Item	Description	Unit	Quantity	Delivery Schedule Quantity	Delivery Schedule Date
10	HIGH CAPACITY PRESSURE REDUCING VALVE AS-10; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38581 L699018090101001 *Draw.No:* *Var.No:*	NO	1.000	1.00	30.06.10
20	LOW CAPACITY PRESSURE REDUCING VALVE AS-19; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38582 L699018090101002 *Draw.No:* *Var.No:*	NO	1.000	1.00	30.06.10
30	COMMON SPRAY BLOCK VALVE CD-15; REFER TECH SPEC NO: PC:TSP:BONGAI:001 ,002&003 & DATA SHEET NO 4-00-306-38762 L699018090101003 *Draw.No:* *Var.No:*	NO	1.000	1.00	30.06.10
40	HIGH CAPACITY SPRAY CONTROL VALVE CD-02&CD-04; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38583 L699018090101004 *Draw.No:* *Var.No:*	NO	2.000	2.00	30.06.10
50	LOW CAPACITY SPRAY CONTROL VALVE CD-08&CD-11; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38584 L699018090101005 *Draw.No:* *Var.No:*	NO	2.000	2.00	30.06.10
60	HIGH CAPACITY DESUPER HEATER DESH-01; REFER TECH SPEC NO:	NO	1.000	1.00	30.06.10

	PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38585 L699018090101006				
70	*Draw.No:* *Var.No:* LOW CAPACITY DESUPER HEATER DESH-02; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38586 L699018090101007	NO	1.000	1.00	30.06.10
80	*Draw.No:* *Var.No:* HIGH CAPACITY PRESSURE REDUCING VALVE AS-10; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38581 L699118090101001	NO	1.000	1.00	30.06.10
90	*Draw.No:* *Var.No:* LOW CAPACITY PRESSURE REDUCING VALVE AS-19; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38582 L699118090101002	NO	1.000	1.00	30.06.10
100	*Draw.No:* *Var.No:* COMMON SPRAY BLOCK VALVE CD-15; REFER TECH SPEC NO: PC:TSP:BONGAI:001 ,002&003 & DATA SHEET NO 4-00-306-38762 L699118090101003	NO	1.000	1.00	30.06.10
110	*Draw.No:* *Var.No:* HIGH CAPACITY SPRAY CONTROL VALVE CD-02&CD-04; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38583 L699118090101004	NO	2.000	2.00	30.06.10
120	*Draw.No:* *Var.No:* LOW CAPACITY SPRAY CONTROL VALVE CD-08&CD-11; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38584 L699118090101005	NO	2.000	2.00	30.06.10
	Draw.No:				

	Var.No:				
130	HIGH CAPACITY DESUPER HEATER DESH-01; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38585 L699118090101006	NO	1.000	1.00	30.06.10
	Draw.No: *Var.No:*				
140	LOW CAPACITY DESUPER HEATER DESH-02; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38586 L699118090101007	NO	1.000	1.00	30.06.10
	Draw.No: *Var.No:*				
150	HIGH CAPACITY PRESSURE REDUCING VALVE AS-10; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38581 L699218090101001	NO	1.000	1.00	30.06.10
	Draw.No: *Var.No:*				
160	LOW CAPACITY PRESSURE REDUCING VALVE AS-19; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38582 L699218090101002	NO	1.000	1.00	30.06.10
	Draw.No: *Var.No:*				
170	COMMON SPRAY BLOCK VALVE CD-15; REFER TECH SPEC NO: PC:TSP:BONGAI:001 ,002&003 & DATA SHEET NO 4-00-306-38762 L699218090101003	NO	1.000	1.00	30.06.10
	Draw.No: *Var.No:*				
180	HIGH CAPACITY SPRAY CONTROL VALVE CD-02&CD-04; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38583 L699218090101004	NO	2.000	2.00	30.06.10
	Draw.No: *Var.No:*				
190	LOW CAPACITY SPRAY CONTROL VALVE CD-08&CD-11; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38584	NO	2.000	2.00	30.06.10

	L699218090101005 *Draw.No:* *Var.No:*				
200	HIGH CAPACITY DESUPER HEATER DESH-01; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38585 L699218090101006 *Draw.No:* *Var.No:*	NO	1.000	1.00	30.06.10
210	LOW CAPACITY DESUPER HEATER DESH-02; REFER TECH SPEC NO: PC:TSP:BONGAI:001,002&003 & DATA SHEET NO 4-00-306-38586 L699218090101007 *Draw.No:* *Var.No:*	NO	1.000	1.00	30.06.10

