068-2-6 or equivalent	No		Yes		
	Electrostatic discharge test	IEC 61000-4-2 or equivalent	No		Yes		
	Radio frequency immunity test	IEC-61000-4-6 or equivalent	No		Yes		
	Electromagnetic field immunity	IEC 61000-4-3 or equivalent	No		Yes		
	Degree of protection test	IS-13947	No		Yes		
	Fuse Clearing Capability	Approved procedure	No		Yes		
	Short Circuit current capability	IEC 60146-2	No		Yes		
	6	Public Address System					
		IP based PA system components	As per Standard	IEC 60268-16	No	Yes	
	7	Control Valves	CV test	ISA 75.02& 75.11	No	Yes	
	8	Flow Nozzle Orifice plates	Calibration	ASME PTC BS 1042	No	Yes	
## The contractor shall submit for Employers approval the reports of all the type test as per latest IS-10918 carried out within last ten years from the date of Bid opening and the test(s) should have been either conducted at an independent laboratory or in presence of owner's representative. The complete type test reports shall be for any rating of Battery in a particular group based on plate dimensions being manufactured by supplier. Note: Type Tests are to be conducted only for the items, which are being supplied as a part of this Package.							
SIPAT SUPER THERMAL POWER STATION STAGE-III (1X800 MW) EPC PACKAGE		TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO.:		SUB-SECTION-IIIC-10 TYPE TEST REQUIREMENTS		PAGE 8 OF 8	



1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

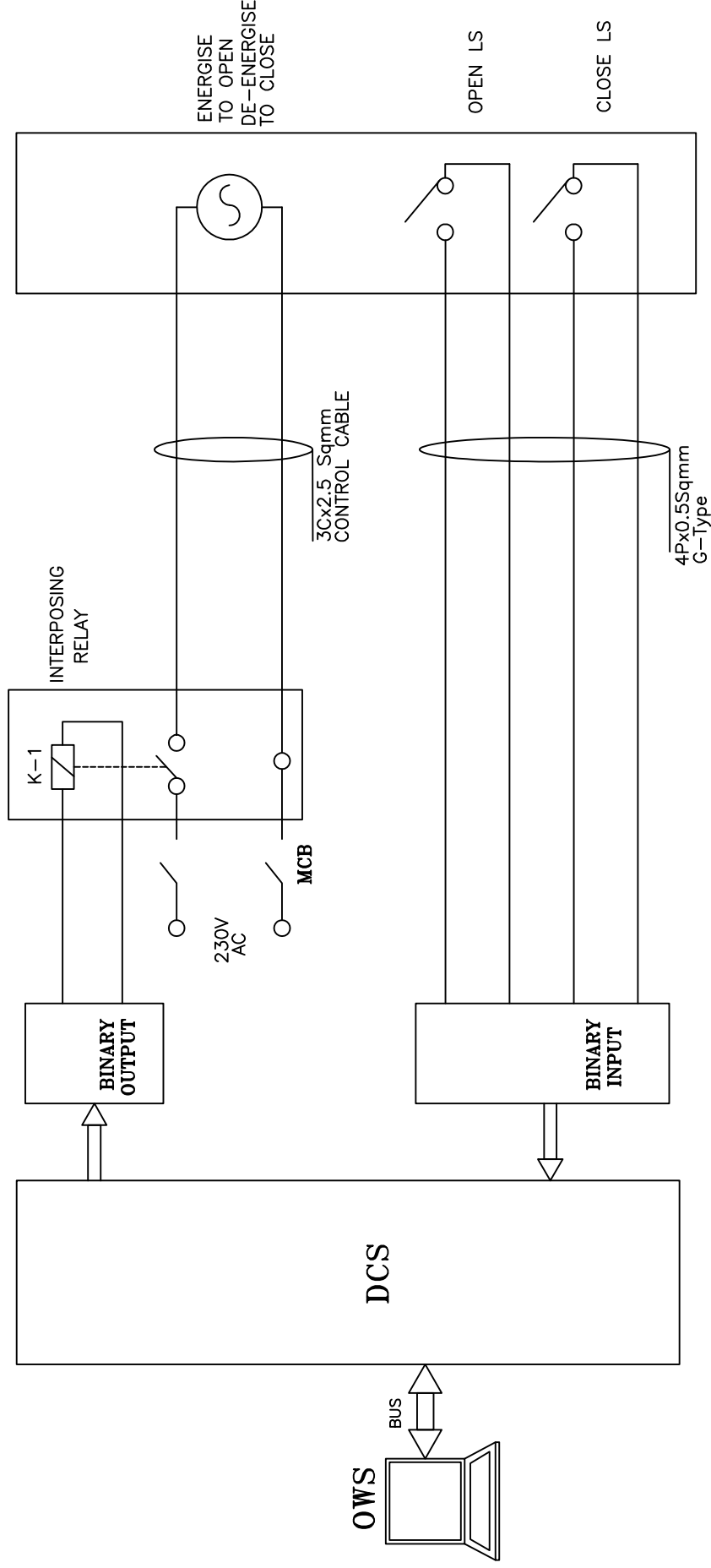
SECTION: C
SUB SECTION: C&I

SIGNL EXCHANGE BETWEEN DRIVES &
DCS

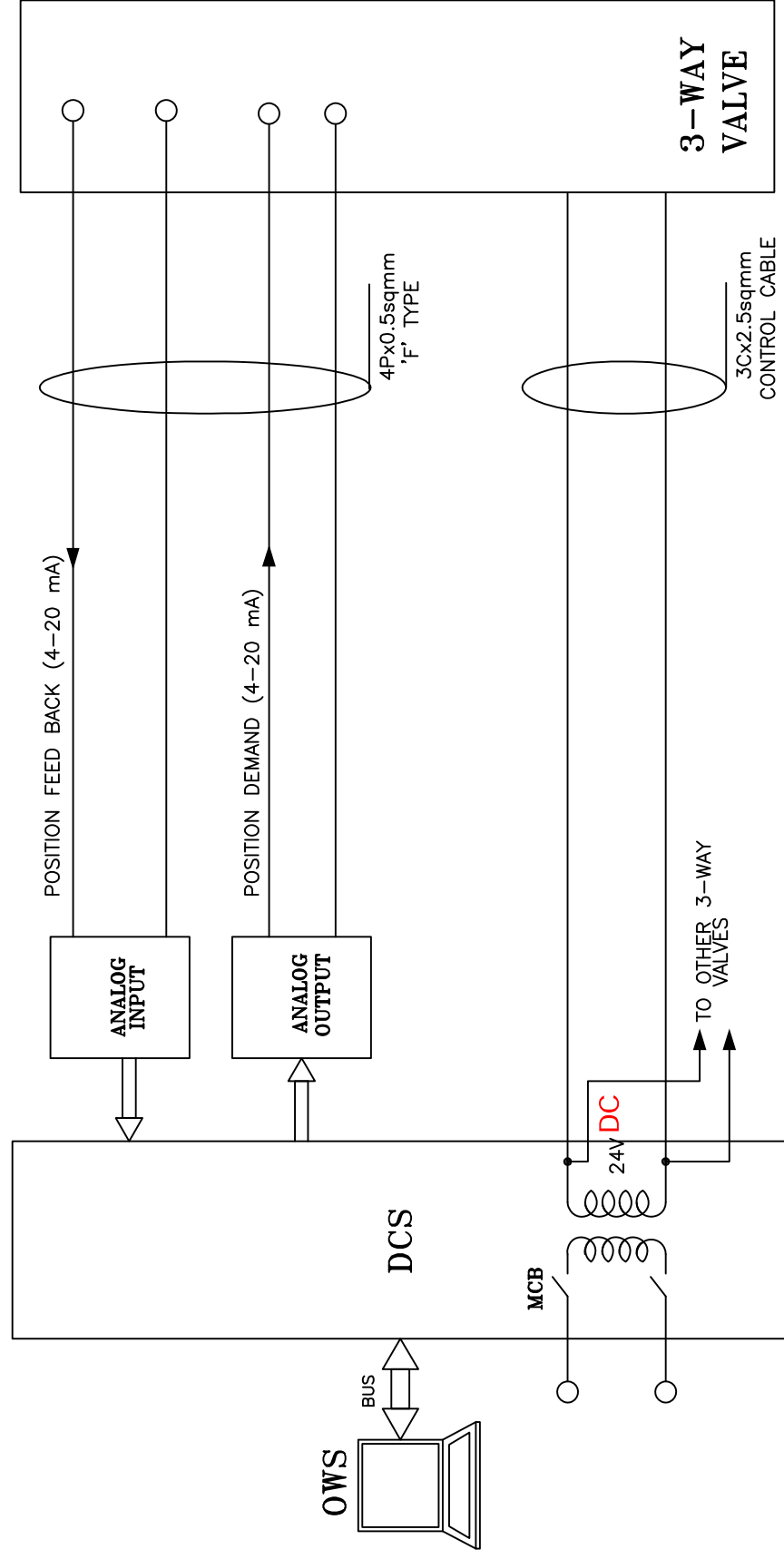
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DCS INTERFACE FOR MOTORIZED OPERATED FIRE DAMPER (BID-FD)

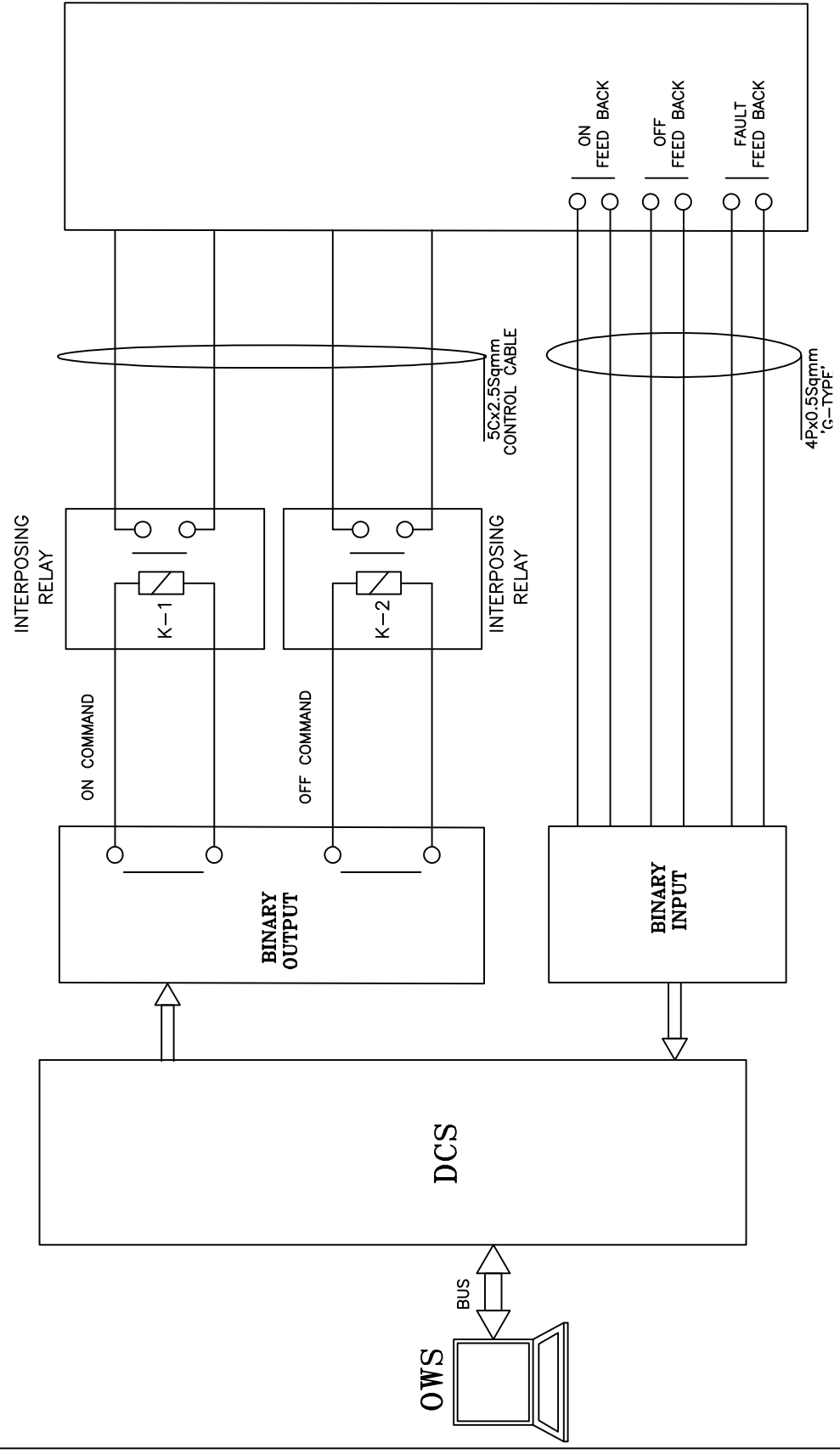
With Suitable JB to integrate DCS
command and feedback with Fire
damper



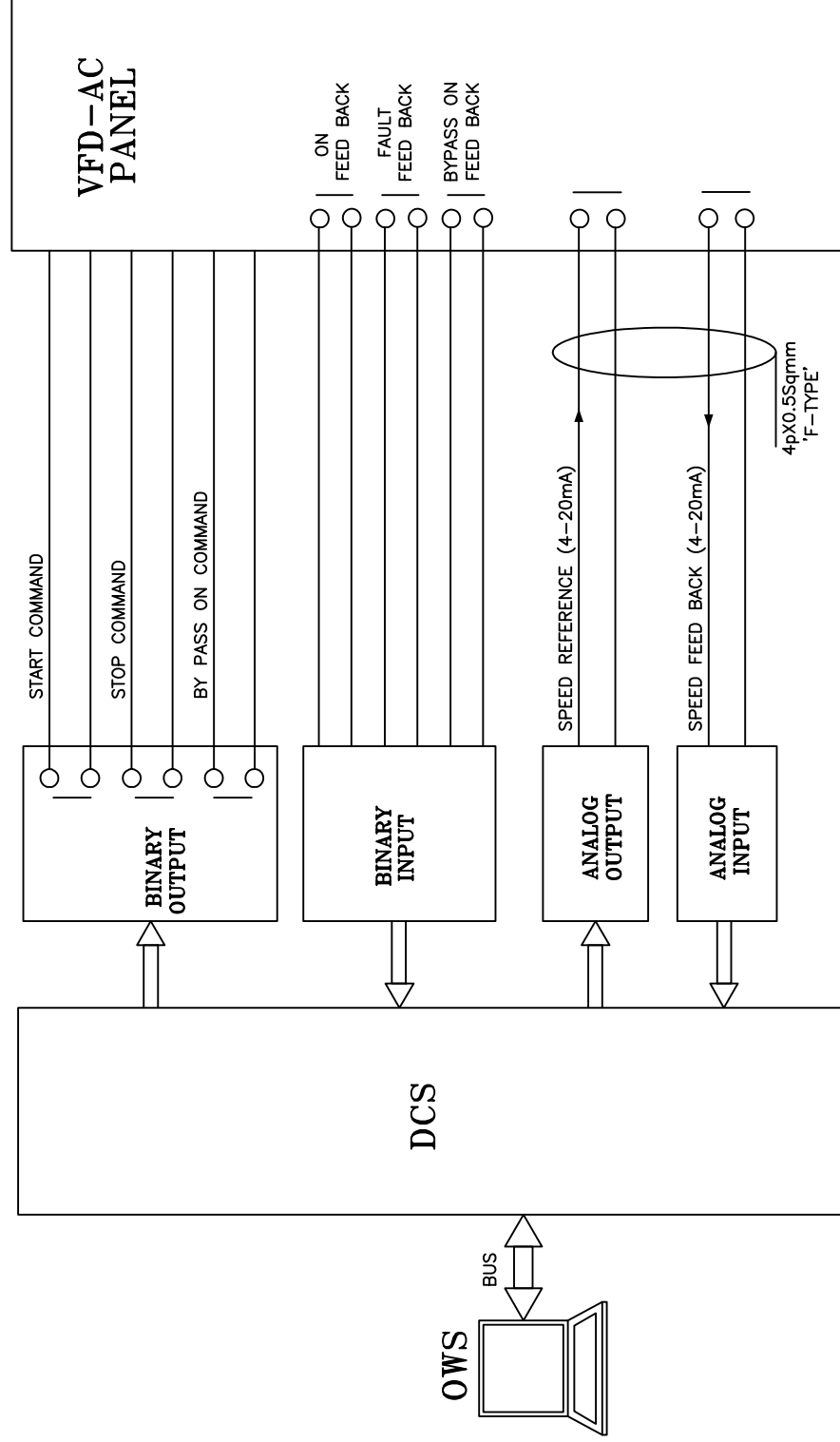
DCS INTERFACE FOR 3-WAY MIXING VALVE (MOD-AC)



