

NATIONAL THERMAL POWER CORPORATION LIMITED
VINDHYACHAL STPP STAGE-V (1 x 500 MW)
TG PACKAGE

TECHNICAL SPECIFICATION
FOR
CONTROL VALVES WITH ACCESSORIES
(Pneumatically Operated)

VOLUME II-B & III

SPECIFICATION No: PE-TS-388-145-I 104



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

1.0 The tender document contains three (3) volumes. The bidder shall meet the requirements of all the three volumes.

1.1 **Volume-I** (CONDITIONS OF CONTRACT)

This consists of four parts as below :-

Volume-IA : This part contains instructions to bidders for making bids to BHEL.
Volume-IB : This part contains general commercial conditions of the tender & includes provision that vendor is responsible for the quality of item supplied by their sub-vendors.
Volume-IC : This part contains special conditions of contract.
Volume-ID : This part contains commercial conditions for erection & commissioning site work, as applicable.

1.2 **Volume-II** TECHNICAL SPECIFICATIONS

Technical requirements are stipulated in Volume-II which comprises of :-

Volume-IIA : General Technical Conditions
Volume-IIB : Technical Specification including Drawings, if any.

1.2.1 **Volume-IIB**

This volume is sub-divided into following sections :-

Section-A : This section outlines the scope of enquiry.
Section-B : This section provides "Project Information".
Section-C : This section indicates technical requirements specific to the contract, not covered in Section-D.
Section-D : This section comprises of technical specifications of equipments complete with data sheet A, B and C.

Data Sheet - A specifies data and other requirements pertaining to the Equipment.

Data Sheet - B Specifies data to be filled by the bidder (Data Sheet-B is contained in Volume-III).

Data Sheet - C Indicates data/documents to be furnished after the award of contract as per agreed schedule by the vendor (as applicable).

1.2.2 **Volume-III** **TECHNICAL SCHEDULES**

This volume contains technical schedules and Data Sheets-B, which are to be duly filled by the bidder and the same shall be furnished with the technical bid as per instructions given in Document No. PE-SS-999-100-Q-002 in Volume-III.

2.0 The requirements mentioned in Section-C / Data Sheets-A of section-D shall prevail and govern in case of conflict between the same and the corresponding requirements mentioned in the descriptive portion in Section-D.

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BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT DIVISION
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	<p>Technical specification for Control Valves with Accessories (Pneumatically Operated)</p> <p>VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE</p>	SPECIFICATION NO. PE-TS-388-145-I104	
		VOLUME II-B	
		SECTION	
		REV. NO. 00	DATE: 18/07/2012
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**TECHNICAL SPECIFICATION
FOR
CONTROL VALVES WITH
ACCESSORIES
(Pneumatically Operated)**

**VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE**

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION A


REV. NO. 00

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**SECTION – A
SCOPE OF ENQUIRY**

	TECHNICAL SPECIFICATION FOR CONTROL VALVES WITH ACCESSORIES (Pneumatically Operated)		SPEC NO.: PE-TS-388-145-I 104	
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SCOPE OF ENQUIRY

1. SCOPE

- 1.1 This specification covers the Design, Manufacture, Inspection and Testing at manufacturer's works, proper packing for transportation and delivery to site of the **Control Valves with Pneumatic Actuator along with Accessories, Start-up/Commissioning and Mandatory Spares** as mentioned in different sections of this specification for **1X500 MW VINDHYACHAL STPP STAGE-V - TG PACKAGE**.
- 1.2 The quality plan enclosed forms the minimum requirement but not limited to be adhered to by the bidder. Bidder to sign and stamp the same and submit along with the offer as an acceptance.
- 1.3 Bidder to note that CV test is required to be conducted on one type per size, CV value. Bidder to group such valves and indicates the same along with the price bid. Unpriced portion to be submitted to engineering.
- 1.4 Following signed & stamped documents with company seal to be submitted by bidder.
- Complete offer including calculation sheets, catalogues etc.
 - Quality Plan
 - Datasheet A & B, duly filled
 - Schedule of prices & unit prices, inspection schedule
 - Schedule of submission of drawings/documents, equipment manufacture, inspection & dispatch.

2 GENERAL TECHNICAL INSTRUCTIONS

- 2.1 It is not the intent here to specify all the details of design and manufacture. However, the equipment shall conform in all respects to high standard of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to the customer / consultant, who will interpret the meaning of drawing and specification and shall be entitled to reject any component or material which in his judgment is not in full accordance herewith.
- 2.2 The omission of specific reference to any component / accessory necessary for the proper performance of the equipment's shall not relieve the supplier of the responsibility of providing such facilities to complete the supply within the quoted prices.
- 2.3 BHEL' s / NTPC' s representatives shall be given access to the shop in which the equipment's are being manufactured or tested and all test records shall be made available to them.
- 2.4 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 / NTPC.



TECHNICAL SPECIFICATION
FOR
CONTROL VALVES WITH
ACCESSORIES
(Pneumatically Operated)
VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B


SECTION B


REV. NO. 00


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SECTION – B
PROJECT INFORMATION

CLAUSE NO.	PROJECT INFORMATION																										
1.00.00	BACKGROUND Vindhyachal Super Thermal Power Project was conceived as a pit head coal based super thermal power plant of 2260 MW (6x210 MW + 2X500 MW) for which land was acquired during stage-I of the project. the capacity of the project was increased to 4260 MW by adding two units of 500 Mw each under Stage-III and two units of 500 MW each under Stage-IV of the project. Futtther, the capacity of the project was increased to 4760 MW by adding one unit of 500 MW under Stage-V. Stage-I, li & III of the project comprising of six units of 210 Mw + two units of 500 MW + two units of 500 MW are under commercial operation .Two units of 500 Mw under stage-IV and one unit of 500 MW under stage V of the project is under implmenetation. The capacity after implementation of Stage-V of the project shall be 4760 MW.																										
2.00.00	CAPACITY <table><tr><th>Stage</th><th>Capacity</th><th>Status</th></tr><tr><td>I</td><td>6X210 MW</td><td>Under Commercial Operation</td></tr><tr><td>II</td><td>6X500 MW</td><td>Under Commercial Operation</td></tr><tr><td>III</td><td>2X500 MW</td><td>Under Commercial Operation</td></tr><tr><td>IV</td><td>2X500 MW</td><td>Presently under implementation</td></tr><tr><td>V</td><td>1xx500 MW</td><td>Presently under implmentation</td></tr></table>				Stage	Capacity	Status	I	6X210 MW	Under Commercial Operation	II	6X500 MW	Under Commercial Operation	III	2X500 MW	Under Commercial Operation	IV	2X500 MW	Presently under implementation	V	1xx500 MW	Presently under implmentation					
Stage	Capacity	Status																									
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II	6X500 MW	Under Commercial Operation																									
III	2X500 MW	Under Commercial Operation																									
IV	2X500 MW	Presently under implementation																									
V	1xx500 MW	Presently under implmentation																									
3.00.00	LOCATION AND APPROACH: The plant is located in Sidhi district of Madhya Pradesh, having a latitude and longitude of 24° 6' N and 82° 40' E respectively. Major rail and road distances from the project site are as under: <table><tr><th rowspan="2"><u>Between</u></th><th colspan="2"><u>Distance (Kms)</u></th></tr><tr><th><u>By Road</u></th><th><u>By Rail</u></th></tr><tr><td>Vindhyachal – Lucknow</td><td>435</td><td>475</td></tr><tr><td>Vindhyachal – New Delhi</td><td>850</td><td>925</td></tr><tr><td>Vindhachal- Sidhi</td><td>095</td><td>-</td></tr><tr><td>Vindhyachal- Bhopal</td><td>610</td><td>590</td></tr><tr><td>Vindhyachal- Mirzapur</td><td>175</td><td>175</td></tr><tr><td>Vindhyachal – Varanasi</td><td>220</td><td>-</td></tr></table> The Vicinity Plan of the project is enclosed as Annexure A-I .				<u>Between</u>	<u>Distance (Kms)</u>		<u>By Road</u>	<u>By Rail</u>	Vindhyachal – Lucknow	435	475	Vindhyachal – New Delhi	850	925	Vindhachal- Sidhi	095	-	Vindhyachal- Bhopal	610	590	Vindhyachal- Mirzapur	175	175	Vindhyachal – Varanasi	220	-
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VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A	PROJECT INFORMATION	PAGE 1 OF 13																							

CLAUSE NO.	PROJECT INFORMATION			
4.00.00	LAND REQUIREMENT A total area of 5378 acres of land was acquired for the project during implementation of Stage-I. The plant facilities and township for this project would be accommodated in the land acquired during Stage-I of the project. However, for ash dyke, approximately 260 acres of land is proposed to be acquired.			
5.00.00	COAL AVAILABILITY AND LINKAGE Coal requirement for Vindhyachal STPP, Stage-I, II & III is presently being met from Northern Coal Fields (NCL). The daily coal requirement for one 500 MW Unit shall be about 2.87 MTPA at 90% PLF. For FR purposes, coal from NCL has been considered.			
6.00.00	COAL TRANSPORTATION Coal requirement for Stage-V shall be met from Stage-IV itself. Accordingly Stage-IV CHP capacity has been selected as 2000 MTPH. Coal input to Stage-IV & Stage-V may be from BOBR or BOX N wagons.			
7.00.00	RAILWAY SIDING For bringing the equipment and material to the power house through rail, a permanent railway siding has already been constructed during Stage-I, II & III. This siding is proposed to be extended upto Stage-V of the project to provide rail access to unloading bays and transformer yard.			
8.00.00	COOLING WATER REQUIREMENT, SOURCE, COMMITMENT AND SYSTEM The source of raw water for the project is hot water Discharge channel of CW System of Singrauli STPP as that of in existing Stage-I, II, III & IV of Vindhyachal STPP. Raw water is proposed to be used for meeting the complete water requirement of the project. Normal Make up water requirement for this project would be about 1800 M ³ /hr with ash water re-circulation system and 2800 m ³ /hr with once thru system. The total commitment for the project is 180 Cusecs and the same has been duly concurred by CWC. The make-up water requirement of Stage-V will be about 20 Cusecs which shall be met from surplus water available within existing commitment.			
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A	PROJECT INFORMATION	PAGE 2 OF 13

CLAUSE NO.	PROJECT INFORMATION		
9.00.00	<p>METREOLOGICAL DATA</p> <p>Important Metreological Data from nearest observatory at Sidhi is placed at Annexure B-I.</p>		
11.00.00	<p>PLANT WATER SCHEME</p> <p>The Plant water scheme is described below.</p>		
11.01.00	<p>Condenser Cooling (CW) Water System</p> <p>It is proposed to provide recirculating type CW system with induced draft type cooling towers, Raw water for Stage – V of this project shall be pumped from the hot water (CW system) discharge channel of Singrauli Project of NTPC to Water pretreatment Plant. The treated clarified water shall be pumped to the Stage – V circulating Water (CW) system as make up to the system. It is proposed to operate the CW system at a C.O.C. of about 4 and chemical treatment programme (using acid dosing and scale cum corrosion inhibitors dosing) shall be employed in addition to blow down of CW water to control the CW system water chemistry. The expected circulating water analysis is given in Annexure C-I of the Sub-section.</p>		
11.02.00	<p>Equipment Cooling Water (ECW) System (Unit Auxiliaries)</p> <p>The plant auxiliaries of Steam Generator shall be cooled by Demineralised water (DM) in a closed circuit. The primary circuit DM water shall be cooled through plate type heat exchangers by Circulating Water tapped from CW system in a closed secondary circuit. The hot secondary circuit cooling water shall be cooled in the cooling towers and shall be returned back to the system.</p>		
11.03.00	<p>Ash Water System</p> <p>(a) It is proposed to operate ash water system in a closed circuit. The ash water from the ash dyke shall be recirculated. During re-circulation mode, the make up to the ash water system (to compensate for the ash water blow down and evaporation loss in ash dyke) shall be supplied from CW blow down.</p> <p>(b) During initial operating stage of the project, when decanted ash water is not available from the dyke, the ash water system shall be operated in once through mode. The make-up water to ash water system shall be pumped from the raw water (from the discharge channel of Singrauli station) source and CW blow down water.</p>		
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A	PROJECT INFORMATION PAGE 3 OF 13

CLAUSE NO.	PROJECT INFORMATION		
11.04.00	<p>(c) Considering total ash handling plant water requirement of 1100 Cu.M/hr. for slurry formation during re-circulation mode operation, it is expected that about 970 M³/hr of decanted ash water shall return to the ash handling system after accounting for evaporation loss.</p> <p>(d) The quality of raw water is given at Annexure B-III.</p> <p>Other Miscellaneous Water Systems</p> <p>(a) CW system blow down water shall be used for the dust suppression system of coal handling plant, ash slurry pumps sealing, make-up to ash handling plant, make-up to fire water storage tanks and cooling water requirement of hydrogen generation plant. The service (wash water) water collected from various areas shall be treated using oil water separators, tube settlers, coal settling pits etc. as per requirement and treated water from liquid effluent treatment plant shall be recycled back to the service water system for re-use. The excess service water shall be led to central monitoring basin for disposal.</p> <p>(b) Separate water Pre-treatment plants are proposed for Circulating water (PT-CW) system and Demineralisation Plant (PT-CW) plant.</p> <p>(c) It is proposed to provided a DM plant for this stage of the project. From the proposed DM plant DM water shall be pumped to meet the Steam Cycle make-up water requirement, makeup the hydrogen generation plant and makeup to the primary circuit of ECW (unit auxiliaries) system, boiler fill water shall be provided from Demineralising plant. In addition, separate set of boiler fill pumps shall be provided to fill the boiler from these DM water storage tanks, DM water required for regeneration of condensate polishing plant and resin transfer operation shall also be provided by these tanks.</p> <p>(d) The quality of filtered (potable) water and DM water is given in Annexure -B-III of this sub-section.</p>		
12.00.00	<p>CRITERIA FOR WIND RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT</p> <p>All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed for wind forces as given in Sub-Section-D-1, Part-B, Section-VI, i.e. Technical Specification for Civil and Structural Works.</p>		
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A	PROJECT INFORMATION PAGE 4 OF 13

CLAUSE NO.	PROJECT INFORMATION			एनटीपीसी NTPC
13.00.00	<p>CRITERIA FOR EARTHQUAKE RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT</p> <p>All power plant structures and equipment, including plant auxiliary structures and equipment shall be designed for seismic forces as given in Sub-Section-D-1, Part-B, Section-VI, i.e. Technical Specification for Civil and Structural Works.</p>			
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A	PROJECT INFORMATION	PAGE 5 OF 13

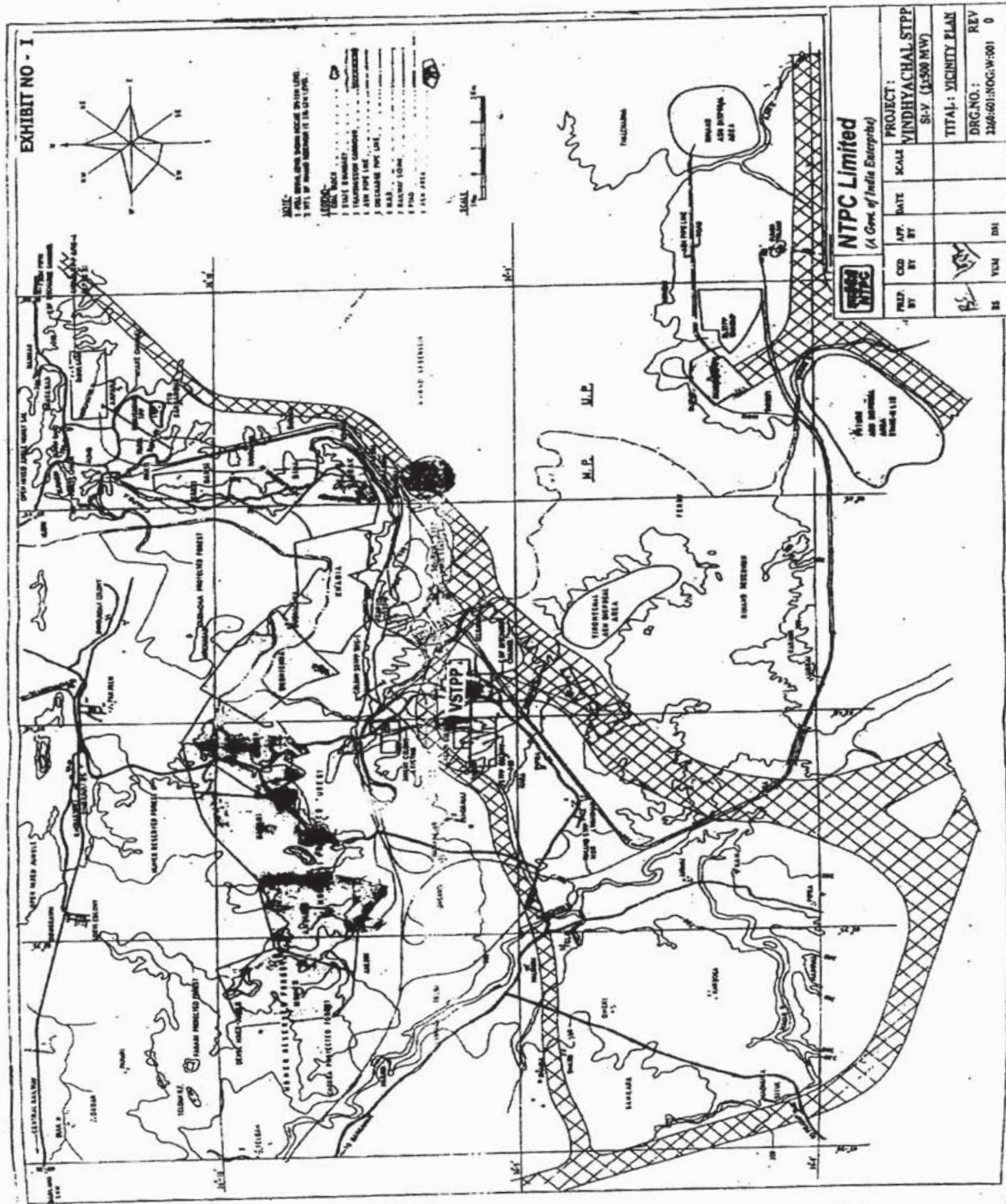
CLAUSE NO.

