

TELANGANA STATE POWER GENERATION
CO. LTD

4X270 MW BHADRADRI TPS

TECHNICAL SPECIFICATION
FOR
**AUXILIARY STEAM PRESSURE REDUCING
AND DESUPERHEATING STATION
ALONGWITH ACCESSORIES**

SPECIFICATION No: PE-TS -411-142-N101 (REV 00)



BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA, INDIA

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION	SPEC. NO.: PE-TS-411-142-N101	
		SECTION	CONTENTS (I & II)
		REV. NO.	00
		DATE	27.04.2017

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SCOPE OF ENQUIRY



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- 1.1 This enquiry covers the Design, Manufacture, Assembly, Inspection and Testing at Vendor's and/or his sub-vendors works, painting and delivery to site of Auxiliary Steam Pressure Reducing & Desuperheating Stations, as mentioned in different sections of this specification for 4X270 MW Bhadradi TPS.

The tenderer shall also quote separately for the following:-

- a) Supervision of erection & commissioning of the equipment, if applicable.
 - b) Recommended spares for 3 years of post guarantee period operation.
- 1.2 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to the Engineer/Owner who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgment is not in full accordance herewith.
- 1.3 The bidder may quote for his standard, proven design of equipment and shall indicate any deviations from this specification in the enclosed schedule. **In the absence of duly filled deviation schedule, it shall be presumed that the offer confirms exactly to this specification.** The bidder shall also furnish the performance feedback data of the equipment from similar installations. However, the acceptance of the deviations/options is not binding on the Engineer/Owner.
- 1.4 The bids shall be in English language and MKS Units.
- 1.5 Filled up quality Plans as minimum technical requirements, are included in this specification in Vol. IIB Sec D. Bidder is required to submit the enclosed Quality Plan, or bring out specific deviations on it, while submitting the bid.
- 1.6 Similar to Quality Plan, Bidder is required to furnish Field Quality Plan (FQP), if applicable. FQP shall indicate all inspection/test to be carried out at site covering the following:
- i). Receipt of material.
 - ii). Storage or Conservation.
 - iii). Pre-Erection & Erection
 - iv). Pre-Commissioning, commissioning & post commissioning.

FQP shall furnish adequate instructions to be followed by erection & commissioning agency at site.



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- 1.7 The omission of specific reference to any component / accessory necessary for the proper performance of the equipments shall not relieve the supplier of the responsibility of providing such facilities to complete the supply within the quoted prices.
- 1.8 BHEL's / TSGENCO's representatives shall be given access to the shop in which the equipments are being manufactured or tested and all test records shall be made available to him.
- 1.9 The Equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and Material Dispatch Clearance Certificate (MDCC) is issued by BHEL / TSGENCO.



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PROJECT INFORMATION



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1. INTRODUCTION

4x270 MW Bhadradi T PS is being set up by Telangana State Electricity Corporation Limited (TSGENCO) at Manuguru in the district of Khammam, Telangana, India.

The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually binding on BHEL/Owner. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.

2. APPROACH TO SITE

The distance from Manuguru to Major cities in state: Hyderabad-345KM, Warangal-180km, Bhadrachalam-38km, Kothagudem-70km and Khammam-130km, Vijayawada-195km.

District: KHAMMAM

State: TELANGANA

Nearest Airport: The nearest airport is Vijayawada Airport but the most used airport is the Hyderabad International Airport.

Nearest Railway Station: Manuguru railway station is 10KM from nearby town. However Warangal/Vijaywada railway Station is major railway station near to Manuguru.

3. TEMPERATURE

- Mean daily minimum ambient temperature during oldest month of the year=11.5 Deg.C
- Mean daily minimum ambient temperature during hottest month of the year=45.1 Deg.C

4. RAINFALL

Intensity of rainfall @ 80 mm/hr considering heaviest fall in 24 hrs

5. WIND DATA

- Basic wind speed at 10m height : 44 m/sec
- Wind pressure : As per IS: 875 Part III- 1987

6. SEISMIC ZONE

Zone III as defined in IS: 1893 (part-1)-2002 according to Indian Standard Seismic Zoning Map



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SPECIFIC TECHNICAL REQUIREMENTS

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BRIEF SYSTEM DESCRIPTION

- 1.1 Auxiliary steam system is designed to provide steam for the turbine auxiliaries and boiler auxiliaries during start-up, low loads and normal running of unit.
- 1.2 The system comprises of two auxiliary steam pressure reducing and desuperheating System (PRDS). One “High capacity PRDS” with tapping off steam from main steam line to meet auxiliary steam requirements during unit start-up, low loads and the other “Low Capacity PRV” with tapping off steam from CRH line to meet auxiliary steam requirements during normal running. Spray water required for desuperheating will be tapped off from CEP discharge.
- 1.3 These two stations will reduce the pressure and temperature of the steam tapped off from CRH line and main steam line to 14 kg/cm² (abs) & 320 Deg C at the high temperature auxiliary steam header and subsequently to 14 kg/cm² (abs) & 210 Deg C at the low temperature auxiliary steam header through a suitable desuperheater between the high temperature and low temperature auxiliary steam headers.
- 1.4 APRDS system Comprises of:

S No	Description	Quantity (Per unit)	Total For Station
1	High Capacity PRV on MS line (AS-10)	1	4
2	Low Capacity PRV on CRH Line (AS-16)	1	4
3	Spray Control Valve for HC-DESH (CD-65)	1	4
4	Spray Control Valve for LT-DESH (CD-70)	1	4
5	Direct mixing type HC desuperheater (DESH-1)	1	4
6	Direct mixing type LT desuperheater (DESH-2)	1	4

- 1.5 Spares, consumable and specified tools & tackles:
 - i) Start-up, Commissioning spares and consumables shall be part of main package supply; however bidder to indicate prices separately. All such items shall be strictly interchangeable with the parts for which they are intended for replacements.
 - ii) The bidder shall supply one complete set of special tools & tackles (if any) required for the erection, assembly, disassembly & maintenance of the equipment. A list of such tools & tackles to be supplied shall be submitted along with the bid.

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- iii) Bidder to indicate the service life expectancy period for the spare parts under normal working conditions. The spares shall be treated and packed for long storage under climatic conditions prevailing at site. Small items shall be packed in sealed transparent plastic bags with desiccators' packs as necessary.

iv) **Mandatory Spares List:**

A)	High capacity PRDS system (AS-10)		QUANTITY FOR STATION
i)	Pressure reducing cum desuperheating valves		
a)	Stem	1 no.	1
b)	Body seat rings	2 nos. for each type, size and rating of valves	2
c)	Gland packings	3 nos. for each type, size and rating of valves	3
d)	Gasket	3 nos.	3
iii)	Spray water line control valves		
	Valve trim including cage, plug, stem, , guide bushing steam packing	1 no. for each size, type and rating of valves	1
B)	Low capacity PRDS system (AS-16)		
i)	Pressure reducing cum desuperheating valves		
a)	Stem	1 no.	1
b)	Body seat rings	2 nos. for each type, size and rating of valves	2
c)	Gland packings	3 nos. for each type, size and rating of valves	3
d)	Gasket	3 nos.	3
iii)	Spray water line control valves		
	Valve trim including cage, plug, stem, guide bushings. steam packing	1 no. for each size, type and rating of valves	1

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- v) Commissioning Spares: As applicable for the project
(For Minimum requirement refer section II)

Start-up & Commissioning spares:

- i) Start-up and Commissioning spares are those spares, which may be required during the start-up and commissioning of the Control Valves. All start-up spares, which are supplied under this contract, shall be strictly interchangeable with the parts for which they are intended for replacements.
- ii) The Start-up and commissioning spares indicated by the bidder shall be a part of the main Control valves supply. However bidder to indicate prices separately. The list of these spares required to be supplied shall be submitted along with the bid.

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SPECIFIC TECHNICAL REQUIREMENTS.

The requirements in this section are specific for this project and shall over-ride in case of any contradiction.

1. **DRG./DOC. and QUALITY PLAN (BHEL Format) should filled-up and furnished with the bid, complete in all respect. In the absence of those, the bid would be considered incomplete and liable for rejection.** Catalogue, Leaflets related with the models of Control Valves as well as each Accessory must be furnished with the offer.
2. The Hook-up diagram for Control valve, is attached. The scope demarcation as indicated should be adhered. The connection details at Instrument Air valve shall be furnished to successful bidder after the award of contract.
3. Valve Body Sizes shall be quoted to take care of the specification requirements like parameters, and limitations of Fluid outlet velocities, Noise Level etc. **However Port (Trim) Sizes shall be selected to suit CV requirement for achieving percentage valve lift as per Technical Specification.**
4. Bidder to note that, **wherever downstream side of the valve is subjected to the Vacuum service, bidder to offer double Gland packing, and in that case, flow direction of working fluid shall be to close the valve.** Separate indication for the same has not been made in the data sheets-A.
5. For valves subjected to cavitation service, anti-cavitation trim shall be provided.
6. In case during erection/commissioning of the control valve, any spares are required which have not been specified in the Start-up/commissioning spares list, the same will have to be supplied by the bidder free of cost
7. Facility to adjust the maximum travel of the stem & starting point of travel shall be incorporated.
8. SS nameplate to control valve shall include Tag no./ KKS no./ Sl. No./ Body material/ size/ Press Rating/ Trim material/ Trim type/ action on air failure/ diaphragm air press at full open and close condition
9. Hand wheel shall have open/ close direction.
10. Limit switch shall be designed for 1,00,000 operations.
11. JB shall be 36 ways as per enclosed hook-up diagram.
12. The material of filter for Air Filter Regulator shall be Sintered bronze.
13. Bidder to indicate pick-up & drop out voltage for all solenoid valves.
14. Protection class for Limit switches, I/P converter and Position transmitter shall be IP-65 only.
15. All JB's and valves shall be with double compression type Ni plated brass cable glands.
16. Solenoid valve class of protection shall be IP-65.
17. All local cabling up to JB's shall be in Conduit (Flexible/Rigid). If JB is not mounted near valve
18. Noise Reduction shall be made through inherent design and not through external means.

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SPARES: The following spares are required to be offered

A. Recommended Spares:

The bidder shall furnish a List of Recommended spares for 3 years of normal operation of the Control valves / Accessories. The BHEL/Customer reserves the right to buy any or all of the recommended spares.

B. Start-up & Commissioning Spares:

Start-up and Commissioning spares are those spares, which may be required during the start-up and commissioning of the Control Valves. All start-up spares, which are supplied under this contract, shall be strictly interchangeable with the parts for which they are intended for replacements. The Start-up and commissioning spares indicated by the bidder shall be a part of the main Control valves supply. However bidder to indicate prices separately. The list of these spares required is enclosed in the section-D of this specification.

Bidder to indicate the service life expectancy period for the spare parts under normal working conditions. The spares shall be treated and packed for long storage, under climatic conditions prevailing at site. Small items shall be packed in sealed transparent plastic bags with desiccator's packs as necessary.

19. Documentation:

(A) Along with the bids: following documents for the project

- a) Signed and stamped compliance certificates in attached format.
- b) "Schedule of prices" and "Schedule of unit Prices" in attached format.
- c) Schedule of submission of Drg. / Doc, Equip. Manufacture, Inspection and Dispatch.
- d) Inspection schedule
- e) Quality Plan Duly signed and Stamped

(B) After the award of contract:

The documentation as listed below for the project

6 sets of the following documents + 3 sets of CDs to be enclosed with the bids for Approval:

- a. Assembly (dimensional) drawings.
- b. Valve Edge preparation details.
- c. Data sheet-C completely filled-up.
- d. Hook-up diagram of Control Valve with Actuator & Accessories.
- e. Valve & Actuator assembly dimensional drawings with weights.
- f. Quality Plan duly signed and stamped.