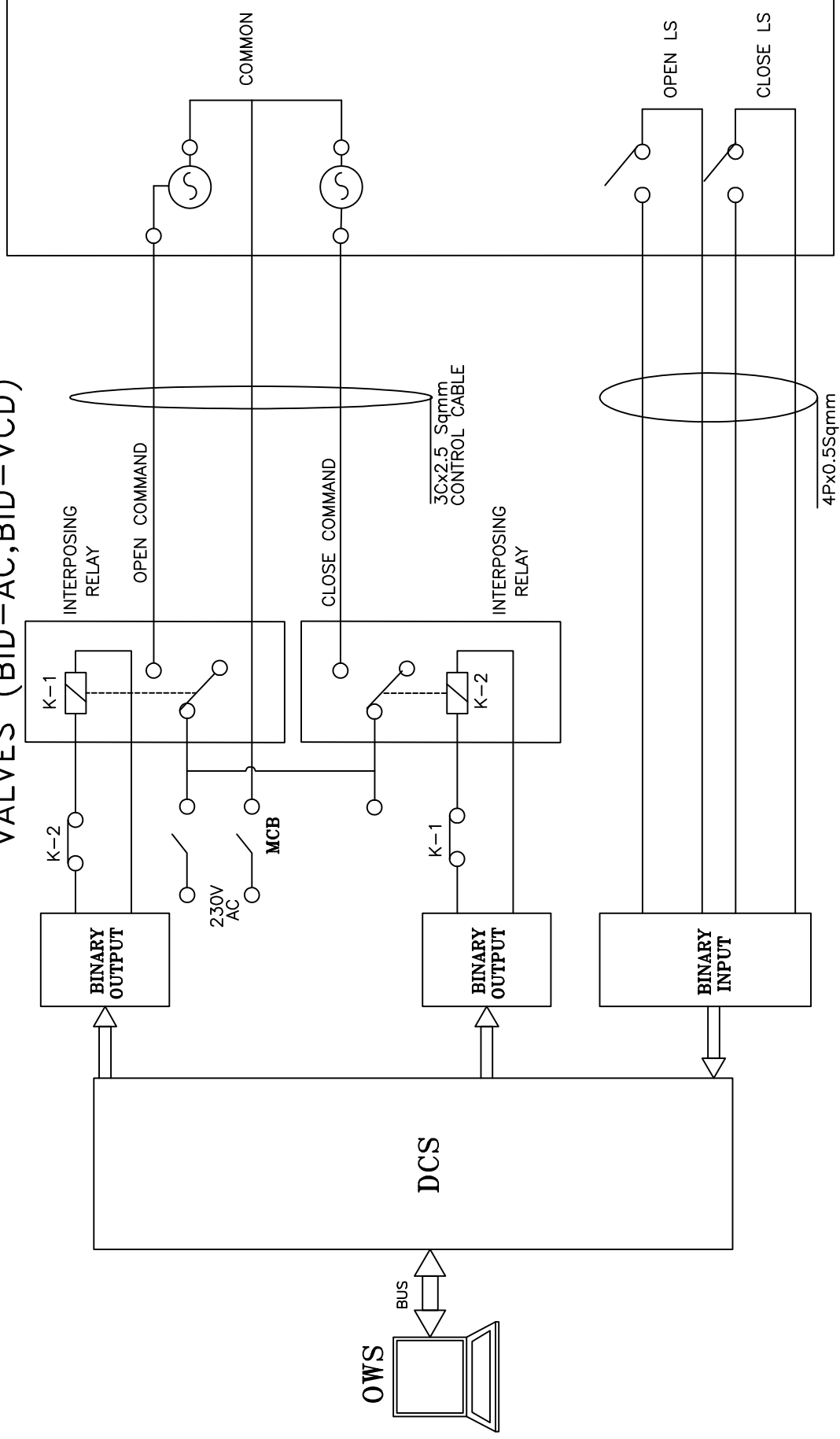
HOOK-UP DIAGRAM FOR ACCU/SCREW CHILLER

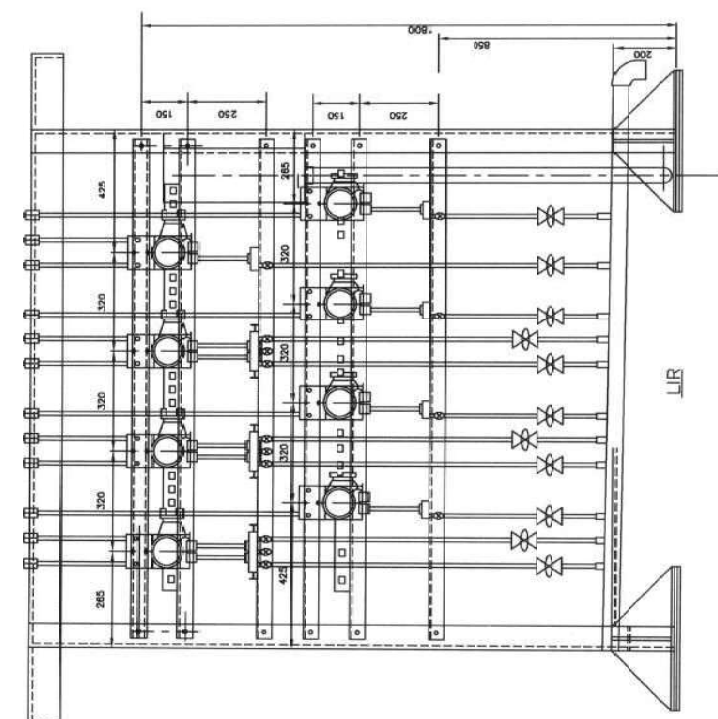
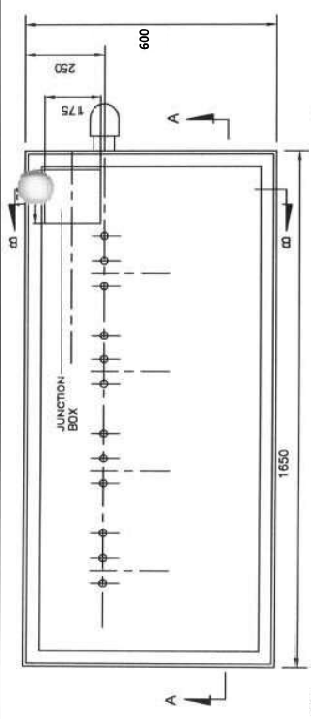


DCS INTERFACE FOR AHUS VFD(VFD-AC)



DCS INTERFACE FOR MOTORIZED OPERATED VALVES (BID-AC,BID-VCD)





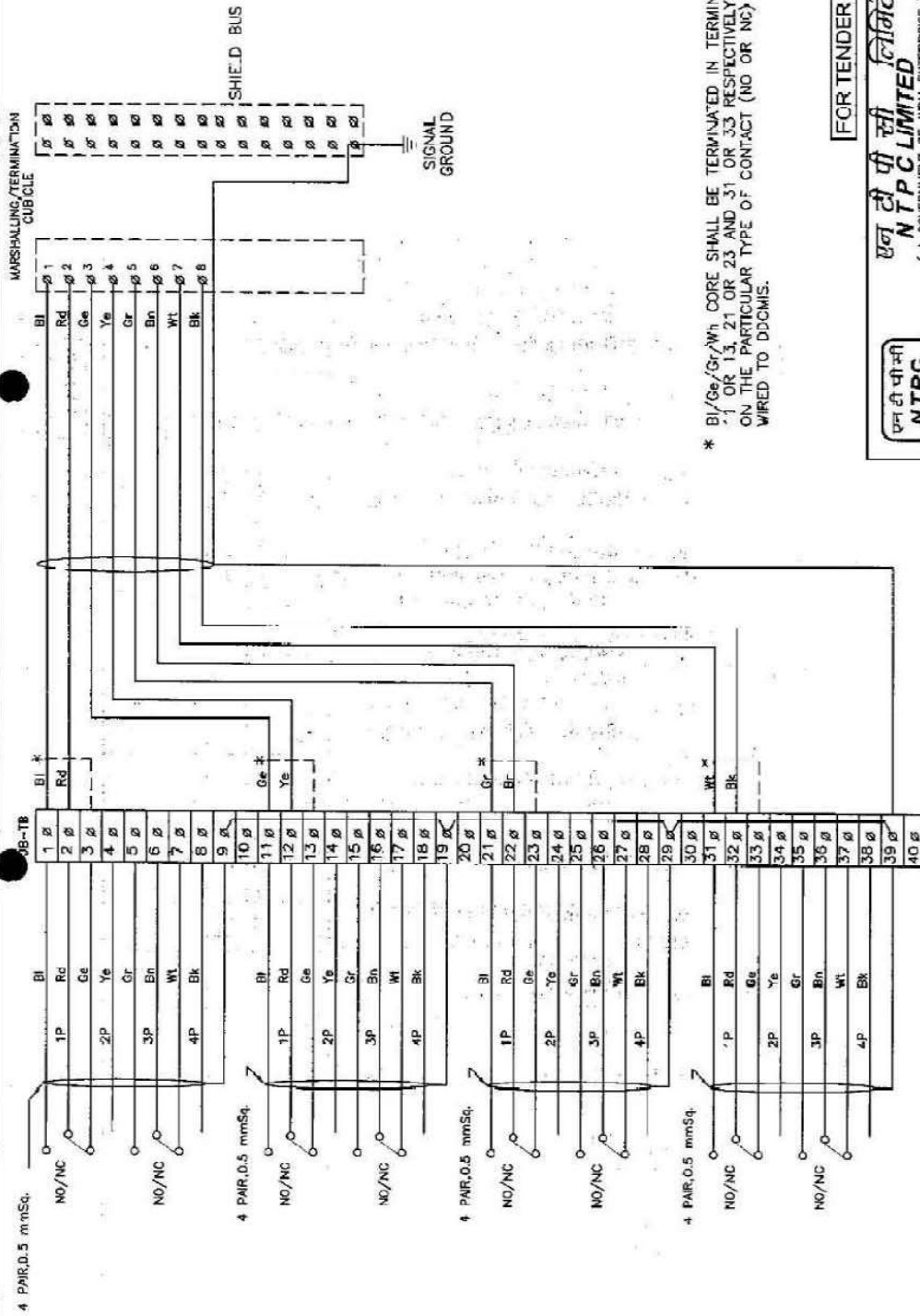
NOTE:-
1. MATERIAL OF JBs FOR LIRs SHALL BE SAME AS THAT OF LIR.

FOR TENDER PURPOSE ONLY

NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION	
PROJECT: TYPICAL THERMAL POWER PROJECT	
TITLE: TYPICAL GA OF LOCAL INSTRUMENT ENCLOSURE / RACK	
SIZE: A3	SCALE: N.T.S.
DWG. NO.: 0000-999-POI-A-064	REV. NO.: A
SH- 03 OF 03	

REV. NO.	DESCRIPTION	DATE	APPD.	DATE	ARCH.	C	E	M	DESIGN	CHD.	CLEAR BY
A	FIRST ISSUE	21.08.12									

SECTION-AA
LIR WITHOUT PURGING



* BI/Ge/Gr/Wt CORE SHALL BE TERMINATED IN TERMINAL 1 OR 3, 1 OR 13, 21 OR 23 AND 31 OR 33 RESPECTIVELY DEPENDING ON THE PARTICULAR TYPE OF CONTACT (NO OR NC) IS TO BE WIRED TO DOOMIS.

FOR TENDER PURPOSE ONLY

एन टी पी सी लिमिटेड
NTPC LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT
TYPICAL THERMAL POWER PROJECT

TITLE
INTERFACING OF FIELD INSTRUMENTS
SWITCH TERMINATION DETAILS
NO/NC

REV. NO.	DRG. NO.	SCALE	SIZE	DATE	APPRD.	ARCH.	CLEAR BY	DESCRIPTION
A	0000-9999-POI-A-065	NTS	A3	29.04.06				

SH 02 OF 14

ENGINEERING DIVISION															
PROJECT		TYPICAL THERMAL POWER PROJECT													
TITLE		INTERFACING OF FIELD INSTRUMENTS 4-20mA													
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	CD	ARCH.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
					CLEARED BY							A3	NTS		C
C	NOTE REGARDING CABLE IS ADDED.										10.12.13				
B	INTERNAL WIRING FOR LIE/LIR MOUNTED SHOWN WIRING OF STAND ALONE TXTR SHOWN										10.12.06				
A	FIRST ISSUE										12.1.05				

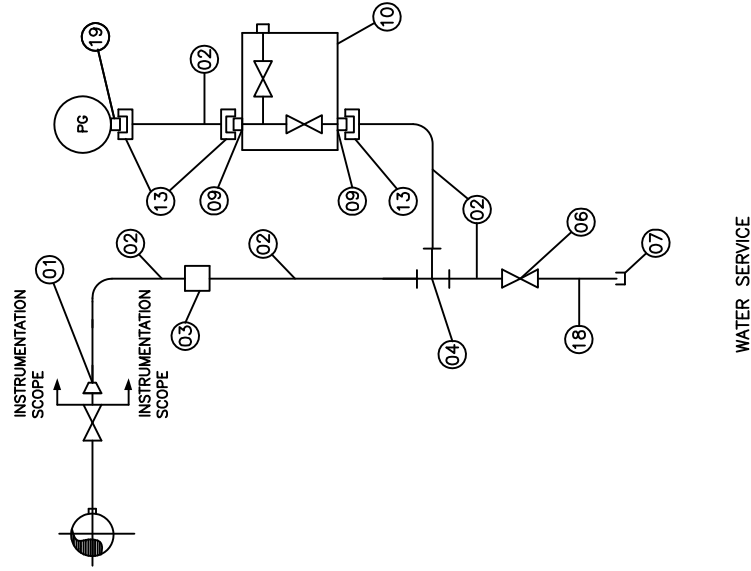


1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

SECTION: C
SUB SECTION: C&I

INSTRUMENT INSTALLATION DRAWING

|



TITLE :-

INSTRUMENT INSTALLATION DIAGRAM PRESSURE GAUGES

DRG.
NO.

PE-DG-999-145-XXXX

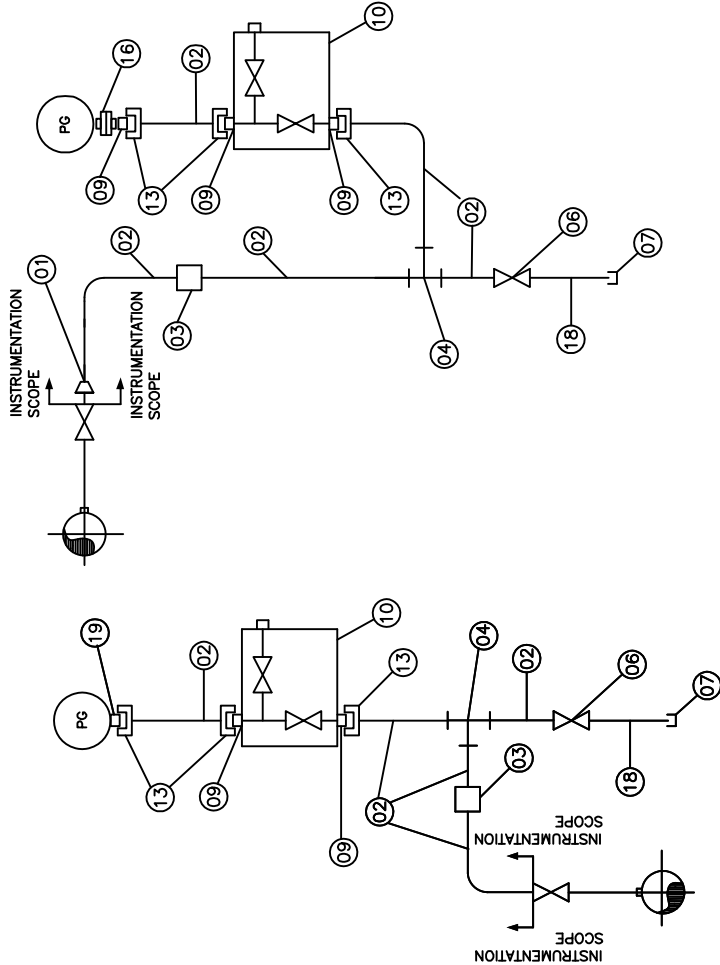
REV.
NO.