PROJECT INFORMATION



VICINITY PLAN

ANNEXURE A-I



VINDHYACHAL SUPER THERMAL POWER PROJECT
STAGE-V (1X500 MW)
STEAM TURBINE GENERATOR PACKAGE

TECHNICAL SPECIFICATIONS
SECTION-VI
PART-A

PROJECT
INFORMATION


PAGE
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METROLOGICAL DATA

ANNEXURE B-1
PAGE 2 OF 2

[illegible]

CLAUSE NO.	PROJECT INFORMATION			<div>एनटीपीसी NTPC</div>
				ANNEXURE C-I PAGE 1 OF 5
	COOLING WATER ANALYSIS			
	Constituent	as	mg per litre	
1.	Calcium	CaCO ₃	148.0	
2.	Magnesium	CaCO ₃	37.5	
3.	Sodium & Potassium	CaCO ₃	47.5	
4.	Bicarbonate	CaCO ₃	104.5	
5.	Chloride	CaCO ₃	47.5	
6.	Sulphate	CaCO ₃	81.0	
7.	Corbonate	CaCO ₃	0	
8.	Silica	SiO ₂	25.0	
9.	Iron	Fe	.75	
10.	pH Value	-	7.6-7.9	
11.	Turbidity	NTU	50	
	Note: The C.W system is expected to operate at about 4.0 Cycles of concentration.			
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A		PROJECT INFORMATION PAGE 9 OF 13

CLAUSE NO.	PROJECT INFORMATION			
				ANNEXURE C-I PAGE 2 OF 5
	RAW WATER ANALYSIS			
	Constituent	as	mg per litre	
1.	Calcium	CaCO ₃	34.0	
2.	Magnesium	CaCO ₃	15.0	
3.	Sodium & Potassium	CaCO ₃	19.0	
4.	Bicarbonate	CaCO ₃	46.0	
5.	Chloride	CaCO ₃	12.0	
6.	Sulphate	CaCO ₃	10.0	
7.	Corbonate	CaCO ₃	0	
8.	Silica	SiO ₂	10.0	
9.	Iron	Fe	2.0	
10.	pH Value	-	7.6-8.2	
11.	Turbidity	NTU	upto 1000	
12.	Temperature (°C)		43	
	Note: Raw water from hot water channel of Singrauli STPP.			
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A		PROJECT INFORMATION PAGE 10 OF 13

CLAUSE NO.	PROJECT INFORMATION			
				ANNEXURE C-I PAGE 3 OF 5
	CLARIFIED WATER ANALYSIS			
	Constituent	as	mg per litre	
1.	Calcium	CaCO ₃	59.2	
2.	Magnesium	CaCO ₃	15.0	
3.	Sodium & Potassium	CaCO ₃	19.0	
4.	Bicarbonate	CaCO ₃	41.7	
5.	Chloride	CaCO ₃	19.0	
6.	Sulphate	CaCO ₃	32.5	
7.	Corbonate	CaCO ₃	0	
8.	Silica	SiO ₂	10.0	
9.	Iron	Fe	.0.30	
10.	pH Value	-	7.6-8.2	
11.	Turbidity	NTU	10	
12.	Temperature (°C)		43	
	Note: At the outlet of clarifier of PT Plant			
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A		PROJECT INFORMATION
				PAGE 11 OF 13

CLAUSE NO.	PROJECT INFORMATION			<div>एनडीपीसी NTPC</div>
				ANNEXURE C-I PAGE 4 OF 5
	FILTERED WATER ANALYSIS (Drinking Water)			
	Constituent	as	mg per litre	
1.	Calcium	CaCO ₃	59.2	
2.	Magnesium	CaCO ₃	15.0	
3.	Sodium & Potassium	CaCO ₃	19.0	
4.	Bicarbonate	CaCO ₃	41.7	
5.	Chloride	CaCO ₃	19.0	
6.	Sulphate	CaCO ₃	32.5	
7.	Corbonate	CaCO ₃	0	
8.	Silica	SiO ₂	10.0	
9.	Iron	Fe	0.30	
10.	pH Value	-	7.5-7.7	
11.	Turbidity	NTU	2	
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-A		PROJECT INFORMATION PAGE 12 OF 13

CLAUSE NO.	PROJECT INFORMATION			<div>एनडीपीसी NTPC</div>																								
	<div>ANNEXURE C-I PAGE 5 OF 5</div> <div>ANALYSIS OF DM WATER TO BE USED FOR MAKE-UP WATER TO CONDENSER</div> <table><tr><th>Sl. No.</th><th>Characteristics</th><th></th><th>Value</th></tr><tr><td>1.</td><td>Silica (Max.)</td><td>-</td><td>0.02 ppm as SiO₂</td></tr><tr><td>2.</td><td>Iron as Fe</td><td>-</td><td>Nil</td></tr><tr><td>3.</td><td>Total hardness</td><td>-</td><td>Nil</td></tr><tr><td>4.</td><td>pH value</td><td>-</td><td>6.8 to 7.2</td></tr><tr><td>5.</td><td>Conductivity</td><td>-</td><td>Not more than 0.1 excluding the effects of free CO₂</td></tr></table>			Sl. No.	Characteristics		Value	1.	Silica (Max.)	-	0.02 ppm as SiO ₂	2.	Iron as Fe	-	Nil	3.	Total hardness	-	Nil	4.	pH value	-	6.8 to 7.2	5.	Conductivity	-	Not more than 0.1 excluding the effects of free CO ₂	
Sl. No.	Characteristics		Value																									
1.	Silica (Max.)	-	0.02 ppm as SiO ₂																									
2.	Iron as Fe	-	Nil																									
3.	Total hardness	-	Nil																									
4.	pH value	-	6.8 to 7.2																									
5.	Conductivity	-	Not more than 0.1 excluding the effects of free CO ₂																									
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE	TECHNICAL SPECIFICATIONS SECTION-VI PART-A	PROJECT INFORMATION	PAGE 13 OF 13																									



TECHNICAL SPECIFICATION FOR

CONTROL VALVES WITH ACCESSORIES (Pneumatically Operated)

**VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE**

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION C

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SECTION-C

SPECIAL TECHNICAL REQUIREMENT



Technical specification for
Control Valves with Accessories
(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V
(1x500 MW)
TG PACKAGE

SPEC NO.: **PE-TS-388-145-I 104**

VOLUME **II-B**

SECTION **C**

REV. NO. 00

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SPECIFIC TECHNICAL REQUIREMENTS.

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

- 1) For Actuator selection, bidder to take care of clause no. 5.00.00 at Section III-C08, NTPC spec. Attached in subsequent part of this section (Section-C)
- 2) Bidder to note that data sheet-B, Format "Schedule of submission of Drawings / Documents, Equipment Manufacture, Inspection and Despatch" enclosed in Section-D, to be signed and stamped and submitted with the bid. Quality Plan enclosed in Volume-IIB should be furnished duly signed and stamped. NO DEVIATION IS ACCEPTABLE.
- 3) All the formats in Volume-III should be filled-up and furnished with the bid, complete in all respect. Catalogue, Leaflets related with the models of Control Valves as well as each Accessory must be furnished with the offer. In the absence of those, the bid would be considered incomplete and liable for rejection.
- 4) The Hook-up diagram for Control valve is attached in Section-C. The Bidder's scope starts from isolation valve at Inst. Air Supply header. The suitable Connector required for connection of pneumatic tubing to isolation valve at Inst. Air Header is also in bidder's scope. The connection details at inst air valve shall be furnished to the successful bidder after the award of contract.
- 5) 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 specification clause nos. 1.02.00 and its sub-clauses, furnished at section-C (Control Valve and Actuators, Section III C-08, NTPC spec, Sec-VI, PART B-2, 6sheets). In case of any contradiction in requirements (of sizing of Control Valve) between clause 3.1.7 of Spec. no. PES-145-06 enclosed in Section-D AND clause 1.02.00 and its sub-clauses at section-C (Control Valve and Actuators, Section IIIC-08, NTPC spec, Sec-VI, PART B 6 sheets), the requirement of clause 1.02.00 and its sub-clauses will prevail.**
- 6) 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 200 Deg C.
- 7) Valve and actuator shall be designed for full differential pressure (Max. shut-off pressure).
- 8) Tolerances on end to end, center to center, center to face shall be in accordance with ASME B16.10.



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(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V
(1x500 MW)
TG PACKAGE

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- 9) Anticavitation trims shall be provided for valves with cavitation services and hardened trims for flashing services.
- 10) Valve type like cavitation/flashing/ high DP has been indicated in the data sheet. Bidder to offer the valve accordingly. However if process is Cavitating, although not indicated in the valve type, bidder to offer Anticavitation trim.
- 11) Noise abatement mentioned shall be obtained by valve body and trim design & not by any external means.
- 12) Control valve accessories shall be fitted on the valve body. Integral pneumatic tubing shall be $\frac{1}{4}$ " OD PVC coated copper, and fittings shall be of brass. Applicable accessories shall be terminated at the junction box (mounted on the body).
- 13) Type of flow action ("under the seat" or "over the seat") will be selected by the bidder. However wherever downstream side is subjected to vacuum, flow action shall be "flow to close" (over the seat). Specific mention for the same has not been made in the datasheets.
- 14) Trim material and body material has been specified in the Datasheets-A. Bidder to offer body material & trim material combinations equivalent or better than the material specified in Datasheets-A. Wherever there is deviation from the datasheets, bidder to furnish the documentary proof for confirming superior trim material/ body material selection along with their offer. BHEL/NTPC reserves the right to accept/reject any variation to the specification.
- 15) Trim supplied shall be suitable for quick changing and trim exit velocity shall be limited to avoid cavitation.
- 16) The sizing procedure followed shall be as per latest edition of ANSI/ISA or equivalent standard.
- 17) The End Connections Shall Be Socket Welded For Sizes Below 50NB And Butt Welded For Sizes 50NB And Above.
- 18) Stem material for all Control Valves shall be SS 316 STELLITED.
- 19) Facility to adjust the maximum travel of stem & starting point of travel shall be incorporated.
- 20) Bidder to furnish the list of all control valves for which Cv test is to be carried. Cv test shall be carried out for each type of control valve(of same size,Cv,trim characteristics). Cv test reports shall be verified by BHEL/NTPC.Type test certificate shall also be acceptable.Bidder to note that only those type test reports for same type of control valves shall be offered for verification which are not older than 3 years from the date of Part 1 opening (receipt of technical unpriced offer).



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- 21) Calculation of Cv, noise level, valve outlet velocity, trim exit velocity, actuator sizing, data sheet-c in line with data sheet-A of specification, dimensional drawings / edge preparation details, etc shall be submitted for BHEL/NTPC review and approval, to reach BHEL within 15 days after receipt of LOI.
- 22) 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.
- 23) 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 without any commercial implication and time delay.
- 24) Limit switch, position feedback shall be terminated up to JB by 0.5 mm²/PVC/Cu/1.1kv/FRLS shielded control cables. Solenoid valve shall be terminated by 2.5 mm² size cable.
- 25) SS nameplate for 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 pressure at full open and close condition.
- 26) Open to close and close to open time of pneumatic actuator (modulating type) shall be less than 10 sec. Bidder to include volume booster if required to achieve fast response time < 10 sec for on/off type control valve also, the actuator shall have a response time less than 10 sec.
- 27) Specification of electrical actuator shall not be considered.
- 28) Hand wheel shall have open/close direction.
- 29) Air filter regulator shall be designed for an inlet pressure of 5-8 kg/cm².
- 30) Limit switch shall be designed for 1, 00,000 operations.
- 31) Expander/reducer shall be in BHEL's scope of supply.
- 32) JB shall be 36 ways as per enclosed hook-up diagram.
- 33) Pneumatic connection: for each control valve 12 meters length (for each leg of 1/4" size light drawn tempered) copper tubing conforming to ASTM B75 shall be used. Thickness shall not be less than 0.065 inch and shall be PVC coated. Fittings to be used with copper tubes shall be cast brass, screwed type including SS connection to suit 15 NB size screwed root valves

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(as per is-554). Copper tubes shall be provided for connection between air filter regulators & root valves.

34) Inspection shall be carried out in line with approved drawing/ data sheet/ QP & specific technical requirements

35) Third party inspection: customer shall witness the inspection for control valves and Cv test at the manufacturer's works/ FCRI, PALAKKAD. Bidder to inform 15 days before the date of inspection.

36) 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.

37) **SPARES:** The following spares are required to be offered

(A) **Mandatory spares to be considered as separate package. Mandatory spares to be packed in different colour & shipped separately. Marking on mandatory spares must be in different colour from main supply so that these are easily identifiable at site.**

(B) **Recommended Spares:**

In addition to the Mandatory spares mentioned, the bidder shall also furnish a List of Recommended spares for 3 years of normal operation of the Control valves / Accessories. The BHEL/NTPC reserves the right to buy any or all of the recommended spares.

The prices of these spares will remain valid for a period of minimum 6 months after the placement of order.

(C) **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 format for price schedule to be filled-up by the bidder is enclosed in Volume-III

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.

38) 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.



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39) SMART POSITIONER

- i) The smart positioner shall accept 4-20 mA signal from the control system as input and provide a compatible signal for driving the pneumatic actuator.
- ii) In addition to the electrical-to-pneumatic signal conversion and positioning functions, it shall also perform detailed diagnostics & make available the actuator/control valve faults via hart interface. The hart signal for the detailed faults shall be superimposed on the 4-20 ma control signal itself. The faults to be covered shall include valve jamming, air supply failure, leakage etc.
- iii) It shall have facility of characterisation of the valve (i.e. equal percentage, quick opening, linear, etc.) in the positioners itself.
- iv) Bidder to include in their offer, if any software is required to be installed on the HMS pc (HMS in BHEL'S scope) to communicate with the smart positioners and to access the diagnostic features of the smart positioners. Bidder to furnish price for such software in their offer.
- v) The positioner shall have the facility of detection of control signal failure and making the valve either stayput/open/close as per process requirement upon this condition.
- vi) The smart positioner shall have the fail-freeze feature.

40) Bidder to provide Cast Steel (CS) yokes for CEP Minimum Recirculation valves (Tag nos. CDV-10/12/14). Cast Iron (CI) yokes are Not Acceptable for this service.

41) Documentation:

(A) Along with the bids: following documents for respective projects separately

- a) Signed and stamped compliance certificates in attached format (VOL.-III).
- b) Schedule of prices in attached format (VOL.-III).
- c) Schedule of submission of Drg. / Doc, Equip. Manufacture, Inspection and Dispatch.
- d) Inspection schedule



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(B) After the award of contract:

The documentation as listed below will separate for respective projects

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.
- 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 finalised.
- i. Bar chart to indicate the time schedule for procurement, manufacture, testing and dispatch.


(C) Final documentation:


Copies of documents / drawings to be furnished by the successful bidder shall be as follows:


- a. Assembly (dimensional) drawings, calculations, edge preparation details/datasheets/QP for approval - 15 sets.
- b. Category-I & IV approved final drawings /datasheets - 15 sets with CD - ROMS.
- c. Valve sizing calculations, noise level calculations and outlet velocity calculations - 15 sets with 2 CD - ROMS
- d. Test certificates - 15 sets.
- e. "As built" drawings - 15 sets.
- f. Operation & maintenance manuals - 15 sets.