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- g. All calculations like CV, Noise Level, Valve Outlet Velocity, Actuator sizing etc.
- h. All relevant catalogues for the models of the valves as well as accessories finalized.
- i. Bar chart to indicate the time schedule for procurement, manufacture, testing and dispatch.

(B) Final documentation:

The documentation as listed below will separate for respective projects

1. Category -I & IV Approved final drawings/data sheets, - 10 sets with 4 CD-ROMS
Valve sizing calculations, Noise level calculations and
Valve Outlet Velocity calculations.
2. Test certificates - 10 sets.
3. Operation & Maintenance Manuals - 10 sets with 4 CD-ROMS
for Control Valve, Actuator and all the Accesories

NOTES : 1. Packing instructions :- Packing boxes shall have clear marking "To be stored indoor, away from water and dust."

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DATA SHEET- A-1

SIZING DATA FOR HIGH CAPACITY AUXILIARY STEAM PRDS (ASV-10), SPRAY CONTROL VALVE (CD-65)

SL.NO.	PARAMETERS	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	MECH. DESIGN
1.0	INLET PARAMETERS TO PRV (AS-10)							
1.1	PRESSURE (kg/cm ² (a))	36	83	150	150	85	54	167
1.2	TEMP. (°C)	350	490	537	537	490	370	540
1.3	FLOW (T/Hr)	BIDDER TO CALCULATE						
2.0	PARAMETERS AT DESUPERHEATER OUTLET (DESH-1)							
2.1	PRESSURE (kg/cm ² (a))	14	14	14	14	14	14	22
2.2	TEMP. (°C)	320	320	320	320	320	320	360
2.3	FLOW (T/Hr)	37.79	43.29	70.42	78.61	24.28	24.28	
3.0	INLET OF SPRAY CONTROL VALVE (CD-65)							
3.1	PRESSURE (kg/cm ² (a))	24	24	20	20	23	23	30
3.2	TEMP. (°C)	47	47	47	47	48	48	60
3.3	FLOW (T/Hr)	BIDDER TO CALCULATE						

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DATA SHEET- A-2

SIZING DATA FOR LOW CAPACITY PRV (AS-16)

SL.NO.	PARAMETERS	CASE-1	CASE-2	# CASE-3	MECH. DESIGN
1.0	INLET OF PRV (ASV-26)				
1.1	PRESSURE (kg/cm ² (a))	21.15	16.73	41.38	47.0
1.2	TEMPERATURE (OC)	328.8	319.9	345.9	380.0
1.3	FLOW (T/Hr)	5.35	7.89	7.82	
2.0	OUTLET OF PRV (ASV-26)				
2.1	PRESSURE (kg/cm ² (a))	14	14	14	22
2.2	FLOW (T/Hr)	3.55	7.89	6.02	

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DATA SHEET- A-3

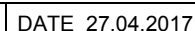
SIZING DATA FOR LOW TEMPERATURE DESUPERHEATER (DESH-2) & SPRAY CONTROL VALVE (CD-70)

SL.NO.	PARAMETERS	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5	CASE 6	CASE 7	CASE 8	MECH. DESIGN
1.0	INLET OF DESUPERHEATER (DESH-2)									
1.1	PRESSURE (kg/cm² (a))	14	14	14	14	14	14	14	14	22
1.2	TEMP. (°C)	320	320	320/318.7	320.0	320	320	320	317	360
1.3	FLOW (T/Hr)	BIDDER TO CALCULATE								
2.0	OUTLET OF DESUPERHEATER (DESH-2)									
2.1	PRESSURE (kg/cm² (a))	14	14	14	14	14	14	14	14	22
2.2	TEMP. (°C)	210	210	210	210	210	210	210	210	360
2.3	FLOW (T/Hr)	19.30	19.30	3.9/6.6	51.60	64.10	19.30	19.30	5.90	
3.0	INLET OF SPRAY CONTROL VALVE (CD-70)									
3.1	PRESSURE (kg/cm² (a))	23.75	23.75	22.14 / 20	20	20	22.5 4	22.54	22.14	28
3.2	TEMP. (°C)	47	47	47.5 / 46.8	46.8	46.8	47.8	47.8	47.5	60
3.3	FLOW (T/Hr)	BIDDER TO CALCULATE								

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DATA SHEETS- A

AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION



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Tag No.: **AS-10**

Data Sheet No. PES-145-06-DS1-0

DATA SHEET – A2

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)								DATA SHEET – B (TO BE FILLED UP BY BIDDER)	
PERFORMANCE OF VALVE	LINEARITY			± 2%				.....	
	HYSTERESIS			± 1%				.....	
	SENSITIVITY			± 0.5%				.....	
	ACCURACY (OVERALL)			± 2%				.....	
SERVICE CONDITION*	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALCU- LATED CV	% VALVE LIFT	VALVE O/L VELOCITY
		Refer Sizing Data for High Capacity Aux PRDS							
	VALVE TYPE						☐ CAVITATION ☐ FLASHING ☐ HIGH DP		
	* MAX SHUT OFF PRESS (KG/CM2g) 165.9 * BODY DESIGN : PRESS (KG/CM2g) TEMP (DEG C) 165.9 545 * IBR FORM III-C ☐ REQUIRED ☐ NOT REQUIRED								
	TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg								

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Tag No.: **AS-16**

Data Sheet No. PES-145-06-DS1-0

DATA SHEET – A2

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)								DATA SHEET – B (TO BE FILLED UP BY BIDDER)	
PERFORMANCE OF VALVE	LINEARITY			± 2%				.....	
	HYSTERISIS			± 1%				.....	
	SENSITIVITY			± 0.5%				.....	
	ACCURACY (OVERALL)			± 2%				.....	
SERVICE CONDITION*	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALCU- LATED CV	% VALVE LIFT	VALVE O/L VELOCITY
		Refer Sizing Data for Low Capacity Pressure Reducing Valve (PRV)							
	VALVE TYPE						☐ CAVITATION ☐ FLASHING ☐ HIGH DP		
	* MAX SHUT OFF PRESS (KG/CM2g) 47 * BODY DESIGN : PRESS (KG/CM2g) TEMP (DEG C) 47 360 * IBR FORM III-C ☐ REQUIRED ☐ NOT REQUIRED								
	TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg								

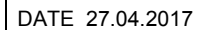
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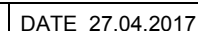
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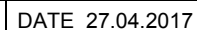
Data Sheet No. PES-145-06-DS1-0

DATA SHEET – A2

DATA SHEET – A2 FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR)			
GENERAL*	PROJECT SERVICE	4X270 MW BHADRADRI TPS SPRAY TO HIGH TEMP. DESUPERHEATER (DESH-1)	.....
	LOCATION	☒ INDOOR ☐ OUTDOOR	.....
	DUTY	☐ ON/OFF ☒ MODULATING	.....
	PIPE SIZE (inlet / outlet)	Ø 48.3X5.08 | Ø 48.3X5.08	.....|.....
	PIPE MATERIAL (inlet / outlet)	SA 106 Gr B | SA 106 Gr B	.....
BODY*	MODEL NO.	BIDDER TO SPECIFY	.....
	TYPE OF BODY: GUIDING : NO. OF PORTS	☒ GLOBE ☐ ANGLE | ☐ TOP ☐ CAGE | ONE	.....|.....|.....
	BODY SIZE: PORT SIZE: DESIGN CV		.....|.....|.....
	END CONNECTION & RATING (ANSI)	☐ BWE ☒ SWE ☐ FLANGED	.....
	BODY MATERIAL	☒ A216 WCB ☐ A217 WC6 ☐ SS ☐ A217 C5 ☐ A351 CF8M	.....
	PACKING: MATERIAL SINGLE / DOUBLE	☐ PTFE ☒ GRAFOIL ☐ DOUBLE ☒ SINGLE	.....
	BONNET TYPE	☐ STD ☐ EXTENDED ☐ FINNED	.....
	TRIM FORM	☐ LINEAR ☒ EQ. PERCENTAGE	.....
	TRIM MATERIAL: SEAT | PLUG	☐ QUICK OPEN (ON/OFF)	.....
	: CAGE | GUIDE BUSH	SS 316 STELLITED | SS 316 STELLITED	.....|.....
FLOW	17-4 PH SS | SS 316 STELLITED	.....|.....	
OUTLET VELOCITY	☐ BELOW SEAT ☐ ABOVE SEAT	.....	
	☒ < 7 M/SEC (WATER) | ☐ MAC NO < 1/3 (STM)	.....|.....	
			
		☐ II ☐ III ☐ IV ☒ V ☐ VI	.....
		LESS THAN 85 dBA	.....
		☐ YES ☒ NO	.....
		☐ YES ☒ NO	.....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE	BIDDER TO SPECIFY	.....|.....
	CLOSE AT : OPEN AT (KG/CM2g)	0.2 | 1.0	.....|.....
	*TRAVEL TIME FOR OPEN TO CLOSE } AND CLOSE TO OPEN	LESS THAN 20 SECS.	.....
	*VALVE POSN. ON SIGNAL AIR FAILURE *VALVE POSN. ON SUPPLY AIR FAILURE	☐ TO OPEN ☐ STAYPUT ☒ TO CLOSE ☒ STAYPUT	.....
ACCESSORIES	POSITIONER	☒ REQUIRED ☐ NOT REQUIRED	.....
	AIR FILTER REGULATOR	☒ REQUIRED ☐ NOT REQUIRED	.....
	AIR LOCK RELAY	☒ REQUIRED ☐ NOT REQUIRED	.....
	POSITION LIMIT SWITCH	☒ REQUIRED ☐ NOT REQUIRED	.....
	POSITION TRANSMITTER	☒ REQUIRED ☐ NOT REQUIRED	.....
	SOLENOID VALVE	☒ REQUIRED ☐ NOT REQUIRED	.....
	E/P CONVERTOR	☒ REQUIRED ☐ NOT REQUIRED	.....
	JUNCTION BOX	☒ REQUIRED ☐ NOT REQUIRED	.....
	HAND WHEEL (SIDE MOUNTED)	☒ REQUIRED ☐ NOT REQUIRED	.....
	LOCAL POSITION INDICATOR	☒ REQUIRED	.....