Specification Number	Rev.no.	Sheet Number
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TECHNICAL SPECIFICATION FOR CONTROL VALVES

NTPC LIMITED
BONGAIGAON THERMAL POWER PROJECT
(3X250 MW)

CONTENTS

00	12-2-10	Fresh Issue	PARAMESH	R.PRABHA	C V N
Rev	Date	Alteration	Prepared	Approved(C&I)	Approved(Mech.)

Important note to the Bidder

Bidder is to take Photostat copy of Table V-A & Table V-B, control valve data sheets, Section VII and section VIII of this specification, fill it by neatly typing and submit the same along with the offer. Non-compliance of the above shall lead to rejection of the offer. Information called for in the above tables, sections of the Technical specification furnished in any other format shall be considered only for information.

SECTION - I

INTENT OF SPECIFICATION

1.0 This specification is intended to cover the design, engineering, manufacture, shop Fabrication, assembly, tests and inspection at manufacturer's works, packing and despatch of control valves for the mentioned project.

2.0 The equipment to be supplied as per this Technical specification shall be suitable for the site conditions specified in Equipment specification (Section III)

3.0 It is not the intent to completely specify herein all aspects of design and construction of equipment. Nevertheless the equipment shall conform to all aspects of high standards of engineering , design and workmanship and shall be capable of performing in continuous commercial operation in a manner acceptable to the purchaser who will interpret the meaning of the specification, drawings and shall have right to accept or reject any work or material which in his assessment is not complete to meet the requirements of this specification and/or applicable national and/or international standards mentioned elsewhere in the specification.

4.0 If any provision of this specification departs from the bidder's usual construction sufficiently to materially increase cost of equipment without (in bidders opinion) providing a corresponding increase in quality or if the bidder considers that his usual construction would provide better quality, the Bidder shall call this to the attention of the Purchaser by submitting an alternate bid. However in any case, a base bid shall be submitted based on the equipment and services as specified.

SECTION - II

SCOPE OF WORK AND SUPPLY

1.0 SCOPE OF WORK

The scope of work of this specification shall include design, manufacture and delivery of control valves as detailed in various sections of this specification.

2.0 SCOPE OF SUPPLY

1. High capacity Pressure Reducing valve	TAG No. AS 10
2. Low capacity Pressure Reducing valve	TAG No. AS 19
3. Common spray block valve	TAG No. CD-15
4. High capacity spray CV	TAG No.CD-02,CD-04
5. High capacity Desuperheater	TAG No.DESH-01
6. Low capacity spray PCV	TAG No.CD-08,CD-11
7 Low Capacity Desuperheater	TAG No.DESH-02

Complete accessories such as pneumatic diaphragm actuators, smart positioners, I/P converters, position transmitter, air lock valve, limit switches, air-set (air filter with regulators and gauges), solenoid valves, junction box and hand wheel for all control valves. All accessories shall be mounted integrally, tubed and supplied.

SECTION - III

EQUIPMENT SPECIFICATION

1. High capacity PR valve TAG No. AS 10	4-00-306-38581/REV00 (4 SHEETS)
2. Low capacity PR valve TAG No. AS 19	4-00-306-38582/REV00 (4 SHEETS)
3. Spray Water Common block valve TAG No. CD-15	4-00-306-38762/REV00 (4 SHEETS)
4. High capacity spray CV TAG No.CD-02, CD-04	4-00-306-38583/REV00 (4 SHEETS)
5 Low capacity spray CV TAG No.CD-08,CD-11	4-00-306-38584/REV00 (4 SHEETS)
6. High Capacity desuperheater TAG No.DESH-01	4-00-306-38585/REV00 (2 SHEETS)
7 Lo Desuperheater TAG No.DESH-02	4-00-306-38586/REV00 (2 SHEET)
9. Schematic Arrangement of Aux. PRDS station	4-00-301-38579/REV00 (1 SHEET)

Section IV

General technical requirements

1.0 The Control valves and accessories furnished by the bidder shall be designed, constructed and tested in accordance with the latest applicable requirements of code for power piping ASME B31.1, 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.