CLAUSE NO.	TECHNICAL REQUIREMENTS	<div>एन टी पी सी NTPC</div>		
	<div>SUB-SECTION – IIIC - 08</div> <div>CONTROL VALVES AND ACTUATORS</div>			
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE	TECHNICAL SPECIFICATIONS SECTION-VI PART-B	SUB-SECTION-IIIC-08 CONTROL VALVES AND ACTUATORS	PAGE 1 OF 8	


CLAUSE NO.	TECHNICAL REQUIREMENTS			
	CONTROL VALVES AND ACTUATORS			
1.00.00	CONTROL VALVES, ACTUATORS & ACCESSORIES			
1.01.00	General Requirements			
1.01.01	The control valves and accessories equipment furnished by the Bidder shall be designed, constructed and tested in accordance with the latest applicable requirements of code for pressure piping ANSI B 31.1, the ASME Boiler & pressure vessel code, Indian Boiler Regulation (IBR), ISA, and other standards specified elsewhere as well as in accordance with all applicable requirements of the "Federal Occupational Safety and Health Standards, USA" or acceptable equal standards. All the Control Valves, their actuators and accessories to be furnished under this Sub-section will be fully suitable and compatible with the modulating loops covered under the Specification.			
1.01.02	All the control valves and accessories offered by the Bidder shall be from reputed, experienced manufacturers of specified type and range of valves.			
1.01.03	This specification does not cover special type of control valves such as combined pressure and temperature control valve for Aux PRDS applications, Separator Drain Control Valves etc.			
1.02.00	CONTROL VALVE SIZING & CONSTRUCTION			
1.02.01	The design of all valve bodies shall meet the specification requirements and shall conform to the requirements of ANSI (USA) for dimensions, material thickness and material specification for their respective pressure classes.			
1.02.02	The valve sizing shall be suitable for obtaining maximum flow conditions with valve opening at approximately 80% of total valve stem travel and minimum flow conditions with valve stem travel not less than 10% of total valve stem travel. All the valves shall be capable of handling at least 120% of the required maximum flow. Further, the valve stem travel range from minimum flow condition to maximum flow condition shall not be less than 50% of the total valve stem travel. The sizing shall be in accordance with the latest edition of ISA handbook on control valves. While deciding the size of valves, Bidder shall ensure that valves trim exit outlet velocity as defined in ISA handbook does not exceed 8 m/sec for liquid services, 150 m/sec. for steam services and 50% of sonic velocity for flashing services. Bidder shall furnish the sizing calculations clearly indicating the outlet velocity achieved with the valve size selected by him as well as noise calculations, which will be subject to Employer's approval during detailed engineering.			
1.02.03	Control valves for steam and water applications shall be designed to prevent cavitation, wire drawing, flashing on the downstream side of valve and down stream piping. Thus for cavitation/flashing service, only valve with anti cavitation trim shall			
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
	be provided. Detailed calculations to establish whether cavitation will occur or not for any given application shall be furnished.			
1.02.04	Control valves for application such as HP/LP heater Emergency level control, Emergency Make-up to Condenser hotwell, GSC minimum flow, Deaerator Drain to condenser hotwell, condensate spill to condensate reserve tank, condenser normal make-up and valve gland sealing supplying pressure control, CEPS minimum flow control, BFP recirculation control valve shall have permissible leakage rate as per leakage Class V. All other control valve shall have leakage rate as per leakage Class-IV.			
1.02.05	The control valve induced noise shall be limited to 85 dBA at 1 meter from the valve surface under actual operating conditions. The noise abatement shall be achieved by valve body and trim design and not by use of silencers.			
2.00.00	VALVE CONSTRUCTION			
2.01.00	All valves shall be of globe body design & straightaway pattern with single or double port, unless other wise specified or recommended by the manufacturer to be of angle body type. Rotary valve may alternatively be offered when pressure and pressure drops permit.			
2.02.00	Valves with high lift cage guided plugs & quick-change trims shall be supplied.			
2.03.00	Cast Iron valves are not acceptable.			
2.04.00	Bonnet joints for all control valves shall be of the flanged and bolted type or other construction acceptable to the Employer. Bonnet joints of the internal threaded or union type will not be acceptable.			
2.05.00	Plug shall be of one-piece construction cast, forged or machined from solid bar stock. Plug shall be screwed and pinned to valve stems or shall be integral with the valve stems.			
2.06.00	All valves connected to vacuum on down stream side shall be provided with packing suitable for vacuum applications (e.g. double vee type chevron packing)			
2.07.00	Valve characteristic shall match with the process characteristics.			
2.08.00	Extension bonnets shall be provided when the maximum temperature of flowing fluid is greater than 280 deg. C.			
2.09.00	Flanged valves shall be rated at no less then ANSI press class of 300 lbs.			
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CLAUSE NO.	TECHNICAL REQUIREMENTS				
3.00.00	VALVE MATERIALS				
	Sr. No.	Service	Body material	Trim Material	
	1	Non-corrosive, non-flashing and non-cavitation service except DM service	Carbon steel ASTM-A216 Gr. WCB for fluid temperature below 275 Deg. C Alloy steel ASTM-A217Gr. WC9 for fluid temperature above 275 Deg. C	316SS stellited with stellited faced guide posts and bushings.	
	2.	Severe flashing/cavitation services	Alloy steel ASTM-A217 Gr. 440 C WC9		
	3.	Low flashing/cavitation service	Alloy steel ASTM-A217 Gr. 17-4 PH SS WC6		
4.	DM water service	316 SS	316 SS		
	<p>NOTE Valve body rating shall meet the process pressure and temperature requirement as per ANSI B16.34.</p> <p>However, Bidder may offer valves with body and trim materials better than specified materials and in such cases Bidder shall furnish the comparison of properties including cavitation resistance, hardness, tensile strength, strain energy, corrosion resistance and erosion resistance etc. of the offered material vis-a-vis the specified material for Employer's consideration and approval.</p>				
4.00.00	END PREPARATION				
	<p>Valve body ends shall be either butt welded/socket welded, flanged (Rubber lined for condensate service) or screwed as finalised during detailed engineering and as per Employer's approval. The welded ends wherever required shall be butt welded type as per ANSI B 16.25 for control valves of sizes 65 mm and above. For valves size 50 mm and below welded ends shall be socket welded as per ANSI B 16.11. Flanged ends wherever required shall be of ANSI pressure-temperature class equal to or greater than that of the control valve body.</p>				
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE			TECHNICAL SPECIFICATIONS SECTION-VI PART-B		SUB-SECTION-IIIC-08 CONTROL VALVES AND ACTUATORS
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
5.00.00	VALVE ACTUATORS <p>All control valves shall be furnished with pneumatic actuators. The Bidder shall be responsible for proper selection and sizing of valve actuators in accordance with the pressure drop and maximum shut off pressure and leakage class requirements. The valve actuators shall be capable of operating at 60 deg.C continuously.</p> <p>Valve actuators and stems shall be adequate to handle the unbalanced forces occurring under the specified flow conditions or the maximum differential pressure specified. An adequate allowance for stem force, at least 0.15 Kg/sq.cm. per linear millimeter of seating surface, shall be provided in the selection of the actuator to ensure tight seating unless otherwise specified.</p> <p>The travel time of the pneumatic actuators shall not exceed 10 seconds.</p>			
6.00.00	CONTROL VALVE ACCESSORY DEVICES			
6.01.00	All pneumatic actuated control valve accessories such as air locks, hand wheels/hand-jacks, limit switches, microprocessor based electronic Positioner, diffusers, external volume chambers, position transmitters (capacitance or resistance type only), reversible pilot for Positioner, tubing and air sets, solenoid valves and junction boxes etc. shall be provided as per the requirements.			
7.00.00	SPECIFICATIONS FOR MICROPROCESSOR BASED ELECTRONIC POSITIONER			
	Electrical	Input Signal	4-20 mA	
		Power Supply	Loop Powered from the output card of Control System.	
		Hart Protocol	Compatibility For Remote Calibration & Diagnostics (Super-Imposed HART signal on Input Signal 4-20 mA)	
		Valve Position Sensing	Position Sensing (Non Contact-Type), 4-20 mA O/P Signal For Control System to be provided	
	Environment	Operating Temp	(-)30 To 80 Deg. C	
		Humidity	0-95 %	
		Protection Class	IP-65 Minimum	
	Remote Configuration and Diagnostics	a. The following functions shall be provided in the positioner: Remote Configuration, Calibration and Testing of the Actuator and advanced Diagnostic Features Like Stroke Counter or		
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE		TECHNICAL SPECIFICATIONS SECTION-VI PART-B		SUB-SECTION-IIIC-08 CONTROL VALVES AND ACTUATORS
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CLAUSE NO.	TECHNICAL REQUIREMENTS			
		Travel Counter, Leakage In Actuators, On Line Partial Closure Test, Valve Signature Analysis, Step Response Test, Valve Friction/ Jamming Detection etc. (See Note* below) b. Factory Valve Signature Tests Reports (Pr Vs Valve Travel And Travel Vs I/P Signal) are to be provided.		
	Tests Certificates	Test certificates as per Manufacturer Standard/Relevant Standard are to be submitted		
	Configuration/	Remote Calibration, Auto & Manual Calibration Shall Be Possible		
	Operating	Operating Range	Full Range & Split Range Signal Range	
	Modes	Valve Action	Direct & Reverse. Valve Action	
		Flow Characterisation	Possible To Fit Valve Characteristic Curve Linear & Equal Percentage	
	Fail Safe/Fail Freeze	Fail Safe/Fail Freeze Feature is to Be Provided.		
	Pneumatic	Air Capacity	Sufficient To Handle The Valves Selected/Boosters To Be Supplied If required.	
		Air Supply Pressure	To Suit The Air Supply Pressure/Quality Available.	
		Process Connection	1/4 Inch NPT	
	Performance	Characteristic Deviation	<=0.5 % Of Span	
		Ambient Temp Effect	<=0.01 %/Deg C Or Better	
	EMC & CE Compliance	Required To International Standard Like EN/IEC.	En50081-2 & En50082 Or Equivalent	
	Accessories	In Built Operator Panel	Display With Push Buttons For Configuration And Display On The Positioner Itself (Password Protected/Hardware Lock)	
		Hand Held Hart Calibrator	Universal Hart Calibrator To Be Provided, One Per Unit	
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CLAUSE NO.	TECHNICAL REQUIREMENTS 		
		Press Gauge Block	For Supply & Output Pr., Filter Regulator Other Accessories Shall Be Provided As On 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 On Required Basis
	* Note: Employer is providing a centralized HART management system including the HART multiplexing/interfacing system. The HART signals shall be picked up from marshalling terminals of DDCMIS (SG/TG DDCMIS as well as BOP DDCMIS), as applicable. The details of the above mentioned employer's HART management system are as below: The following functionalities are provided through software of the HART management system: 1. For electronic transmitters, temperature transmitters and analysers: a. Constant scanning to monitor faults or changes to instrument configuration. b. Employer-defined and standard calibration and configuration procedures for all transmitters. c. Constant signal data collection facilities to maintain continuously updated records. d. Automatic tracking of configuration changes made in the field, such as may be introduced by hand-held communicator. All configuration function associated with hand-held communicators shall be available in the system. e. Event and log reports on screen as well as on printer. f. Any addition/deletion of transmitter will be reported on printer and logged in hard disk. Above functionalities are achieved by the Employer's HART management system by providing industry standard softwares. Further, the positioners shall be monitored from the above described HART management system. To achieve this, Bidder shall provide the necessary software to achieve the functionalities described above under "Remote Configuration and		
VINDHYACHAL SUPER THERMAL POWER PROJECT STAGE-V (1X500 MW) STEAM TURBINE GENERATOR PACKAGE	TECHNICAL SPECIFICATIONS SECTION-VI PART-B	SUB-SECTION-IIIC-08 CONTROL VALVES AND ACTUATORS	PAGE 7 OF 8

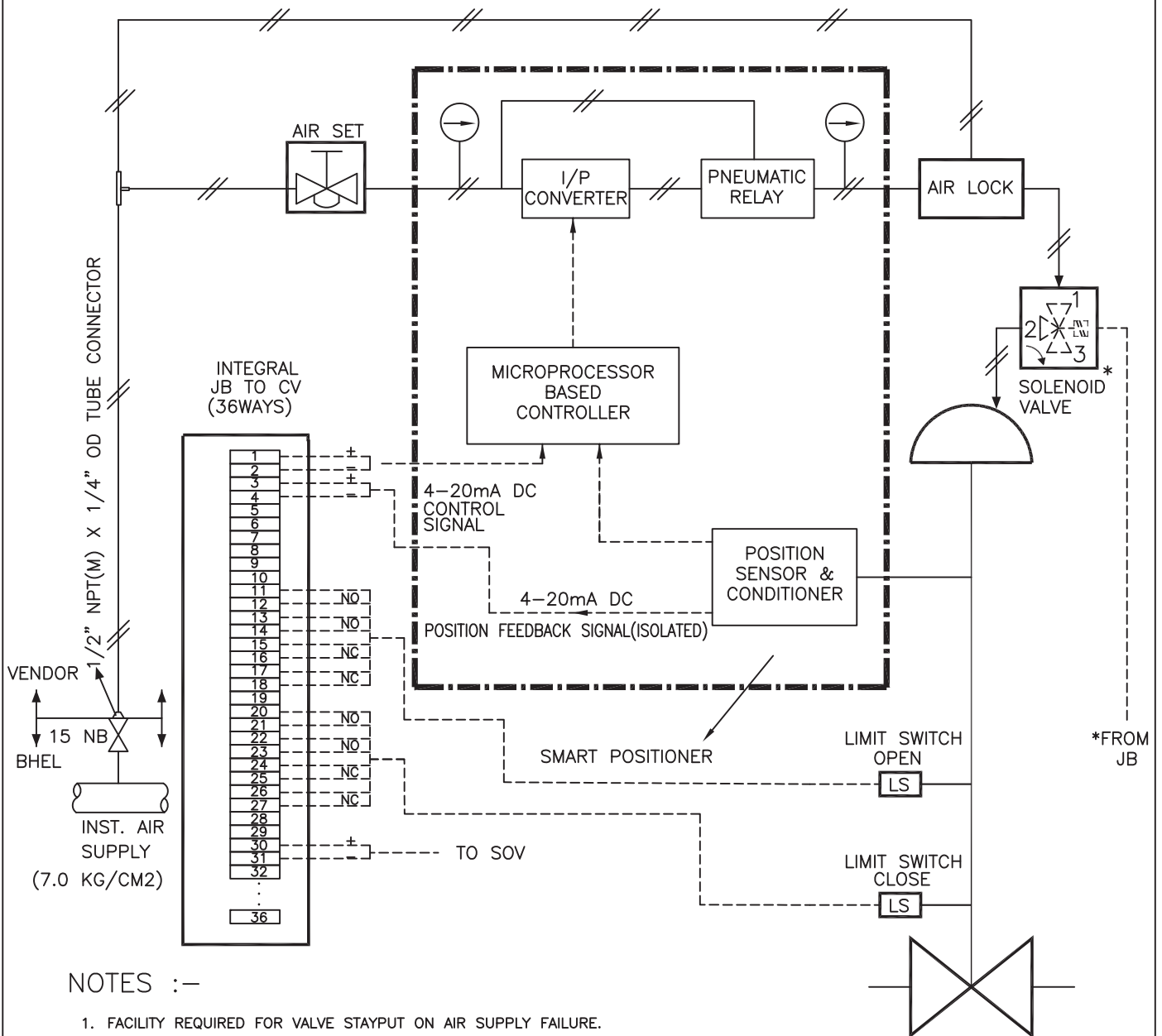
CLAUSE NO.	TECHNICAL REQUIREMENTS		
	<p>Diagnostics", and this software shall be loaded in the Employer's HART management system.</p> <p>Bidder has to list out in his bid the softwares that are compatible with his electronic positioners.</p> <p>8.00.00 TEST AND EXAMINATION</p> <p>All valves shall be tested in accordance with the quality assurance programme agreed between the Employer and Contractor, which shall meet the requirements of IBR and other applicable codes mentioned elsewhere in the specifications. The tests shall include but not be limited to the following:</p> <p>8.01.00 Non Destructive Test as per ANSI B-16.34.</p> <p>8.02.00 Hydrostatic shell test in accordance with ANSI B 16.34 prior to seat leakage test.</p> <p>8.03.00 Valve closure test and seat leakage test in accordance with ANSI-B 16.34 and as per the leakage class indicated above.</p> <p>8.04.00 Functional Test: The fully assembled valves including actuators control devices and accessories shall be functionally tested to demonstrate times from open to close position.</p> <p>CV Test: Please refer Sub-section-IV:110. (Type test requirements).</p> <p>8.05.00 CONTROL VALVE QUANTITIES</p> <p>Bidder shall furnish all the control valves under this main plant package as finalised during detailed engineering stage without any price repercussions whatsoever depending on the process requirements. All the control valves provided by the Bidder for this project shall meet the specifications requirements specified herein. Specification for control valves in this Sub-section has to be read in conjunction with other relevant Sub-sections of this specification.</p>		
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HOOK-UP DIAGRAM WITH SMART POSITIONER



NOTES :-

1. FACILITY REQUIRED FOR VALVE STAYPUT ON AIR SUPPLY FAILURE.
2. SOLENOID VALVE WILL BE PROVIDED ONLY FOR ON/OFF DUTY VALVES AND FOR CONTROL VALVES WHERE OPEN/CLOSE INTERLOCK IS REQUIRED AND 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. GAUGES REQUIRED FOR AIR SUPPLY & OUTPUT(S).
5. MOUNTING ACCESSORIES AS REQUIRED.
6. POSITION FEEDBACK SIGNAL SHALL BE 4-20mA (ISOLATED SIGNAL)
7. JB TERMINALS SHALL BE CAGE CLAMP TYPE SUITABLE FOR 2.5 SQ. MM COPPER WIRE.
8. FOR ON/OFF DUTY PNEUMATIC CONTROL VALVES
THE FOLLOWING ACCESSORIES SHALL NOT BE APPLICABLE:-
a) SMART POSITIONER b) POSITION TRANSMITTER c) I/P CONVERTER
9. 12 METERS 1/4" PVC COATED COPPER TUBING & 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 FITTINGS SHALL BE DOUBLE COMPRESSION TYPE.
10. VOLUME BOOSTER SHALL BE PROVIDED IF REQUIRED

* SOLENOID VALVE- IF APPLICABLE AS PER DATASHEET

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TECHNICAL SPECIFICATION FOR
CONTROL VALVES WITH ACCESSORIES

(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE

SPEC NO.: PE-TS-388-145-I 104

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EQUIPMENT SPECIFICATION



SPECIFICATION FOR CONTROL VALVE (WITH PNEUMATIC / ACTUATOR)

SPECIFICATION NO.: PES – 145 – 06

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1.0 SCOPE

This specification covers the Design, Manufacture, Inspection and Testing at the manufacturer's works, proper packing for transportation and delivery to site of Control valve (with Pneumatic/Electric Actuator) for use in Utility/Captive Power Station/Combined Cycle Station.