**TECHNICAL SPECIFICATION FOR
AUXILIARY STEAM PRESSURE REDUCING &
DESUPERHEATING STATION**

SPECIFICATION NO.: PE-TS-411-142-N101

SECTION I

REV. NO. 00

DATE : 27.04.2017

DATA SHEET A1

DATA SHEET FOR DESUPERHEATER DESH-1

S.NO.	DESCRIPTION	UNITS	DATA FOR HIGH CAP. PRDS DESUPERHEATER
1.0 TAG NO.			DESH-1
2.0	STEAM PARAMETERS		(INLET OF DESUPERHEATER)
2.1 FLOW		T/HR	REFER SIZING DATA FOR HIGH CAPACITY AUX PRDS
2.2 PRESSURE		Kg/cm ² (a)	BIDDER TO DECIDE BASED ON SIZING DATA
2.3 TEMPERATURE		°C	BIDDER TO DECIDE BASED ON SIZING DATA
3.0	STEAM PARAMETERS (OUTLET OF DESUPERHEATER)		REFER SIZING DATA FOR HIGH CAPACITY AUX PRDS
4.0 SPRAY WATER PARAMETERS			(INLET OF DESUPERHEATER)
4.1 FLOW		T/HR	REFER SIZING DATA FOR HIGH CAPACITY AUX PRDS
4.2 PRESSURE		Kg/cm ² (a)	BIDDER TO DECIDE BASED ON SIZING DATA
4.3 TEMPERATURE		°C	REFER SIZING DATA FOR HIGH CAPACITY AUX PRDS
5.0	END DETAILS		(STEAM INLET / OUTLET)
5.1	TYPE / MATCHING PIPE	mm x mm	BW / 323.9 x 9.53
6.0	END DETAILS		(SPRAY WATER INLET)
6.1	TYPE / MATCHING PIPE		SW/ 33.4x4.55
7.0	MATERIALS OF CONSTRUCTION		
7.1 BODY			A217 WC9
7.2 PIPE			SA 335 P22
7.3	SPRAY NOZZLE WITH ASSEMBLY	SS	316
8.0	DESIGN PARAMETERS OF DESUPERHEATER (DESH-1)		
8.1 DESIGN PRESSURE		Kg/cm ² (g)	21
8.2 DESIGN TEMPERATURE		°C 49	0

Note: The desuperheater shall be complete with pipe, spray nozzle along with necessary attachment as per above data sheet. INSERTION TYPE DESUPERHEATERS are not acceptable.



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DATA SHEET A2

DATA SHEET FOR DESUPERHEATER DESH-2

S.NO.	DESCRIPTION	UNITS	DATA FOR LOW TEMP. DESUPERHEATER
1.0 TAG NO.			DESH-2
2.0	STEAM PARAMETERS		(INLET OF DESUPERHEATER)
2.1 FLOW		T/HR	REFER SIZING DATA FOR LOW TEMPERATURE DESUPERHEATER (DESH-2) & SPRAY CONTROL VALVE
2.2 PRESSURE		Kg/cm ² (a)	BIDDER TO DECIDE BASED ON SIZING DATA
2.3 TEMPERATURE		°C	BIDDER TO DECIDE BASED ON SIZING DATA
3.0	STEAM PARAMETERS (OUTLET OF DESUPERHEATER)		REFER SIZING DATA FOR LOW TEMPERATURE DESUPERHEATER (DESH-2) & SPRAY CONTROL VALVE
4.0	SPRAY WATER PARAMETERS		(INLET OF DESUPERHEATER)
4.1 FLOW		T/HR	REFER SIZING DATA FOR LOW TEMPERATURE DESUPERHEATER (DESH-2) & SPRAY CONTROL VALVE
4.2 PRESSURE		Kg/cm ² (a)	BIDDER TO DECIDE BASED ON SIZING DATA
4.3 TEMPERATURE		°C	REFER SIZING DATA FOR LOW TEMPERATURE DESUPERHEATER (DESH-2) & SPRAY CONTROL VALVE
5.0	END DETAILS		(STEAM INLET / OUTLET)
5.1	TYPE / MATCHING PIPE	mm x mm	BW / 273 x 6.35
6.0	END DETAILS		(SPRAY WATER INLET)
6.1	TYPE / MATCHING PIPE		SW / 33.4 x 4.55
7.0	MATERIALS OF CONSTRUCTION		
7.1 BODY			A216 WCB
7.2 PIPE			SA 106 GrB
7.3	SPRAY NOZZLE WITH ASSEMBLY	SS	316
8.0	DESIGN PARAMETERS OF DESUPERHEATER (DESH-2)		
8.1 DESIGN PRESSURE		Kg/cm ² (g)	21
8.2 DESIGN TEMPERATURE		°C 36	0

Note: The desuperheater shall be complete with pipe, spray nozzle along with necessary attachment as per above data sheet. INSERTION TYPE DESUPERHEATERS are not acceptable.

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Tag No.....Applicable for all tag..... Quantity.....				Data Sheet No. PES-145-06-DS1-0	
APPLICABLE FOR TAG Nos.WHEREVER STATEMENT "REQUIRED" INDICATED IN THE INDIVIDUAL CV DATA SHEETS					
DATA SHEET - A2 for ACCESSORIES					
DATA SHEET - A2 FOR ACCESSORIES OF CONTROL VALVES					
POSITIONER	MFR. & MODEL NUMBER		Bidder to Specify		
	BYPASS GAUGE	SENL. CLASS	☒ YES ☐ NO	☒ THREE ☐ TWO	☒ IP-65
	INPUT SIGNAL (Kg / Cm ²)		☒ 0.2 – 1.0 ☐ 0.2 – 0.6 ☐ 0.6 – 1.0		
	OUTPUT SIGNAL (Kg / Cm ²) TO		SUIT ACTUATOR		
AIR FILTER REGULATOR TWO (2) Nos./CV <=5MICRON(SIN TERED BRONZE)	MFR. & MODEL NUMBER		Bidder to Specify		
	AIR SUPPLY PRESS (MAX.) (Kg / Cm ² g)		☒ 10.0 ☐		
	OUTPUT PRESS (Kg / Cm ² g)		TO SUIT ACTUATOR		
	OUTPUT GAUGE		☒ REQUIRED (2 Inch) ☐ NOT REQUIRED		
AIR LOCK	MFR. & MODEL NUMBER		Bidder to Specify		
	SET PRESS (Kg / Cm ²)				
	SUPPLY PRESS (MAX.) (Kg / Cm ²)		☒ 10.0 ☐		
	RESET TYPE		AUTO		
	VENT PLUG		REQUIRED		
LIMIT SWITCH	MFR. & MODEL NUMBER		Bidder to Specify		
	OPEN posn	INT posn	CLOSE posn	☒ 1 NO.	☐ --- ☒ 1 NO.
	CONTACT TYPE		SPDT 2 NO + 2 NC		
	RATING (AC / DC)		5A 240V AC AND 0.5A 220V DC		
	ENCLOSURE CLASS		☒ IP-65 ☐		
POSITION TRANSMITTER	MFR. & MODEL NUMBER		Bidder to Specify		
	TYPE		☒ Electronic (2-Wire) Contactless ☐ OTHER		
	SUPPLY		☒ 24V DC ☐ 220V DC ☐ 110V AC ☐ 240V AC		
	OUTPUT RATING		☒ 4-20mA ☐ 0-100 ohms		
	ACCURACY		± 2% FS		
	ENCLOSURE CLASS		☒ IP-65 ☐		
SOLENOID VALVE	MFR. & MODEL NUMBER		ROTEX / ASCO		
	RATING		☒ 24V DC ☐ 220V DC ☐ 240V AC ☐		
	OPERATION QUANTTY		☐ Stayput ☒ Interlock ☒ 1 ☐ 2		
	COIL INSULATION CLASS		CLASS - H		
	ENCLOSURE CLASS		☐ IP 55 ☒ IP-65 ☐		
HANDWHEEL	ORIENTATION		☐ TOP MOUNTED ☒ SIDE MOUNTED		
JUNCTION BOX	NO. OF WAYS		☐ 24-WAYS ☐ AS REQUIRED ☒ 36-Ways		
	SIZE AS		REQUIRED		
	CABLE GLANDS (Size / Quantity)		AS REQUIRED (Double Compression Type).		
	ENCLOSURE CLASS		☐ IP 55 ☒ IP65		
I/P CONVERTER	INPUT SIGNAL	POWER SUPPLY	4-20mA DC	24V DC	
	SPLIT RANGE		☐ YES ☐ NO		
	ENCLOSURE CLASS		☐ IP 55 ☒ IP-65		
	Accuracy	Repeatability	± 0.5 % FS		± 0.5 % FS
Cu. Tubing & Fittings / per CV	This is in addition to cu. Tubing and fittings which are integral part of CV as per ASTM B68 to B75 (USA)		25 Meters of ¼ " PVC coated anneled Cu. Tubing, with 1 set of Fittings for each CV for connection to IA Header on one end and accessories on another end of CV.		
Note : Swage Type flare less tubing fittings shall be used for tubing connections.					COMPANY SEAL
					NAME
					SIGNATURE/DATE

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SPECIFICATION FOR CONTROL VALVES

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1.0 SCOPE

- 1.1 This specification covers the Design, Manufacture, Inspection and Testing at the manufacturer's works, proper packing for transportation and delivery to site of AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION (with Pneumatic Actuator) for use in Utility/Captive Power Station.
- 1.2 Expander/Reducer between valve body & pipe shall be in BHEL's scope of supply. However, any other expander/reducer required shall be in bidder's scope of supply.

2.0 CODES AND STANDARDS

- 2.1 As a minimum requirement, the latest revision/version of the following or equivalent standards shall be complied as a minimum requirement :-

Indian Boiler Regulation	:	IBR
ASME	:	B31.1/BPVC
Allowable Seat leakage	:	FCI-70.2
Pressure & Temperature ratings	:	ANSI-B16.34
Enclosure class	:	IEC-144 / NEMA / IS-13947
Control Valves Sizing	:	ISA S-75

3.0 TECHNICAL REQUIREMENTS

The Control valve, Actuator and the accessories shall be suitable for continuous operation under an ambient temperature of 0-60°C and Relative Humidity of 0-95% unless specified otherwise in volume IIB Section-B or Section-C.

3.1 Control Valve

The control valve shall be suitably designed for the process operating conditions and system characteristics as specified in the Data Sheet-A.

- 3.1.1 The control valve shall be of globe/angle body design, as per datasheet, with single port. Valve trim shall be cage guided balanced type for valve sizes $\geq 3"$ and above. The valve trim shall be suitable for quick replacement without any cutting or welding. Anti-cavitation trims shall be provided for valves with cavitation service and hardened trims for flashing services.
- 3.1.2 Bidder to note that High Capacity PRDS is a steam conditioning valve with single valve body design. Bidder to offer body and trim materials as per the datasheet-A. Wherever there is a deviation from the datasheets, bidder to furnish the documentary proof for confirming superior trim material/body material selection along with their offer. BHEL/Customer reserves the right to accept/reject any variation in the specification.
- 3.1.3 Asbestos shall not be used for the packing or any other component.
- 3.1.4 The valve bonnet and packing shall be suitable for the service conditions as in Data Sheet-A. Gland sealed type bonnets are not acceptable. Bonnets having Teflon packing shall have valve stem finished to

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2-4 micro inches RMS. Packing material requiring lubrication will not be acceptable.

Type of bonnet shall be according to the service condition. Extension bonnets shall be provided when the maximum temperature of the flowing fluid is greater than 280 or unless otherwise specified.