2.0 The design of all valve bodies shall meet the specification requirements and shall conform to the requirements of ASME for dimensions, material thickness and material specification for their respective pressure classes.

3.0 The valve sizing shall be suitable for obtaining maximum flow conditions with valve openings 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 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 velocity at valve outlet does not exceed 8 m/sec for liquid service, 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 Owner's approval during detailed engineering.

4.0 Control valves for steam and water applications shall be designed to prevent cavitation, wire drawing, flashing on the downstream side of valve and downstream piping. Thus for cavitation / flashing service, only valve with anti cavitation trim shall be provided. Detailed calculations to establish whether cavitation will occur or not for any given application shall be furnished.

5.0 Control valves for spray water application shall have leakage rate as per leakage class V. All other control valves shall have leakage rate as per leakage class IV

6.0 The control valve induced noise shall be limited to 85 dBa at 1.0 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.

7.0 The characteristic of control valves shall be determined based on the application / service.

8.0 **Valve construction:**

8.1 All valves shall be of globe body design & straightway pattern with single or double port, unless otherwise specified or recommended by the manufacturer to be of angle body type. Rotary valve may alternatively be offered when pressure and pressure drops permit.

8.2 Valves with high lift cage-guided plugs & quick-change trims shall be supplied.

8.3 Cast Iron valves are not acceptable.

8.4 Bonnet joints for all control valves shall be of flanged and bolted type or other construction acceptable to the owner. Bonnet joints of internal threaded or union type are not acceptable.

8.5 Plug shall be of one-piece construction either 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.

8.6 All valves connected to vacuum on down stream side shall be provided with packing suitable for vacuum application (e.g Double Vee type chevron packing)

8.7 Valve characteristic shall match with the process characteristics.

8.8 Extension Bonnets shall be provided when the maximum temperature of following fluid is greater than 280° C

8.9 Flanged valves shall be rated at no less than ASME pressure class of 300 lbs.

9.0 **Valve Actuators:**

9.1 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° C continuously.

9.2 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/cm^2 per linear millimetre of seating surface, shall be provided in the selection of actuator to ensure tight seating unless otherwise specified.

9.3 The travel time for the actuators shall not exceed 10 seconds.

10.0 Control valve Accessory Devices:

10.0 Control valve Accessory Devices:

10.1 All control valve accessories such as I/P converters, air locks, hand wheels / hand-jacks, Torque switches, smart positioners, solenoid valves, diffusers, external volume chambers, Position transmitters (capacitance type only), tubing and air sets and junction boxes etc. Shall be provided as per requirements.

10.2 I/P Converter: (IF APPLICABLE)

Type	: Fail-Freeze type (Electronic)
Input	: 4 – 20 mA
Air supply	: 1.5 Kg / cm^2 (g)
Linearity	: 0.5 % of span
Hysterisis	: 0.1 % of span
Amb. Temp. Effect	: < 0.02 % of span
Protection	: IP 55
Allowed Drift	: ± 2 % of set point / hr

11.0 NAME PLATE:

11.1 Name plate shall be of engraved chromium plate or label with engraving filled with enamel. Nameplate data shall be inscribed on the plate in such a manner that it cannot erode or peel off. Name Plate inscriptions shall be bilingual in Hindi followed by English. Alternatively two separate plates one with Hindi and other with English inscriptions may be provided.

11.2 Name plate shall be marked in accordance with MSS standard SP-25 and ASME B16.34 as a minimum.

11.3 Valves shall be identified by owner's tag no. on a metal tag permanently attached to a non pressure part, such as the yoke by a stainless steel wire.

11.4 All exposed steel surfaces are to be painted before despatch as per technical

Requirements.

Section V

Spares & Special Tools

1.0 Commissioning spares

Commissioning spares are those spares, which may be required during start up, and commissioning of the unit. Bidder must quote for these spares and unit prices to be indicated.

2.0 Recommended spares

Recommended spares for all the items for three-year operation. Bidder must quote unit prices. Bidder shall indicate the shelf life for gaskets, packing etc. The recommended spares list shall be independent of the list of mandatory spares. The purchaser reserves the right to buy any or all of the recommended spare parts.