2.0 CODES AND STANDARDS

2.1 All the equipments specified herein shall comply with the requirements of the latest issue of the relevant National and International standards.

2.2 The Design and Materials used for the components shall also comply with the relevant National and International standards.

2.3 As a minimum requirement, the following standards shall be complied with :

Indian Boiler Regulation (IBR)	:	
Allowable Seat leakage	:	ANSI-B16.104 / FCI-70.2
Pressure & Temperature ratings	:	ANSI-B16.34
Enclosure class	:	IEC-144 / NEMA / IS-13947
Control Valves	:	ISA S-75
Electric Motor operated Actuators	:	IS-9334

3.0 TECHNICAL REQUIREMENTS

The Control valve, Actuator and the accessories shall be suitable for continuous operation under an ambient temperature of 0-55°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 operating conditions and system characteristics as specified in the Data Sheet-A.

3.1.1 The control valve shall be of globe body design with single port. The valve trim, shall be suitable for quick removal without any cutting or welding.

3.1.2 The material of body, internals and packing shall be as specified in the data sheets. Alternatives, considered more suitable for service specified may be given as alternative offer, along with adequate justification. However main offer shall totally meet specification requirements. Asbestos shall not be used for the packing or any other component.

3.1.3 The valve bonnet and packing shall be suitable for the service conditions as in Data Sheet-A. Gland sealed type bonnets are not acceptable. Double packing is mandatory for applications involving vacuum service. Bonnets having teflon packing shall have valve stem finished to 2-4 microns. Packing material requiring lubrication will not be acceptable. Justification for proper selection of bonnet & packing shall be furnished in the bid.

3.1.4 The valve end connection as specified in Data Sheet-A shall conform to ANSI B16.25 for Butt Weld connection and ANSI B16.5 for flanged ends. End to end dimension shall be as per ANSI 16.10.

3.1.5 The valve seat leakage shall be as per ANSI B16.104 / FCI-70.2. The leakage class shall be as per Data Sheet-A.



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- 3.1.6 The valve body shall have the direction of flow embossed on all valves.
- 3.1.7 The sizing shall conform to the requirements of ANSI/ISA(S75- 01), and the valve capacity shall be selected so as to meet the following:
- | | | | | |
|--|---|---|---|--------------------|
| Valve with Linear characteristic. | - | Normal Flow (Design Point) | : | 70-75% valve lift. |
| | - | Max. Flow | : | 90% valve lift. |
| | - | Min. Flow | : | >10% valve lift. |
| | | | | |
| Valve with Equipercantage Characteristic | - | Normal Flow (Design Point) | : | 75-85% valve lift. |
| | - | Max. Flow | : | 90% valve lift. |
| | - | Min. Flow | : | >10% valve lift. |
| | | | | |
| ON/OFF Quick open Characteristic | - | 1.1 times the CV calculated on the basis of maximum flow condition. | | |
- 3.1.8 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 implication.
- 3.1.9 Suitable justification and evidence shall be furnished regarding proper selection of the valve.
- 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 | <= | 7 Metres/Sec. |
| ii) Steam service | <= | 1/3 Sonic velocity in the flow medium. |
- 3.1.11 For flashing duty, the trim design shall be such that the vapour bubbles are kept away from valve body.
- 3.1.12 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.
- 3.1.13 In case of predicted noise level above 85 dBA, suitable low noise trim or inbuilt diffusers shall be provided to bring down the noise level below 85dBA.
- 3.1.14 The equivalent weighted sound level measured at 1.5M. above floor level in elevation and one metre horizontally from the control valve expressed in decibels to a reference of 0.0002 microbar shall not exceed 85 dBA (without pipe insulation). The offer shall include noise prediction calculations for each valve.
- 3.1.15 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.



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3.2 Pneumatic Actuator

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 and shut off pressure.

3.2.1 The pneumatic spring opposed diaphragm actuator 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 20 seconds under the most stringent service conditions.

3.2.5 The actuator shall be painted with epoxy based paint.

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 tube and flare less brass fittings (Refer typical hook up diagram in sheet 12 of 12).

3.3.1 Hand wheel

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

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 supplied as indicated in Data Sheet-A. The electronic position transmitter shall be non-contact type with 4-20 mA DC 2-wire output suitable for 12-50V DC supply. The resistance type position transmitter shall have 0-100 ohm variation for valve position change of 0-100%. The position transmitters of both types shall have accuracy and enclosure class. Necessary cable glands shall be supplied.



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3.3.4 Air Filter Regulator

Instrument quality air at suitable pressure of 5.5 Kg/Cm2(g) to 7 Kg/Cm2(g) shall be supplied to each valve through air filter regulator. The filter regulator shall include an inbuilt blow-down valve, 5 micron size filter. The design pressure for regulator shall be 7 Kg/cm2g. The Air filter regulator shall be selected to meet the requirements of positioner/actuator, E/P convertor 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 stayput, 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 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-55. Cable gland shall be provided for cable entry. The solenoid shall in general conform to IS-8935. The solenoid operation shall be universal type. The solenoid shall be suitable for 24V DC supply, unless specified otherwise in Data Sheet-A.

3.3.7 Limit Switches

Limit switches 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-55. Each limit switch shall be supplied with cable glands.

3.3.8 I/P Converter

I/P Converters shall preferably be of force balance type and shall produce pneumatic output signal corresponding to input current signal, also specified in Data Sheet. Convertor electronics shall be protected against reverse connection of signal polarities and a separate external connection shall be provided to facilitate grounding of instrument casing. Cable glands with neoprene gromets suitable for PVC cables shall be provided. I/P convertor shall have span adjustment facility. I/P convertor enclosure shall conform to IP-55 enclosure class.

3.3.9 Positioner

Positioner shall be suitable for accepting controller output signal 0.2-1.0 Kg/cm2, 0.2-0.6 Kg/cm2 or 0.6-1.0 Kg/cm2 as specified and give an output suitable for the actuator. Pneumatic positioner shall have 3 gauges. All gauges shall have metric scales. The positioner input signal range shall be adjustable. Wherever applicable, it shall be possible to bypass the positioner by means of a switch. **Linearity and Hysteresis shall be as indicated in Data sheet-A**

3.3.10 Electro pneumatic Positioner

In place of separate E/P Converter and pneumatic positioner a combined electro pneumatic positioner can also be supplied. The electro pneumatic positioner shall have 2 gauges.

3.3.11 Junction Box



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Wherever specified, an 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-55.

3.4 Guarantee & Performance

3.4.1 The overall performance of the control valve with pneumatic actuator assembly shall be as follows:-

- | | | | |
|------|--------------------|---|----------------------|
| i) | Hysteresis | : | $\pm 1\%$ of span |
| ii) | Linearity | : | $\pm 2\%$ of span |
| iii) | Sensitivity | : | $\pm 0.5\%$ of span. |
| iv) | Repeatability | : | $\pm 1\%$ of span |
| v) | Accuracy (Overall) | : | $\pm 2\%$ of span |

3.4.2 The guarantee for the control valve, pneumatic actuator & accessories shall be for 12 months continuous operation from the date of commissioning, unless specified otherwise in VOL-IIB Section-B or Section-C.

3.5 Electric Actuator

The electric actuator shall be employed for modulating duty.

3.5.1 The actuator assembly shall be complete with drive motors, gears, hand wheel, signaling & switching units, associated control, integral starter, (when specified) and other accessories as required.

3.5.2 The Electric Actuator shall be capable of positioning the associated valve at the desired opening for all the operating conditions.

3.5.3 The motor shall meet the requirements of Current, torque, Axial thrust, Accelerating & stall time as imposed by the driven equipment.

3.5.4 The motor shall be suitable for direct on line starting.

3.5.5 Motors shall be suitable for inching & plugging duty operations.

3.5.6 The motors shall be capable of starting and accelerating to rated speed at 85% of rated voltage.

3.5.7 The motors shall be rated for continuous operations for modulating duty.

3.5.8 The motor shall operate satisfactorily under the following conditions:

- i) $\pm 10\%$ supply voltage variation at rated frequency.
- ii) -5% to $+ 3\%$ variation in frequency at rated supply voltage.

iii) Simultaneous variation in voltage and frequency, the sum of absolute percentage not exceeding 10%.

3.5.9 The Actuator shall be suitable for mounting directly on the valve and shall be suitable for mounting in any position. Supports required for inclined mounting shall form part of supply of valve assembly.

3.5.10 The actuator shall be capable of producing the required torque and thrust at the output shaft for satisfactory operation of the associated valve.



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- 3.5.11 Each actuator shall have a hand wheel for emergency operation. The hand wheel shall be designed such that it is declutched automatically when the power supply to the motor is restarted.
- 3.5.12 The hand wheel shall be so arranged that when looking from hand wheel, the valve is closed by rotating the hand wheel in clockwise direction.
- 3.5.13 Motor shall be totally enclosed conforming to IP-65 or better as per data sheet. The enclosure shall be suitable to protect the motor from leakage steam, water or oil from valve joints and glands.
- 3.5.14 Where flameproof enclosures are specified, it shall meet the specification IS-2148.
- 3.5.15 Insulation shall be at least class-B or better and shall be tropicalised to withstand the atmospheric condition.
- 3.5.16 The actuator shall be provided with antifriction bearing in grease filled cartridge.
- 3.5.17 Each actuator shall be provided with a mechanical position indicator to indicate accurately the valve position.
- 3.5.18 The integral starter, if specified in data sheet-A, shall be provided in weatherproof enclosure with protection class not less than IP-65 or better as per data sheet.

The integral starter shall consist of:

- i) Mechanical & Electrically interlocked reversing contractors suitable for class AC4 duty or Thyristor as per data sheet.
- ii) Thermal overload relay.
- iii) Step down control transformer with fuses.
- iv) Interposing relay.
- v) Monitoring relay..
- vi) Open, Close & Stop push buttons.
- vii) Indicating lamps.
- viii) Local-Remote lockable selector switch with spare potential free contacts, wired for remote interface.
- ix) A potential free contact shall be provided for remote annunciation of power failure/overload condition. The contact shall be SPDT, rated for at 5A 240V AC or 0.2A at 220V DC.



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- 3.5.19 The actuator shall be suitably time rated for the duty cycle involved with the necessary number of starts per hour, but in no case, less than 1200 starts per hour.
- 3.5.20 The actuator shall be provided with a suitable control unit for receiving 4-20 mA signal from remote controller.
- 3.5.21 The servomotor gear should have self locking or suitable brake so as to maintain it's last position as and when the motor power is switched off.
- 3.5.22 Thermostat/Thermistor as specified in the data sheet shall be provided for sensing the winding temperature and giving trip command. The trip contact shall be change over type. The contact shall be wired up to the actuator terminal box.
- 3.6 Accessories for Control Valve with Electric Actuator
- 3.6.1 Torque Switches
- i) Each actuator shall be provided with at least one open and one close torque switches each with 2 NO+2 NC contacts. The contacts shall be rated for 5A at 240V AC or 0.2A at 220V DC.
 - ii) The torque switches shall have a minimum accuracy $\pm 3\%$ of set value.
 - iii) The torque switches shall be provided with calibrated knobs for setting desired torque. Separate knobs shall be provided for close and open torque switches.
 - iv) The torque switches shall be provided with mechanical latching device to prevent operation when unsealing from the positions. The latching device shall unlatch as soon as the valve leaves the end position. If such provision is not possible, the torque switches shall be bypassed by end position limit switches, which open on valve leaving end position. These limit switches are additional to the number of limit switches specified elsewhere.
 - v) The torque switches or worm gear shall be self-locking type so that when torque switch operates it remains operated until the actuator is operated in the reverse.
 - vi) The torque switch enclosure shall conform to IP-55.
- 3.6.2 Limit Switches
- Each limit switch shall have 2NO+2NC contact with contacts rated for 5A 240V AC/0.2A 220V DC unless otherwise specified. The switch enclosure shall conform to IP-55. Each limit switch shall be supplied with cable glands.
- 3.6.3 Space Heater
- A space heater shall be provided in limit switch and starter compartments to prevent condensation. This shall be suitable for the power supply specified in the data sheet. Where integral starters are provided the space heaters shall be wired to control supply within the actuator.



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3.6.4 Remote Position Transmitter

The position transmitter shall be supplied as indicated in Data Sheet-A. The electronic position transmitter shall be non-contact type with 4-20mA DC 2-wire output suitable for 12-50V DC supply. The resistance type position transmitter shall have 0- 100 ohm variation for valve position change of 0-100%. The position transmitters of both types shall have $\pm 1\%$ accuracy. The enclosure shall conform to IP-55. Necessary cable glands shall be supplied.

3.6.5 Wiring

- i) The actuator and the accessories will be neatly wired up to the terminal boxes.
- ii) The internal wiring shall be minimum of 1 mm² stranded PVC insulated copper conductor.
- iii) The wiring shall be identified by means of numbered ferrules on both ends of all wires.

3.7 Terminal and Terminal boxes

3.7.1 Motor Terminal Box

- i) The terminals, terminal boards, terminal boxes, winding tails and associated equipment shall be suitable for connection to supply system having short circuit capacity specified in data sheet and clearance time determined by the associated fuses.
- ii) The terminals shall be stud type insulated from the frame. The insulation shall not be porcelain. The studs shall be of brass or stainless steel or phosphor bronze of adequate size.
- iii) The terminal box shall be totally enclosed conforming to degree of protection IP-65.

3.7.2 Actuator Terminal Box

- i) All terminals of limit and torque switches, space heater, position transmitters, thermostat/thermister shall be brought to a common terminal box. The enclosure shall be to degree of protection IP-65.
- ii) Terminal board with plug in connector shall be provided. Alternatively stud type or insertion type may be considered. Pinch screw type however will not be accepted. All terminals shall be shrouded to prevent accidental contact. Where stud type terminals are offered, it shall be as per clause 3.7.1 (ii).
- iii) There shall be at least five terminals spare to terminate spare cores of cable.

3.7.3 Cable Glands

The motor terminal box and actuator terminal box shall be provided with required number of double compression nickel plated brass cable glands to suit cable type and associated size.

3.7.4 Earthing Terminal

Two earthing terminal shall be provided on either side of motor and actuator terminal box.

3.7.5 Painting

The Actuator shall be painted with epoxy-based paint.



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4.0 TESTING AND INSPECTION

4.1 The bidder shall adopt suitable quality assurance plan to ensure that the equipments offered will meet the specification requirements in full.

4.2 The bidder shall furnish the Quality Plan in the format enclosed in volume-III. In case the Quality Plan(s) is/are included in volume-IIB, the bidder shall furnish his Quality Plan strictly in line with the same. The Quality Plan shall be discussed and finalised with the technically accepted bidders before opening the price bid. The stages where purchaser would like to be associated for witnessing or verification of tests would be indicated by the purchaser in the Quality Plan before approval.

4.3 The following test shall be conducted as a minimum requirement.

4.3.1 Control Valve

- i) Radiographic tests on castings.
- ii) Dye penetrant tests on machined surface.
- iii) Ultrasonic tests for the forgings & bars of all valves with 60 Kg/cm² & higher ratings.
- iv) Hydrostatic tests as per ANSI B 16.34 prior to seat leakage tests.
- v) Valve closure and seat leakage tests as per ANSI B 16.104 / FCI-70.2.

4.3.2 Pneumatic Actuators

Functional test of actuator and each accessory.

4.3.3 Electric Actuator

- i) Routine tests on motors as per IS: 325.
- ii) Functional test on actuator and each accessory.
- iii) Insulation resistance and high voltage test.
- iv) Stall current & Stall torque test.
- v) Output shaft speed and torque of actuator and corresponding current tests.

4.3.4 Control valve with Actuator & Accessories fully assembled

- i) Functional tests of control valve operation along with actuator & accessories.
- ii) Dimension checks.

4.3.5 Type tests or Test Reports

- i) Valve lift vs. Flow test (Cv Test)
- ii) Degree of protection tests for the enclosures
- ii) Temperature rise test (applicable for Electrical Actuator only).
- iii) Type test for motor as per IS: 325.

4.4 Inspection will be conducted by BHEL and/or their authorised representatives as per the agreed inspection schedule. The inspection schedule will be submitted by the bidder, for BHEL's approval at contract stage. The cost of all tests and inspections will be deemed to have been included in the bid. For all the type tests covered under 4.3.5 above, "Type Test Certificates" as per agreed Quality Plan shall be furnished. In the absence of the same, such Type Tests shall be arranged at the Vendor's works in the presence of BHEL and/or their authorised representatives or in independent Test House/Laboratory approved by BHEL.



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4.5 The Standard QP is included in this specification to enable bidder to understand the extent of inspection and testing requirements to execute this job. The successful bidder has to follow the agreed QP, taking care of customer requirements mentioned in Sec-C and submit QP for final approval by BHEL / Customer.

5.0 SPARES AND CONSUMABLES

5.1 Commissioning Spares and consumables

As part of the main equipment supply, the bidder shall supply all commissioning spares and consumables required during Start-up,

5.2 Mandatory Spares

The bidder shall offer along with main offer, the Mandatory Spares as specified in Volume IIB Section-C of the specification. The Mandatory Spares offered shall be of the same make and type as the main equipment.

5.3 Recommended Spares

The bidder shall furnish a list of Recommended Spares along with the normal service expectancy period and frequency of replacement; quantities recommended for 3 years operation along with unit rate against each item to enable BHEL / BHEL's Customer to place a separate order later, if required.