00 DATE 05.11.13

SHT

3 OF 9

ITEM NO	ITEM/DESCRIPTION	MATERIAL	SIZE	QTY				CHEMICAL
				WATER	STEAM	PULSATING	AIR	
01	REDUCER (IF APPLICABLE)	SAME AS MAIN PIPE	1" X 1/2"SW	01	01	01	00	01
02	SEAMLESS PIPE	SAME AS MAIN PIPE	1/2"	A/R	A/R	A/R	A/R	A/R
03	FORGED COUPLING	SAME AS MAIN PIPE	1/2" SW	A/R	A/R	A/R	A/R	A/R
04	FORGED TEE	SAME AS MAIN PIPE	1/2" SW	01	01	01	01	01
06	FORGED GLOBE VALVE	SAME AS MAIN PIPE	1/2" SW	01	01	01	01	01
07	CAP	SAME AS MAIN PIPE	1/2" NPTF	01	01	01	01	01
09	ADAPTER – M TO M	SS316	M20X1.5M X 1/2" NPTM	02	02	02	02	03
10	TWO VALVE 3 WAY MANIFOLD WITH VENT PLUG	SS316	1/2" NPTF	01	01	01	01	01
11	SYPHON	SS316	1/2" SW	00	01	00	00	00
12	SNUBBER	SS316	M20X1.5M X M20X1.5"	00	00	01	00	00
13	NUT & TAIL PIECE WITH ANNEALED COPPER/SS304 WASHER	SS316	NUT SIZE : M20 X 1.5 WITH 100MM TAIL	03	03	03	03	03
16	CHEMICAL SEAL	SS316	1/2" NPTF X 1/2" NPTF	00	00	00	00	01
18	NIPPLE	SAME AS MAIN PIPE	1/2" NPTM X 1/2" SW	01	01	01	01	01
19	ADAPTER – M TO F	SS316	M20X1.5M X 1/2" NPTF	01	01	01	01	00



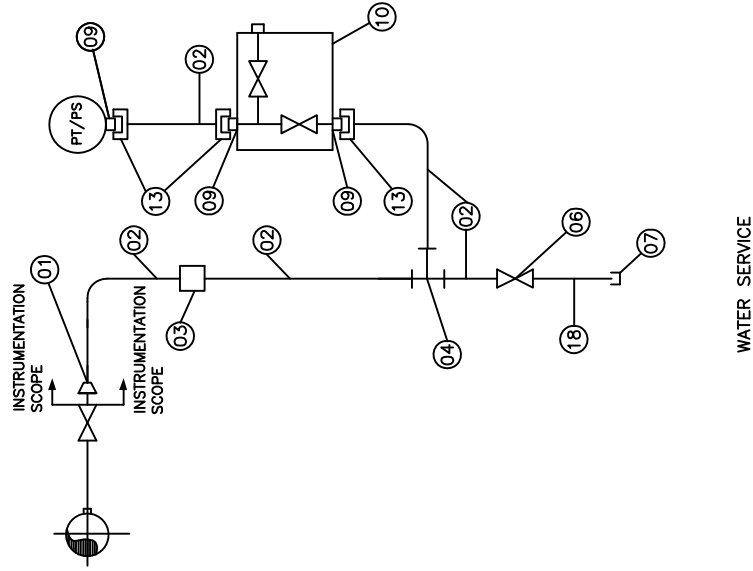
TITLE :-

INSTRUMENT INSTALLATION DIAGRAM PRESSURE GAUGES

DRG. NO. PE-DG-999-145-XXXX

REV. NO. 00 DATE 05.11.13

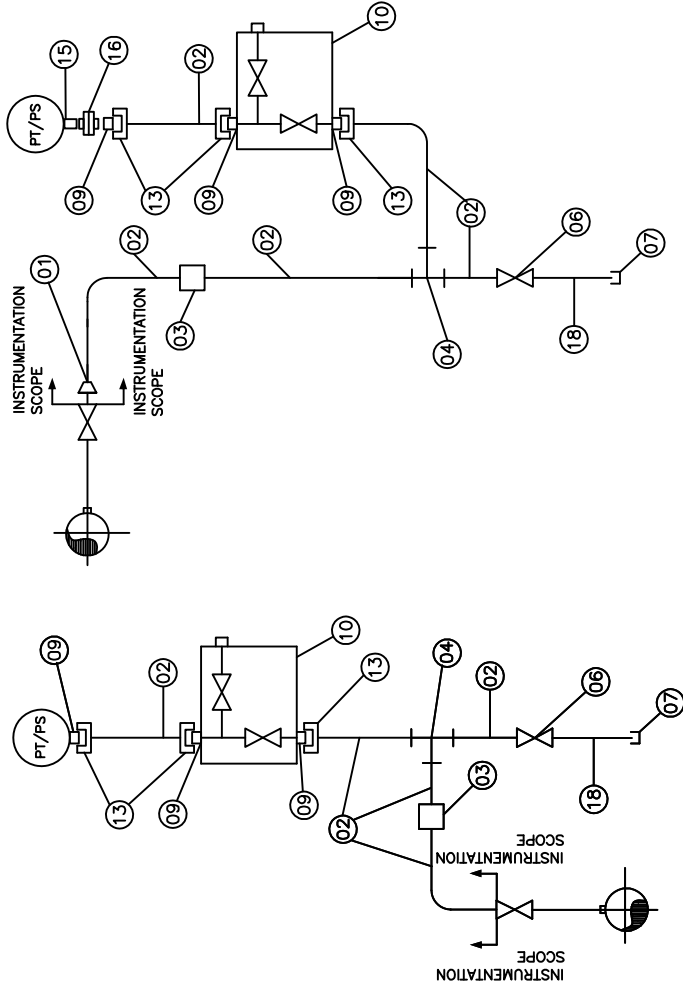
SHT 4 OF 9



TITLE :-

INSTRUMENT INSTALLATION DIAGRAM
PRESSURE SWITCHES/TRANSMITTERS

DRG. NO.	PE-DG-999-145-XXXX		
REV. NO.	00	DATE	05.11.13
SHT	5	OF	9



AIR SERVICE

WITH CHEMICAL SEAL
(FOR VISCOUS NON-CORROSIVE FLUID ONLY)

ITEM NO	ITEM/DESCRIPTION	MATERIAL	SIZE	QTY			CHEMICAL
				WATER	STEAM	PULSATING	
01	REDUCER (IF APPLICABLE)	SAME AS MAIN PIPE	1" X 1/2"SW	01	01	01	01
02	SEAMLESS PIPE	SAME AS MAIN PIPE	1/2"	A/R	A/R	A/R	A/R
03	FORGED COUPLING	SAME AS MAIN PIPE	1/2" SW	A/R	A/R	A/R	A/R
04	FORGED TEE	SAME AS MAIN PIPE	1/2" SW	01	01	01	01
06	FORGED GLOBE VALVE	SAME AS MAIN PIPE	1/2" SW	01	01	01	01
07	CAP	SAME AS MAIN PIPE	1/2" NPTF	01	01	01	01
09	ADAPTOR – M TO M	SS316	M20X1.5M X 1/2" NPTM	03	03	03	03
10	TWO VALVE 3 WAY MANIFOLD WITH VENT PLUG	SS316	1/2" NPTF	01	01	01	01
11	SYPHON	CS	1/2" SW	00	01	00	00
12	SNUBBER	SS316	M20X1.5M X M20X1.5F	00	00	01	00
15	CONNECTOR – M TO M	SS316	1/2" NPTM X 1/2" NPTM	00	00	00	01
16	CHEMICAL SEAL	SS316	1/2" NPTF X 1/2" NPTF	00	00	00	01
13	NUT & TAIL PIECE WITH ANNEALED COPPER/SS304 WASHER	SS316	NUT SIZE : M20 X 1.5 WITH 100MM TAIL	03	03	03	03
18	NIPPLE	SAME AS MAIN PIPE	1/2" NPTM X 1/2" SW	01	01	01	01



TITLE :-

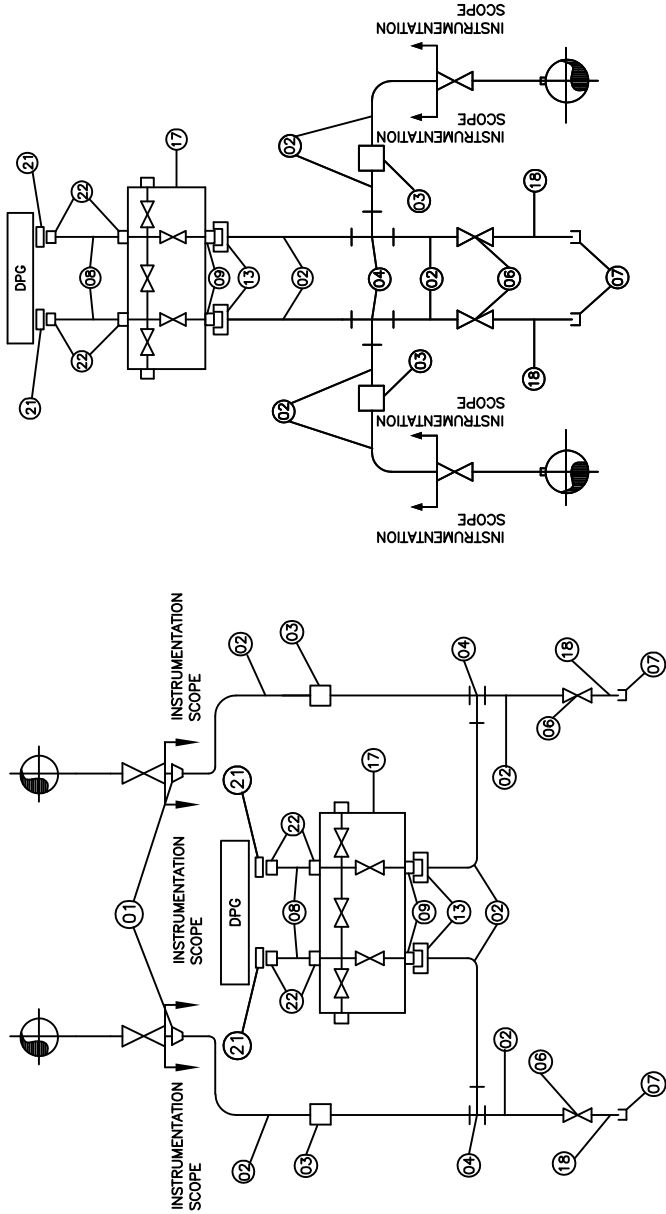
INSTRUMENT INSTALLATION DIAGRAM PRESSURE SWITCHES/TRANSMITTERS

DRG. NO. PE-DG-999-145-XXXX

REV. NO. 00 DATE 05.11.13

SHT 6 OF 9

ITEM NO	ITEM/DESCRIPTION	MATERIAL	SIZE	QTY
01	REDUCER (IF APPLICABLE)	SS316	1" X 1/2"SW	02
02	SEAMLESS PIPE	SAME AS MAIN PIPE	1/2"	A/R
03	FORGED COUPLING	SAME AS MAIN PIPE	1/2" SW	A/R
04	FORGED TEE	SAME AS MAIN PIPE	1/2" SW	02
06	FORGED GLOBE VALVE	SAME AS MAIN PIPE	1/2" SW	02
07	CAP	SAME AS MAIN PIPE	1/2" NPTF	02
08	SEAMLESS TUBE	SS316	1/2" OD	A/R
09	ADAPTOR – M TO M	SS316	M20X1.5M X 1/2" NPTM	02
17	FIVE VALVE MANIFOLD WITH DRAIN PLUG	SS316	1/2" NPTF	01
16	CHEMICAL SEAL	SS316	1/2" NPTF X 1/2" NPTF	00
13	NUT & TAIL PIECE WITH ANNEALED COPPER/SS304 WASHER	SS316	NUT SIZE : M20 X 1.5 WITH 100MM TAIL	02
18	NIPPLE	SAME AS MAIN PIPE	1/2" NPTM X 1/2" SW	02
22	TUBE FITTING DFDC	SS316	1/2" NPTM X 1/2"OD TUBE	04
21	CONNECTOR – F TO F	SS316	1/2" NPTF X 1/2" NPTF	02



AIR SERVICE

WATER SERVICE

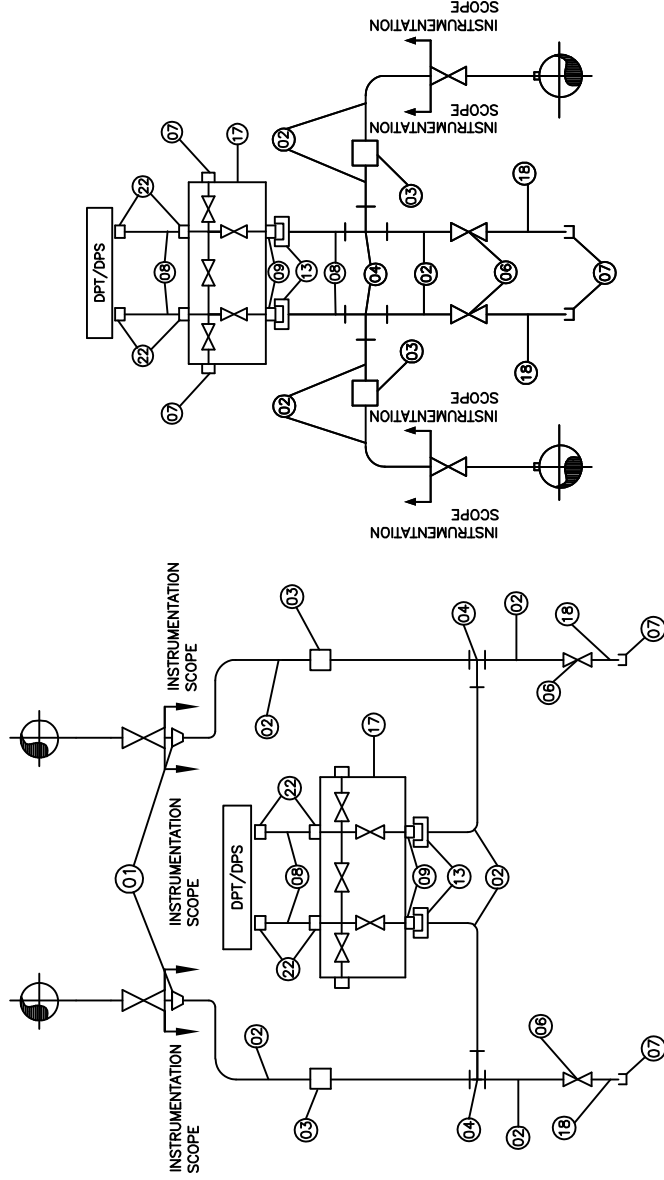


TITLE :-

INSTRUMENT INSTALLATION DIAGRAM

DIFFERENTIAL PRESSURE GAUGES

DRG. NO.	PE-DG-999-145-XXXX
REV. NO.	00
DATE	05.11.13
SHT	7 OF 9



AIR SERVICE

WATER SERVICE

ITEM NO	ITEM/DESCRIPTION	MATERIAL	SIZE	QTY	
				WATER	AIR
01	REDUCER (IF APPLICABLE)	SS316	1" X 1/2"SW	02	00
02	SEAMLESS PIPE	SAME AS MAIN PIPE	1/2"	A/R	A/R
03	FORGED COUPLING	SAME AS MAIN PIPE	1/2" SW	A/R	A/R
04	FORGED TEE	SS316	1/2" SW	02	02
06	FORGED GLOBE VALVE	SS316	1/2" SW	02	02
07	CAP	CS	1/2" NPTF	02	02
08	SEAMLESS TUBE	SS316	1/2" OD	A/R	A/R
09	ADAPTER – M TO M	SS316	M20X1.5M X 1/2" NPTM	02	02
17	FIVE VALVE MANIFOLD WITH DRAIN PLUG	SS316	1/2" NPTF	01	01
16	CHEMICAL SEAL	SS316	1/2" NPTF X 1/2" NPTF	00	00
15	CONNECTOR – M TO M	SS316	1/2" NPTM X 1/2" NPTM	00	00
13	NUT & TAIL PIECE WITH ANNEALED COPPER/SS304 WASHER	SS316	NUT SIZE : M20 X 1.5 WITH 100MM TAIL	02	02
18	NIPPLE	SAME AS MAIN PIPE	1/2" NPTM X 1/2" SW	02	02
21	CONNECTOR – F TO F	SS316	1/2" NPTF X 1/2" NPTF	00	00
22	TUBE FITTING DFDC	SS316	1/2" NPTM X 1/2"OD TUBE	04	04



TITLE :-

INSTRUMENT INSTALLATION DIAGRAM

DIFFERENTIAL PRESSURE SWITCHES/TRANSMITTERS

DRG. NO. PE-DG-999-145-XXXX

REV. NO. 00 DATE 05.11.13

SHT 8 OF 9



1X800 MW SIPAT EPC, STAGE III
C&I SPECIFICATION FOR
HVAC SYSTEM

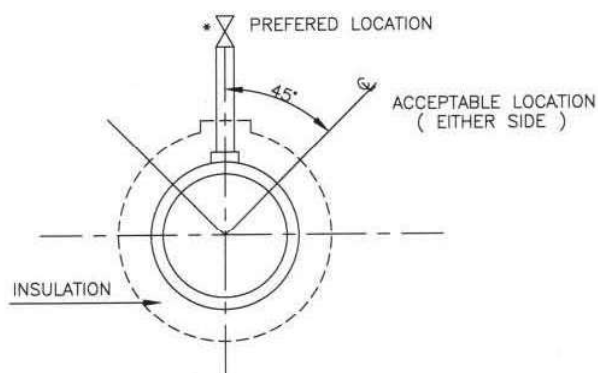
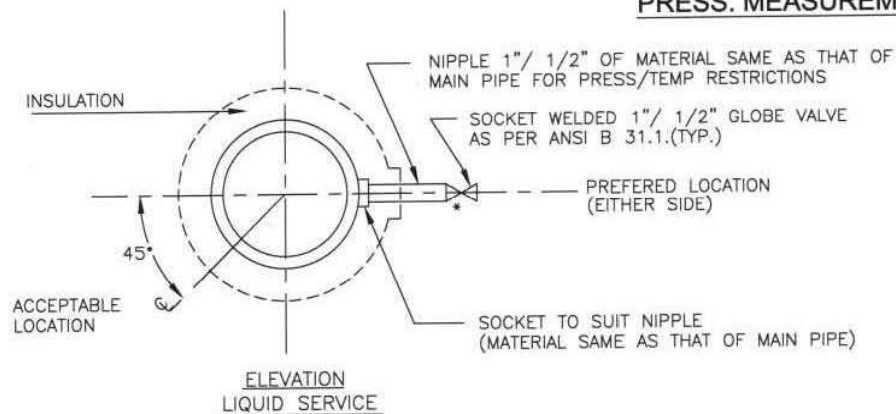
SECTION: C
SUB SECTION: C&I

INSTRUMENT STUB DETAILS

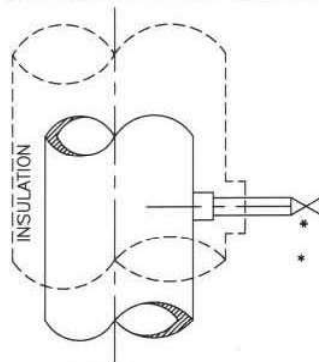
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PRESS. MEASUREMENT



PRESSURE CONNECTION ON HORIZONTAL PIPE



* USE DOUBLE ISOLATION VALVES FOR PRESSURE EQUAL TO OR EXCEEDING 40 Kg/Cm².