- 3.1.5 The valve end connection as specified in Data Sheet-A shall conform to ANSI B16.25 for Butt Weld connection and ANSI B16.11 for socket weld connection. Tolerances on end to end, center to center, center to face shall be in accordance with ASME B16.10. The end connections shall be Socket Welded for sizes below 50NB and Butt Welded for sizes 50NB and above.
- 3.1.6 The valve seat leakage shall be as per FCI-70.2. The leakage class shall be as per Data Sheet-A.
- 3.1.7 The valve body shall have the direction of flow embossed on all valves.
- 3.1.8 The sizing shall conform to the requirements of ISA S75.01. Valve shall be capable of handling 120% of required maximum flow with meeting below mentioned requirements:
- | | | | | |
|--|---|---|---|--------------------|
| Valve with Linear characteristic. | - | Normal Flow (Design Point) | : | 70-75% valve lift. |
| | - | Max. Flow | : | 90% valve lift. |
| | - | Min. Flow | : | >10% valve lift. |
| Valve with Equipercentage Characteristic | - | Normal Flow (Design Point) | : | 75-85% valve lift. |
| | - | Max. Flow | : | 90% valve lift. |
| | - | Min. Flow | : | >10% valve lift. |
| ON/OFF Quick open Characteristic | - | 1.2 times the CV calculated on the basis of maximum flow condition. | | |
- 3.1.9 Calculation for valve sizing, velocity and noise shall be subject to purchaser's approval during contract stage. However responsibility of proper selection and design for the duties specified lies with the vendor. Any modifications required to be done on the valves or actuators & accessories to achieve satisfactory performance of the control system shall be done without any commercial & delivery implication.
- 3.1.10 The valve outlet velocities shall be limited to the following values, unless otherwise specified in the Data sheet-A.
- | | | |
|-------------------|----|-----------------|
| i) Liquid service | <= | 8 Meters/Sec. |
| ii) Steam service | <= | 150 Meters/Sec. |
- 3.1.11 For cavitation service, the trim design shall be of multistage pressure drop type, so as to avoid cavitation altogether, instead of keeping cavitation away from valve parts
- 3.1.12 The equivalent weighted sound level measured at 1.5 metre above floor level in elevation and 1 metre horizontally from the control valve expressed in decibels to a reference of 0.00 02 microbar shall not

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exceed 85 dBA (without pipe insulation). The offer shall include noise prediction calculations for each valve.

3.1.13 In case of predicted noise level above 85 dBA, same shall be brought down to acceptable noise level i.e. below 85dBA through Source treatment (proper valve trim & valve body selection). Path treatment (LNP/ Diffuser/ Cartridge/ Silencer etc.), if any shall be subject to Customer's/Owner's approval.

3.1.14 In case of wrong selection/mal operation of valve and for associated actuator during guarantee period, the vendor shall replace the valve suitably with a modified/new valve of design as approved by purchaser and all the expenses for replacement, rectification/modification including transportation both ways will be at vendor's expenses.

3.2 **ACTUATORS-** The control valves shall be operated with pneumatic actuator

3.2.1 **Pneumatic Actuator**

The actuator shall be designed for a thrust of 120% of valve's shut-off pressure at an air line supply pressure of 5-8 Kg/Sq. cm.

The pneumatic actuators shall be employed for modulating or open/close duty, as specified in Data Sheet-A. The bidder shall be responsible for proper selection and sizing of valve actuators in accordance with the pressure drops, shut off pressure and valve travel.

The pneumatic spring opposed diaphragm actuator or piston actuator as the case may be for modulating duty shall be capable of positioning the associated valve at desired opening for all the operating conditions specified.

3.2.2 The pneumatic actuator for open/close duty shall be suitable for fast opening/closing of the associated valve.

3.2.3 The actuator design shall allow valve assembly to be mounted at 45° inclination on either side in the vertical plane.

3.2.4 The actuators shall be suitably sized to ensure that the associated valve travel time from full open to full closed position and vice versa is less than 10 seconds or as specified in the datasheet under the most stringent service conditions.

3.3 **Accessories for Control valve with Pneumatic Actuator**

The bidder shall offer all the accessories as specified in the Data Sheet - A for the Pneumatic Actuators under modulating or OPEN/CLOSE duty. The accessories specified shall be supplied duly mounted on the valve actuator and piped with PVC covered copper/ SS tube and flare less brass/ SS fittings etc. as per the hook up diagram (Refer drawing no. PES-145-06B).

3.3.1 **Handwheel**

Handwheel shall have OPEN & CLOSE direction marking and clockwise rotation as viewed from front shall close the valve. The handwheel shall have a circular stainless steel plate with Tag number and service.

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3.3.2 Local Position Indicator

Each actuator shall be provided with a mechanical pointer attached to stem, moving over a graduated scale with markings, for OPEN, 25%, 50%, 75%, CLOSE positions.

3.3.3 Position Transmitter

The position transmitter shall be integral part of the smart positioner.

3.3.4 Air Filter Regulator

Instrument quality air at suitable pressure of 5 Kg /Cm²(g) to 8 Kg/Cm²(g) shall be supplied to each valve through air filter regulator. The filter regulator shall include an inbuilt blow-down valve (auto drain feature), 5 micron size filter. The bowl material for the AFR shall be sintered bronze. The Air filter regulator shall be selected to meet the requirements of positioner/actuator, E/P converter and air-lock. The flow capacity of the Air filter regulator shall be variable with a knob. Output gauge shall be provided wherever pneumatic positioner is not specified for the valve.

3.3.5 Air Lock Relay

Air lock relay shall retain the valve position stay put, in case of air supply failure and shall reset automatically on resumption of air supply. Air lock shall have a threaded plug for evacuating diaphragm air if required for local manual operation.

3.3.6 Solenoid Valves

Solenoid valves are meant for interlock & protection purposes overriding the controller signal, and/or to result stayput action on controller signal failure. The Solenoid valve shall be 3-way Universal type and the valve internals and valve body shall be of stainless steel. The coil shall have class-H insulation and rated for continuous AC/DC duty as specified in Data sheet-A. The enclosure shall be to IP-65. Cable gland shall be provided for cable entry. The solenoid shall in general conform to IS-8935. The solenoid shall be provided with manual overriding facility. The solenoid shall be suitable for 24 V DC supply, unless specified otherwise in Data Sheet-A.

3.3.7 Limit Switch Assembly

Limit switch assembly are required as specified in the data sheet-A. Each limit switch shall have 2NO+2NC contacts with contact rating of 5A at 240V AC/0.2A at 220V DC unless otherwise specified. The switch enclosure shall conform to IP-65. Each limit switch shall be supplied with cable glands.

3.3.8 I/P Converter

I/P Converter shall be integral part of the smart positioner.

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3.3.9 Smart positioner

Microprocessor based Electronic (Smart)Positioner			
1	Electrical	a) Input Demand Signal	4-20 mA
		b) Power Supply	Loop Powered from the output card of Control System (12-30 V DC)
		c) HART Protocol	Compatibility for Remote Calibration & Diagnostics (Superimposed HART signal on input Signal (4-20 mA))
		d. Valve position sensing	Position sensing, 4-20 mA output signal to be provided for control system.
2	Environment	a) Operating temp.	(-)30 To 80 Deg. C
		b) Humidity	0-95 %
		c) Protection class	IP-65 Minimum
3	Software for Configuration and Diagnostics	Software	Windows based software. Software shall meet the requirements for Configuration, Diagnostics, Calibration and Testing of the actuator. It shall be easily upgradable with some hardware and compatible with any HART management system/AMS. Valve positioning timing, actuator leakage, and valve wear and tear, fault alarm to be offered as a minimum.
		Diagnostic/Test features	Advanced diagnostic features like Stroke counter or Travel counter, Leakage in actuators, Valve Signature analysis, Step Response test, Valve friction /Jamming detection etc. to be provided.
4	Test reports/ Certificates	Factory Valve Signature Tests Reports (Pressure versus Valve travel and Travel versus I/P signal) are to be provided.	
		Test certificates as per manufacture standard/Relevant standard are to be submitted.	
5	Configuration/ Calibration	Remote & Local Calibration, Auto & Manual Calibration shall be possible.	
6	Operating Range	Full range/ Split range.	
7	Modes	Valve Action	Direct / Reverse Valve Action
		Flow Characterization	Possible to fit Valve Characteristic Curves- Linear , Equal percentage etc.
8	Fail Safe/Fail Freeze	Fail Safe/Fail Freeze feature is to be provided as per datasheet. (In case the fail freeze feature is not intrinsic to the positioner, Bidder shall achieve the	

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		same externally through solenoid valve Connected in the pneumatic circuit).	
9	Pneumatic	Air capacity	Sufficient to handle the valves & actuators selected/ Boosters to be supplied, if required.
		Air pressure	To suit the air supply pressure/quality available.
		Process connection	1/4" NPT
10	Performance	characteristic deviation	<=0.75 % of span.
		ambient temp effect	<=0.01 %/ deg c or better.
		dead band	adjustable to 0.1 to 10%
		scan time	10 ms
		resolution <=0.05	%
		sensitivity/linearity	0.3-0.4% of FS
		repeatability	0.32% of FS
		auto tune	yes
11	EMC & CE compliance	Required to International Standard like EN/IEC.	EN50081-2 & EN50082 or equivalent.
12	Accessories	In-built Operator Panel	Display with push buttons for configuration and display on the positioner itself (Password protected/Hardware lock).
		Pressure Gauge Block & Position Indicators.	For supply & output pressures, Air Filter Regulator, integral type position transmitter, in built mechanical position indicator and other accessories shall be provided on as required basis for making system complete.
		Electrical Cable Entry	1/2" NPT, side or bottom entry to avoid water ingress.
		Valves Mounting Assembly	For Sliding Stem/Rotary/Single acting/Double acting actuators on as required basis.

3.3.10 Junction Box

Integral junction box with all electrical accessories conduited up to JB shall be supplied. The junction box shall have two (2) cable glands for outgoing cables. Junction box shall have enclosure class of IP-65.

3.4 **Painting** of the control valve assembly shall be as per the Painting Specification attached elsewhere in this technical specification. In the absence of specification for painting, vendor to submit their standard painting procedure for painting for BHEL's approval. Epoxy based paint (corrosion-resistant) to be provided for control valves for coastal environment.

3.5 **Sub-vendors** shall be subject to BHEL/ Customer/Customer's Consultant approval in the event of order.

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4.0 TESTING AND INSPECTION

- 4.1 The testing and inspection of the equipment/items shall be in line with the approved QAP
- 4.2 The cost of all tests as per the approved QAP will be deemed to have been included in the bid.
- 4.3 In case, the bidder is supplying the valve from outside India, the third party inspection shall be arranged and considered by the bidder in their offer.

5.0 SPARES AND CONSUMABLES

5.1 Start-up/Commissioning Spares

The bidder shall supply all the start-up/commissioning spares as per the BOQ given in the technical specification.

S.No.	ITEM DESCRIPTION	QUANTITY REQUIRED (per unit)
1	Gaskets	One (1) set with each control valve Tag
2	Gland Packings	One (1) set with each control valve Tag
3	SS Tubing (as applicable)	12 Meters of 1/4 " SS Tubing, with 1 set of Fittings for each CV

5.2 Mandatory Spares

The bidder shall supply all the mandatory spares as per the BOQ given in the technical specification.

6.0 DRAWINGS AND DOCUMENTS

6.1 The bidder shall furnish the following documents (4sets) along with the bid

- Compliance certificate as enclosed in Section II.
- Schedule of deviations if any.
- Sizing Calculations.
- General Assembly (GA) drawings indicating all important details for layout.
- Quality Plan duly signed & stamped.
- Relevant Catalogs with detailed technical information.
- Un-price schedule of prices & unit prices as per NIT.

6.2 The successful bidder shall furnish the following documents to BHEL during the contract stage viz. after the award of contract:

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6.2.1 2 sets of the following CONTROL VALVE DOCUMENTS for approval + 1 sets of CD/soft copy:

- All Sizing Calculations (CV, Noise Level, Valve Outlet Velocity, Actuator sizing etc.)
- General Assembly (GA) drawings indicating all important details (edge preparation details, dimensions, weight etc) for layout.
- Data sheet-B completely filled-up.
- Hook-up diagram of Control Valve with Actuator & Accessories.
- Quality Plan duly signed & stamped.
- Relevant Catalogs with detailed technical information.