5.4 Special Tools & Tackles

The bidder shall furnish a list of Special Tools & Tackles included in the bid.

6.0 DRAWINGS AND DOCUMENTS

6.1 The bidder shall furnish the following documents in required number of copies along with the bid:

6.1.1 Data sheet-B, completely filled-up along with all enclosures.

6.1.2 Wiring diagrams for Electrical Actuators.

6.1.3 Hook up diagrams of Control Valve with Actuator & accessories.

6.1.4 Valve & actuator assembly dimensional drawings with weights.

6.1.5 Quality Plan

6.1.6 All relevant Catalogs with detailed technical information.

6.1.7 Bar-chart to indicate the time schedule for procurement, manufacture, testing and despatch.

6.2 The successful bidder shall furnish the following documents in required number of copies to BHEL during the contract stage:

6.2.1 For approval

i) Dimensional drawings.



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- ii) Installation drawings with overall dimensions of the completed equipment and clearances for operation and maintenance.
- iii) Data sheet-C, completely filled-up along with all the enclosures including the sizing calculations & noise calculations.
- iv) Quality Plan.
- v) Test Certificates.

6.2.2 Final / As-built Drawings

Final / As-built drawings / CDs in required number of copies shall be submitted.

6.3 Operation & Maintenance Manuals

O&M Manuals in required number of copies shall be submitted. O&M manuals shall also contain storage and commissioning instructions.

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.

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.

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8.0 APPLICABLE DATA SHEET FORMS

This document shall be read with one or more of the following data sheet forms :

- Data sheet A&B for Control Valve with Pneumatic Actuator : Data sheet no. PES-145-06-DS1-1
- Data sheet C for Control Valve with Pneumatic Actuator : Data sheet no. PES-145-06-DS2-1
- Data sheet A&B for Control Valve with Electric Actuator : Data sheet no. PES-145-06-DS3-1
- Data sheet C for Control Valve with Electric Actuator : Data sheet no. PES-145-06-DS4-1

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SPECIFICATION FOR MICROPROCESSOR BASED ELECTRONIC POSITIONER (SMART) (PES – 145 – 06A)

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1.0 Electrical

Input Signal	4-20mA
Power Supply	Loop Powered from the output card of Control System (12-30 V DC)
Hart Protocol	Compatibility For Remote Calibration & Diagnostic (Super-Imposed HART Signal On Input Signal (4-20mA))
Valve Position Feedback (4-20mA)	Position Sensing 4-20mA O/P Signal For Control System To Be Provided. If non contact type of Position feedback signal is required, Position transmitter to be separately provided.

2.0 Environment

Operating Temperature	(-) 30 To 80 Deg.C
Humidity	0-95%
Protection Class	IP-65 (Minimum)

3.0 Software For Configuration & Diagnostic

Software	Windows Based Software, Software Shall Meet The Requirement For Configuration, Diagnostics, Calibration And Testing Of the Actuator. Valve positioning timing, actuator leakage, and Valve Wear & tear, fault alarm to be offered as a minimum. Easily up gradable with same hardware and compatible with any HART management systems / AMS.
Diagnostic/Test Features (Optional)	Advanced Diagnostic Features Like Stroke On Line Partial Closure Test, Valve Signature Analysis (Online graphical representation), Step Response Test, Valve Friction/Jamming Detection Etc To Be Provided.

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Factory Valve Signature Tests Reports (Pr Vs Valve Travel And Travel Vs I/P Signal) Are To Be Provided.

Hardware PC For Configuration/Software (OPTIONAL)

Test Certificates Test Certificates As Per Manufacture Standard/Relevant Standard Are To Be Submitted.

Configuration / Remote Calibration, Auto & Manual Calibration Shall Be Possible.

4.0 Modes

Valve Action	Direct & Reverse, Valve Action. (Same positioner for Single Acting or Double Acting And no separate relays required for changing from Single acting to double).
Flow Characterization	Possible to fit valve characteristic curve linear & Equal percentage
Fail Safe/Fail Freeze (Optional)	Fail Safe/Fail Freeze feature is to be provided.

5.0 Performance

Characteristic Deviation	$\leq 0.75\%$ of span
Ambient temp effect	$\leq 0.01\%$ /Deg C or better.
Dead Band	Adjustable 0.1 to 10%.
Scan Time	10ms
Resolution	$\leq 0.05\%$
Sensitivity/Linearity	0.3-0.4% of FS
Repeatability	0.32% of FS
Auto-Tune	Yes

	SPECIFICATIONS FOR MICROPROCESSOR BASED ELECTRONIC POSITIONER (SMART)	SPECIFICATION NO.: PES – 145 – 06A	
		VOLUME	
		SECTION	
		REV. NO. 00	DATE : 19.03.2008
		SHEET 3	OF 4

Leak Test Yes

7.0 EMC & CE compliance

Required International Standard Like EN/IEC. To En50081-2&En50082 or equivalent

8.0 Accessories

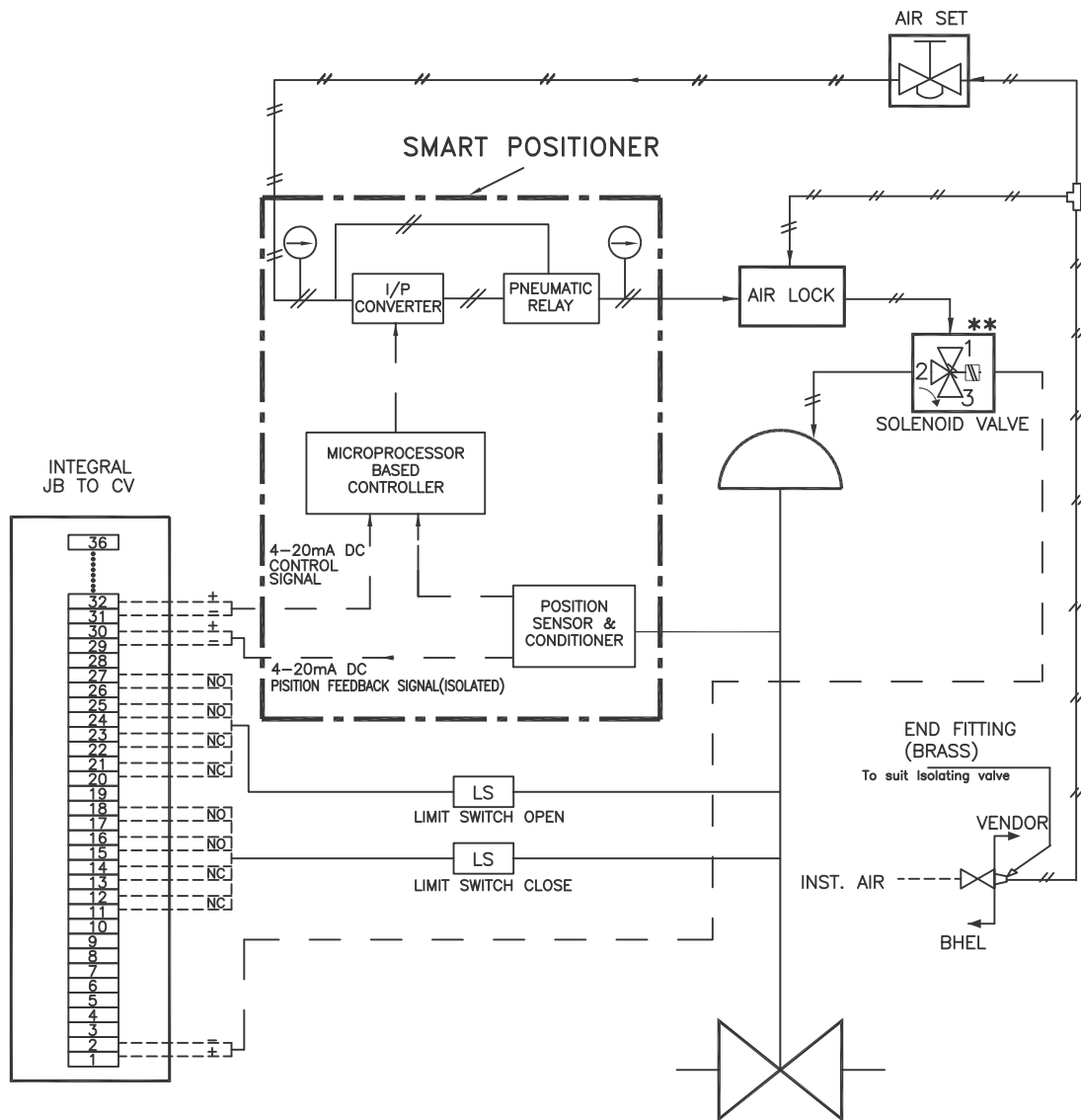
In Built Operator Panel Display With Push Buttons For Configuration And Display On The Positioner Itself

Hand Held Hart Calibrator (Optional) Universal Hart Calibrator To Be Provided, One Per Unit.

Press Gauge Block For Supply & Output Pr., Filter Regulator Other Accessories Shall Be Provided As On Required Basis For Making System Complete.

Electrical cable entry 1/2-Npt, side or bottom entry to avoid water Ingress.

STANDARD TYPICAL CONTROL VALVE HOOK-UP DIAGRAM WITH SMART POSITIONER



NOTE:—

- SOLENOID VALVE WILL BE PROVIDED ONLY FOR ON/OFF DUTY VALVES & FOR CONTROL VALVES WHERE OPEN/CLOSE INTERLOCK IS REQUIRED AND INDICATED IN RESPECTIVE DATA SHEETS.
- SOLENOID VALVES PORT CONDITION:
PORT 1 & 2 SHAL BE CONNECTED UNDER DE-ENERGISED CONDITION.
PORT 2 & 3 SHAL BE CONNECTED UNDER ENERGISED CONDITION.
- FOR ON/OFF DUTY PNEUMATIC CONTROL VALVE, SMART POSITIONER SHALL NOT BE APPLICABLE.
- JB TERMINALS SHALL BE CAGE CLAMP TYPE SUITABLE FOR 2.5 SQ. MM COPPER WIRE.
- 10 METERS 1/4 " PVC COATED COPPER TUBING AND 1 SET OF FITTINGS TO BE SUPPLIED FOR EACH CONTROL VALVE FOR CONNECTION TO ISO VALVE AT INST AIR HEADER ON ONE END AND TO AIR LOCK RELAY/AIR FILTER REGULATOR ON THE OTHER END.
- VOLUME BOOSTER IF REQUIRED SHALL BE PROVIDED.

** APPLICABLE TO VALVES WHERE OPEN/CLOSE ACTION REQUIRED ON INTERLOCK CONDITION



TECHNICAL SPECIFICATION FOR
CONTROL VALVES WITH ACCESSORIES
(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION D

REV. NO. 00

DATE 18/07/2012


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SECTION-D

DATA SHEETS - A&B

BHEL PEM	DOCUMENT TITLE	DOCUMENT NUMBER PE-TS-388-145-I 104
	DATA SHEET FOR CONTROL VALVES	REVISION 00 DATE 18/07/2012
	VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SHEET 56 OF 135

S.No.	SERVICE	Total Qty
01.	D/A Pegging from Aux. Steam Header (ASV-8)	01
02.	D/A Pegging from CRH Line (CRHV-6)	01
03.	CEP A/B/C Minimum Recirculation (CDV-10, CDV-12 & CDV-14)	03
04.	Main Condensate Control (CDV-22 & CDV-25)	02
05.	GSC min. flow recirculation (CDV-39)	01
06.	Excess Dump Control (CDV-43)	01
07.	Condensate for SD F/T (CDV-67)	01
08.	Condensate for Valve Gland Sealing (CDV-72)	01
09.	HPH-6A Drain to HPH-5A (DRV-2)	01
10.	HPH-6B Drain to HPH-5B (DRV-8)	01
11.	HPH-6A Drain to HP Drain F/T (DRV-5)	01
12.	HPH-6B Drain to HP Drain F/T (DRV-11)	01
13.	HPH-5A Drain to Deaerator (DRV-15)	01
14.	HPH-5B Drain to Deaerator (DRV-22)	01
15.	HPH-5A Drain to HP Drain F/T (DRV-18)	01
16.	HPH-5B Drain to HP Drain F/T (DRV-25)	01
17.	LPH-3 Drain to LPH-2 (DRV-28)	01
18.	LPH-3 Drain to LP Drain F/T (DRV-31)	01
19.	LPH-2 Drain to LPH-1 (DRV-34)	01
20.	LPH-2 Drain to LP Drain F/T (DRV-37)	01
21.	Deaerator Overflow (DRV-48)	01
22.	DM Normal Makeup to Hotwell (DMV-2)	01
23.	Emergency MU to Hotwell (DMV-9)	01
24.	Low Load Feed Control (FDV-14)	01
25.	ECW SYSTEM-(ECW-114)	01


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
		REV. NO. 00	DATE : 18/07/2012
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Tag No. :...ASV-8... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP D/A PEGGING FROM AUX. STEAM HEADER <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 273 x 6.35 | 508 x 9.53 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input checked="" type="checkbox"/> A216 WCB <input type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input type="checkbox"/> DOUBLE <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input checked="" type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) SS 316 STELLITED | SS 316 STELLITED SS 316 STELLITED | SS 316 STELLITED Bidder to specify <input type="checkbox"/> < 7 M/SEC(WATER) <input checked="" type="checkbox"/> MAC NO < 1/3 (STM) <input type="checkbox"/> II <input type="checkbox"/> III <input checked="" type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. ..... ..... .....|. .....|. ..... ..... ..... .....|. .....|. ..... ..... ..... .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 1.0 | 0.2 < 10 Sec <input checked="" type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....

 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE : 18/07/2012
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Tag No. : CDV-10, CDV-12
CDV-14

Qty.: Three (3)

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

DATA SHEET – A & B

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			$\pm 1\%$				.....
	HYSTERESIS			$\pm 1\%$				.....
	SENSITIVITY			$\pm 0.5\%$				.....
	ACCURACY (OVERALL)			$\pm 2\%$				.....
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	MIN.	30	24	0.6	46.5			
	2.	NORMAL	300	30	0.6	46.5			
	3.	MAX.	310	37	1.5	50			
	VALVE TYPE						<input type="checkbox"/> CAVITATION <input type="checkbox"/> FLASHING <input type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 39 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 39/VACUUM | 55 IBR FORM III-C <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED						..... .....|..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. ____2____ AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION .									

	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
		REV. NO. 00	DATE : 18/07/2012
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Tag No. : CDV-22 & CDV-25

Qty.: Two(2)

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP MAIN CONDENSATE CONTROL <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 406.4 x 12.7 | 406.4 x 12.7 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input checked="" type="checkbox"/> A216 WCB <input type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input type="checkbox"/> DOUBLE <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input type="checkbox"/> LINEAR <input checked="" type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) SS 316 STELLITED | SS 316 STELLITED SS 316 STELLITED | SS 316 STELLITED Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input checked="" type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 0.2 | 1.0 < 10 sec <input type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input checked="" type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....

 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE : 18/07/2012
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Tag No. : CDV-22 & CDV-25

Qty.: Two(2)

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

DATA SHEET – A & B

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 HYSTERESIS SENSITIVITY ACCURACY (OVERALL)			$\pm 1\%$ $\pm 1\%$ $\pm 0.5\%$ $\pm 2\%$				..... ..... ..... .....
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	DESIGN POINT	1555	20.8	18.85	50			
	2.	60% LOAD	747.75	26.02	10.1	47.4			
	3.	100% MCR	1191.64	21.53	14.8	47			
	4.	VWO	1247.4	20.81	15.8	46.9			
	5.	MIN. (10% LOAD)	119	31.0	7.9	50.6			
	VALVE TYPE						<input type="checkbox"/> CAVITATION <input type="checkbox"/> FLASHING <input checked="" type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 39 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 39 | 55 IBR FORM III-C <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED						..... ..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. <u> 4 </u> AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION.									


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE : 18/07/2012
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Tag No.CDV-39... Qty.: ...One (1)...

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

DATA SHEET – A & B

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			$\pm 1\%$				.....
	HYSTERESIS			$\pm 1\%$				.....
	SENSITIVITY			$\pm 0.5\%$				.....
	ACCURACY (OVERALL)			$\pm 2\%$				.....
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	MIN.	22	24	0.3	46.9			
	2.	MAX	220	33	0.7	50.7			
	VALVE TYPE						<input type="checkbox"/> CAVITATION <input type="checkbox"/> FLASHING <input type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 39 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 39/VACUUM | 55 IBR FORM III-C <input type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED						..... .....|..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. __2__ AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION .									


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
		REV. NO. 00	DATE : 18/07/2012
		SHEET 67	OF 135

Tag No. :...CDV-43... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP EXCESS RETURN TO CST <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 219.1 x 8.18 | 219.1 x 8.18 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input type="checkbox"/> GLOBE <input checked="" type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input type="checkbox"/> DOUBLE <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input checked="" type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) 17-4 PH SS | 17-4 PH SS 17-4 PH SS | 17-4 PH SS Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input checked="" type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. ..... ..... ..... .....|. .....|. ..... ..... ..... ..... ..... ..... .....|. .....|.
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 1.0 | 0.2 < 10 sec <input checked="" type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... ..... .....


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE : 18/07/2012
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Tag No.CDV-43... Qty.: ...One (1)...