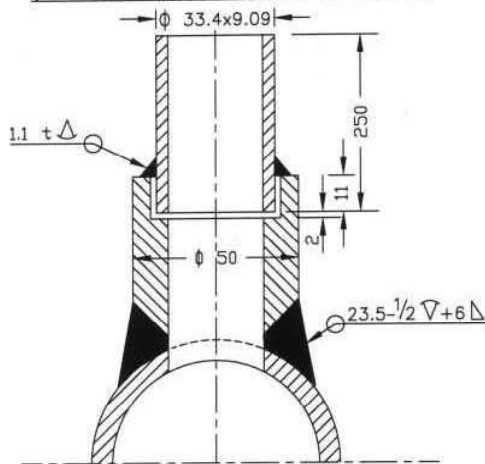
PRESSURE CONNECTIONS ON VERTICAL PIPES

FOR TENDER PURPOSE ONLY

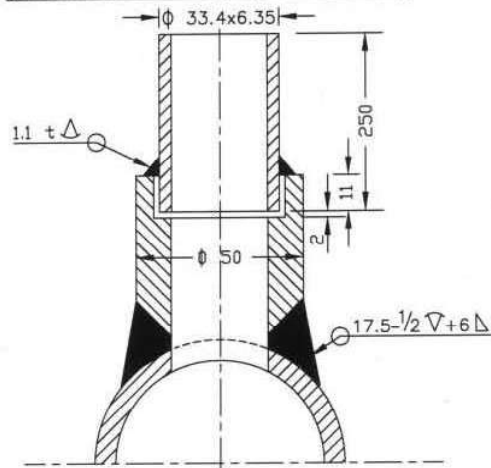
NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION प्रगती पीसी NTPC											
PROJECT TYPICAL THERMAL POWER PROJECT											
TITLE INSTRUMENT SOURCE CONNECTION DETAILS											
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	CL	ARCH.	APPD.	DATE
A	FIRST ISSUE										31-08-18
Cleared by										SIZE A4	SCALE N.T.S.
										DRG. NO. 0000-999-POI-A-035	REV. NO. A

PRESSURE MEASUREMENT

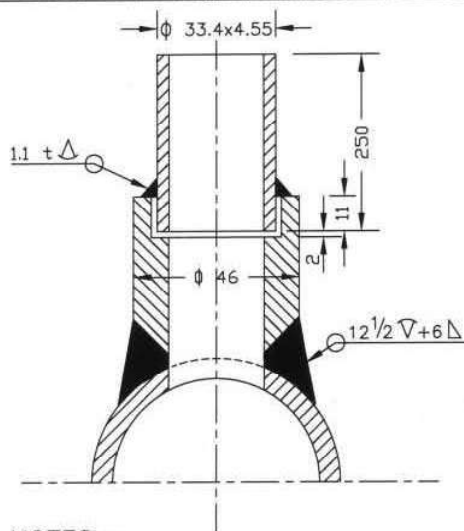
(SYSTEM PR. >40Kg/Sq Cm CL 9000)



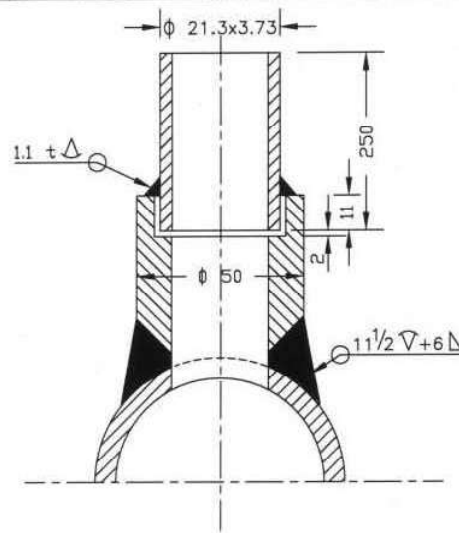
(SYSTEM PR. >40Kg/Sq Cm CL 6000)



(SYSTEM PR. <40Kg/Sq cm Nb 25 CL 3000)



(SYSTEM PR. <40Kg/Sq cm Nb 15 CL 3000)



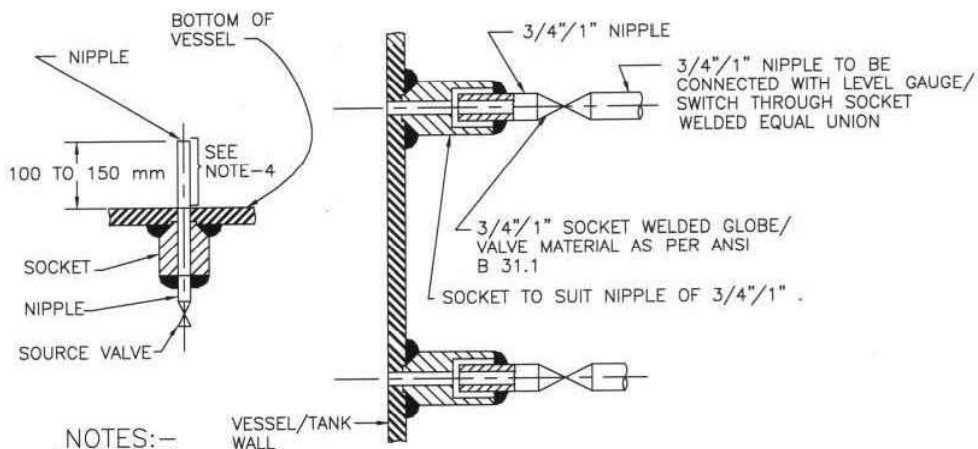
NOTES:-

1. MATERIAL OF THE BOSS AND NIPPLE SHALL BE THE SAME AS THE PIPE INTO WHICH IT IS WELDED AND CONFIRM TO ANSI B 16.11.
2. THE LENGTH OF THE NIPPLE SHOULD BE 250mm.
3. THE OTHER END OF THE NIPPLE SHALL BE SOCKET WELDED WITH 1" GLOBE VALVE OF MATERIAL AS PER ANSI B 16.1.
4. TWO ISOLATED VALVES ARE TO BE USED FOR PRESSURE = >40 Kg/Cm2.
5. EDGE HOLE MUST BE CLEAN AND SQUARE OR ROUNDED SLIGHTLY (1/64" RADIUS) FREE FROM BURRS, WIRE EDGES OR OTHER IRREGULARITIES.
6. ORIENTATION OF TAP WILL BE VARY WITH TYPE OF PROCESS FLUID AND NATURE OF RUN OF THE PIPE.
7. ACTIVITIES TO BE COMPLETED AT THE SHOP, WELD THE COUPLING (OR BOSS) ON THE PIPE AND DRILL PRESSURE CONNECTION HOLE (SAME AS I D OF NIPPLE) IN THE PIPE IN ALIGNMENT WITH HOLE IN THE COUPLING.
8. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

FOR TENDER PURPOSE ONLY

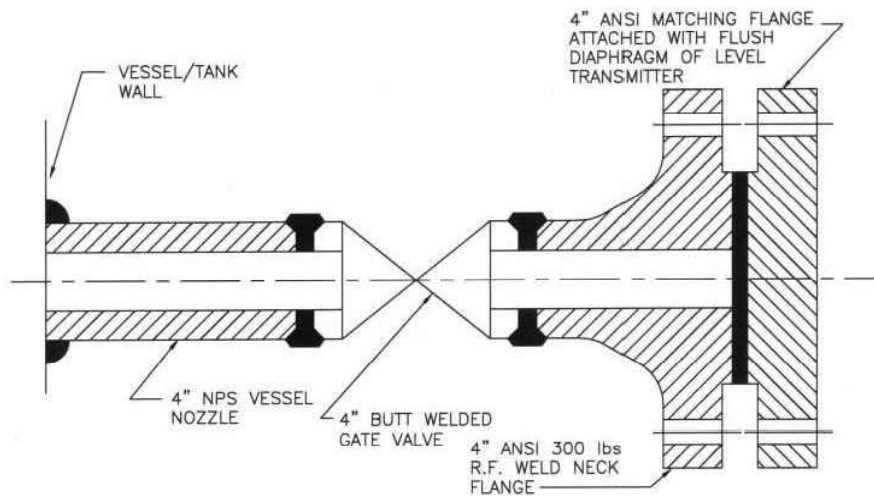
NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION									
PROJECT TYPICAL THERMAL POWER PROJECT									
TITLE INSTRUMENT SOURCE CONNECTION DETAILS									
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	DATE	SIZE A4 SCALE N.T.S. DRG. NO. 0000-999-POI-A-035 Sh-2 Of 14
FIRST ISSUE									
T.G.									
C&I ARCH. APPD. DATE									
CLEARED BY									

LEVEL MEASUREMENT



NOTES:-

1. THIS TYPE OF PROCESS CONNECTION SHALL BE USED FOR LEVEL GAUGE AND EXTERNAL CAGE TYPE FLOAT OR DISPLACER OPERATED LEVEL SWITCH.
2. FOR GAUGES 3/4" NIPPLE ALONG WITH 3/4" SW SOURCE VALVE AND FOR SWITCHES 1" NIPPLE ALONG WITH 1" SW SOURCE VALVE SHALL BE PROVIDED AS PROCESS CONNECTION.
3. SOURCE CONNECTION ON VESSEL SHOULD NOT BE LOCATED AT PLACES SUBJECTED TO INTERFACE AND TURBULENCE FROM INLETS AND OUTLETS.
4. IF LOWER CONNECTION IS TAKEN FROM BOTTOM OF THE VESSEL THEN THE NIPPLE MUST BE 100 mm TO 150 mm ABOVE THE BOTTOM OF THE VESSEL.



NOTES:-

1. THIS TYPE OF PROCESS CONNECTION SHALL BE PROVIDED FOR TANK LEVEL MEASUREMENT OF VISCOUS OR CORROSIVE LIQUID USING FLUSH DIAPHRAGM/WAFER TYPE LEVEL TRANSMITTER.
2. WELDING OF MATCHING FLANGE TO GATE VALVE SHALL BE DONE BY BIDDER.

FOR TENDER PURPOSE ONLY

एन टी पी सी NTPC NTPC LIMITED (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION															
PROJECT: TYPICAL THERMAL POWER PROJECT															
TITLE: INSTRUMENT SOURCE CONNECTION DETAILS															
REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	CLT	ARCH.	APPD.	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
A	FIRST ISSUE											A4	N.T.S.	0000-999-POI-A-035	A
Cleared by												Sh-13 of 14			



HVAC SYSTEM

LIST OF INDICATIVE MAKES OF SUB-VENDOR ITEMS

SECTION-I SUB SECTION -E

LIST OF MAKES OF SUB-VENDOR ITEMS



HVAC SYSTEM

LIST OF INDICATIVE MAKES OF SUB-VENDOR ITEMS

Sl. NO.	ITEM / EQUIPMENT	SUB SUPPLIER
1	SCREW CHILLER	YORK / TRANE / CARRIER / KIRLOSKAR / DUNHAM BUSH / MCQUAY (DAIKIN) / BLUE STAR / VOLTAS
2	VAPOUR ABSORBTION MACHINE	VOLTAS / THERMAX
3	PRECISION PACKAGE UNITS	STULZ / UNIFLAIR / EMERSON / BLUEBOX / CLIMADENTA
4	PACKAGE UNIT	VOLTAS / BLUE STAR / CARRIER
5	SPLIT AIR CONDITIONER	VOLTAS / BLUE STAR / CARRIER / HITACHI / LG
6	AIR HANDLING UNITS	VOLTAS / BLUE STAR / ZECO / CARRYAIRE (FLAKT) / EDGETECH / ETHOS / SYSTEM AIR / WAVES AIRCON
7	CENTRIFUGAL FAN	CB.DOCTOR / FLAKT / KRUGER / NICOTRA / COMEFRI / MARATHON / PATEL AIR FLAKT / KRUGGER / DRAFT AIR / HYDERABAD POLLUTION CONTROL / ADVANCE VENTILATION / PATEL AIR / SK SYSTEM / CB DOCTOR / SARLA / COMEFRI
8	CHILLED & CONDENSER WATER PUMP	BEST & CROMPTON / JYOTI / SAM TURBO / KBL / KSB / M&P / VOLTAS / BEACON-WEIR / WORTHINGTON / FLOWMORE / SULZER / BHARAT PUMPS & COMPRESSORS LTD / FLOWSERVE INDIA CONTROL PVT LTD / V-FLOW PUMPS & SYSTEMS CO
9	COOLING TOWER	PAHARPUR / MIHIR / PCT / FLOWTECH / BELL
10	INDUCTION MOTORS (LT)	SIEMENS / ABB / CGL / MARATHON / KEC / BHARAT BIJLEE / NGEF / JYOTI / LHP
11	AIR FILTER	PUROLATOR / FMI / ANFILCO / TENACITY / JOHN FOWLER / SPECTRUM / AIR TECH / PUROMATIC
12	AXIAL FANS / F.A. FANS	FLAKT / KHAITAN / PATEL / NICOTRA / SARLA / KRUGER / MARATHON / C DOCTOR HYDERABAD POLLUTION CONTROL / SK SYSTEM / ADVANCE VENTILATION / NICOTRA / PATEL AIR / SARLA (SITAL) / KHAITAN
13	INSULTATION MATERIAL	BEARDSHELL / K-FLEX / PARAMONT / ARMAFLEX / SUPREME / LLOYDS / UP TWIGA / AEROCCELL
14	BALANCING VALVE	ADVANCE
15	BUTTERFLY VALVE	AUDCO / FOURESS / INTER VALVE / BDK / WEIR BDK / TYCO / CRANE PROCESS / KEYSTONE
16	NON RETURN VALVE	LEADER / H.SARKAR / FLUID LINE / HI -TECH / CRESENT / A V VALVES / BANKIM & COMPANY / SHIVADURGA



HVAC SYSTEM

LIST OF INDICATIVE MAKES OF SUB-VENDOR ITEMS

17	GATE/GLOBE VALVES	CRESENT / BDK / AUDCO / FOURESS / KIRLOSKAR / SANT / BOMBAY METAL & ALLOYS / BANKIM / LEADER / H SARKAR / AV VALVES / VENUS PUMPS AND ENGG/SAMSON CONTROLS PVT. LTD/INSTRUMENTATION LTD./ KOSO INDIA PRIVATE LIMITED,
18	3 WAY MIXING VALVE WITH ACTUATING MOTOR	SIEMENS BUILDING TECHNOLOGY /JOHNSON / BELIMO / HONEYWELL / RAPID CONTROL / ALC
19	MOTORIZED BUTTERFLY VALVE	ANERGY / ADVANCE / BELIMO / JOHNSON / HONEYWELL / SIEMENS
20	Y / POT STRAINER	MULTITEX / GREAVES COTTON / JAYPEE / SANT / OTOKLIN / GRAND PRIX / GUJARAT OTOLIFT / DS ENGG / SAROJINI ENTERPRISE / BHATIA ENGINEERING / FILTRATION ENGINEERS INDIA PVT LTD / SUNGOV ENGINEERING
21	PIPING - ERW	SURYA ROSHNI / TISCO / DADU PIPES / INDUS TUBE / WELSPUN / TATA / BST / JINDAL / SAIL
22	PIPING - CS SEAMLESS (ASTM A 106)	ISMT / MAHARASHTRA SEAMLESS
23	GI SHEETS FOR DUCTING	TISCO / INDIAN IRON & STEEL CO LTD. / RASHITRYA ISPAT NIGAM LTD. / ESSAR/ ISPAT INDUSTRIES / JSW STEEL / LLOYDS STEEL / BHUSHAN / TATA / SAIL / JINDAL
24	FIRE DAMPER	TSC / CARRYAIRE / RAVISTAR (SYSTEM AIR)
25	GRILL/DIFFUSER/VOLUME CONTROL DAMPER	AIR FLOW/ TSC /AIR MASTER/ CARYAIRE/RAVI STAR (SYSTEM AIR)
26	STRIP HEATER	ESCORTS / RACOLD / DASPASS/ ALCO/ HEATCO / HOTSET
27	PAN HUMIDIFIER	RAPID COOL/ HOTSET /ALCO
28	RELIEF / PURGE VALVE	BRASSOMATIC
29	THERMOSTATS	HONEYWELL / RANCO / PENN / DANFOSS / INDFOSS / JHONSON CONTROL /RANUTROL
30	HUMID STAT	JHONSON CONTROL / HONEYWELL / PENN
31	ANTI FREEZE THERMOSTAT	RANCO / HONEYWELL / PENN / DANFOSS / INDFOSS
32	FLOW SWITCH	AS PER APPROVED MAKE LIST
33	FLOW METER	AS PER APPROVED MAKE LIST
34	RH SENSOR/TEMP SENSOR	AS PER APPROVED MAKE LIST
35	FIBRE OPTIC CABLE	AS PER APPROVED MAKE LIST
36	ANNUNCIATOR FOR PANEL	NA
37	METERING PUMP	SHAPO TOOLS / VK PUMPS
38	WATER SOFTENING PLANT	THERMAX / ION EXCHANGE / DOSI ION