6.3 Final documentation:

Final Documents / drawings to be furnished by the successful bidder shall be as follows:
12 sets with 5 CD-ROMS/Soft Copy of:-

- Category I & IV approved CONTROL VALVE DOCUMENTS
- Test certificates
- Operation & maintenance manuals for Control Valve, Actuator and all accessories

7.0 MARKING AND PACKING

7.1 Marking

A stainless steel metal nameplate should be permanently fixed on each equipment giving its tag number and technical specifications. The Following Details are to be marked on the Packing Cases

- ✓ Address of consignee
- ✓ Purchase order no.
- ✓ Description of items or title of packing list
- ✓ Weight
- ✓ Dimension of the Box
- ✓ Marking showing upright position
- ✓ Marking showing sling position
- ✓ Marking showing umbrella (i.e. for machines/components to be stored under covered storage)



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7.2 Packing

All equipment / materials shall be suitably packed and protected for the entire period of dispatch, storage and erection against impact, abrasion, corrosion, incidental damage due to vermin, sunlight, high temperature, rain, moisture, humidity, dust, sea water spray (where applicable) as well as rough handling and delays in transit and storage in open. Guidelines for packing are as follows:

- ✓ After inspection of control valves assembly, smart Positioner along with Pressure Gauge shall be disassembled & packed separately.
- ✓ Threaded connection of Smart Positioner & Pressure Gauge shall be shipped with the end caps fitted to avoid any damage.
- ✓ Instructions with sketch for mounting the Smart Positioner & Pressure Gauge shall be sent along with the aforesaid accessories.
- ✓ Packing of the control valves and Smart Positioner along with Pressure Gauge shall be done in separate wooden boxes/cases in order to avoid damage during transit and also during storage at site in tropical climatic conditions for a period of 18-24 months.
- ✓ All valves & smart positioner along with pressure gauges shall be packed properly with quality wooden planks with proper wooden frame support. Moreover the valves are internally covered with polythene sheets to protect from the water and moisture entry.
- ✓ Stronger shock absorbing cover material like expanded Polyurethane which can take any direct impact on it shall be used for packing.
- ✓ Proper reaper support to be provided in the packing and Valve assembly to be aligned properly to avoid the damage of accessories during transit due to vibration effect.
- ✓ Marking for Fragile & Condensing environment shall be done on the packing box.

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION		SPEC. NO.: PE-TS-411-142-N101
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SPECIFICATION FOR DESUPERHEATER

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION		SPEC. NO.: PE-TS-411-142-N101
			SECTION II
	REV. NO.	00	DATE 27.04.2017

1.0.0 **GENERAL**

This standard specification covers the design, materials, construction features, manufacturing process, assembly, inspection and testing requirements, painting and packing requirements of Steam Desuperheater along with spray nozzle.

2.0.0 **CODES AND STANDARDS**

2.1.0 The design, manufacture, inspection and testing of the equipment shall comply with the requirements of the latest national and international codes and standards wherever applicable. Wherever the specific code requirements are specified herein, the same shall be adhered to.

In particular, the equipment shall be designed to comply with latest editions of the following standards

- (i) Indian Boiler Regulations (IBR).
- (ii) ASME Section - VIII / Div. - 1.
- (iii) Material specifications as per ASTM, AISI.

3.0.0 **DESIGN AND CONSTRUCTIONAL FEATURES**

3.1.0 The desuperheater shall be of direct mixing mechanical spray type. The assembly shall consist of desuperheater pipe with steam inlet and outlet & spray water connection along with spray nozzle. The spray nozzle shall direct the spray in the direction of steam flow for proper mixing and arranged in such position that direct impingement of spray water on desuperheater walls is avoided.

3.2.0 The spray nozzle shall be accurately sized for best results in total range as stipulated in the data sheet.

3.3.0 The desuperheater shall be complete with matching counter flanges including bolts, nuts, gaskets, necessary reducers / expanders to suit purchaser's pipe line and supporting legs / pads & holding down bolts as required.

3.4.0 The material of construction shall be as indicated in Desuperheater Data Sheet.

4.0.0 **SHOP INSPECTION AND TEST**

4.1.0 The bidder shall submit along with the offer the Quality Plans in the enclosed format together with all reference documents/standards etc. as applicable.

4.2.0 Indicative Quality Plans, specifying minimum checks and tests as considered necessary are enclosed along with this specification for compliance. These however are not intended to exhibit the total comprehensive testing programmes, which are the responsibility of the bidder.

4.3.0 Detailed Quality Plans to be submitted by the bidders should also include all the checks/tests carried out by the suppliers as part of their normal practice. The Quality Plans submitted by the bidders shall be subject to approval of BHEL/their Customer who reserves the right to ask for further checks during finalization of Quality Plans.

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION	SPEC. NO.: PE-TS-411-142-N101	
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BHEL/their Customer shall indicate customer hold points in the approved Quality Plans beyond which the work shall not proceed without their approval.

4.4.0 The supplier shall furnish their production program along with scheduled dates of testing at least three months in advance to enable BHEL/their customer to plan for witnessing the tests identified as hold points.

4.5.0 Material identification and co-relation with test certificates for all major components shall be essentially required. In absence of these, the material of each component shall be tested as per relevant specification for Chemical Composition and Mechanical properties i.e. Yield Stress, Ultimate Tensile Stress, Impact test, % Elongation, % Reduction in Area, Hardness etc. In addition, to ensure freedom from surface and sub-surface defects, suitable Non Destructive Testing shall also be carried out.

4.6.0 Following tests shall be done at Manufacturers' works during various stages as minimum requirement :

4.6.1 Visual examination of all components.

4.6.2 Check for weld joints for proper fit up, Dye Penetration Test after root run and final welding. 100% Radiographic test as per ASTM E 165 for all butt welds.

4.6.3 Verification of stress relieving chart if post-weld heat treatment is called for.

4.6.4 Check / test for pressure retaining bolts and nuts as per relevant Codes/Standards.

4.6.5 Dimension check for all components including surface finish.

4.6.6 Hydraulic Test to two times the rated design pressure for desuperheater body and other pressure retaining parts.

4.6.7 Check for final completeness, cleaning, surface finish, appearance, identification, surface preparation, painting, marking and packing including spares.

4.6.8 The equipment comes under the purview of IBR (Indian Boiler Regulations). All tests certificates duly signed by Chief Inspector (IBR) / authorized representative shall be furnished in IBR from III-C.

4.6.9 The particulars of proposed shop tests and process of test shall be submitted to BHEL/their Customer along with Quality Plan for approval.

5.0.0 PERFORMANCE REQUIREMENTS

Bidder shall guarantee that equipment offered shall meet the rating and performance requirements as stipulated in this specification. In case it is not as per guarantee furnished by the bidder, the deficiency shall be made good by the bidder by rectification / replacement of defective parts within reasonable time at their own cost inclusive of cost of transportation both ways if required. The Purchaser is entitled to reject the equipment in case of repeated failures to meet the guaranteed performance.

6.0.0 PAINTING

6.1.0 All foundry sand and loose material shall be removed and surface should be made thoroughly clean for further protection as required.

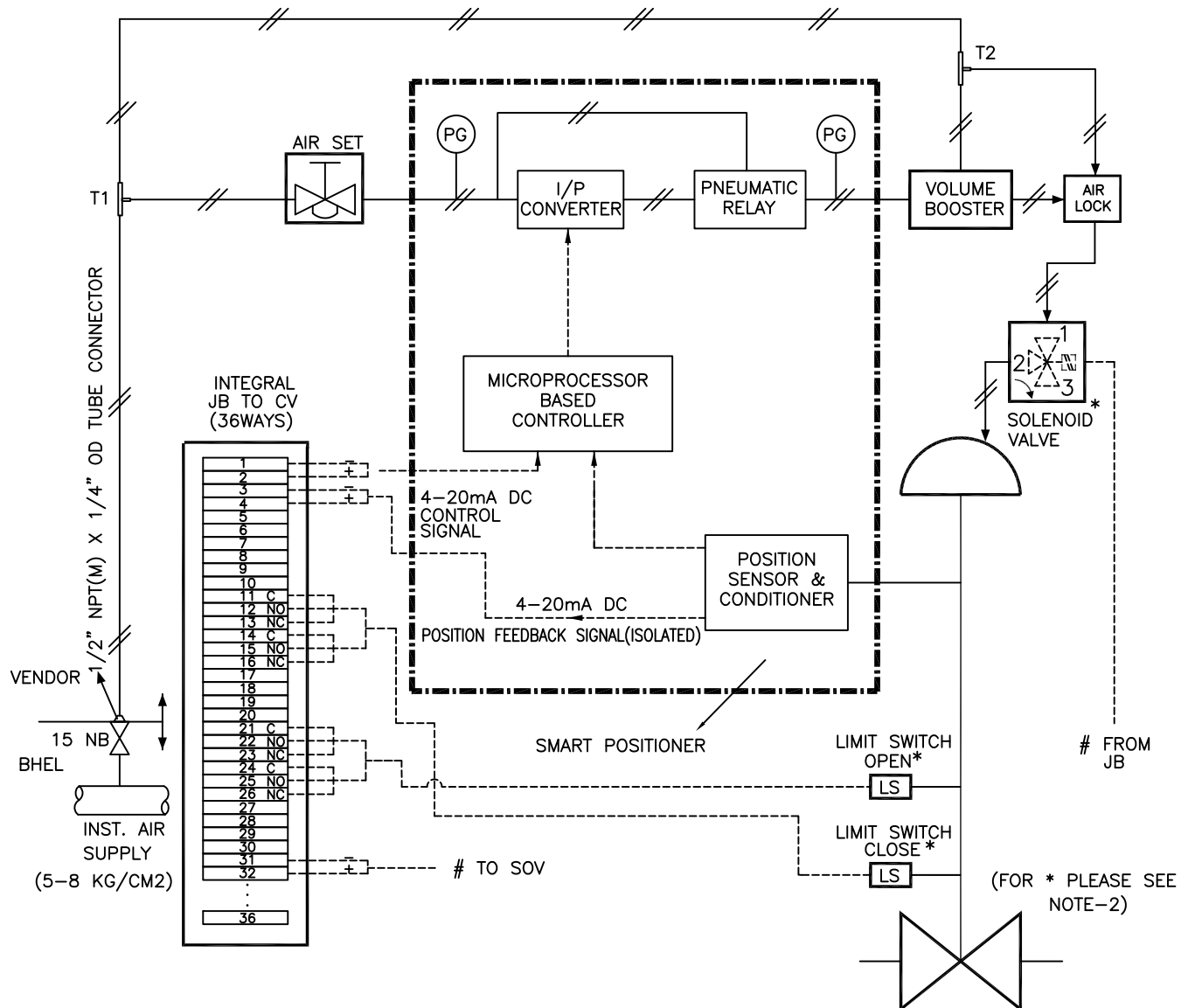
6.2.0 A shop coat of paint, removable after installation at site, shall be applied to all steel surfaces and other exposed surfaces requiring corrosion protection during transit and storage at site.

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION	SPEC. NO.: PE-TS-411-142-N101	
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7.0..0 PRESERVATION, MARKING AND PACKING

- 7.1.0 A Stainless Steel metal nameplate should be permanently fixed on each equipment giving its Tag . No. and technical specifications i.e. Service, Size, Pressure Rating etc.
- 7.2.0 All equipments / materials shall be packed suitably and protected from impact, abrasion, corrosion, incidental damage due to vermin, Sun-light, high temperature, rain, moisture, humidity, dust, sea water (where applicable) as well as rough handling during entire period of dispatch, storage and erection including delays in transit and storage in open.
- 7.3.0 Spares shall be packed separately and marked clearly for identification. These shall be specially packed for long storage without damage.