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

DATA SHEET – A & B

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			$\pm 1\%$				.....
	HYSTERESIS			$\pm 1\%$				.....
	SENSITIVITY			$\pm 0.5\%$				.....
	ACCURACY (OVERALL)			$\pm 2\%$				.....
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	MIN.	30	34	4.0	46.9			
	2.	MAX	300	34	5.0	50.7			
	VALVE TYPE						<input type="checkbox"/> CAVITATION <input type="checkbox"/> FLASHING <input type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 39 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 39 | 55 IBR FORM III-C <input type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED						..... .....|..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. ____2____ AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION .									


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
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Tag No.CDV-67... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP CONDENSATE SPRAY TO SD FLASH TANK <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input checked="" type="checkbox"/> ON/OFF <input type="checkbox"/> MODULATING 33.4 x 4.55 | 33.4 x 4.55 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input type="checkbox"/> BWE <input checked="" type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input checked="" type="checkbox"/> DOUBLE <input type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input checked="" type="checkbox"/> QUICK OPEN (ON/OFF) 17-4 PH SS | 17-4 PH SS 17-4 PH SS | 17-4 PH SS Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input checked="" type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 1.0 | 0.2 < 10 sec <input checked="" type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
		REV. NO. 00	DATE : 18/07/2012
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Tag No. :...DRV-2... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP HPH-6A NORMAL DRAIN TO HPH-5A <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 168.3 x 7.11 | 168.3 x 7.11 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input type="checkbox"/> DOUBLE <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input checked="" type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) 17-4 PH SS | 17-4 PH SS 17-4 PH SS | 17-4 PH SS Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input checked="" type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. ..... ..... .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 0.2 | 1.0 < 10 sec <input type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input checked="" type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....


 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE : 18/07/2012
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Tag No.DRV-8... Qty.: ...One (1)...

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

DATA SHEET – A & B

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 HYSTERESIS SENSITIVITY ACCURACY (OVERALL)			$\pm 1\%$ $\pm 1\%$ $\pm 0.5\%$ $\pm 2\%$				..... ..... ..... .....
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	40% MCR	24	16.2	7.0	166.2			
	2.	60% MCR	39.06	27	11.2	188.6			
	3.	100% MCR	77.4	42.4	17.6	209.0			
	4.	VWO	82.8	44.3	18.4	211.2			
	5.	BMCR / VWO	85.26	43.9	18.2	210.4			
	VALVE TYPE						<input type="checkbox"/> CAVITATION <input checked="" type="checkbox"/> FLASHING <input type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 54 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 54 | 220 IBR FORM III-C <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED						..... ..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. ____4____ AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION .									


 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
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Tag No. :...DRV-22... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP HPH-5B NORMAL DRAIN TO DEAERATOR <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 219.1 x 6.35 | 219.1 x 8.18 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input type="checkbox"/> DOUBLE <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input checked="" type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) 17-4 PH SS | 17-4 PH SS 17-4 PH SS | 17-4 PH SS Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input checked="" type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. ..... ..... ..... .....|. .....|. ..... ..... ..... ..... ..... ..... .....|. .....|.
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 0.2 | 1.0 < 10 sec <input type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input checked="" type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... ..... .....


 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
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Tag No.DRV-18... Qty.: ...One (1)...

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

DATA SHEET – A & B

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 HYSTERESIS SENSITIVITY ACCURACY (OVERALL)			$\pm 1\%$ $\pm 1\%$ $\pm 0.5\%$ $\pm 2\%$			..... ..... ..... .....	
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	40% MCR	34.8	7.9	0.3	162.9			
	2.	60% MCR	64.98	12	0.3	182.8			
	3.	100% MCR	122.36	18	0.3	204.0			
	4.	VWO	130.2	18.8	0.3	206.2			
	5.	BMCR / VWO	133.86	18.6	0.5	205.5			
	VALVE TYPE						<input checked="" type="checkbox"/> CAVITATION <input checked="" type="checkbox"/> FLASHING <input type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 22 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 22/VACUUM | 225 IBR FORM III-C <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED						..... .....|..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. <u> 4 </u> AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION .									


	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
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Tag No. :...DRV-34... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP LPH-2 NORMAL DRAIN TO LPH-1 <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 273 x 6.35 | 323 x 9.53 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC6 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input checked="" type="checkbox"/> DOUBLE <input type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input checked="" type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) 17-4 PH SS | 17-4 PH SS 17-4 PH SS | 17-4 PH SS Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input checked="" type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	.....|. .....|. ..... .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. ..... .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 0.2 | 1.0 < 10 sec <input type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input checked="" type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....


 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)	SPECIFICATION NO.: PE-TS-388-145-I001	
		VOLUME II B	
		SECTION D	
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Tag No. :...DRV-48... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP DEAERATOR OVERFLOW TO LP DRAIN F/T <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input checked="" type="checkbox"/> ON/OFF <input type="checkbox"/> MODULATING 168.3 x 7.11 | 273 x 9.27 SA 106 GR B | SA 106 GR B	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC9 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input checked="" type="checkbox"/> DOUBLE <input type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input type="checkbox"/> LINEAR <input type="checkbox"/> EQ. PERCENTAGE <input checked="" type="checkbox"/> QUICK OPEN (ON/OFF) 440 C | 440 C 440 C | 440 C Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input checked="" type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. ..... ..... ..... .....|. ..... ..... ..... .....|. ..... ..... ..... .....|. .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 1.0 | 0.2 < 10 sec <input checked="" type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....


 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
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Tag No.DMV-9... Qty.: ...One (1)...

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

DATA SHEET – A & B

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 HYSTERESIS SENSITIVITY ACCURACY (OVERALL)			$\pm 1\%$ $\pm 1\%$ $\pm 0.5\%$ $\pm 2\%$				..... ..... ..... .....
SERVICE CONDITION	SL. No. +	LOAD	FLOW (T/HR)	INLET PR. KG/CM2(A)	OUTLET PR. KG/CM2(A)	TEMP DEG (C)	CALC ULATED CV	% VLV LIFT	VLV O/L VELOCITY
	1.	MIN. (5% MU)	82	5.5	0.45	33			
	2.	NORMAL (10% MU)	163	4.8	0.5	33			
	3.	CT PUMP DESIGN FLOW	300	3.9	0.8	33			
	4.	NORMAL (10% MU)	163	4.8	1.5	33			
	VALVE TYPE						<input checked="" type="checkbox"/> CAVITATION <input type="checkbox"/> FLASHING <input type="checkbox"/> HIGH DP		
	MAX SHUT OFF PRESS (KG/CM2g) 10 BODY DESIGN : PRESS (KG/CM2g) | TEMP (DEG C) 10/VACUUM | 50 IBR FORM III-C <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED						..... .....|..... .....	
TOTAL WEIGHT (VALVE + ACTUATOR + ACCESSORIES) Kg							Bidder to specify		
NOTES: 1. + DESIGN CV SHALL BE BASED ON SERVICE CONDITIONS INDICATED AT SL. NO. <u> 2 </u> AND SHALL BE CHECKED FOR ALL OTHER CONDITIONS AS PER SPECIFICATION.									

 BHEL PEM	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)		SPECIFICATION NO.: PE-TS-388-145-I001	
			VOLUME II B	
			SECTION D	
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Tag No. :...FDV-14... Qty.: ...One (1)...

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

DATA SHEET – A & B

DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)			DATA SHEET – B (TO BE FILLED UP BY BIDDER)
GENERAL	PROJECT SERVICE LOCATION DUTY PIPE SIZE (inlet / outlet) mm PIPE MATERIAL (inlet / outlet)	NTPC – 1 X 500 MW VINDHYACHAL TPP LOW LOAD FEED CONTROL <input checked="" type="checkbox"/> INDOOR <input type="checkbox"/> OUTDOOR <input type="checkbox"/> ON/OFF <input checked="" type="checkbox"/> MODULATING 273 x 40 | 273 x 40 SA 106 GR C | SA 106 GR C	..... ..... ..... ..... .....|.
BODY	MODEL NO. 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 : CAGE | GUIDE BUSH FLOW (BELOW SEAT / ABOVE SEAT) OUTLET VELOCITY REQUIRED LEAKAGE CLASS NOISE LEVEL (dBA) VACUUM SERVICE ANTI CAVITATION TRIM	Bidder to specify <input checked="" type="checkbox"/> GLOBE <input type="checkbox"/> ANGLE <input type="checkbox"/> TOP <input checked="" type="checkbox"/> CAGE | ONE Bidder to specify <input checked="" type="checkbox"/> BWE <input type="checkbox"/> SWE <input type="checkbox"/> FLANGED <input type="checkbox"/> A216 WCB <input checked="" type="checkbox"/> A217 WC9 <input type="checkbox"/> SS <input type="checkbox"/> A217 CS <input type="checkbox"/> A351 CF8M <input type="checkbox"/> PTFE <input checked="" type="checkbox"/> GRAFOIL <input type="checkbox"/> DOUBLE <input checked="" type="checkbox"/> SINGLE <input checked="" type="checkbox"/> STD <input type="checkbox"/> EXTENDED <input type="checkbox"/> FINNED <input type="checkbox"/> LINEAR <input checked="" type="checkbox"/> EQ. PERCENTAGE <input type="checkbox"/> QUICK OPEN (ON/OFF) 17-4 PH SS | 17-4 PH SS 17-4 PH SS | 17-4 PH SS Bidder to specify <input checked="" type="checkbox"/> < 7 M/SEC (WATER) <input type="checkbox"/> MAC NO. < 1/3(STM) <input type="checkbox"/> II <input type="checkbox"/> III <input checked="" type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VI LESS THAN 85 dBA <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	.....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. ..... ..... .....|. .....|. .....
PNEUMATIC ACTUATOR	MODEL NO. & SIZE CLOSE AT : OPEN AT (KG/CM2g) TRAVEL TIME FOR OPEN TO CLOSE, CLOSE TO OPEN VALVE POSN. ON SIGNAL AIR FAILURE VALVE POSN. ON SUPPLY AIR FAILURE	Bidder to specify 1.0 | 0.2 < 10 sec <input checked="" type="checkbox"/> TO OPEN <input type="checkbox"/> STAYPUT <input type="checkbox"/> TO CLOSE <input checked="" type="checkbox"/> STAYPUT	.....|. .....|. ..... ..... ..... .....
ACCESSORIES	POSITIONER (SMART) 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	<input checked="" type="checkbox"/> REQUIRED (WITH HART PROTOCOL) <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED PART OF POSITIONER <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> REQUIRED <input checked="" type="checkbox"/> NOT REQUIRED	..... ..... ..... ..... ..... ..... ..... ..... .....


DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR)

Tag No.ECW114... Qty.: ...One (1)...

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


DATA SHEET – A & B


[illegible]

	<p>Technical specification for Control Valves with Accessories (Pneumatically Operated)</p> <p>VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE</p>	SPECIFICATION NO. PE-TS-388-145-I104	
		VOLUME II-B	
		SECTION D	
		REV. NO. 00	DATE: 18/07/2012
		SHEET 107	OF 135

SECTION – D

DATA SHEETS – ACCESSORIES FOR CONTROL VALVES

	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE		SPECIFICATION NO. PE-TS-388-145-I104	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE: 18/07/2012
			SHEET 108	OF 135
Tag No Applicable FOR TAG NOS AS PER BHEL-C DATA SHEET EXCEPT TAG CDV-67 & DRV-48 (ON-OFF VALVE) Quantity.....				
APPLICABLE FOR TAG Nos.WHEREVER STATEMENT "REQUIRED" INDICATED IN THE INDIVIDUAL CV DATA SHEETS				
DATA SHEET – A & B for ACCESSORIES				
DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)				DATA SHEET – B (TO BE FILLED-UP BY BIDDER)
POSITIONER (SMART)	MFR. & MODEL NUMBER		Bidder To Specify	
	APPLICATION		AS PER DATA SHEET	
	BYPASS	GAUGES	ENCL. CLASS	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> THREE <input type="checkbox"/> TWO <input checked="" type="checkbox"/> IP 65
	INPUT SIGNAL (ELECTRICAL)		4-20 mA	
	OUTPUT SIGNAL (PNEUMATIC)(Kg / Cm ²)		TO SUIT ACTUATOR	
	INCREASE IN AIR SIGNAL		<input checked="" type="checkbox"/> VALVE OPEN <input type="checkbox"/> VALVE CLOSE	
	POSITION FEED BACK		4-20 mA (ISOLATED SIGNAL)	
	BOOSTER		<input checked="" type="checkbox"/> YES	
LINEARITY		+ / - 0.5% OF OUTPUT SPAN		
AIR FILTER REGULATOR	MFR. & MODEL NUMBER		Bidder To Specify	
	AIR SUPPLY PRESS (Kg / Cm ² g)		<input checked="" type="checkbox"/> 7.0	
	OUTPUT PRESS (Kg / Cm ² g)		TO SUIT ACTUATOR	
	OUTPUT GAUGE		<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	QTY		1 NO	
AIR LOCK	MFR. & MODEL NUMBER		Bidder To Specify	
	SET PRESS (Kg / Cm ²)		Bidder To Specify	
	SUPPLY PRESS (Kg / Cm ²)		<input checked="" type="checkbox"/> 7.0	
	RESET TYPE		AUTO	
	VENT PLUG		REQUIRED	
LIMIT SWITCH	MFR. & MODEL NUMBER		Bidder To Specify	
	OPEN posn	INT posn	CLOSE posn	<input checked="" type="checkbox"/> 1 NO. --- <input checked="" type="checkbox"/> 1 NO.
	CONTACT TYPE		SPDT 2 NO + 2 NC	
	RATING (AC / DC)		5A 240V AC , 0.2A 220V DC AND 5A 24V DC	
	ENCLOSURE CLASS		<input checked="" type="checkbox"/> IP 65	
SOLENOID VALVE	MFR. & MODEL NUMBER		Bidder To Specify	
	RATING		<input checked="" type="checkbox"/> 24V DC <input type="checkbox"/> 220V DC <input type="checkbox"/> 240V AC <input type="checkbox"/>	
	OPERATION	QUANTITY	<input type="checkbox"/> Stayput <input type="checkbox"/> Interlock <input type="checkbox"/> 1 <input type="checkbox"/> 2	
	COIL INSULATION CLASS		CLASS - H	
	ENCLOSURE CLASS		<input checked="" type="checkbox"/> IP 65	
HANDWHEEL	ORIENTATION		<input checked="" type="checkbox"/> TOP MOUNTED / <input checked="" type="checkbox"/> SIDE MOUNTED	
JUNCTION BOX	NO. OF WAYS		<input type="checkbox"/> 24-WAYS <input type="checkbox"/> 36-Ways <input checked="" type="checkbox"/> AS REQUIRED	
	SIZE		AS REQUIRED	
	CABLE GLANDS (Size / Quantity)		AS REQUIRED (Double Compression Type).	
	ENCLOSURE CLASS		<input checked="" type="checkbox"/> IP 65	
VOLUME BOOSTER			BIDDER TO SPECIFY	
Cu. Tubing & Fittings / per CV	This is in addition to cu. tubing and fittings which are integral part of CV		20 Meters of ¼ " PVC coated 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.	
			COMPANY SEAL	
			NAME	
			SIGNATURE	
			DATE	

	DATA SHEET FOR CONTROL VALVES (WITH PNEUMATIC ACTUATOR) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE		SPECIFICATION NO. PE-TS-388-145-I104	
			VOLUME II B	
			SECTION D	
			REV. NO. 00	DATE: 18/07/2012
			SHEET 109	OF 135
Tag No Applicable FOR TAG NOS CDV-67 & DRV-48 (ON-OFFVALVE) 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 – A & B for ACCESSORIES				
DATA SHEET – A FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY PURCHASER)				DATA SHEET – B (TO BE FILLED-UP BY BIDDER)
POSITIONER (SMART)	MFR. & MODEL NUMBER		Bidder To Specify	
	APPLICATION		AS PER DATA SHEET	
	BYPASS	GAUGES	ENCL. CLASS	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> THREE <input type="checkbox"/> TWO <input checked="" type="checkbox"/> IP 65
	INPUT SIGNAL (ELECTRICAL)		4-20 mA	
	OUTPUT SIGNAL (PNEUMATIC)(Kg / Cm ²)		TO SUIT ACTUATOR	
	INCREASE IN AIR SIGNAL		<input checked="" type="checkbox"/> VALVE OPEN <input type="checkbox"/> VALVE CLOSE	
	POSITION FEED BACK		4-20 m A (ISOLATED SIGNAL)	
	BOOSTER		<input checked="" type="checkbox"/> YES	
	LINEARITY		+ / - 0.5% OF OUTPUT SPAN	
AIR FILTER REGULATOR	MFR. & MODEL NUMBER		Bidder To Specify	
	AIR SUPPLY PRESS (Kg / Cm ² g)		<input checked="" type="checkbox"/> 7.0	
	OUTPUT PRESS (Kg / Cm ² g)		TO SUIT ACTUATOR	
	OUTPUT GAUGE		<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	QTY		1 NO	
AIR LOCK	MFR. & MODEL NUMBER		Bidder To Specify	
	SET PRESS (Kg / Cm ²)		Bidder To Specify	
	SUPPLY PRESS (Kg / Cm ²)		<input checked="" type="checkbox"/> 7.0	
	RESET TYPE		AUTO	
	VENT PLUG		REQUIRED	
LIMIT SWITCH	MFR. & MODEL NUMBER		Bidder To Specify	
	OPEN posn	INT posn	CLOSE posn	<input checked="" type="checkbox"/> 1 NO. <input type="checkbox"/> --- <input checked="" type="checkbox"/> 1 NO.
	CONTACT TYPE		SPDT 2 NO + 2 NC	
	RATING (AC / DC)		5A 240V AC , 0.2A 220V DC AND 5A 24V DC	
	ENCLOSURE CLASS		<input checked="" type="checkbox"/> IP 65	
SOLENOID VALVE	MFR. & MODEL NUMBER		Bidder To Specify	
	RATING		<input checked="" type="checkbox"/> 24V DC <input type="checkbox"/> 220V DC <input type="checkbox"/> 240V AC <input type="checkbox"/>	
	OPERATION	QUANTITY	<input type="checkbox"/> Stayput <input type="checkbox"/> Interlock <input type="checkbox"/> 1 <input type="checkbox"/> 2	
	COIL INSULATION CLASS		CLASS - H	
	ENCLOSURE CLASS		<input checked="" type="checkbox"/> IP 65	
HANDWHEEL	ORIENTATION		<input checked="" type="checkbox"/> TOP MOUNTED / <input checked="" type="checkbox"/> SIDE MOUNTED	
JUNCTION BOX	NO. OF WAYS		<input type="checkbox"/> 24-WAYS <input type="checkbox"/> 36-Ways <input checked="" type="checkbox"/> AS REQUIRED	
	SIZE		AS REQUIRED	
	CABLE GLANDS (Size / Quantity)		AS REQUIRED (Double Compression Type).	
	ENCLOSURE CLASS		<input checked="" type="checkbox"/> IP 65	
VOLUME BOOSTER			BIDDER TO SPECIFY	
Cu. Tubing & Fittings / per CV	This is in addition to cu. tubing and fittings which are integral part of CV		20 Meters of ¼ " PVC coated 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.	
				COMPANY SEAL
				NAME
				SIGNATURE
				DATE