HVAC SYSTEM

LIST OF INDICATIVE MAKES OF SUB-VENDOR ITEMS

39	PRESSURE TRANSMITTER	AS PER APPROVED MAKE LIST
40	TEMPERATURE TRANSMITTER	AS PER APPROVED MAKE LIST
41	ROTAMETER	AS PER APPROVED MAKE LIST
42	AIR WASHER & UAF* (Refer Note 7)	HYDERABAD POLLUTION CONTROL / SK SYSTEM / ADVANCE VENTILATION / DRAFT AIR / BLUE STAR / VOLTAS / STERLING WILSON/ ROOTS COOLING SYSTEM / C.DOCTOR / TAP / PACK PLAST / INDUSTRIAL PROJECTS AND PRODUCTS
43	PRESSURE GAUGE	GENERAL INST CONSORTIUM / BELL / H.GURU INST / WAAREE INSTRUMENTS / H. GURU IND / FORBES MARSHALL / MANOMETER / A.N. INST / GAUGES BOURDON / GLUCK / WIKA / ASHCROFT / BAUMER TECHNOLOGIES
44	TEMPERATURE GAUGE	H. GURU IND/ H.GURU INST/ FORBES MARSHALL/DETRIVE INST & ELECTRONICS / PYRO ELECTRIC /TOSHNIWAL BROSS / WAREE INSTRUMENTS / A.N.INST / GOA INSTRUMENTS / WIKA/ ASHCROFT / H GURU (SI)
45	LEVEL GAUGE	GENERAL INSTRUMENTS / CHEMTROLS / SBEM, PUNE/ AUTOMAT MUMBAI /SIGMA / TOSHNIWAL / TECHNOMATIC / TELACO /LEVCON / D K INSTRUMENTS / PUNE TECHTROL / FLOW STAR
46	PRESSURE SWITCH / DP SWITCHES	BELLS / DANFOSS / DK INSTRUMENTS/ DRESSER / SOR INC / VASU / SWITZER / INDFOSS / TRAFAG / GIC / ASHCROFT
47	LEVEL SWITCH	SBEM / BLISS ANAND / HI TECH / RAMAN INST / SIGMA / SOR INC / WAREE INST / LEVCON / DK INSTURMENT / V ATUOMATE /CHEMTROLS / SIMENS / FLOW STAR / TRAC
48	CONTROL PANEL	INDUSTRIAL CONTROL & APPLIANCE/ PYROTECH /POSITRONICS / CONTROL & SWITCHGEAR /SIEMENS / L&T /GE POWER /RITTAL / HOFFMAN
NOTES		1. THE APPROVED SUB VENDOR LIST IS ATTACHED ABOVE
		2. IF ANY ITEMS ARE NOT COVERED IN APPROVED LIST, INDICATIVE SUB VENDOR LIST CAN BE REFERRED ABOVE
		3. INDICATIVE SUB VENDOR LIST IS SUBJECT TO BHEL AND CUSTOMER APPROVAL DURING DETAILED ENGINEERING STAGE WITHOUT ANY COMMERCIAL & DELIVERY IMPLICATION TO BHEL. BIDDER TO PROPOSE SUB VENDOR WITHIN 4 WEEKS OF PLACEMENT OF LOI. THEREAFTER NO REQUEST FOR ADDITIONAL SUB-VENDOR SHALL BE ENTERTAINED.
		4. THE INSPECTION CATEGORY HAS BEEN INDICATED IN APPROVED SUB VENDOR LIST



HVAC SYSTEM

LIST OF INDICATIVE MAKES OF SUB-VENDOR ITEMS

5. FOR ITEMS WHICH ARE NOT COVERED IN APPROVED SUB VENDOR LIST THE INSPECTION CATEGORY WILL BE INTIMATED AFTER AWARD OF CONTRACT BY BHEL/CUSTOMER. HOWEVER, THE SAME WILL BE ADHERED BY THE BIDDER WITHOUT ANY COMMERCIAL AND DELIVERY IMPLICATION TO BHEL/CUSTOMER.

6. PLEASE ALSO REFER RESPECTIVE SUB-SECTION C-1,C-3, C-4 & C-5 FOR HANDLING RELATED EQUIPMENT ,ELECTRICAL AND C&I LIST OF MAKE.

7.* DESIGNED BY C.DOCTOR / BLUE STAR / VOLTAS / HYDERABAD POLLUTION CONTROLS / SK SYSTEM /ADVANCE VENTILATION / DRAFT AIR / STERLING & WILSON /
ROOTS COOLING AND FABRICATED BY THEIR APPROVED FABRICATORS.

एनडीपीसी NTPC		Project/ परियोजना :SIPAT SUPER THERMAL POWER PROJECT STAGE - III (1X800MW)					LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL					DOC. NO./ दस्तावेज सं.:	
		Package/ पैकेज: EPC PACKAGES					AND SUB-SUPPLIER APPROVAL					REVISION NO : 00	
		Supplier/ आपूर्तिकर्ता:					के अनुमोदन सहित मंदा की सूची					DATE/ तिथि : 02.05.2023	
		Contract No./ अनुबंध सं.:										SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)	
S. N. क्र.सं.	Item / मंदा	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No./ क्यूपी. सं.	QP Sub. Schedu le क्यूपी उप.अनु सूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी	Provenness Clause (Refer Note-1)			
		I			CARPENTER PATTERSON INDIA PVT LTD	VELLORE	A		MAXIMUM LOAD: 23877 KG AND MAXIMUM DISPLACEMENT: 220 MM AND UNDER THE SUPERVISION OF M/S CARPENTER PATERSON, UK.				
		I			AAA SUPPORTS PVT LTD	VADODARA	A		MAXIMUM LOAD: 1.5MT AND MAXIMUM DISPLACEMENT: 250MM				
		I			CARPENTER & PATTERSON	RANIPET	A		SUBJECT TO CONDITIONS AND THE INVOLVEMENT OF THEIR PRINCIPALS				
38	CONVENTIONAL VALVES (GATE, GLOBE & CHECK)	I			VELAN INC.	CANADA	A		SINGLE STAGE DRAIN VALVES (FORGED), SIZE UPTO 50MM NB, CLASS UPTO 2680 FOR POWER CYCLE PIPING APPLICATION.				
		I			LEADER VALVES LTD.	JALANDHAR	A		CC NRV UP NB 800, 150# FOR STG PKG.				
		I			BHEL	TRICHY	A						
		I			CRESCENT VALVES	MUMBAI	A		UPTO NB 300 CL 600				
		I			VELAND VALVE CORP.	USA	A		GATE V/V 2-34" CL 900-4500 CAST STEEL GATE V/V 18-48" CH50-800				
		I			VELAN	UK	A		1) GLOBE V/V 1/4"-2" C14500 (2) BONNETLESS GLOBE V/V 1/2-2.5" CI 150-500)				
		I			L&T VALVES	COIMBATORE	A		UP TO CLASS 4500 & GRADE 91				
		I			TRILLIUM FLOW	HUBLI	A		UPTO NB 300 & CL-600, FORGED UPTO NB 50 CL 800				
		I			FOURESS ENGG. INDIA LTD.,	THANE	A		(1) 10"X600 # GATE/GLOBE/CHECK VALVES (2) 16"X300# GATE/GLOBE/CHECK VALVES (3) 24"X150# GATE/GLOBE/CHECK VALVE (4) 2"X800 # FS GATE/GLOBE/CHECK (LIST) AS PER B85352 (B) GATE GLOBE/CHECK VALVES FOR 700# TO 1500#				
		I			NITTON VALVES INDIA PVT. LTD.,	AURANGABAD	A		(1) GATE VALVE: UPTO36" CLASS 600 WCB/WCC (2) GLUBE VALVE: UPTO 16" CLASS 300 WCB/WCC (3) CHECK VALVE : UPTO 12" CLASS 600 WCB/WCC & WC6				

एनटीपीसी NTPC		Project/ परियोजना :SIPAT SUPER THERMAL POWER PROJECT STAGE - III (1X800MW)										LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			DOC. NO./ दस्तावेज सं.:	
		Package/ पैकेज: EPC PACKAGES										AND SUB-SUPPLIER APPROVAL			REVISION NO : 00	
		Supplier/ आपूर्तिकर्ता:										के अनुमोदन सहित मदों की सूची			DATE/ तिथि : 02.05.2023	
		Contract No./ अनुबंध सं.:													SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)	
S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No./ क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनु सूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी	Provenness Clause (Refer Note-1)						
		I			SAMSHIN LTD.,	SOUTH KOREA	A		(1) GATE - 450 NB 3900 SPL CL SA 217 C12A (GR 91) (2) GLOBE (CAST) - 200 NB 3900 SPL, CL FOR SA 217C12 (G 91) (3) GLOBE (FORGED GR 92) - 50 NB 4500 CL GR SA182 F 92 (4) CHECK (CAST) - 200 NB 3500 SPL CL FOR SA 217C12A (GR91) (5) CHECK (FORGED GR 92) - 50 NB 4500 CL GR SA 182 F 92 (5) ANGLE (FORGED80 NB)							
		I			TOA VALVE ENGINEERING INC.	JAPAN	A		CONVENTIONAL VALVES (1) GATE VALVES UPTO SIZE 16", CLASS 4500 UPTO C12A/F91 (2) GATE VALVES UPTO SIZE 26" CLASS 2500 UPTO C12A (3) CHECK VALVES UPTO SIZE 14" CLASS 2500 UPTO C12A (4) GLOBE VALVES UPTO SIZE 3" CLASS 4500 UPTO C12A (5) GLOBE VALVES UPTO SIZE 10" CLASS 1500 & 4" CLASS 2500 UPTO F91							
		I			FOURESS ENGG. INDIA LTD.	THANE	A		(1) 10"X600 # GATE/GLOBE/CHECK VALVES (2) 16"X300# GATE/GLOBE/CHECK VALVES (3) 24"X150# GATE/GLOBE/CHECK VALVE (4) 2"X800 # FS GATE/GLOBE/CHECK (LIST) AS PER BS5352 (B) GATE GLOBE/CHECK VALVES FOR 700# TO 1500#							
		I			BABCOCK VALVES	SPAIN	A		(1)CAST GATE VALVE (CS) VALVE CLASS UPTO 2500SPL & SIZE UPTO 10" (2)CAST GLOBE VALVE (CS) CLASS UPTO 2500SPL & SIZE UPTO 3 INCH (3) FORGED GLOBE VALVE (CS) CLASS UPTO 1500 & SIZE UPTO 1" (4) FORGED GLOBE VALVE (CS) CLASS UPTO TO 800 & SIZE UPTO 1.5"							

एनटीपीसी NTPC		Project/ परियोजना :SIPAT SUPER THERMAL POWER PROJECT STAGE - III (1X800MW)										LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL स्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मंदा की सूची				DOC. NO./ दस्तावेज सं.: REVISION NO : 00 DATE/ तिथि : 02.05.2023 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)		Provenness Clause (Refer Note-1)
		Supplier/ पैकज: EPC PACKAGES																
		Contract No./ अनुबंध सं.:																
S. N. क्र.सं.	Item / मंद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub, Schedule क्यूपी उप.अनु सूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी									
		I			FORBES MARSHALL PVT LTD	PUNE	A		CONVENTIONAL VALVES :CAST GATE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 10 INCH CAST GLOBE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 3 INCH									
		I			BABCOCK WILCOX ESPANOLA	SPAIN	A		CONVENTIONAL VALVES -CAST GATE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 10 INCH CAST GLOBE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 3 INCH									
		I			HP VALVES OLDENZAAL B V	NETHERLAND	A		CONVENTIONAL VALVES -CAST GATE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 10 INCH CAST GLOBE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 3 INCH									
		I			Aruna Industrial Products Pvt. Ltd.	MADURAI	A		REFER APPROVAL CONDITION									
39	SAFETY VALVES (SPRING TYPE)	I			DRESSER INDUSTRIES	USA	A											
		I			SAMPELL AG	GERMANY	A											
		I			TYCO (PENTAIR VALVES & CONTROLS	USA	A											
		I			FUKUI SEISAKUSHO CO LTD	JAPAN	A											
		I			RIENEKE GMBH	GERMANY	A		HYDRAULIC TYPE									
		I			BOPP & REUTHER	GERMANY	A		HYDRAULIC TYPE									
		I			MIEWA CORPORATION	JAPAN	A		(1) SAFETY VALVE SIZE 1/2" TO 6" & 150 TO 4500 CLASS									
		I			BHEL	TRICHY	A											
		I			PENTAIR SANMAR LTD	PUDUCHOTTAI	A		AUX STEAM SYSTEM: UP TO 6" SIZE AND CLASS UP TO 600									
		I			FAINGER LESER VALVES P LTD	AURANGABAD	A		SIZE(INLET/OUTLET): 200/300 MM APPLICABLE TO MAX DESIGN TEMPERATURE:474 DEG C & PRESSURE:47 KG									
40	ELECTROMATIC RELIEF VALVE (ERV)	I			VALVES TECHNOLOGIES	USA	A		(A) 1.5"X3" CLASS 3100- F91 MATERIAL (B) 2.5"X4" CLASS 1500-F91 MATERIAL									
		I			FUKUI SEISAKUSHO CO LTD	JAPAN	A											

PROJECT : SIPAT-III (1X800MW) PACKAGE : EPC PACKAGES CONTRACTOR: CONTRACT NO. :						LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL					REVISION NO : 00 DATE :02.05.2023 SUB SECTION: QA-IG(MECH)		
Sr No	Item Description	QP Inspection Category	QP No	QP submis sion SCH	QP approve ment at SCH	Proposed Sub Supplier	Country	SS Approval_Status	SS Detail Sub.SCH	SS Approval SCH	Remark	Package Applicable	Provenness Clause (Refer Note- I)
2	Chemical Dosing System	I				Main Contractor Approved Sources							
3	Vapour Exhauster With Motor	II				Main Contractor Approved Sources							
4	Drain Cooler & Misc Tanks	II				Main Contractor Approved Sources							
5	Oxygen/NaOH Dosing System	II				Main Contractor Approved Sources							
6	Misc Items like Internals of equipments(if not covered in MQP) & Consumables like paints, gaskets etc.	III				Main Contractor Approved Sources							
NOTE - 1 : For final Sub-QR approval , document required to be submitted as per Sub-QR requirements given in the specification.													
NOTE-2: Vendors under 'A' are approved and accepted by NTPC with/without conditions in the past. Similar conditions as the case may be for the vendor shall be applicable for this project and tied up in the quality plan.													
NOTE-3: Main contractor approved sub vendors evaluated/ assessed as per Main contractor Quality Management System is acceptable.													
NOTE-4: The items not covered in the above list shall be mutually discussed & agreed for Item categorisation & sub-vendor control.													
LEGENDS/ संकीर्तिका													
* - Inspection category will be decided during vendor evaluation.													
1.0 SYSTEM SUPPLIER / SUB SUPPLIER APPROVAL STATUS CATEGORY प्रणाली आपूर्तिकर्ता / सब-वैडर की स्वीकृति की स्थिति की श्रेणी													
A – For these items proposed vendor is acceptable to NTPC. To be indicated with letter "A" in the list along with the condition of approval, if any/ इन मर्दों के लिए प्रस्तावित वैडर एन्टीपीसी को स्वीकार्य है। अनुमोदन की शर्त, यदि कोई हो, के साथ-साथ पत्र "A" में इंगित किया जाए।													
2.0 QP INSPECTION CATEGORY : स्वीपी / निरीक्षण की श्रेणी:													
CAT - I : For those items the Quality Plans are approved by Customer and final acceptance will be on physical inspection witness by Customer.इन मर्दों के लिए गुणवत्ता योजनाओं को एन्टीपीसी द्वारा अनुमोदित किया जाता है और एन्टीपीसी द्वारा अंतिम स्वीकृति भौतिक निरीक्षण के दौरान उपलब्ध गवाह के आधार पर दी जाएगी।													
CAT - II : For those items the Quality Plans are approved by Customer. However no physical inspection shall be done by Customer. The final acceptance by Customer shall be on the basis of review of documents. इन मर्दों के लिए गुणवत्ता योजनाओं को एन्टीपीसी द्वारा अनुमोदित किया जाता है। हालाँकि एन्टीपीसी द्वारा कोई भौतिक निरीक्षण नहीं किया जाएगा। एन्टीपीसी द्वारा अंतिम स्वीकृति अनुमोदित दस्तावेजों की समीक्षा के आधार पर दी जाएगी।													
CAT - III : For these items Quality control to be exercised as per Main contractor Quality Assurance System. The final acceptance by NTPC shall be on the basis of Certificate of Conformance (COC) by Main Contractor.													
UNITS/WORKS : Place of manufacturing- Place of main supplier of multi units/works.													

INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क़्वालिटी प्लान तथा सब –सप्लायर के अनुमोदन सहित मदों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)		DOC. NO./ दस्तावेज सं.; REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :				Applicable Systems			
Project/ परियोजना : SIPAT-III (1X800 MW) Package/ पैकेज : EPC Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.:	Item / मद	QP/ Insp. Cat. क्यूपी/ निर्ति. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप,अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी (NOTE-1)	Sub- supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी	
2.B	GANTRY CRANE >5T	I (> 10T) / III (>5T UP TO 10T)			ARMSEL	A		UPTO 10 MT EOT & UPTO 15 MT ELECTRIC HOIST	CW
					TRACTEL TIRFOR	A		UPTO 15 MT FOR ELECTRIC HOIST AND UPTO 10 MT FOR EOT	
					MILLARS INDIA	A		UP TO 25 MT	
					AVON CRANES	A		UP TO 25 MT	
					GRIP ENGINEERS	A		50 MT (GEARBOX FROM NTPC APPROVED SOURCES FOR EOT CRANE).	
					GRIP ENGINEERS	A		UPTO 20 MT ELECTRIC HOIST ONLY	
					CRANEX	A		UP TO 140 MT FOR EOT ONLY	
					REVA INDUSTRIES	A		UP TO 60 MT	
					UNIQUE INDUSTRIAL HANDLERS PVT LTD	A		UP TO 165 MT	
					ANUPAM INDUSTRIES LTD.	A		UP TO 60MT	
3	FAN- AXIAL TYPE > = 5KW				SMACO ENGINEERING PVT. LTD	A		UP TO 60MT	WTP,CT,AC&VENTIL ATION,CHP,LHP&GH P,AHP
					MANGLA HOIST	A		UP TO 10MT	
					CB DOCTOR VENTILLATOR PVT LTD	A		up to 50000 CMH	
					HOWDEN SOLYVENT FLAKT INDIA PVT LTD,	A		up to 125000 CMH	



INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL इक्यालिटी प्लान तथा सब -सप्लायर के अनुमोदन सहित मदों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)		DOC, NO./ वस्तुविवरण सं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :				Applicable Systems				
S. N. क्र.सं.	Project/ परियोजना : SIPAT-III (1X800 MW) Package/ पैकेज : EPC Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.:	Item / मद	QP / Insp. Cat. स्वीकृति/ तिथि. श्रेणी.	QP No. / स्वीकृति. सं.	QP Sub. Schedule उप, अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी (NOTE-1)	Sub- supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी
3	FAN- AXIAL TYPE > = 5KW		I			C DOCTOR &CO PVT LTD	KOLKATA	A		up to 50000 CMH
						KRUGER VENTILATION INDUSTRIES (I) PVT LTD	SHAHIPUR, THANE	A		Up to 6000 CMH
						NADI AIRTECHNICS PVT LTD	CHENNAI	A		Up to 15000 CMH
						ADVANCE VENTILATION PVT LTD	KUNDALLI SONEPAT	A		up to 40000 CMH
						SK SYSTEMS PVT LTD	KUNDALI PHASE-II, SONEPAT, HARYANA	A		up to 50000 CMH
4	PIPES-MS- (BLACK/ GI) AS PER IS IS:3589 >1000NB					Patel Airflow	Ahemdabad	A		up to 40000 CMH
						ALMONAROD (P) LIMITED	CHENNAI	A		Up to 14000 CMH
						STEEL AUTHORITY OF INDIA LIMITED	ROURKELA	A		
						WELSPUN	ANJAR	A		SAW UPTO 2600 NB
						WELSPUN	BHARUCH	A		SAW UPTO 1300 NB
						MAN INDUSTRIES	INDORE	A		SAW UPTO 1400 NB
						SAMSHI	VADODARA	A		SAW 450 TO 2540 NB
						MUKAT TANKS & VESSELS	TARAPUR	A		SAW 200 TO 1200 NB
		MUKAT PIPES	RAJPURA	A		SAW UPTO 1800 NB				
CW,CT,MUW										



Project/ परियोजना : SIPAT-III (1X800 MW) Package/ पैकेज : EPC Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.: INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क़्वालिटी प्लान तथा सब -सप्लर के अनुमोदन सहित मदों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)				DOC, NO./ दस्तावेज सं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :				Applicable Systems	
S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूरी/ निरी. श्रेणी.	QP No. / क्यूरी. सं.	QP Sub. Schedule क्यूरी उप, अनुसूचि	Proposed sub-supplier / आपूर्तिकर्ता प्रस्तावित उप	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति / श्रेणी (NOTE-1)	Sub- supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी
4	PIPES-MS- (BLACK/ GI) AS PER IS:3589 >1000NB	I			LALIT PIPES AND PIPES LTD	THANE	A		SAW 350 TO 1400 NB
					RATNAMANI	CHATRAL	A		SAW 600 TO 2600 NB
					RATNAMANI	KUTCH	A		SAW 400 TO 3600 NB
					PSL HOLDINGS LIMITED	DAMAN	A		SAW 450 TO 1600 NB
5	PIPES & FITTINGS-GRP	I			PSL INTERNATIONAL LTD.	CHENNAI	A		SAW 450 TO 1600 NB
					PSL LIMITED	KUTCH	A		SAW 450 TO 1600 NB
					PSL LIMITED	VISAKHAPATNAM	A		SAW 450 TO 1600 NB
					JCO PIPES	CHHINDWARA	A		SAW UPTO 1600 NB
					SURYA GLOBAL STEEL TUBE LTD	ANJAR	A		SAW UP TO 2032 OD
					JINDAL SAW LTD	BELLARY	A		SAW UP TO 3632 OD , THICKNESS 16 MM
					CAPACITE STRUCURES PVT LTD	THANE	A		406.4 MM TO 3874 MM OD
					EPP COMPOSITES PVT LTD	RAJKOT	A		UP TO 900MM
					GRAPHITE INDIA	NASIK	A		UP TO 1000MM
					SHRIRAM SEPL COMPOSITES LTD	CHENNAI	A		UP TO 1100MM

WTP,CT



INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL इंक्वालिटी प्लान तथा सब -सप्लायर के अनुमोदन सहित मदों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)		DOC. NO./ दस्तावेज नं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :							
Project/ परियोजना : SIPAT-III (1X800 MW) Package/ पैकेज : EPC Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध नं.:	Item / मद	QP / Insp. Cat. क्यूरी/ निरी. श्रेणी.	QP No. / क्यूरी. नं.	QP Sub. Schedule क्यूरी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति / श्रेणी (NOTE-1)	Sub- supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी	Applicable Systems
6	SERVICE VESSEL-CPU & OTHER PR VESSELS >= 10 BAR WORKING PRESSURE	I			BALAJI FIBER REINFORCE PVT LIMITED	A		UP TO 650MM	WTP,CPU,CAS,CHP, LHP&GHP,AHP
					MEGHIA FIBRE GLASS INDUSTRIES PVT LTD	A		UP TO 900MM	
					DRIPLEX WATER ENGINEERING	A			
					INTERNATIONAL PVT LIMITED BGR ENERGY SYSTEMS LTD	A		UPTO 3000MM DIA & THICKNESS	
					(ENVIRONMENTAL ENGG. DIV) ISHAN EQUIPMENTS PRIVATE	A		UPTO 28 MM UPTO 2900 MM DIA & THICKNESS	
					LIMITED	A		UPTO 28 MM DIA 2800MM, THICKNESS 25MM DESIGN PRESSURE UP TO 47.5 KSC	
					JASMINO POLYMERTECH PVT LTD	A		DIA UP TO 2900 MM , THICKNESS UPTO 29 MM	
					MAHIMA UDYOG	A		UPTO 3200MM DIA & THICKNESS UPTO 30 MM	
					BELCO POLLUTION CONTROL PVT LTD	A			
					KIRLOSKAR BROTHERS LTD	A			
PUMPS- HORIZONTAL & VERTICAL CENTRIFUGAL -UP TO 300KW					WILO MATHER & PLATT	A			WTP,CW, CPU,FDPs,CHP, LHP &GHP,AC & VENTILATION,MUW, AHP
					WILO MATHER & PLATT	A			
					SAM TURBO	A		FLOW UP TO 1500 CUM/HR AND	
					FLOWMORE LTD	A		POWER RATING UP TO 425 KW	
					CHENNAI	A			



INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्राफिटी भूत तथा सब -वेडर के अनुमान सहित मॉड की सूची SUB-SYSTEM उप-उणाली: BOP SYSTEMS (MECHANICAL)										DOC, NO./ दस्तावेज नं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :			Applicable Systems	
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7	PUMPS- HORIZONTAL & VERTICAL CENTRIFUGAL -UP TO 300KW	(UP TO 60 KW CAT-II, ABOVE 60 KW CAT-I)			JYOTI LTD	VADODARA	A							
					WPIL	GHAZIABAD	A							
					KISHORE PUMPS	PUNE	A			UPTO 500M3/HR ONLY RUBBERLINED PUMPS ALSO				
					GRUNDFOS PUMPS INDIA PVT LTD	CHENNAI	A			HORIZONTAL UP TO 30 KW ONLY AND VERTICAL UP TO 45 KW ONLY (FOR APPLICATIONS WHERE NPSH IS NOT CONSIDERED)				
					SINTECH PRECISION	GHAZIABAD	A			HORIZONTAL UP TO 400 KW MOTOR RATING AND VERTICAL UP TO 30 KW MOTOR RATING				
					KSB	PUNE	A							
					KSB	NASHIK	A							
					FLOWSERVE INDIA CONTROLS	COIMBATORE	A			HOIZONTAL CENTRIFUGAL PUMP UP TO 75 KW ONLY				
					PVT LTD SU MOTOR	MUMBAI	A			HORIZONATL UPTO 500W3/HR ONLY RUBBERLINED PUMPS AND VERTICAL CENTRIFUGAL PUMPS UP TO 100CMH ONLY				
					BHARAT PUMPS AND COMPRESSORS FLOWMORE LTD	NAINI	A			FLOW UP TO 2200 M3/HR AND HEAD UP TO 60 MWC				
					GHAZIABAD	A			WTP, CW					
					KIRLOSKAR BROTHERS LIMITED	KIRLOSKARWADI	A							
					WPIL LTD	KOLKATA	A							
					WPIL LTD	GHAZIABAD	A							



INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क़्वालिटी प्लान तथा सब-सुप्लायर के अनुमोदन सहित मदों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)					DOC. NO./ दस्तावेज नं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :			Applicable Systems		
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8	PUMPS-VT-UP TO 300KW		I			JYOTI LTD	A			
						XYLEM WATER SOLUTIONS INDIA	A			
						PVT LTD FLOWSERVE INDIA CONTROLS	A		UP TO 1025 KW	
						PVT LTD				
						SINTECH PRECISION	A			
9.A	VALVE-DUAL PLATE CHECK > 600MM OR CLASS > 300 (VALVE- DUAL PLATE CHECK UP TO 600MM & CLASS 300: CAT-II & MAIN CONTRACTOR APPROVED SOURCES)		I			WILO MATHER & PLATT	A			
						ADVANCE VALVE PVT LTD	A		DUAL PLATE CHECK VALVES CI UP TO 1000 NB CLASS 125, DUPLEX SS UP TO 600NB CLASS 600.	WTP,CW, CPU,FDPs,CAS,LP PIPING
						LEADER VALVES	A		UP TO 900MM CLASS 150 , SS 200NB CLASS#300	
						R & D MULTIPLE	A		CI/ CS UP TO 800NB PN 10	
						SWIMS TECHNOLOGIES	A		SS BALL VALVES UP TO 500MM AND CLASS #600. CS BALL VALVES UP TO 250 MM AND CLASS# 900, CS/ SS BALL 400NB CLASS#600 AND UP TO 600NB CLASS#300	WTP, CPU,FDPs,CAS,FOH,C HP,LHP&GHP,AHP
9.B	VALVE-BALL > 100 MM OR CLASS > 800; (VALVE- BALL UP TO 100 MM & CLASS 800:CAT-II & MAIN CONTRACTOR APPROVED SOURCES)		I			MICRO FINISH VALVES PVT. LTD.	A			
						FLOW CHEM INDUSTRIES	A		100NB CLASS#600,200NB CLASS#300, 50 NB CLASS#800	
						L&T VALVES LIMITED	A		UPTO 150NB, CLASS #150/300, AND	
						PRECISION ENGG CO VALVES PVT LTD	A		UPTO 50NB, CLASS #800 FCS UP TO 50NB CLASS 800, CCS UP TO 400NB CLASS 150.	
						BELGAUM AQUA VALVE PVT LTD	A		FCS UP TO 50NB CLASS 800, CCS UP TO 200NB CLASS 150.	

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		QP/ Insp. Cat. ब्यूटी/ निर्म. श्रेणी.	QP No. / ब्यूटी. सं.	QP Sub. Schedule उप. अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति / श्रेणी (NOTE-1)	Sub- supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी	
9.C	VALVE-BUTTERFLY > 600MM OR CLASS>150 (VALVE-BUTTERFLY UP TO 600MM & CLASS 150::CAT-II & MAIN CONTRACTOR APPROVED SOURCES)	I			G M ENGINEERING PRIVATE LTD	RAJKOT	A		UP TO 400 NB AND CLASS #600	WTP, CW,CT,CPU,FDPs,CAS ,AC& VENTILATION, MUW,CHP, LHP&GHP,LP PIPING,AHP
					INTERVALVE POONAWALA LTD	PUNE	A		SGI / CI / D2 1400MM PN10, SGI / CI 1000MM PN16,CS/SS 500MM PN16, SS 400MM CLASS#300, MS FABRICATED	
					SWIMS TECHNOLOGIES	HUBLI	A		CI/ DI BUTTERFLY VALVE UP TO 1000MM AND PN16 AND UP TO 1800MM AND PN10,CGS UP TO	
					PENTAIR VALVES	HALOL	A		FOR SS UP TO 500 NB PN-10, CI- UP TO 900NB PN-10, UP TO 500NB PN-16, 450MM CLASS#300., MS FABRICATED	
					FOURES ENGINEERING	BANGALORE	A		CAST SGI/CI/ MS FABRICATED- UP TO 1200 PN-10, UP TO 350 PN-16 ,2400 MM PN6/CLASS150	
					KIRLOSKAR BROTHERS LTD	KONDHAPURI	A		CAST SGI/CI/CS 1400 MM PN16 , SS 300 MM PN16 , 1800MM CLASS 150, MS FABRICATED 900 NB PN40,MS	
					R & D MULTIPLE	VALSAD	A		CAST SGI/CI/MS FABRICATED- UP TO 1800 MM PN-10/CLASS # 75 , 1100MM PN25,1400MM CLASS#150 ,MS	
					ADVANCE VALVES PVT LTD	GREATER NOIDA	A		METAL SEATED, TRIPLE ECCENTRIC, SS BFV OF SIZE UPTO 100NB, AND PRESSURE RATING UPTO CLASS #300.	
					BRAY CONTROLS INDIA PVT. LTD	KANCHIPURAM	A		UPTO 450 MM AND CLASS#600	
					INSTRUMENTATION LTD.	PALAKKAD	A		UPTO 2200NB CLASS # 75	
					HAWA ENGINEERS	AHMEDABAD	A		CI/ CS & FABRICATED UPTO 1200MM, CLASS #150, SS UPTO 250MM, CLASS#150	
					CRANE PROCESS FLOW	SATARA	A		UP TO 900MM PN10	
					L & T VALVES LIMITED	COIMBATORE	A		UP TO 900MM CLASS 150	
					DEMBLA VALVES	THANE	A		UP TO 2200MM CLASS#75	