STANDARD CONTROL VALVE HOOK-UP DIAGRAM (WITH SMART POSITIONER)



NOTES :-

1. POSITION OF EACH VALVE ON SUPPLY AIR FAILURE / ELECTRICAL SIGNAL FAILURE SHALL BE AS PER SPECIFICATION / DATA SHEET.
2. SOLENOID VALVE & LIMIT SWITCHES WILL BE PROVIDED ONLY FOR CONTROL VALVES IF INDICATED IN RESPECTIVE DATA SHEETS.
3. SOLENOID VALVES PORTS CONDITION:
PORT 1 AND 2 SHALL BE CONNECTED UNDER DE-ENERGISED CONDITION.
PORT 2 AND 3 SHALL BE CONNECTED UNDER ENERGISED CONDITION.
4. PRESSURE GAUGES REQUIRED FOR AIR SUPPLY & OUTPUT(S).
5. MOUNTING ACCESSORIES AS REQUIRED.
6. POSITION FEEDBACK SIGNAL SHALL BE 2 WIRE 4-20mA ISOLATED SIGNAL.
7. JB TERMINALS SHALL BE CAGE CLAMP TYPE SUITABLE FOR 2.5 SQ. MM COPPER WIRE. EXTERNAL CONNECTION, OF PLUG IN TYPE OR THROUGH CABLE GLAND, SHALL BE AS PER DATA SHEET
8. ALL APPLICABLE ACCESSORIES SHALL BE PROVIDED AS INDICATED IN THE INDIVIDUAL CONTROL VALVE DATA SHEET / ACCESSORIES DATA SHEET.
9. 12 METERS 1/4" PVC COATED COPPER / SS TUBING (AS PER ACCESSORIES DATA SHEET) & 1 SET OF FITTINGS TO BE SUPPLIED FOR EACH CONTROL VALVE FOR CONNECTION TO ISO VLV AT INST AIR HEADER ON ONE END AND TO AIR LOCK RELAY/AIR FILTER REGULATOR ON THE OTHER END. ALL THE BRASS / SS FITTINGS SHALL BE DOUBLE COMPRESSION TYPE.
10. VOLUME BOOSTER (ALONG WITH TEE-T2 AND RELATED TUBING & CONNECTORS) SHALL BE PROVIDED IF REQUIRED. AIR CONNECTION TO VOLUME BOOSTER FROM TEE-T2 SHALL BE PROVIDED.



STANDARD

DRG.
No.

PES-145-06B

TITLE:-

CONTROL VALVE HOOK-UP DIAGRAM

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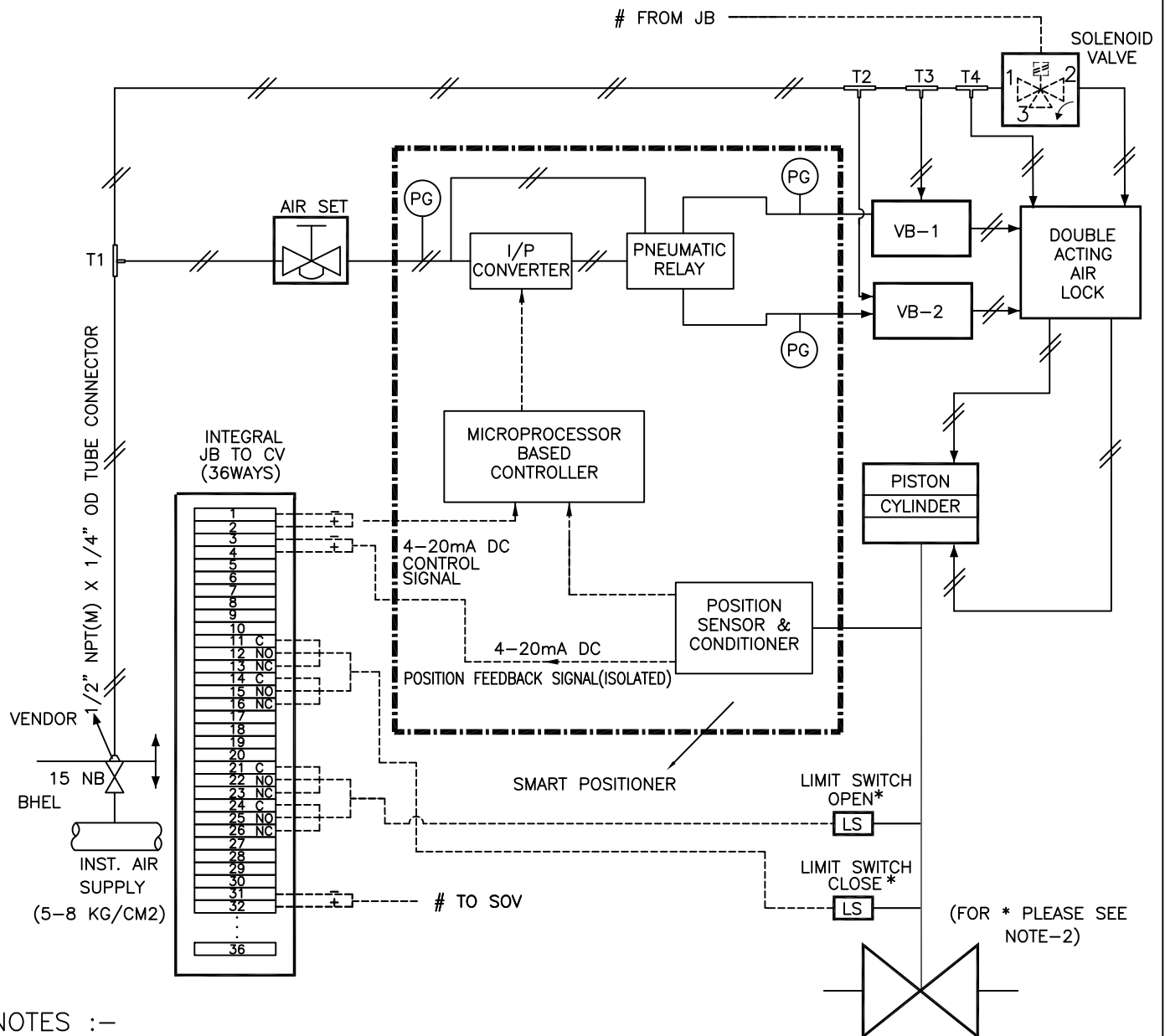
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STANDARD CONTROL VALVE HOOK-UP DIAGRAM (DOUBLE ACTING PISTON ACTUATOR WITH SMART POSITIONER)



NOTES :-

1. POSITION OF EACH VALVE ON SUPPLY AIR FAILURE / ELECTRICAL SIGNAL FAILURE SHALL BE AS PER SPECIFICATION / DATA SHEET. AIR LOCK SHALL BE PROVIDED ACCORDINGLY.
2. SOLENOID VALVE & LIMIT SWITCHES WILL BE PROVIDED ONLY FOR CONTROL VALVES IF INDICATED IN RESPECTIVE DATA SHEETS.
3. SOLENOID VALVES PORTS CONDITION:
PORT 1 AND 2 SHALL BE CONNECTED UNDER DE-ENERGISED CONDITION.
PORT 2 AND 3 SHALL BE CONNECTED UNDER ENERGISED CONDITION.
4. PRESSURE GAUGES REQUIRED FOR AIR SUPPLY & OUTPUT(S).
5. MOUNTING ACCESSORIES AS REQUIRED.
6. POSITION FEEDBACK SIGNAL SHALL BE 2 WIRE 4-20mA ISOLATED SIGNAL.
7. JB TERMINALS SHALL BE CAGE CLAMP TYPE SUITABLE FOR 2.5 SQ. MM COPPER WIRE. EXTERNAL CONNECTION, OF PLUG IN TYPE OR THROUGH CABLE GLAND, SHALL BE AS PER DATA SHEET
8. ALL APPLICABLE ACCESSORIES SHALL BE PROVIDED AS INDICATED IN THE INDIVIDUAL CONTROL VALVE DATA SHEET / ACCESSORIES DATA SHEET.
9. 12 METERS 1/4" PVC COATED COPPER / SS TUBING (AS PER ACCESSORIES DATA SHEET) & 1 SET OF FITTINGS TO BE SUPPLIED FOR EACH CONTROL VALVE FOR CONNECTION TO ISO VLV AT INST AIR HEADER ON ONE END AND TO AIR LOCK RELAY/AIR FILTER REGULATOR ON THE OTHER END. ALL THE BRASS / SS FITTINGS SHALL BE DOUBLE COMPRESSION TYPE.
10. VOLUME BOOSTER (ALONG WITH TEE-T2 AND RELATED TUBING & CONNECTORS) SHALL BE PROVIDED IF REQUIRED. AIR CONNECTION TO VOLUME BOOSTER FROM TEE-T2 & TEE-T3 SHALL BE PROVIDED.



STANDARD

DRG.
No.

PES-145-06B

TITLE:-

CONTROL VALVE HOOK-UP DIAGRAM

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No.

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										TELANGANA STATE POWER GENERATION CORPORATION LTD																																																	
										DESEIN PRIVATE LIMITED																																																	
JOB NO. 411										PROJECT: BHADRADRI TPS, UNITS # 1 TO 4 (4X270 MW), MANUGURU, KHAMMAM DISTRICT																																																	
STATUS STANDARD																																																											
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Sl. No.	Component / operation	Characteristics Checked	* Cate gory	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
1.0	MATERIAL											
1.1	Body & Bonnet casting / forgings, plug, valve stem, seat ring/cage.	1. Ph ysical, Chemical properties	MA Ph y	sical, Chemical tests	One/ Heat(HT Batch)	Approved drg. / data sheet / BHEL specn.	Approved drg. / data sheet / BHEL specn.	Test Certificate	3 ---		2,1	Any Forging>=40mm thick or >= 50mm dia shall be UT checked irrespective of rating.
		2. Heat Treatment	MA	Review of H.T. Chart	Each H.T.	Approved drg. / data sheet / BHEL specn.	Approved drg. / data sheet / BHEL specn.	Test Certificate	3/2 2		1	IBR Certification (if applicable) to be verified by BHEL
		3. Internal quality of castings	MA	RT for Body & UT for Bonnet(NDT)	100%	ASME B 16.34	ASME B 16.34	Test Report / FILM	3/2 2		1	Only for rating ANSI 900 and above. Applicable for Body and Bonnet on ly. For L ower rating o nly if called for in specification.
		4. Surface Quality	MA	1. Visual	100%	MSS-SP-55 MSS	SP-55 T	est Certificate	3/2 ---		2,1	
	2. MT/PT			100%	ASME B 16.34	ASME B 16.34	Test Certificate	3 2		1	After Machining on machined surface only	
LEGEND: * CR - Critical characteristics RT- Radiographic Test PT – Dye penetrant Test \$ P - Agency Performing the Test. 1 - BHEL 4 – Customer / Customer TPIA MA - Major characteristics UT – Ultrasonic Test MT- Magnetic Test W - Agency Witnessing the Test. 2 - Vendor MI - Minor characteristics V - Agency Verifying the Test. 3 - Sub-vendor												