**TECHNICAL SPECIFICATION FOR
CONTROL VALVES WITH ACCESSORIES
(pneumatically operated)**

**VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE**

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION D


REV. NO. 00

DATE : 18/07/2012

SHEET 110 OF 135

SECTION-D

DATA SHEETS -C

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO PE-TS-388-145-I104	
		VOLUME II-B	
		SECTION D	
		REV. NO. 00	DATE: 18/07/2012
		SHEET 111 OF 135	

		NAME
		SIGNATURE
		DATE
Tag No..... Quantity.....		Data Sheet No. PES-145-06-DS2-0
DATA SHEET C		
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 / MATERIAL	
	TRIM FORM	
	TRIM MATERIAL : SEAT | PLUG	
	TRIM MATERIAL : CAGE | GUIDE	
	FLOW	
	OUTLET VELOCITY	
	REQUIRED LEAKAGE CLASS	
	NOISE LEVEL (dBA) (Spec. 3.1.14)	
	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	
	VLV POSN. ON SIGNAL ELEC 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	
	PRESSURE GAUGES	

	Technical specification for Control Valves with Accessories (Pneumatically Operated)		SPECIFICATION NO PE-TS-388-145-I104	
			VOLUME II-B	
	VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE		SECTION D	
			REV. NO. 00	DATE: 18/07/2012
			SHEET 112 OF 135	

Tag No..... Quantity.....				Data Sheet No. PES-145-06-DS2-0					
DATA SHEET C									
DATA SHEET – C FOR CONTROL VALVE (WITH PNEUMATIC ACTUATOR) (TO BE FILLED BY THE BIDDER AFTER THE AWARD OF CONTRACT)									
PERFORMANCE OF VALVE	LINEARITY								
	HYTERSIS								
	SENSITIVITY								
	ACCURACY								
SERVICE CONDITION*	SL.+ NO.	LOAD	FLOW (T/HR)	INLET PR. (KG/CM² (A)	OUTLET PR. (KG/CM² (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.									



TECHNICAL SPECIFICATION FOR
CONTROL VALVES WITH ACCESSORIES
(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION D

REV. NO. 00

DATE : 18/07/2012

SHEET 113

OF

135

SECTION-D

QUALITY PLAN

Manufacturer's Name		QUALITY PLAN (Applicable for mentioned three projects)										PROJECT	
APPROVED VENDORS AS PER LOA (Refer Note - 1)		ITEM : CONTROL VALVE (Pneumatic)										VINDHYACHAL STPP STAGE-V	
		SUB SYSTEM :										TG PACKAGE	
		DATE: 11-11-2009										CONTRACT NO. 9575-110	
		PAGE 1 of 3											
Power Cycle and Water System													
Sl	Component & Operations	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of record	Agency	Remarks				
No	Characteristics	M	C,N	7	8	9	D*	M C N	11				
1	3	4	5	6	7	8	9	10	11				
1.1	RAW MATERIAL AND BOUGHT OUT ITEMS a) Physical and Chemical Properties (Casting/ Forgings), Plug, Stem, Acuator Stem and Seat Rings	Maj.	Physical and Chemical Tests	1/ Heat (HT Batch)	Tech. Specification/ Approved Drawing	Tech. Specification/ Approved Drawing	TC	P V	V				
	b) Heat Treatment	Maj.	Review of HT chart	Each HT	Tech. Specification/ Approved Drawing	Tech. Specification/ Approved Drawing	TC	P V	V				
	c) Internal Quality of casting	Maj.	RT for Body and UT for Bonnet	100%	ANSI B 16.34	ANSI B 16.34	TC	P V	Refer NOTE : 2				
	d) Surface Quality	Maj.	Visual	100%	MSS SP 55	MSS SP 55	TC	P V	V				
	e) Pressure Test for Shell	Maj.	Hyd. Test	100%	ANSI B 16.34	ANSI B 16.34	TC	P V	For Body and Bonnet after machining				
1.2	Diaphragm	Maj.	Visual	100%	Mfr. Standard	Mfr. Standard	TC	P V	-				
	a) Surface Quality	Maj.	Measu.	100%	Mfr. Standard	Mfr. Standard	TC	P V	-				
	b) Hardness	Maj.	10,000 Cycles	100%	10,000 Cycles / As per Mfr. Standard	No Damage	TC	P V	-				
	c) Endurance/ Life	Maj.	1/ Type	100%	1 sample/lot	Material Spec./ Mfr. Std.	TC	P V	-				
1.3	Springs	Maj.	Chemical Mech.	1 sample/lot	Material Spec./ Mfr. Std.	Material Spec./ Mfr. Std.	TC	P V	-				
	a) Composition	Maj.	1 sample/lot	1 sample/lot	Material Spec./ Mfr. Std.	Material Spec./ Mfr. Std.	TC	P V	-				
	b) Mechanical Properties	Maj.	1 sample/lot	1 sample/lot	Material Spec./ Mfr. Std.	Material Spec./ Mfr. Std.	TC	P V	-				
	c) Dimension	Maj.	Measu.	100%	Mfr. Std.	Mfr. Std.	TC	P V	-				
	d) Performance	Maj.	Stiffness Ratio	100%	Approved Drg./ Material Spec.	Approved Drg./ Material Spec.	TC	P V	-				
	e) Endurance Test	Maj.	Cyclic Test (Endurance)	1/ Type	Approved Drg./ Material Spec.	Approved Drg./ Material Spec.	TC	P V	-				
1.4	Functional test (Limit switches, Solenoids, Positioner, AFR, ALR, Position Transmitter)	Maj.	HV, IR and Continuity	100%	Mfr. Standard	Mfr. Standard	TC	P V	-				
	a) Routine Test	Maj.	Review of TC	1/ Type	Mfr. Standard	Mfr. Standard	TC	P V	-				
	b) Type tests	Maj.	Review of TC	1/ Type	Mfr. Standard	Mfr. Standard	TC	P V	-				
	c) Degree of protection	Maj.	Verification of Operation	-	-	-	-	P V	During Final Testing				
	d) Functional Test	Maj.	Review of Calibration TC	100%	Mfr. Standard	Mfr. Standard	TC	P V	-				
1.5	Pressure Gauge	Maj.	Visual	100%	Approved Drg./ Tech. Spec.	Approved Drg./ Tech. Spec.	TC	P V	-				
	a) Performance	Maj.	Review of Calibration TC	100%	Mfr. Standard	Mfr. Standard	TC	P V	-				
	d) Marking and Dimension	Maj.	Visual	100%	Approved Drg./ Tech. Spec.	Approved Drg./ Tech. Spec.	TC	P V	-				

CONTRACTOR'S SIGNATURE: *[Signature]* 11/11/09

CONTRACTOR'S NAME: **Bharat Heavy Engineering Limited**



CONTRACTOR'S ADDRESS: **PPEI Building, HRD & ESI Complex, Plot No. 25, Sector - 16A, NOIDA - 201 301 (U.P.)**


FOR NTPC USE: *[Signature]*

REVIEWED BY: *[Signature]*

NAME & SIGNATURE OF AUTHORITY AND SEAL: *[Signature]*

DESIGN: **DRG/DA & I**

Manufacturer's Name		QUALITY PLAN (Applicable for mentioned three projects)									
 APPROVED VENDORS AS PER LOA (Refer Note - 1)		ITEM : CONTROL VALVE		BHEL QP No. PE-QP-999-145-1 006 A		PROJECT		VINDHYACHAL STPP STAGE-V			
		(Pneumatic)		REV. No.: 00		PACKAGE					
		SUB SYSTEM :		DATE: 11-11-2009		CONTRACT NO.		9575-110			
		Power Cycle and Water System		PAGE 2 of 3							
SI	Component & Operations	Class	Type of check	Quantum of check	Reference Document	Acceptance Norms	Format of record	Agency	Remarks		
No		M	C,N	7	8	9	D*	10	11		
2 INPROCESS INSPECTION											
2.1	Body and Bonnet after machining, Plug with actuator stem	3		100%	Mfr. Std	Mfr. Std	Log Sheet	P	-	-	
2.2	Guide Bush (Wherever applicable)		Hardness Measu.	1 Sample/ Lot	Mfr. Std	Mfr. Std	TR	P	V	V	Butt weld shall be included
2.3	Lapping		Visual	1 Sample/ Lot	-	Approved Drg.	-do-	P	-	-	Hardfacing is to be done as per Mfr. Std.
3 TESTS ON COMPLETED VALVES											
3	CV TEST (TYPE TEST)		Measu.	1/ Type	As per Specification and Approved Drawing	As per Specification and Approved Drawing	TC	✓ P	V	V	V* - NTPC Engg. clearance for CV test shall be reviewed during final inspection.
3.1	Actuator Chamber		Pneu. Test	100%	No leakage	No leakage	TR	✓	P	W	W
3.2	Body		Hydro test	100%	ANSI B 16.34	ANSI B 16.34	TR	✓	P	W	W
3.3	Seat leakage test		Hydro/ Pneu. Test	100%	ANSI B 16.104	ANSI B 16.104/ Approved Data Sheet	TR	✓	P	W	W
3.4	Operation tests		Measu.	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
	a) Valve Travel		Measu.	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
	b) Opening and Closing Time		Measu.	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
	c) Linearity / CAM characteristics		Measu.	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
	d) Hysteresis		Measu.	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
	e) Operation of limit switch and solenoids and other accessories		Measu.	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
	f) Predifined valve position in case of air and signal failure		Visual	100%	Spec./ ADS / Approved Drawings	Spec./ ADS / Approved Drawings	TR	✓	P	W	W
 Dy. General Manager		FOR NTPC USE : REVIEWED BY : 11/11/09									
CONTRACTOR : Power Sector - Project Engineering Management PPEI Building, HRD & ESI Complex Plot No. 25, Sector - 16A, NOIDA - 201 301 (U.P.)		NAME & SIG. OF APPROVING AUTHORITY AND SEAL Dr. S. SAMANTA Engrg. Div/QA & I A-8A, Sector-24, Noida-201301 (U.P.)									

		Manufacturer's Name APPROVED VENDORS AS PER LOA (Refer Note - 1)		QUALITY PLAN (Applicable for mentioned three projects)										PROJECT VINDHYACHAL STPP STAGE-V							
				ITEM : CONTROL VALVE (Pneumatic) SUB SYSTEM : DATE: 11-11-2009 PAGE: 3 of 3										PACKAGE TG PACKAGE CONTRACT NO. 9575-110							
Power Cycle and Water System		Class		Type of check		Quantum of check		Reference Document		Acceptance Norms		Format of record		Agency		Remarks					
1 3.5		2 Final Inspection		3 Overall Dimension Cleanliness and Stamping Painting		4 Measu. Visual Measu.		5 100% 100% 100%		6 10% 100% -		7 Approved Drawings Spec./ADS		8 Approved Drawings Spec./ADS		9 TR TR		10 P W W P V - P - -		11 11	

NOTE : 1 - As on Date agreed sub suppliers are as follows.

- 1) M/s IL, Palakkad -
- 2) M/s Fisher Controls, UK/ USA -
- 3) M/s CCI, USA -
- 4) M/s NIPPON FISHER, JAPAN -
- 5) M/s EMERSON, FRANCE -
- 6) M/s MIL CONTROLS, ALWAYE -
- 7) M/s DRESSER MASOLENIEN, FRANCE -
- 8) M/s COPES VULCAN, UK -
- 9) M/s FISHER SANMAR, CHENNAI -

NOTE : 2 - Only for rating class 900 & above and applicable for Body and Bonnet only. Valve stem for dia > 40 MM UT shall be done on 100 % basis as per ASTM A-388 A and ASME B 16.34.

For lower rating as per specification. M/s BHEL to mentioned in the endorsement sheet if any changes are made in the NDT requirement as per specification.

NOTE : 3 - A) Air Filter regulator to be procured from M/s Plaka and M/s Shavo norgren. B) Smart Positioner (If applicable) to be procured from Siemens, Yokogawa, ABB, Dressor, Fisher, Smar, Masolenien. C) All other bought out items/ accessories are procured from Valve Manufacturer approved sources.

NOTE : 4 - IBR Certificate in Form III C shall be submitted if called for in the specification/ Data Sheet.

NOTE : 5 - Copies of all TC for materials duly correlated with Heat numbers, TC for electrical items and mechanical tests (Leak/ Operation) shall be furnished to BHEL for verification and acceptance.

CONTRACTOR'S SIGNATURE 		LEGEND : * RECORDS, IDENTIFIED WITH "N" SHALL BE ESSENTIALLY INCLUDED BY SUPPLIER IN QA DOCUMENTATION. M: MANUFACTURER/ SUB SUPPLIER, C: MAIN SUPPLIER, N: NTPC, P: PERFORM, W: WITNESS and V: VERIFICATION AS APPROPRIATE. "CHP" : NTPC SHALL IDENTIFY IN COLOUR "N" AS "W", ADS - Approved Data Sheet, TC - Test Certificate, TR - Test Records.		FOR NTPC USE : REVIEWED BY : 		NAME & SIG. OF APPROVING AUTHORITY and SEAL Engg. Div/QA & I	
---	--	--	--	--	--	---	--


DILIP JEJURIKAR
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 PPEI Building, HRD & ESI Complex
 Plot No. 25, Sector - 16A,
 NOIDA - 201 301 (U.P.)

एच. सामंता / S. SAMANTA
 उप महाप्रबन्धक (क्यू ए)
 Dy. General Manager (QA)
 एनटीपीसी लिमिटेड / NTPC Limited
 A-8A, Sector-24, Noida-201301 (U.P.)

CLAUSE NO.	QUALITY ASSURANCE - SG AND AUX			
	TABLE-1 NDT REQUIREMENTS FOR PRESSURE RETAINING COMPONENTS OF VALVES			
	Valve size NB in mm	ANSI Class upto 300	ANSI Class above 300 upto 600	ANSI Class above 600 below 900
	Less than 50	Visual	visual	Visual
	50 & above but below 100	Visual	visual	MPI
	100 & above but less than 300	Visual	MPI	MPI & RT (on 10% of valves on 100% area)
	300 and above	MPI	MPI	MPI & RT (on 10% of valves on changes of section & weld ends)
1.01.07	Note: For body and bonnet forgins UT with MPI may be adopted in place of RT. For austenitic steel MPI may be replaced by LPI.			
	Non Pressure Bearing Attachments Load bearing welds shall be subjected to examination by ultrasonic testing (UT) and magnetic particle inspection (MPI) techniques after stress relief (SR). No load bearing welds shall be subjected to MPI after stress relief. The toes of the welds adjoining the drum shall be ground smooth prior to stress relieving before carrying out this examination.			
	Steam coil air preheater and fuel oil heater Hydraulic pressure test shall be carried out on the heating coils. All pipes, valves steam traps and mountings shall be subjected to hydraulic test as called for under IBR, BS or other approved codes.			
	Soot Blowers (a) Butt weld between nozzle and lance tube shall be subjected to 100 % radiography tests. (b) Soot blower shall be subjected to operational checks as below: (1) Smooth operation			
1.01.08				
1.01.09				
NTPC-TAMIL NADU ENERGY COMPANY LTD POWER PROJECT (2x500 MW) STEAM GENERATOR WITH ESP PACKAGE		TECHNICAL SPECIFICATION SECTION-VI BID DOCUMENT NO.: CS-0260-101-2		PART - B SUB-SECTION-VII Q-1 QA - SG AND AUX.
				PAGE 5 OF 13

सम अमल
एस. सामंता / S. SAMANTA
उप महाप्रबन्धक (क्यू ए)
Dy. General Manager (QA)

11/11/09
DILIP JEJURIKAR
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Plot No. 25, Sector - 16A,
NOIDA - 201 301 (U.P.)