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23	ALARM VALVE WITH TRIMS	II			HD FIRE	A			FDPS			
					HD FIRE	A						
					HD FIRE	A						
24	FOAM SYSTEM(BLADDER TYPE)	I			FIRESECH	A			FDPS			
					WADIA BODY BUILDERS	A						
					AAREL INDUSTRIES	A						
25	FIRE TENDER	I			AMBALA COACH	A			FDPS			
					VIJAY FIRE	A						
					MARATHON ELECTRIC MOTOR(I) LTD	A		UP TO 50000 CMH				
26	CENTRIFUGAL FAN (≥ 5KW) MOTOR FROM NTPC ACCEPTED SOURCE				HOWDEN SOLYVENT FLAKT	A		UP TO 200000 CMH	AC& VENTILATION, CHP, LHP&GHP,,AHP			
				INDIA PVT LTD, ALMONAROD (P) LIMITED	A		UP TO 60000 CMH					
				PATEL AIRFLOW	A		UP TO 250000 CMH					
				CB DOCTOR VENTILATOR PVT LTD	A		UP TO 150000 CMH					
				WOLTER VENTILATORS INDIA (P) LTD	A		UP TO 200000 CMH					



INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क़्वालिटी प्लान तथा सब -सप्लायर के अनुमोदन सहित मदों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)					DOC, NO./ दस्तावेज नं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :				Applicable Systems	
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26	CENTRIFUGAL FAN (≥ 5KW) MOTOR FROM NTPC ACCEPTED SOURCE		I			C DOCTOR &CO PVT LTD	A		UP TO 250000 CMH	
						SUVIDHA AIR ENGINEERS	A		UP TO 190000 CMH	
						SUBURBAN INDUSTRIAL WORKS	A		UP TO 100000 CMH	
						PVT. LTD				
						KRUGER VENTILATION	A		UP TO 90000 CMH	
						INDUSTRIES (I) PVT LTD				
						SOLYVENT FLAKT	A		UP TO 200000 CMH	
						ADVANCE VENTILATION PVT LTD	A		UP TO 250000 CMH	
						SK SYSTEMS PVT LTD	A		UP TO 250000 CMH	
						CUMMINS	A		Up to 2000 KVA	DG SET,FDPS
27	DIESEL ENGINE		I			PERKINS	A		UP to 313 HP	
						GREAVES COTTON	A		Up to 1750 KVA	
						SAIL	A			MUW
28	3 LPE COATED PIPE		I			RATNAMANI	A		UP TO 1100 NB	
						PSL LTD	A		UP TO 1100 NB	
						TRANSTER INDIA	A		HT PLATES & GASKETS FROM TRANSTER SWIDEN/USA,HT PLATES FROM HISKA JAPAN	ECW



INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क़्वालिटी प्लान तथा सब -सप्लायर के अनुमोदन सहित मॉड की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)		DOC. NO./ दस्तावेज नं.: REV. NO.: DATE/ तिथि : 26.06.2023 PAGE/ पृष्ठ :								
S. N. क्र.सं.	Item / मद	QP / Insp. Cat, क्यूपी/ निसी, श्रेणी,	QP No. / क्यूपी, नं., उप,अनुसूचि	QP Sub. Schedule क्यूपी उप,अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति / श्रेणी (NOTE-1)	Sub- supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी	Applicable Systems
33	AIR DRYER	I			SUMMITTS HYGRONICS	COIMBATORE	A		FOR REFRIGERANT DRYER, 11893 M3/HR, REGENERATIVE DRYERS BLOWER REACTIVATED TYPE 2123 M3/HR AND REGENERATIVE DRYERS HOC TYPE 5820 M3/HR	CAS
					MELLCON ENGRS PVT LTD	GR NOIDA	A		Refrigerant type 60 m3/hr & REGENERATIVE DRYERS HOC TYPE 2548 M3/HR	
					DELAIR INDIA LTD	GURGAON	A		Refrigerant type 7500 m3/hr & REGENERATIVE DRYERS HOC TYPE 3000 M3/HR	
					SUMESH PETROLEUM	VADODARA	A		100 CFM(169 M3/HR) & 7 KG/CM2	
					TRIDENT PNEUMATIC PVT LTD	COIMBATORE	A		Refrigerant type 10000 m3/hr & REGENERATIVE DRYERS BHR TYPE 1000 M3/HR	
34	SCREW CHILLER	II			KIRLOSKAR CHILLER	PUNE	A		UP TO 350TR	AC& VENTILATION
					DAIKIN	NEEMRANA	A		UP TO 185 TR	
					BLUE STAR (COMPRESSOR FROM HANBEL-TAIWAN)	WADA	A		SCREW CHILLER UP TO 282TR	
35	Mettalic Expansion Bellows	II			MB METTALIC BELLOWES	CHENNAI	A			MRHS
					SUR Industries	KOLKATA	A			
					LONE STAR	CHENNAI	A			
36	Conveying Compressor (Reciprocating)	I			KIRLOSKAR PNEUMATICS	PUNE	A			MRHS
					INGERSOLL RAND	AHMDABAD	A			

एनटीपीसी NTPC		Project/ परियोजना : SIPAT-III (1X800 MW) Package/ पैकेज : EPC Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.:				INDICATIVE LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मंदाों की सूची SUB-SYSTEM उप-प्रणाली: BOP SYSTEMS (MECHANICAL)				DOC. NO./ दस्तावेज सं.:			
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S. N. क्र.सं.	Item / मंदा	QP / Insp. Cat. क्यूपी/ तिथि, श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप, अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी (NOTE-1)	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण	Remarks/ टिप्पणी	Applicable Systems				
23	DUST SUPPRESSION SYSTEM (PLAIN WATER)				MAIN CONTRACTOR'S APPROVED SOURCES			BOIs SHALL BE FROM NTPC APPROVED SOURCES	CHP, LHP/ GHP				
24	DUST SUPPRESSION SYSTEM (DRY FOG)	I			MAIN CONTRACTOR'S APPROVED SOURCES			BOIs SHALL BE FROM NTPC APPROVED SOURCES	CHP, LHP/ GHP				
Note-1	Items for which Sub-QR is envisaged, vendors are accepted subject to Sub-QR clearance from NTPC Engg.												
A – For these items proposed vendor is acceptable to NTPC. To be indicated with letter “A” in the list along with the condition of approval, if any./ इन मंदाों के लिए प्रस्तावित वेंडर एनटीपीसी को स्वीकार्य है। अनुमोदन की शर्त, यदि कोई हो, के साथ-साथ पत्र “क्यू” में इंगित किया जाए।													
DR – For these items “Detailed required” for NTPC review. To be identified with letter “DR” in the list. एनटीपीसी द्वारा इन मंदाों की समीक्षा के लिए “विस्तृत ज़रूर की आवश्यकता” होगी। सूची में “DR” पत्र में इंगित किया जाना चाहिए।													
QP / INSPECTION CATEGORY:													
CAT-I / श्रेणी- I: For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP. इन मंदाों के लिए गुणवत्ता योजनाओं को एनटीपीसी द्वारा अनुमोदित किया जाता है और एनटीपीसी द्वारा अंतिम स्वीकृति भौतिक निरीक्षण के दौरान उपलब्ध गवाह के आधार पर दी जाएगी।													
CAT-II / श्रेणी- II: For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP. इन मंदाों के लिए गुणवत्ता योजनाओं को एनटीपीसी द्वारा अनुमोदित किया जाता है। हालांकि एनटीपीसी द्वारा कोई भौतिक निरीक्षण नहीं किया जाएगा। एनटीपीसी द्वारा अंतिम स्वीकृति अनुमोदित क्यूपी के अनुसार दस्तावेजों की समीक्षा के आधार पर दी जाएगी।													
CAT-III/ श्रेणी-III : For these items Quality control to be exercised as per Main contractor Quality Assurance System. The final acceptance by NTPC shall be on the basis of Certificate of Conformance (COC) by Main Contractor.													
UNITS/WORKS इकाईयां / कार्वा: Place of manufacturing/ निर्माण का स्थान Place of Main Supplier of multi units/works/बहु- इकाईयों / कार्वाों के मुख्य सप्लायर का स्थान.													
FORMAT NO./ प्रारूप सं: QS-01-QAI-P-1B/F1-R0													
Engg. Div. / QA&I													

S. N. क्र.सं.		Item / मद	Project/ परियोजना : SIPAT-III (1X800MW) Package/ पैकेज: EPC PACKAGES Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.:					LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL ज्वालिटी प्लान तथा सब-सप्लर के अनुमोदन सहित मदों की सूची					DOC. NO./ दस्तावेज सं.: REVISION NO : 00 DATE/ तिथि : 09.05.2023 SUB-SYSTEM उप-प्रणाली: QA-ELEC	
			QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी				
					Powertech	Sonepat	A		Upto 55 KW with following conditions: i) VFD from Schneider- France, upto 415V, 50KW. ii) Enclosure & bought out items shall be from NTPC acceptable makes & iii) Engineering support for integration will be provided by Schneider/ Authorized integrator of Schneider					
					DANFOSS	Oragadam	A		(upto 690V, 1200KW). VFD drives with VFD sourced from Danfoss-Denmark/USA and Panel sourced from Rittal					
					YASAKAWA	Japan	A		VFD from Yasakawa- Japan, Upto 415V, 132KW					
					ROCKWELL AUTOMATION	SAHIBABAD	A		VFD from Rockwell(Allen Bradley)- USA, (Upto 415 V, 600 KW)					
					ABB	BANGALURU	A		VFD from ABB-Finland, Upto 690V, 750 KW					
					SIEMENS	NASIK	A		VFD from SIEMENS- Germany, Upto 690V,900KW					
					VACON	BANGALORE	A		VFD(NXP model) from VACON Finland, upto 400KW,415V and upto 900KW, 690V					
37.1		MV VFD Control Panel	CAT I		HITACHI III REL POWER ELECTRONICS PVT. LTD.	SANAND	A		UP TO 11KV					
					TMEIC INDUSTRIAL SYSTEMS INDIA PRIVATE LIMITED	TUMKUR	A		UP TO 11KV					
38		Elevator (GEAR TYPE)	CAT I		ECE INDUSTRIES,	Ghaziabad	A							
					TECHNO INDUSTRIES LTD.,	AHMEDABAD	A							
					BHARAT ELEVATORS ENGG. PVT. LTD.,	KOLKATA	A							
					OTIS	MUMBAI	A							
					KONE ELEVATORS INDIA PVT. LTD.,	CHENNAI	A							
					OMEGA ELEVATORS	AHMEDABAD	A							
					SAMIL ELTEC CO.LTD.	SOUTH KOREA	A							
					ORION ELEVATOR CO. LTD.,	AHMEDABAD	A							
39		HVR Transformer & EC Panel	CAT I		ADOR Powertron	Pune	A							
					BHEL	Jhansi	A							
40		Panel Type Hopper Heater	CAT I		HTD	USA	A							
					Hotfoil EHS	USA	A							
					HTD HEAT TRACE(I) Pvt Ltd	Hyderabad	A							
					Thermon	USA	A							
					Thermopads(Unit-II)	Jesdimetla	A							
					Thermon	Pune	A							
41		Neutral Grounding Transformer	CAT II		Pragati Electrical Pvt. Ltd.	Mumbai	A							
					Bharat Bijlee Ltd	Navi Mumbai	A							
					Prayog Electrical Ltd.	Pune	A							
					Andrew Yule	Chennai	A							
42		L.T Switchgear - Floor mounted Fixed type indoor LT Switchgear Panel (MLDB)	CAT I											
					Switching Circuits	Kolkata	A							
					Hindustan Control & equipment Ltd	Kolkata	A		With fabrication & painting at unit II & MP-Electrical Narendrapur					
					Makrel	Vadodara	A		Prior Type Testing					
					Jakson	Greater Noida	A							
					Vidvut Control	Gazirabad	A							

 एन टी पी सी				PROJECT : Sipat-III (1X800MW) PACKAGE : EPC PACKAGES CONTRACTOR: CONTRACT NO :				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL				REVISION NO : 00 DATE :02.05.2023 SUB SECTION: C&I	
Sr No	Item Description	QP Inspection Category	QP No	QP submission SCH	QP approval at SCH	Proposed Sub Supplier	Country	SS Approval_Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	Remark		
12-C	Electrical actuator for ID/FD/PA Blade pitch ,IGV &SCOOP	III				Harold Beck & Sons Inc	USA	A					
		III				SIPOS Aktronik GmbH	Germany	A					
13	Electronics Transmitter (Pressure , DP and DP based Flow/Level)												
13-A	Electronics Transmitter (Pressure , DP and DP based Flow/Level)												
		III				ABB Ltd	Bengaluru	A			2600T & critical item from ABB Italy/ Their approved source;		
		III				Emerson Process Management Ltd	Pawane	A					
		III				Siemens Ltd	Thane	A			Model:-SITRANS P		
		III				Honeywell Automation India Ltd	Pune	A					
		III				Baldota Control and Equipment Pvt Ltd	Navi Mumbai	A			PT & DPT of LD 301 Series (SMAR)		
		III				Yokogawa India Limited	Bengaluru	A			EJA-E 110,430,530 SERIES & all raw material and BOI under knocked down condition (sensor assembly as a single unit) shall be sourced from M/S Yokogawa Japan		
		III				M/s Endress + Hauser India Automation Instrument Pvt Ltd	Aurangabad	A					
		III				Emerson (Rosemount)	USA	A					
		III				Yokogawa	Japan	A					
		III				ABB	Germany / Italy	A			2600T & critical item from ABB Italy/ Their approved source;		
		III				Siemens	France	A			Sitrans P DSIII Series		
		III				Fuji Electric	France	A			FCX -AIII SERIES		
		III				Fuji	Japan	A					
13-B	Electronics Transmitter -Field Bus Based (Pressure , DP and DP based Flow/Level)												
		I				ABB India Ltd	Bengaluru	A			One no of Transmitter will be sent at DDCMIS supplier for function testing of field bus communication with DDCMIS during FAT		
		I				Yokogawa India Limited	Bengaluru	A			EJA-E 110,430,530 SERIES & all raw material and BOI under knocked down condotion (sensor assembly as a single unit) shall be sourced from M/S Yokogawa Japan		
14	EQMS												



PROJECT : Sipat-II (1X800MW)
PACKAGE : EPC PACKAGES
CONTRACTOR:
CONTRACT NO.:

REVISION NO. : 00
DATE :02.05.2023
SUB SECTION: C&I

PROJECT : Sipat-III (1x800MW) PACKAGE : EPC PACKAGES CONTRACTOR : CONTRACT NO :										LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL				REVISION NO : 00 DATE :02.05.2023 SUB SECTION: C&I	
Sr No	Item Description	QP Inspection Category	QP No	QP submission SCH	QP approval SCH	Proposed Sub Supplier	Country	SS Approval_Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	Remark				
		I				SWAN	Hyderabad	A			1. Conductivity analyser, pH analyser and Temperature Transmitter will be of M/s ABB, UK make . 2. TSS analyser will be of M/s Daeyoon, South Korea make . 3. Oil in water analyser will be of M/s TriOs, Germany make. 4. Online BOD/COD analyser will be of M/s Shimadzu, Japan make . 5. Flow meter will be of M/s Khrono Marshall, Maharashtra make. 6. Data Acquisition System will be procured from Knowledge Lens, Karnataka.				
15	Fiber optic cable	Note-3				U M Cables Ltd	Silvassa (Daman)	A							
		Note-3				KEC International Ltd	Mysore	A							
		Note-3				Apar Industries Limited	Valsad (Gujrat)	A							
		Note-3				HFCL	Goa	A							
		Note-3				Aksh Fibre	Bhiwadi (Raj)	A							
		Note-3				Finolex Cable Ltd	Goa	A							
		Note-3				Birla Cable Limited	Rewa	A							
		Note-3				R&M	Switzerland	A							
		Note-3				Molex	UK	A							
		Note-3				Corning	USA	A							
16	Fire alarm Panel										1.M/S Notifier Make Fire alarm Panel 2.PI Refer Note-07				
		II				Toshniwal Industrial Pvt Ltd	Ajmer	A							
		II				Bosch Security system	Bengaluru	A			1.Detector , Hooter, MCP, Modules, Panel shall be M/s Bosch. Make				
		II				Notifier	USA	A							
		II				Autronica	Norway	A							
		II				Schrack	Austria	A							
		II				Edwards	Mexico	A							
		II				Shield Fire safety and security Ltd	UK	A							
		II				Jhonson Controls	USA	A			Simplex Brand				
17	Flame Monitoring System (Scanner)										1.Flame detector, amplifier ,light guide fiber optic , smart display programming unit , test kit & simulator will be supplied from M/S Forney Corporation USA 2.Other components like outer carrier ,IDD cable with connector , expander , Y connector with adapter gasket , fastners & signal isolators will be supplied from M/S Forney Corporation USA approved sources 3.PI Refer Note-7				
		I				Lucent Marcons Pvt Ltd (System Integrator of M/S Forney Corporation USA)	Noida	A							
		I				HI Tech System & services Ltd (System Integrator of BFI Germany)	Kolkata	A			1.For BFI Germany make system 2. PI Refer Note-7				



PROJECT : Sipat-III (1X800MW)
PACKAGE : EPC PACKAGES
CONTRACTOR:
CONTRACT NO :