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Sl. No.	Component / operation	Characteristics Checked	* Cate gory	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency ^s			Remarks
									P	W	V	
		5. Pressure test for shell	MA	Hyd. Test	100%	ISA-S-75.19/ ASME B 16.34	ISA-S-75.19/ ASME B 16.34	Test Certificate	2	2	1	For Body & Bonnet after machining
1.2	Diap hragm	1. Surface Quality	MA	Visual	100%	Mfr. standard	Mfr. standard	Test Certificate	3/2	---	2,1	
		2. Hardness	MA	Measurement	100%	Mfr. standard	Mfr. standard	Test Certificate	3/2	---	2,1	
		3. Endurance / Life cycle	MA	Cyclic test 10,000 cycles	One / Type	10,000 cycles/ Mfr. standard.	No damage	Test Certificate	3/2		2,1	
1.3	Sprin g	1. Composition	MA	Chemical-Analysis	One sample/ Heat	Material spec. / Mfr. standard	Material spec. / Mfr. standard	Test Certificate	3	---	2,1	
		2. Mech. Properties	MA	Mech. Test	One sample/ Heat	Material spec. / Mfr. standard	Material spec. / Mfr. standard	Test Certificate	3	---	2,1	Mech. Test shall be as per IS Standard.
		3. Performanc e	MA	1. Stiffness ratio	100%	Material spec. / Mfr. standard	Material spec. / Mfr. standard	Test Certificate	3	---	2,1	
				2. Scragging	100%	Material spec. / Mfr. standard	Material spec. / Mfr. standard	Test Certificate	3	---	2,1	
				3. Cyclic test (Endurance)	One / type	10,000 cycles	Material spec. / Mfr. standard	Test Certificate	3	---	2,1	
				4. Dimension (Measurement)	One sample/ Lot	Mfr. standard	Appd Drg	Record	3	---	2,1	

LEGEND: * CR - Critical characteristics
 MA - Major characteristics
 MI - Minor characteristics

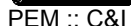
RT- Radiographic Test
 UT - Ultrasonic Test

PT - Dye penetrant Test
 MT- Magnetic Test

\$ P - Agency Performing the Test.
 W - Agency Witnessing the Test.
 V - Agency Verifying the Test.

1 - BHEL
 2 - Vendor
 3 - Sub-vendor
 4 - Customer / Customer TPIA

 PEM :: C&I	4X270 MW BHADRADRI QUALITY PLAN FOR CONTROL VALVE (PNEUMATIC)							QUALITY PLAN NO.: PE-QP-411-145-I 006				
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Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
1.4	Electrical items [Limit switches, Solenoids, Position Transmitter(if provided externally)]	1. Routine Test	MA	HV, IR, Continuity function	100%	Rele. Standards	Rele. Standards	Test Certificate	3	---	2,1	In case TC is not available, Actual test shall be conducted
		2. Degree of protection	MA	IP/NEMA Tests	One sample / type	Approved Data sheet	Approved Data sheet	Test Certificate	3	---	2,1	
1.5	Pressure Gauges	1. Performance	MA	Review of calibration certificates	100%	Mfr. Standard	Mfr. Standard	Test Certificate	3	---	2,1	
		2. Marking	MA	Visual	100%	Mfr. standard	Mfr. standard	Records	3	---	2,1	
2.0 IN PROCESS INSPECTION												
2.1	After machining, i, Body ii Bonnet iii Plug iv Valve Stem v seat ring/cage	1. Surface flaws	MA	Visual & MT/PT	100% (on accessible surfaces)	ASME B 16.34	ASME B 16.34	Test Records	2	---	1	Butt weld ends shall be included.
		2. Dimensional checks	MA	Measurement	100%	Mfr. Standard	Mfr. Standard	Records	2	---	1	
		3. Hard facing (wherever applicable)	MA	Hardness Measurement	One sample/Lot	Mfr. Standard	Mfr. Standard	Records	2	---	1	
2.2	Lapping	Machining surface contact	MA	Blue Matching	One sample/lot	----- Proper	Physical Contact	---	2	---	---	
LEGEND: * CR - Critical characteristics RT- Radiographic Test PT – Dye penetrant Test \$ P - Agency Performing the Test. 1 - BHEL 4 – Customer / Customer TPIA MA - Major characteristics UT – Ultrasonic Test MT- Magnetic Test W - Agency Witnessing the Test. 2 - Vendor MI - Minor characteristics V - Agency Verifying the Test. 3 - Sub-vendor												



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Sl. No.	Component / operation	Characteristics Checked	* Cate gory	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
		9. Operation of limit switch & solenoids and other accessories	MA	Function	100%	Approved drg. / data sheet	As per specs/ Approved drg. / data sheet	Test Report	2	1	1, 4	On assembled valve Refer Note-4
		10. Overall dimensions	MI	Visual and dimensional	100%	Approved drg. / data sheet	As per specs/ Approved drg. / data sheet	Records 2		1	1, 4	Refer Note-4
		11. Pre defined valve position in case of air failure	MA	Visual	100%	As per spec & Appd drg	As per spec & Appd drg	Test Certificate	2 1		1, 4	
		12. Cleanliness, painting, stamping (for direction of flow), Tag No.	MA	Visual and dimensional	100%	Approved drg. / data sheet	As per specs/ Approved drg. / data sheet	Test Certificate	2 1		1	
5.0	AUXILIARY ITEMS (Performance test of auxiliary items shall be performed on the completely assembled valve)											
5.1	Positioner	Overall leakage after assembly including Nozzles leakage	MA	Leak Test (in the steady state input signal)	100 %	Mfr. Standard	No leakage	Test Certificate	3/2 ---		1	Overall leakage including tubing
5.2	Air filter regulator	1. Normal air consumption	MA	Measurement	Each type	Mfr. Standard	No leakage	Test Certificate	3/2 ---		1	
		2. Overall leakage	MA	Visual (soap solution)	100 %	Mfr. Standard	No leakage	Test Certificate	3/2 ---		1	
5.3	Air lock relay	Performance Test	MA	Leakage test	100%	Mfr. Standard	No leakage	Test Certificate	3/2 ---		1	
5.4	Electronic position transmitter(not applicable if provided integral to smart positioner)	1. Accuracy	MA	Operation	100%	Approved data sheet /	Approved data sheet /	Test Certificate	2 1		1	
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Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
5.5	Current to Pneumatic converter(not applicable for smart positioner)	1. Physical Verification Make/Model	MA	Visual	100%	Approved drg. / data sheet	Approved drg. / data sheet	Test Certificate	2 ---		2,1	
		2. Degree of Protection	MA	IP/NEMA test	Each type	Relevant Standard	Relevant Standard	Test Certificate	3 ---		2,1	
		3. Linearity	CR	Measurement	100%	Approved drg. / data sheet / BHEL specn.	Approved drg. / data sheet / BHEL specn.	Inspection Report	2 ---		1	
		4. Hysteresis	CR	Measurement	100%	Approved drg. / data sheet / BHEL specn.	Approved drg. / data sheet / BHEL specn.	Inspection Report	2 ---		1	
5.6	Smart Positioner (As Applicable)	1. Physical Verification Make/Model	MA	Visual	100%	Approved drg. / data sheet	Approved drg. / data sheet	Test Certificate	2 ---		2,1	
		2. Degree of Protection	MA	IP/NEMA test	Each type	Relevant Standard	Relevant Standard	Test Certificate	3 ---		2,1	
		3. Linearity	CR	Measurement	100%	Approved drg. / data sheet / BHEL specn.	Approved drg. / data sheet / BHEL specn.	Inspection Report	2 ---		1	
		4. Hysteresis	CR	Measurement	100%	Approved drg. / data sheet / BHEL specn.	Approved drg. / data sheet / BHEL specn.	Inspection Report	2 ---		1	
		5. Calibration with Hand Held Communicator	MA	Measurement	Each type	Approved data sheet / Mfr. Standard	Approved data sheet / Mfr. Standard	Test Certificate	2 1		1	
6.0	PAINTING	Soundness of Painting	MA	Visual and Measurement	100%	BHEL specn. / Mfr. Standard	BHEL specn. / Mfr. Standard	Inspection Report	2 ---		---	Refer Note-2

LEGEND: * CR - Critical characteristics
 MA - Major characteristics
 MI - Minor characteristics

RT- Radiographic Test
 UT - Ultrasonic Test

PT - Dye penetrant Test
 MT- Magnetic Test

\$ P - Agency Performing the Test.
 W - Agency Witnessing the Test.
 V - Agency Verifying the Test.

1 - BHEL
 2 - Vendor
 3 - Sub-vendor

4 - Customer / Customer TPIA

 PEM :: C&I		4X270 MW BHADRADRI QUALITY PLAN FOR CONTROL VALVE (PNEUMATIC)						QUALITY PLAN NO.: PE-QP-411-145-I 006				
								VOLUME				
								SECTION				
								REV. NO. 00		DATE: 28.05.2015		
								SHEET 7		OF 7		
Sl. No.	Component / operation	Characteristics Checked	* Category	Type/Method of Check	Extent of Check	Reference documents	Acceptance Norms	Format of Records	Agency \$			Remarks
									P	W	V	
7.0	PACKING	Soundness of Packing against transit damage	MA Visual	I	100%	Mfr. Standard Mfr.	Standard Inspection	n Report	2 ---		---	Refer Note-3

NOTES:

1. In case ~~valid CV test certificate for a similar control valve(Same type, Same size, Same CV) is not submitted to BHEL by the vendor~~, CV test shall be conducted at FCRI/Any govt. approved laboratory/ BHEL approved Laboratory.
2. In the absence of BHEL spec. for painting, vendor to obtain BHEL's approval on their painting specification / procedure.
3. Sea worthy packing shall be provided, if applicable.
4. The quantum of check shall be 100% for manufacturer and 10% for BHEL/BHEL nominated inspection agency.
5. IBR certificates in Form III-C shall be submitted if called for in the specification/datasheet.
6. Copies of all TC's(Test Certificates) for materials duly correlated with Heat Nos., TC's for electrical items and mechanical tests(Leak/Operation) shall be submitted to BHEL for verification and acceptance.

LEGEND: * CR - Critical characteristics RT- Radiographic Test PT – Dye penetrant Test \$ P - Agency Performing the Test. 1 - BHEL 4 – Customer / Customer TPIA MA - Major characteristics UT – Ultrasonic Test MT- Magnetic Test W - Agency Witnessing the Test. 2 - Vendor MI - Minor characteristics V - Agency Verifying the Test. 3 - Sub-vendor											
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		STANDARD QUALITY PLAN FOR AUXILIARY STEAM PRDS			CUSTOMER : TSGENCO		PROJECT: 4X270 MW BHADRADRI TPS		SPECIFICATION NUMBR PE-TS-411-142-N101			
					BIDDER/ : AS PER APPROVED VENDOR LIST		SPECIFICATION TITLE : AUXILIARY STEAM P.R.D.S					
		SHEET 1 of 2			SYSTEM ITEM : STEAM DESUPERHEATER		QUALITY PLAN NUMBR		SECTION		VOLUME	
SL. NO.	COMPONENT/ OPERATION	CHARACT-ERISTIC CHECK	CAT.	TYPE METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11

1.0	Raw Materials											
1.1	Pipes	Mechanical & Chemical Prop.		Mechanical & Chemical	100%	Appd Specn./ Data Sheet/Drg.	Appd Specn./ Data Sheet/Drg.	TC	3/2	-	1	Correlation required
		Leakproofness		Hydraulic test	100%	-do-	-do-	TC	3/2	-	1	
		Dimensions		Measurement	100%	-do-	-do-	IR	3/2	-	1	
1.2	Forging	Physical & Chemical Prop.		Physical & Chemical Prop.	1/heat	Appd Specn./ Data Sheet/Drg.	Appd Specn./ Data Sheet/Drg.	TC	3/2	-	1	Correlation required
		Dimensions		Measurement	100%	-do-	-do-	IR	3/2	-	1	
		Heat Treatment		Scrutiny	100%	-do-	-do-	HT/SR Chart	3/2	-	1	Correlation required
2.0	In Process											
2.1	Forgings	Internal defects		U.T	100%	ASTMA 435	ASTMA 435	IR	3/2	-	1	
2.2	Machining Body Internals	Dimensions		Measurement	100%	Appd.Drg.	Appd.Drg.	IR	3/2	-	1	Correlation required
2.3	Body	Surface Defects		D.P. Check	100%	ASTME165	ASME-B 16.34 ,Appendix-III	TC	3/2	-	1	

PARTICULARS	CUSTOMER/CONSULTANT	BHEL	BIDDER / VENDOR	
NAME				
SIGNATURE				
DATE				
				BIDDER'S/ VENDOR'S COMPANY SEALS



**TECHNICAL SPECIFICATION FOR
AUXILIARY STEAM PRESSURE REDUCING &
DESUPERHEATING STATION**

SPEC. NO.: PE-TS-411-142-N101

SECTION II

REV. NO. 00

DATE 27.04.2017

COMPLIANCE CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificate and furnish same with the offer.