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. PE-TS-388-145-I104	
		VOLUME II-B	
		SECTION D	
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SECTION-D



TECHNICAL SPECIFICATION FOR
CONTROL VALVES WITH ACCESSORIES
(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION D

REV. NO. 00

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SECTION-D

BILL OF QUANTITY



Technical specification for
Control Valves with Accessories
(Pneumatically Operated)
VINDHYACHAL STPP STAGE-V
(1x500 MW)
TG PACKAGE

SPECIFICATION NO. **PE-TS-388-145-II04**

VOLUME **II-B**

SECTION **D**

REV. NO. 00

DATE: 18.07.12

SHEET 120 OF 135

BILL OF QUANTITY

**[A] CONTROL VALVES COMPLETE WITH SMART POSITIONER
AND ALL ACCESSORIES MOUNTED, TUBED AND TERMINATED ON JB**

S. No.	TAG NO.	SERVICE/ ITEM DESCRIPTION	QTY
1	ASV-8	DEAERATOR PEGGING FROM AUX.STEAM HEADER	1
2	CRHV-6	DEAERATOR PEGGING FROM CRH LINE	1
3	CDV-10, -12, -14	CEP A / B / C MINIMUM RECIRCULATION	3
4	CDV-22 & CDV-25	MAIN CONDENSATE	2
5	CDV-39	GSC MINIMUM FLOW RE-CIRCULATION	1
6	CDV-43	EXCESS DUMP	1
7	CDV-67	CONDENSATE FOR SD FLASH TANK	1
8	CDV-72	CONDENSATE FOR VALVE GLAND SEATING	1
9	DRV-2	HPH-6A DRAIN TO HPH-5A	1
10	DRV-8	HPH-6B DRAIN TO HPH-5B	1
11	DRV-5	HPH-6A DRAIN TO HP DRAIN FLASH TANK	1
12	DRV-11	HPH-6B DRAIN TO HP DRAIN FLASH TANK	1
13	DRV-15	HPH-5A DRAIN TO DEAERATOR	1
14	DRV-22	HPH-5B DRAIN TO DEAERATOR	1
15	DRV-18	HPH-5A DRAIN TO HP DRAIN FLASH TANK	1
16	DRV-25	HPH-5B DRAIN TO HP DRAIN FLASH TANK	1
17	DRV-28	LPH-3 DRAIN TO LPH-2	1
18	DRV-31	LPH-3 DRAIN TO LP DRAIN FLASH TANK	1
19	DRV-34	LPH-2 DRAIN TO LPH-1	1
20	DRV-37	LPH-2 DRAIN TO LP DRAIN FLASH TANK	1
21	DRV-48	DEAERATOR OVERFLOW	1
22	DMV-2	DM NORMAL MAKE-UP TO HOTWELL	1
23	DMV-9	EMERGENCY MAKE-UP TO HOTWELL	1
24	FDV-14	LOW LOAD FEED CONTROL	1
25	ECW-114	TG ECW SYSTEM	1



Technical specification for
Control Valves with Accessories
(Pneumatically Operated)
VINDHYACHAL STPP STAGE-V
(1x500 MW)
TG PACKAGE

SPECIFICATION NO. **PE-TS-388-145-I104**

VOLUME **II-B**

SECTION **D**

REV. NO. 00

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BILL OF QUANTITY

[B]	¼" COPPER TUBING (PVC COATED) (To be supplied Loose)		350 METERS
[C]	FITTINGS: (To be supplied Loose)	(i) BRASS FITTING for Connection to Air Filter Regulator	1 Lot
		(ii) BRASS FITTING for Connection to Air Lock Relay	1 Lot
		(iii) BRASS FITTING for Connection to IA Header isolation valve	1 Lot
		(iv) BRASS EQUAL TEE	1 Lot
[D]	SOFTWARE & ACCESSORIES		
1	VALVE DIAGNOSTIC AND CONFIGURATION SOFTWARE		1 No.
2	UNIVERSAL HAND HELD CALIBRATOR		1 No.



TECHNICAL SPECIFICATION FOR
CONTROL VALVES WITH ACCESSORIES
(Pneumatically Operated)

VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE

SPEC NO.: PE-TS-388-145-I 104

VOLUME II B

SECTION D


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SECTION-D

SPARES

	Technical specification for Control Valves with Pneumatic Actuator and accessories VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. PE-TS-388-145-I104	
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LIST OF COMMISSIONING SPARES


S.No.	ITEM DESCRIPTION	QUANTITY
1.	Gaskets	One (1) set with each control valve Tag
2.	Gland Packings	One (1) set with each control valve Tag

LIST OF MANDATORY SPARES

S.No.	ITEM DESCRIPTION	QUANTITY
1.	Pneumatic and electro-hydraulic actuator assembly	10% or 2 nos. of each type, Model and rating, whichever is more.(1 LOT)


NOTES:

Wherever % is indicated, the quantity shall be calculated for % of supply for total quantity of 1 unit of 1X500 MW, unless otherwise specified. The quantity to be reckoned for % indicated shall be rounded off to the next higher whole number. For example if the % of total quantity arrived is 0.2, the quantity to be supplied shall be 1 and if the % of total quantity is 5.1, the quantity to be supplied shall be 6.

	<p>Technical specification for Control Valves with Accessories (Pneumatically Operated)</p> <p>VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE</p>	SPECIFICATION NO. PE-TS-388-145-I104	
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SECTION – D

SUB VENDORS LIST

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW)	SPECIFICATION NO. PE-TS-388-145-I104	
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SUB VENDOR LIST

- | | |
|-------------------------|--|
| 1. Air Filter regulator | Placka/ Shavo Norgan/ ABB/Bells Control/Schrader/Veljan |
| 2. Solenoid | ASCO/Avcon/ Rotex/ Schrader/ Herion Norgren/ Schovill
Duncan Ltd. |
| 3. Smart Positioner | Metso/ Emerson/ Seimens/ ABB/ Flow Serve/ Foxboro/ Yamatake |

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE		SPECIFICATION NO. PE-TS-388-145-1104	
			VOLUME II-B	
			SECTION D	
			REV. NO. 00	DATE: 18.07.12
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SCHEDULE OF SUBMISSION OF DRAWINGS / DOCUMENTS, EQUIPMENT MANUFACTURE INSPECTION AND DESPATCH

1.	<u>ZERO DATE</u>	<u>DATE of LOI / FOI / TOI</u>
2.	Submission of Data Sheets / documents / catalogues / Valve sizing calculations / Noise calculations for approval.	2 Weeks from the Zero date.
3.	Technical finalisation, freezing of inputs of manufacture by way of vetting of documents and technical discussions and resubmissions of documents (if required)	6 Weeks from the Zero date.
4.	Inspection of Equipment as per Approved (Category-I) drawings / documents.	24 Weeks from the Zero date.
5.	Release of MDCC by BHEL	26 Weeks from the Zero date.
6.	Dispatch (Packaging & Dispatch)	26 Weeks from the Zero date.
7.	Final documents submission as per Contract	28 Weeks from the Zero date.

NOTE: Delays due to non-fulfillment of the requirements of approved Quality Plan and approved Data sheets, Drawings, Catalogues and Sizing Calculations observed during inspection shall be to the Vendor's account.

Delays due to INCOMPLETE (Partly) submission of Data sheets, Drawings, Catalogues and Sizing Calculations also be considered as **"DOCUMENTS NOT SUBMITTED"**

(Signature and Stamp of the Bidder)

NATIONAL THERMAL POWER CORPORATION LIMITED

**VINDHYACHAL STPP STAGE-V (1x500 MW)
TG PACKAGE**


**TECHNICAL SPECIFICATION
FOR
CONTROL VALVES WITH ACCESSORIES
(Pneumatically Operated)**

VOLUME III

SPECIFICATION No: PE-TS-388-145-I 104




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

	<p align="center">TECHNICAL SPECIFICATION FOR CONTROL VALVES WITH ACCESSORIES (Pneumatically Operated)</p> <p align="center">VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE</p>	SPEC NO.: PE-TS-388-145-I 104	
		VOLUME III	
		SECTION	
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2.	SCHEDULE OF PRICES	2
3.	SCHEDULE OF UNIT PRICES	1
4.	CV TEST CHARGES	1
5.	INSPECTION SCHEDULE	1
6.	DEVIATION SCHEDULE	1

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. : PE-TS-388-145-II04	
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SCHEDULE OF DRAWINGS, DATASHEETS, DOCUMENTS, CATALOGUES SUBMITTED WITH THE BID

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. : PE-TS-388-145-II04	
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SCHEDULE OF PRICES

S.NO.	ITEM DESCRIPTION		QTY	TOTAL PRICE
[A] CONTROL VALVES COMPLETE WITH SMART POSITIONER AND ALL ACCESSORIES MOUNTED, TUBED AND TERMINATED ON JB				
S. No.	TAG NO.	SERVICE		
1.	ASV-8	DEAERATOR PEGGING FROM AUX.STEAM HEADER	1	
2.	CRHV-6	DEAERATOR PEGGING FROM CRH LINE	1	
3.	CDV-10, -12, -14	CEP A / B / C MINIMUM RECIRCULATION	3	
4.	CDV-22 & CDV-25	MAIN CONDENSATE	2	
5.	CDV-39	GSC MINIMUM FLOW RE-CIRCULATION	1	
6.	CDV-43	EXCESS DUMP	1	
7.	CDV-67	CONDENSATE FOR SD FLASH TANK	1	
8.	CDV-72	CONDENSATE FOR VALVE GLAND SEATING	1	
9.	DRV-2	HPH-6A DRAIN TO HPH-5A	1	
10.	DRV-8	HPH-6B DRAIN TO HPH-5B	1	
11.	DRV-5	HPH-6A DRAIN TO HP DRAIN FLASH TANK	1	
12.	DRV-11	HPH-6B DRAIN TO HP DRAIN FLASH TANK	1	
13.	DRV-15	HPH-5A DRAIN TO DEAERATOR	1	
14.	DRV-22	HPH-5B DRAIN TO DEAERATOR	1	
15.	DRV-18	HPH-5A DRAIN TO HP DRAIN FLASH TANK	1	
16.	DRV-25	HPH-5B DRAIN TO HP DRAIN FLASH TANK	1	
17.	DRV-28	LPH-3 DRAIN TO LPH-2	1	
18.	DRV-31	LPH-3 DRAIN TO LP DRAIN FLASH TANK	1	
19.	DRV-34	LPH-2 DRAIN TO LPH-1	1	
20.	DRV-37	LPH-2 DRAIN TO LP DRAIN FLASH TANK	1	
21.	DRV-48	DEAERATOR OVERFLOW	1	
22.	DMV-2	DM NORMAL MAKE-UP TO HOTWELL	1	
23.	DMV-9	EMERGENCY MAKE-UP TO HOTWELL	1	
24.	FDV-14	LOW LOAD FEED CONTROL	1	
25.	ECW-114	TG ECW SYSTEM	1	

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. : PE-TS-388-145-II04		
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[B]	350 METERS OF Cu. TUBING FOR CONNECTION BETWEEN IA HEADER ON ONE END AND ACCESSORIES ON THE OTHER END OF CV	
[C] (i)	1 LOT OF BRASS FITTINGS FOR CONNECTION TO AIR FILTER REGULATOR(AS PER HOOK-UP DIAGRAM)	
(ii)	1 LOT OF BRASS FITTINGS FOR CONNECTION TO AIR LOCK RELAY(AS PER HOOK-UP DIAGRAM)	
(iii)	1 LOT OF BRASS FITTINGS FOR CONNECTION TO IA HEADER ISOLATION VALVE(AS PER HOOK-UP DIAGRAM)	
(iv)	1 LOT OF BRASS EQUAL TEE(AS PER HOOK-UP DIAGRAM)	
[D]	START-UP/COMMISSIONING SPARES (SEPARATE SHEET WITH BREAK UP TO BE ATTACHED)	
(i)	1 SET OF BODY AND BONNET GASKETS FOR EACH CV	
(ii)	1 SET OF GLAND PACKINGS FOR EACH CV	
[E]	Cv TEST CHARGES FOR EACH TYPE OF CONTROL VALVE(SEPARATE SHEET ATTACHED IN VOL-III)	
[F]	SOFTWARE & ACCESSORIES SOFTWARE FOR CONFIGURATION , DIAGNOSTIC, CALIBRATION & TESTING (FOR ALL TAGS)	
[G]	UNIVERSAL HAND HELD CALIBRATOR	
[H]	MANDATORY SPARES AS PER LIST ENCLOSED IN SECTION D (SEPARATE SHEET WITH BREAK UP TO BE ATTACHED)	

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. : PE-TS-388-145-II04	
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SCHEDULE OF UNIT PRICES


CONTROL VALVE ACCESSORIES

S. No.	ITEMS	UNIT PRICE
1. \$	POSITIONER EACH MODEL AND TYPE	
2.	AIR FILTER REGULATOR	
3.	AIR LOCK RELAY	
4. \$	POSITION LIMIT SWITCH OF EACH MODEL AND TYPE	
5.	ELECTRONIC POSITION TRANSMITTER OF EACH MODEL AND TYPE	
6.	SOLENOID VALVE	
7.	VOLUME BOOSTER (PNEUMATIC RELAY)	
8. \$	PRESSURE GAUGES OF EACH TYPE	
9.	JUNCTION BOX (36 WAYS)	
10.	HANDWHEEL	
11. \$	ACTUATOR OF EACH TYPE	
12.	BRASS FITTING FOR CONNECTION TO AIR FILTER REGULATOR	
13.	BRASS FITTING FOR CONNECTION TO AIR LOCK RELAY	
14.	BRASS FITTINGS FOR CONNECTING TO AIR HEADER	
15.	BRASS EQUAL TEE	
16.	COPPER TUBING PER METRE	
17. \$	VALVE STEM WITH PLUG & SEAT RING EACH SIZE & TYPE	
18. \$	GASKET OF EACH SIZE AND TYPE	
19. \$	BODY SEAL GASKETS OF EACH SIZE AND TYPE	
20. \$	CAGE OF EACH SIZE AND TYPE	
21. \$	GLAND PACKING EACH SIZE AND TYPE	
22. \$	VALVE TRIM OF EACH SIZE AND TYPE	
23. \$	DIAPHRAM OF EACH SIZE AND TYPE	
24. \$	SEAL BOX "O" RING OF EACH TYPE AND SIZE	
25. \$	COLOR "O" RING OF EACH TYPE AND SIZE	
26.	POSITION TRANSMITTER	

NOTE

\$: Separate list to be attached for each size and type of these control valve accessories.


PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE		SPECIFICATION NO. : PE-TS-388-145-II04	
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INSPECTION SCHEDULE


(PLACE & ADDRESS OF TESTING/ INSPECTION AND ITS SCHEDULE DATE & DURATION IN NUMBER OF DAYS ITEM/COMPONENTWISE TO BE LISTED)

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. : PE-TS-388-145-II04		
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DEVIATION SCHEDULE

PARTICULARS OF THE BIDDER / AUTHORISED REPRESENTATIVE				
NAME	DESIGNATION	SIGNATURE	DATE	COMPANY SEAL

	Technical specification for Control Valves with Accessories (Pneumatically Operated) VINDHYACHAL STPP STAGE-V (1x500 MW) TG PACKAGE	SPECIFICATION NO. PE-TS-388-145-I 104	
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CV TEST CHARGES

S.NO.	ITEM DESCRIPTION		CV TEST CHARGES
S. No.	TAG NO.	SERVICE	
1	ASV-8	DEAERATOR PEGGING FROM AUX.STEAM HEADER	
2	CRHV-6	DEAERATOR PEGGING FROM CRH LINE	
3	CDV-10, -12, -14	CEP A / B / C MINIMUM RECIRCULATION	
4	CDV-22 & CDV-25	MAIN CONDENSATE	
5	CDV-39	GSC MINIMUM FLOW RE-CIRCULATION	
6	CDV-43	EXCESS DUMP	
7	CDV-67	CONDENSATE FOR SD FLASH TANK	
8	CDV-72	CONDENSATE FOR VALVE GLAND SEATING	
9	DRV-2	HPH-6A DRAIN TO HPH-5A	
10	DRV-8	HPH-6B DRAIN TO HPH-5B	
11	DRV-5	HPH-6A DRAIN TO HP DRAIN FLASH TANK	
12	DRV-11	HPH-6B DRAIN TO HP DRAIN FLASH TANK	
13	DRV-15	HPH-5A DRAIN TO DEAERATOR	
14	DRV-22	HPH-5B DRAIN TO DEAERATOR	
15	DRV-18	HPH-5A DRAIN TO HP DRAIN FLASH TANK	
16	DRV-25	HPH-5B DRAIN TO HP DRAIN FLASH TANK	
17	DRV-28	LPH-3 DRAIN TO LPH-2	
18	DRV-31	LPH-3 DRAIN TO LP DRAIN FLASH TANK	
19	DRV-34	LPH-2 DRAIN TO LPH-1	
20	DRV-37	LPH-2 DRAIN TO LP DRAIN FLASH TANK	
21	DRV-48	DEAERATOR OVERFLOW	
22	DMV-2	DM NORMAL MAKE-UP TO HOTWELL	
23	DMV-9	EMERGENCY MAKE-UP TO HOTWELL	
24	FDV-14	LOW LOAD FEED CONTROL	
25	ECW-114	TG ECW SYSTEM	

NOTE: a) CHARGES TO BE INDICATED AGAINST EACH TAG NO.

b) CV TEST TO BE CONDUCTED FOR ONE PER TYPE PER SIZE , CV VALUE , TAG NOS. TO BE GROUPED ACCORDINGLY AND INDICATED