REVISION NO : 00
DATE : 02.05.2023
SUB SECTION: C&I

LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL				SS Approval Status (Note-1)				SS Approval SCH		SS Detail Sub.SCH		SS Approval SCH		Remark	
Sr No	Item Description	QP Inspection Category	QP No	QP submission SCH	QP approval SCH	Proposed Sub Supplier	Country	SS Approval Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	SS Detail Sub.SCH	SS Approval SCH	SS Detail Sub.SCH	Remark	
		I				Yokogawa India Ltd	Bengaluru	A						M/s Yokogawa Japan (Gas Density based) Make analyser	
		I				SIEMENS	Gurugram	A						M/s Siemens, Gammany (Calomat 6) Make analyser	
		III				GE Sensing EMEA	Ireland	A						Conductivity based	
		III				ABB	UK	A							
		III				Emerson (Rosemount)	USA	A							
		III				Environment One Corporation	USA	A						Conductivity based	
26	HEA ignitor	I				Durag India Instrumentation Pvt Ltd	Bengaluru	A						M/S Durag Germany make HEA Ignitor	
		I				Hindustan Thermometers	Ambala	A						Conditional as per approval ref no 01/CQA/0270-102 dated 17.09.2012 Spark tip of their own make is also acceptable	
		I				Fives combustion System Pvt Ltd	Vadodara	A							
		I				Boiler control Pvt Ltd	Pudukottai (Tamilnadu)	A						Approved for Aux Boiler package only	
		III				Unison Industries	USA	A							
		III				Durag GmbH	Germany	A							
		III				Ignition system INC	USA	A							
		III				Tesi SPA	Italy	A							
27	High Temp. cable (PTFE/FEP)	II				Thermocables	Hyderabad	A							
		II				Tempsens	Udaipur	A							
		II				Habia cables	Sweden	A							
		II				Thermo Electrica BV	Netherland	A							
		II				Lapp cables	Germany	A							
		II				Kerpen cables	Germany	A							
28	Impulse Pipes/Tubes	II				MAHARASHTRA SEAMLESS	Raigarh	A						For CS Pipes only	
		II				Ramanani Metals and Tubes	Gandhinagar	A						For SS only.	
		II				Heavy Metals and Tubes	Gandhinagar	A						For SS & CS only.	
		II				ISMT	Ahamadnagar	A						For CS/ AS upto Gr 22 Pipes only	
		II				Nippon Steel & Sumitomo Metals corporation	Japan	A							
		II				TPS Tecnitube	Germany	A							
		II				Veluric & Manessmann	Germany	A							
		II				Trouway and Cauvin	France	A							
		II				Sandvik	Sweden	A						For SS only	
		II				REMI Edelstahl Tubulars Ltd	Palehar	A							
29	Instrument Cables (F.G & T/C Cables)	Note-2				Goyolene Fibers (India) Pvt Ltd	Silvassa	A						F&G Type Cable	
		Note-2				Temsens Instruments Ind Pvt Ltd	Udaipur	A							
		Note-2				Havells India	Alwar	A							
		Note-2				Paramount Communication Ltd	Khushkhera	A						F Type Cable	
		Note-2				Polycab	Daman	A							
		Note-2				Delton	Faridabad	A							
		Note-2				KEI	Bhiwadi (Raj)	A							
		Note-2				Elkey Telelinks	Faridabad	A							
		Note-2				CORDS	Kaharani	A							
		Note-2				CORDS	Bhiwadi	A							
		Note-2				Nico	Kolkata	A							



PROJECT : Sipat-III (1X800MW)
PACKAGE : EPC PACKAGES
CONTRACTOR:
CONTRACT NO. :

LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL

REVISION NO. : 00
DATE :02.05.2023
SUB SECTION: C&I

Sr No	Item Description	QP Inspection Category	QP No	QP submission SCH	QP approval SCH	Proposed Sub Supplier	Country	SS Approval Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	Remark
		Note-2				Universal Cable	Satna	A			
		Note-2				Thermocables	Hyderabad /Mahboobnagar	A			
		Note-2				Gupta Power Infrastructure Ltd.	Khurdha	A			
		Note-2				CMI	Faridabad	A			
		Note-2				Advance Cables Pvt Ltd	Bengaluru	A			F&G Type Cable
		Note-2				Genscab Industries Ltd	Bhiwadi (Raj)	A			F&G Type Cable
		Note-2				Apar Industries Limited	Valsad	A			F&G Type Cable
		Note-2				Suyog Electricals Ltd	Halol (Gujrat)	A			
		Note-2				Special Cables Pvt Ltd	Rudrapur	A			
		Note-2				TC Communication	Ghaziabad	A			
		Note-2				TEW & C	USA	A			
		Note-2				Habia cables	Sweden	A			
		Note-2				Kerpen cables	Germany	A			
		Note-2				Lapp cables	Germany	A			
		Note-2				Thermo electra Bv	Netherlands	A			
30	Intelligent Battery charger 24V DC / DCDB/BHMS										
		II				Chabbi Electricals	Jalgaon	A			Rectifier module, Controller module and Battery Health monitoring system shall be of M/s Vertiv make
		II				Eltek SGS Pvt Ltd	Gurgaon	A			
31	Large Video Screen (LED Based)	I				Pyrotech Electronics Pvt Ltd	Udaipur	A			
		I				Delta India Electronics Pvt Ltd	Gurgaon	A			
		I				Barco Electronics system (P) Ltd	Noida	A			
		I				Planner System Inc	USA	A			
32	Level switch- Conductivity type					Raman Instruments (System integrator of Delta Morbey/ Emerson Mobrey /Solartron -Mobrey)	Delhi	A			1.M/S Emerson (Morbey) UK system 2.PI refer Note-07
		II				HI Tech System & services Ltd (System Integrator of Levelstate systems Ltd ,UK)	Kolkata	A			1. M/S Levelstate UK System .Vessel from M/s Hi Tech 2.PI refer Note-07
		II				BHEL	Trichurapalli	A			
		III				Emerson -Mobrey (Solartron mobrey)	UK	A			
		III				Levelstate Systems Ltd	UK	A			
		III				Yarway	USA	A			
33	Local Instrument Enclosure/Rack					Pyrotech Electronics Pvt. Ltd	Udaipur	A			BOI from LOA approved sources
		I				Sajas electrical	Trichurapalli (Tamilnadu)	A			BOI from LOA approved sources
		I				Prammen	Pudukottai (Tamilnadu)	A			BOI from LOA approved sources
		I				Chemim C&I Pvt Limited	Puducherry	A			1- BOI from LOA approved sources 2.Fabrication at M/s LUFFT tech India 3- Painting at M/s Supream Coater & Fabricator
34	Master Slave Clock System					Signals and Systems Pvt. Ltd. (SANDS)	Chennai	A			
		I				Masibus	Gandhinagar	A			

Sr No	Item Description	QP Inspection Category	QP No	QP submis sion al SCH	Proposed Sub Supplier	Country	SS Approval Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	Remark
		I			KAIZEN AUTOMATION ELECON PERIPHERALS LIMITED	AHEMDABAD ANAND	A A			For M/s Schneider make system For M/s ABB make system
38	Pneumatic Actuator Regulating (Power Cylinder HAD,CAD SADC & Besser Tilt)									
		I			Instrumentation Limited	Palakkad (Kerala)	A			
		I			Kelton	Cochin (Alleppy)	A			
		I			SMC Corporation India Private Ltd	Noida	A			Up to Bore size 12 inches
		I			IMI Norgren Herion Pvt Ltd	Noida	A			
		II			Dong Woo Valve Control Co. Ltd	S.Korea	A			
		II			Shin Hwa Engineering Co. Ltd	S.Korea	A			
39	Radar type level transmitter	III			Limaco	Russia	A			High Frequency Type
		III			Emerson Process Management Ltd	Pawane	A			For M/s Emerson Singapore make
		III			Endress & Houser	Aurangabad	A			
		III			SIEMENS	Canada	A			
		III			B M Technology	Italy	A			For Non Contact type
		III			Magnetrol	Belgium	A			
		III			ABB	USA	A			K-Tech Brand
		III			Endress & Houser	Germany	A			
		III			Saab Rosemount	Sweden	A			
		III			Emerson Process Management	Singapore	A			Rosemount 3300 series for GW Radar & 5600 Series for Non-Contact type
		III			Endress & Houser	Germany	A			
		III			Vega Grieshaber KG	Germany	A			
		III			nVent Solutions limited	UK	A			
		III			Wrexham Mineral	UK	A			
		III			KME	Italy	A			
41	SWAS (Sampling Handling System and Dry Panel)									
		I			Emerson Process Management Ltd	Navi Mumbai	A			Analysers and Other BOI Components from LOA agreed source
		I			Forbes Marshall	Pune	A			Analysers and Other BOI Components from LOA agreed source
		I			SEPI	Pune	A			Analysers and Other BOI Components from LOA agreed source
42	Water Analyser (Chloride, Conductivity, Dissolved Oxygen,pH, Hydrazine, Concentration , Phosphate, Silica, Sodium,Turbidity, Total Iron, Degassed Cation Conductivity)	III			Emerson Process Management Pvt Ltd	Pawane	A			For Conductivity,pH, Dissolved Oxygen, Turbidity
		III			Mettler Toledo India Pvt Ltd	Vasai	A			For pH Analyser (1. PH analyser from M/S Mettler Toledo GmbH Switzerland 2. Other components like, Housing, Panel mounting kit, Tubing's & easy clean mechanism will be supplied by M/s Mettler Toledo India Pvt Ltd)

PROJECT : Sipat-II (1X800MW) PACKAGE : EPC PACKAGES CONTRACTOR: CONTRACT NO :				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL					REVISION NO : 00 DATE :02.05.2023 SUB SECTION: C&I	
Sr No	Item Description	QP Inspection Category	QP No	QP submis sion al SCH	Proposed Sub Supplier	Country	SS Approval Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	Remark
		III			Endress Hauser India Pvt. Limited	Mumbai	A			For pH Analyser (1. pH sensor with cable , analyser ,retract & cleaning assembly , electrolyte reservoir (As applicable) will be supplied from Principals of M/S Endress Hauser India Pvt. Limited. 2. Other components like, Flow through assembly shall be supplied from M/S Endress Hauser India Pvt. Limited approved sources.)
		III			Thermo Fisher Scientific	USA	A			For Chloride, Dissolved Oxygen, Hydrazine
		III			ABB	UK	A			For Chloride, Dissolved Oxygen, Hydrazine, Phosphate, Silica, Sodium, Turbidity
		III			Hach	USA	A			For Conductivity, pH, Concentration, Phosphate, Silica, Turbidity
		III			ABB	USA	A			For Conductivity, pH
		III			Yokogawa	Japan	A			For Conductivity
		III			Hach	Switzerland	A			For Dissolved oxygen, Hydrazine, Silica, Sodium
		III			Yokogawa	Japan	A			For pH
		III			Eutech Instrument PTE Ltd	Singapore	A			For Silica
		III			Orion	USA	A			For Sodium
		I			METTLER TOLEDO INDIA PVT LTD	Mumbai	A			For Chloride Analyser
43	Temp Transmitter									
43-A	Temp Transmitter									
		III			Endress & Houser	Aurangabad	A			
		III			Emerson Process Management Ltd	Pawane	A			For M/s Emerson Singapore make
		III			Yokogawa	Bengaluru	A			Make Yokogawa japan and calibration at Yokogawa Banglore
		III			ABB	Bengaluru	A			For M/s ABB Germany make
		III			WIKA Instruments India Pvt Ltd	Pune	A			For M/s WIKA Germany make Model no T-32
		III			Honeywell Automation India Ltd	Pune	A			
		III			Yokogawa	Japan	A			
		III			Moore	USA	A			
		III			M System co Ltd	Japan	A			Model No-B3HU-0
		III			Emerson	U.S.A/Singapore/ Germany	A			
		III			ABB	Germany	A			
		III			Emerson Process Management	Germany	A			
43-B	Temp Transmitter -Field Bus based Single/Dual Input									
		I			ABB India Ltd	Bengaluru	A			One no of TT will be available at DCS supplier for function testing of field bus communication with DCS during FAT
44	Turbine supervisory Instruments along with vibration analysis system.									
		I			GE	Pune	A			For GE Bently ,USA make system

PROJECT : Sipat-III (1X800MW) PACKAGE : EPC PACKAGES CONTRACTOR: CONTRACT NO :				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL					REVISION NO : 00 DATE :02.05.2023 SUB SECTION: C&I	
Sr No	Item Description	QP Inspection Category	QP No	QP submis sion at SCH	Proposed Sub Supplier	Country	SS Approval_Status (Note-1)	SS Detail Sub.SCH	SS Approval SCH	Remark
		I			Meggitt India Pvt Ltd	Bengaluru	A			For Meggitt (Vibrometer) Switzerland make system
		I			Forbes Marshall	Pune	A			For Shinkawa Japan make system
		II			GE BENTLY	USA	A			
		II			SHINKAWA	JAPAN	A			
		II			MEGGITT	Switzerland	A			
45	Ultrasonic Type Flow Meter (for Stack)	III			Sick India Pvt Ltd	Mumbai	A			For Sick AG Germany make
		III			Sick AG	Germany	A			
		III			Durag	Germany	A			
		III			Teletyne	USA	A			
46	Ultrasonic type level Transmitter	III			EIP Enviro	Noida	A			1-Ultrasonic level Tx shall be BM Technology Italy make 2-Required mounting arrangement , Testing, Calibration shall be carried out at M/s EIP Works.
		III			E & H	Aurangabad	A			Complete Instrument Transmitter & Probe to be procured from Mobrey UK , only integration & configuration at Pawane works
		III			Emerson Process Management Ltd	Pawane	A			
		III			BM Technology	Italy	A			
		III			Siemens Miltronics	Canada	A			
		III			Nivelco Process Control	Hungary	A			
		III			E & H	Germany	A			
		III			HAWK Measurement PTY Ltd	Australia	A			
47	UPS With ACDB	Note-5			Vertive Energy Pvt Ltd	Pune	A			Upto 125 KVA for 1 phase and 300 KVA for 3 Phase
		Note-5			Vertive Energy Pvt Ltd	Mumbai	A			Upto 160 KVA
		Note-5			Hitachi Hirel Power Electronics Pvt Ltd	Gandhinagar	A			Upto 200 KVA,
		Note-5			Fuji Electric Consul Neowatt Private Limited	Pune	A			Up to 100 KVA single phase
		Note-5			KELTRON	Trivendrum	A			
		Note-5			Merlin & Gerin	France	A			
		Note-5			Gutor	Switzerland	A			
		Note-5			ABC	Germany	A			
		Note-5			Fuji Electric	Japan	A			
48	Vibration Monitoring System	II			Sensonics Technology India	Kundli	A			For Sensonic UK system
										1. Imported items like Vibration Monitors, Cross Connection Cables, Buffered Output Modules, and Piezoelectric Vibration Sensors, Eddy Current type Proximity Probe, Extension Cable and Signal Conditioner will be procured from Valmet Automation, Finland. 2. Indigenous items like Communication cables, networking components, blank panels, TB, OWS will be procured from NTPC approved sources.
		II			BHEL	Bengaluru	A			

S. N. क्र.सं.	Item / मद	एनटीपीसी NTPC			Project/ परियोजना : SIPA-I-III (1X800MW) Package/ पैकेज : EPC PACKAGES Supplier/ आपूर्तिकर्ता : Contract No./ अनुबंध सं.:			LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL अनुमति प्राप्त मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 00 DATE/ तिथि : 09/05/2023 SUB-SYSTEM उप-प्रणाली: QA-ELEC		
		QP/ उप-प्र. Cat. वर्गी. निरी. श्रेणी.	QP No./ वर्गी. सं.	QP Sub. Schedule वर्गी. उप-अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता			Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी		

36	LT MOTOR	CAT I											
					ABB			FARIDABAD	A				UPTO 55KW
					ABB			BANGALORE	A				
					HYOHI LTD			VADODARA	A				
					TIPM			JAPAN	A				UPTO 15 KW (NON FLAME PROOF)
					HYOSUNG			SOUTH KOREA	A				
					WEG			BRAZIL	A				
					HYUNDAI			SOUTH KOREA	A				
					LHP			SOLAPUR	A				
					CGL			AHMEDNAGAR	A				ROP. FOR FLAME PROOF MOTOR
					TMEIC			JAPAN (NAGASAKHI)	A				
					NGEF			BANGALORE	A				UPTO 15 KW
					BHARAT BIJLEE			MUMBAI	A				ROP. FOR FLAME PROOF ALSO
					KEC			BANGALORE/ HUBLI*	A				*UPTO 90KW ROP. FOR FLAME PROOF ALSO
					MARATHON			KOLKATA	A				ROP (UPTO 600V & 600 KW) FOR FLAME PROOF ALSO
					ABB			SWEDEN	A				UPTO 55KW
					HAVELL			NEEMRANA	A				UP TO 90KW
					KAWAMATA			JAPAN	A				UP TO 75 KW
					TIPS			JAPAN	A				UP TO 45KW
36.1	DC Motor	CAT I											
					CGL			MANDIDEEP	A				
37	LT VFD Control Panel	CAT I											

एनटीपीसी NTPC		Project/ पैकेज : SIPAT-III (1X800MW) Package/ पैकेज: EPC PACKAGES Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL अनुमोदन सहित मॉड की सूची		DOC. NO./ दस्तावेज सं.: REVISION NO : 00 DATE/ तिथि : 09/05/2023 SUB-SYSTEM उप-प्रणाली: QA-ELEC
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