- a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions with regard to same.
- b) There is no other deviations w.r.t. specification other than those furnished in the 'Schedule of Technical Deviation/ Clarification'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn. The acceptance of the deviations is not binding on BHEL/ Customer.
- c) Bidder shall submit stamped QP on compliance basis in the event of order based on the guidelines given in the specification. In case, the bidder is supplying the item from outside India, the third party inspection shall be arranged and considered by the bidder in their offer.
- d) Any drawing/ document/ data-sheet/ calculation/ Quality plan/ Instrumentation etc. submitted along with the offer shall be considered for reference only, same shall be subject to BHEL/ Customer/Customer's Consultant approval in the event of order.
- e) The offered materials shall be either equivalent or superior to those specified in the specification. For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.
- f) Bidder to confirm that any calculation/format required during the contract (in the event of order) to ascertain any calculated/selected value shall be furnished.
- g) Selection of valves and actuators are bidder's responsibility. Any change in selection of type of valve / sizing / percentage opening, calculations, QP, etc., if desired by BHEL / customer during approval of the documents after award of contract, without major changes in process parameters as per tender specification, shall be carried out by bidder without any commercial implication and time delay.
- h) All sub - vendors shall be subject to BHEL/ Customer/Customer's Consultant approval in the event of order.

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION		SPEC. NO.: PE-TS-411-142-N101			
			SECTION II			
			REV. NO.	00	DATE	27.04.2017
Tag No..... Quantity.....			Data Sheet No. PES-145-06-DS2-1			
DATA SHEET-B						
DATA SHEET – C FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY THE BIDDER AFTER THE AWARD OF CONTRACT)						
GENERAL*	PROJECT					
	SERVICE					
	LOCATION					
	DUTY					
	PIPE SIZE (inlet / outlet)					
	PIPE MATERIAL (inlet / outlet)					
BODY	MODEL NUMBER					
	TYPE OF BODY : GUIDING : NO. OF PORTS					
	BODY SIZE : PORT SIZE : DESIGN CV					
	END CONNECTION & RATING (ANSI)					
	BODY MATERIAL					
	PACKING MATERIAL SINGLE / DOUBLE					
	BONNET TYPE					
	TRIM FORM					
	TRIM MATERIAL : SEAT | PLUG					
	TRIM MATERIAL : CAGE | GUIDE					
	FLOW					
	OUTLET VELOCITY					
	REQUIRED LEAKAGE CLASS					
	NOISE LEVEL (dBA)					
	VACUUM SERVICE					
	ANTI CAVITATION TRIM					
PNEUMATIC ACTUATOR	MODEL NO. & SIZE					
	CLOSE AT : OPEN AT (Kg / Cm ² g)					
	*TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN					
	*VALVE POSN. ON SIGNAL AIR FAILURE					
	*VALVE POSN. ON SUPPLY AIR FAILURE					
ACCESSORIES	POSITIONER					
	AIR FILTER REGULATOR					
	AIR LOCK RELAY					
	POSITION LIMIT SWITCH					
	POSITION TRANSMITTER					
	SOLENOID VALVE					
	E / P CONVERTER					
	JUNCTION BOX					
	HAND WHEEL (SIDE MOUNTED)					
	LOCAL POSITION INDICATOR					
	ELECTRO PNEUMATIC POSITIONER					

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION				SPEC. NO.: PE-TS-411-142-N101				
					SECTION II				
					REV. NO.	00	DATE 27.04.2017		
Tag No..... Quantity..... Data Sheet No. PES-145-06-DS2-1									
DATA SHEET-B									
DATA SHEET – C FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY THE BIDDER AFTER THE AWARD OF CONTRACT)									
PERFORMANCE OF VALVE	HYTERSIS								
	LINEARITY								
	SENSITIVITY								
	ACCURACY (Overall)								
SERVICE CONDITION*	SL.+ NO.	LOAD	FLOW (T/HR)	INLET PR. (KG/CM ² (A)	OUTLET PR. (KG/CM ² (A)	TEMP DEG. C	CALCULA TED CV	% VALVE LIFT	VALVE O/L VELOCITY
		VALVE TYPE							
		* MAX SHUT OFF PRESS ((KG/CM ² g)							
		* BODY DESIGN : PRESS ((KG/CM ² g) | TEMP (DEG. C)							
		* IBR FORM III-C							
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) KG.									
SEA WORTHY PACKING									

	TECHNICAL SPECIFICATION FOR AUXILIARY STEAM PRESSURE REDUCING & DESUPERHEATING STATION		SPEC. NO.: PE-TS-411-142-N101	
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Tag No.....	Quantity.....	Data Sheet No. PES-145-06-DS2-1
DATA SHEET-B		
DATA SHEET – C FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY THE BIDDER AFTER THE AWARD OF CONTRACT)		
POSITIONER	MFR. & MODEL NUMBER	
	BYPASS	GAUGES ENCL. CLASS
	INPUT SIGNAL (Kg / Cm ²)	
	OUTPUT SIGNAL (Kg / Cm ²)	
AIR FILTER REGULATOR	MFR. & MODEL NUMBER	
	AIR SUPPLY PRESS (Kg / Cm ² g)	
	OUTPUT PRESS (Kg / Cm ² g)	
	OUTPUT GAUGE	
	FILTER SIZE	
	AUTO DRAIN FEATURE	
AIR LOCK	MFR. & MODEL NUMBER	
	SET PRESS (Kg / Cm ²)	
	SUPPLY PRESS (Kg / Cm ²)	
	RESET TYPE	
	VENT PLUG	
LIMIT SWITCH	MFR. & MODEL NUMBER	
	OPEN posn	INT posn CLOSE posn
	CONTACT TYPE	
	RATING (AC / DC)	
	ENCLOSURE CLASS	
POSITION TRANSMITTER	MFR. & MODEL NUMBER	
	TYPE	
	SUPPLY	
	OUTPUT RATING	
	ACCURACY	
	ENCLOSURE CLASS	
SOLENOID VALVE	MFR. & MODEL NUMBER	
	RATING	
	OPERATION QU	ANTITY
	COIL INSULATION CLASS	
	ENCLOSURE CLASS	
HANDWHEEL	ORIENTATION	
JUNCTION BOX	NO. OF WAYS	
	SIZE	
	CABLE GLANDS (Size / Quantity)	
	ENCLOSURE CLASS	
	BODY MATERIAL	
I/P CONVERTER	INPUT SIGNAL	POWER SUPPLY
	SPLIT RANGE	
	ENCLOSURE CLASS	
	LINEARITY	
	HYSTERESIS	
Cu. Tubing & Fittings / per CV	15 Meters of ¼" PVC coated SS. Tubing, with 1 set of Fittings for connection to IA Header on one end and accessories on another end of CV	
PAINTING	COLOUR/SHADE	
	THICKNESS (DFT)	
	TYPE	
		COMPANY SEAL
		NAME
		SIGNATURE
		DATE

	TITLE DATASHEET-C STEAM DESUPERHEATER		SPEC. NO.: PE-TS-411-142-N101	
			SECTION-II	
			SHEET 1 OF 2	
INSTRUCTIONS TO BIDDER 1. Items which deviate from specification shall be marked with an asterisk (*) 2. This data sheet shall be submitted alongwith bid.				
SL.NO.	ITEM	UNIT	PARTICULARS	
1.0	TYPE OF DESUPERHEATER	-		
2.0	MODEL NO.	-		
3.0	NUMBER OFFERED	NOS.		
4.0	FLOW CAPACITY (OUTLET OF DESUPERHEATER)	T/HR		
5.0	STEAM PARAMETERS AT INLET			
5.1	PRESSURE	KG/CM ² A		
5.2	TEMPERATURE	°C		
5.3	FLOW	T/HR		
6.0	STEAM PARAMETERS AT OUTLET			
6.1	PRESSURE	KG/CM ² A		
6.2	TEMPERATURE	°C		
7.0	SPRAY WATER PARAMETERS			
7.1	PRESSURE	KG/CM ² A		
7.2	QUANTITY	T/HR		
8.0	DESIGN PARAMETERS OF DESUPERHEATER BODY			
8.1	PRESSURE	KG/CM ² G		
8.2	TEMPERATURE	°C		
9.0	DESIGN PRESSURE OF SPRAY NOZZLE	KG/CM ² G		
10.0	TYPE OF SPRAY NOZZLE			
10.1	FIXED / VARIABLE AREA ORIFICE			
10.2	SINGLE HOLE / MULTI HOLE			
Name of Bidder / Vendor			Project	
Revision Number	0	1	2	3
Signature of Bidder / Vendor / Authorised Representative				
Date				
BIDDER'S SEAL				

	TITLE DATA SHEET - C STEAM DESUPERHEATER		SPECIFICATION NO. PE-TS-411-142-N101	
			SECTION-II	
			SHEET	2	OF	2
INSTRUCTIONS TO BIDDER 1. Items which deviate from specification shall be marked with an asterisk (*) 2. This data sheet shall be submitted alongwith bid.				
SL.NO.	ITEM	UNIT	PARTICULARS	
11.0	NUMBER OF SPRAY NOZZLE / TURNDOWN RATIO			
12.0	SPRAY WATER NOZZLE CHARACTERISTICS			
13.0	SIZE OF ORIFICE	MM		
14.0	MIN. VELOCITY ACCEPTABLE IN THE DESUPERHEATER PIPE	M/SEC		
15.0	END CONNECTIONS TYPE & SIZE			
15.1	DESUPERHEATER INLET / OUTLET			
15.2	SPRAY WATER INLET			
16.0	MATERIAL OF CONSTRUCTION			
16.1	BODY			
16.2	SPRAY NOZZLE			
17.0	OVERALL DIMENSIONS	MM		
18.0	WEIGHT OF DESUPERHEATER	KG		
19.0	MOUNTING RECOMMENDATIONS (IF ANY)			
20.0	DESIGN CODE			
21.0	HYDRAULIC TEST PRESSURE	KG/CM ² G		
Name of Bidder / Vendor			Project	
Revision Number	0	1	2	3
Signature of Bidder / Vendor / Authorised Representative				
Date				
BIDDER'S SEAL				



**TECHNICAL SPECIFICATION FOR
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SCHEDULE OF TECHNICAL DEVIATION/ CLARIFICATION

S. No.	Document Ref/ Title / Section	Page No.	Clause No.	Description	Deviation/ Clarification