3.0 Mandatory spares

Mandatory spares are those spares, which are considered essential by the purchaser for Normal operation of the plant. If such spares are indicated, bidder shall indicate the Price for each and every item in the schedule of mandatory spares whether or not the Bidder considers it necessary for the purchaser to have it. If the bidder fails to comply With the above or fails to quote the price of any mandatory spares the cost of such Spares shall be deemed to be included in the contract price.

4.0 Bidder shall quote separately the special tools if any required for erection, commissioning and maintenance of the equipment if the bidder considers it as essential whether or not the requirement of such tools are indicated in this specification. However, if the requirements of such tools are indicated, bidder shall indicate the price for each and every item of the special tools indicated. If the bidder fails to comply with the above or fails to quote the price of special tools indicated, the cost of such special tools shall be deemed to be included in the contract price. All tools shall be new and unused.

5.0 Bidder shall identify the Commissioning spares, Recommended spares and Mandatory Spares in the cross sectional drawing or in the catalogue for easy reference.

6.0 All spares supplied under this contract shall be strictly interchangeable with the parts for which they are intended for replacements. The spares shall be treated and packed for long storage under the climatic conditions prevailing at the site. eg. Small Items shall be packed in sealed transparent plastic bags with dissector packs as necessary.

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

8.0 All spare parts furnished shall be new and unused. The contractor shall guarantee that in the event of any of the spares offered goes out of production notice shall be given to the owner sufficiently in advance to enable him to order this requirement of spares in one lot, if he so desires.

9.0 Bidder shall indicate the service expectancy period for the spare parts under normal operating conditions before the replacement is necessary.

10.0 Complete manufacturing drawings of items shall be given to the owner as and when any spare parts is discontinued from manufacturing.

11.0 Bidder shall furnish the list of spare and special tools required as per the Table V-A and V-B.

12.0 Requirement of Mandatory Spares are indicated in Table V-C.

TECHNICAL SPECIFICATION FOR AUX.PRDS CONTROL VALVES

TABLE V-A

LIST OF SPARES
(To be filled in by the bidder)

Sl. no	Description of spare	Reference Drawing.	Item no.	Qty. reqd For commissioning Spare.	Qty. reqd For Recommended Spare.	Qty. reqd For mandatory Spare.	COST / No

Signature of the bidder.

TABLE V-B

LIST OF special tools
(To be filled in by the bidder)

Sl. no	Description of the tool	Reference Drawing.	Item no.	Quantity	COST / No

Signature of the bidder.

TABLE-V-C
MANDATORY SPARES

S No.	Description	Qty	Unit
1.	High Capacity PRDS system		
1.0	Desuperheater Liner	1	Set
1.1	Steam Pressure reducing cum desuperheating valves		
	i) Stem	1	Number
	ii) Disc	1	Number
	iii) Body seat rings	2 for each type, Size & rating of valves	Number
	iv) Gland packing	2 for each type, Size & rating of valves	Number
	v) Pressure seal ring	3	Number
	vi) Gasket	2	Number
1.2	High capacity spray water line control valves. Valve trim including cage, plug, stem, seat rings, guide bushings, stem packing	1 For each Type, size and rating Of valves	Number
2.	Low capacity PRDS system (CRH)		
	i. Steam pressure reducing valve:		
	ii. Stem	1	Number
	iii. Disc	1	Number
	iv. Body seat rings	2 for each type, size and rating	Number
	v. Gland packing	2 for each Type, size and rating of valve	Number
	vi. Pressure seal ring	3	Number
	vii. Gasket	1	Number

2.2	Low capacity spray water line control valves. Valve trim including cage, plug, stem, seat rings, guide bushings, stem packing	1 for each Type, size and rating of valves		Number
3.0	Actuators & Assemblies			
	i) Actuator assembly			10% or 1 no. Each type, model And rating which ever is more
	ii) Diaphragms, O-rings, seals etc. of all type, make etc.			200% for each model
	iii) Pneumatic air filter/regulator of each type, make rating etc.			5% or one no. Whichever is more
	iv) Pressure gauges of all types, make rating etc.			5% or one no. Of each type Whichever is more
	v) Solenoid valves			10% or two no. Of each type Whichever is more
	vi) Positioner unit			20% or one no. Of each type Whichever is more
	vii) Solenoid valves			20% or two no. Of each type Whichever is more

Quality Assurance, Inspection and Testing

1.0 General:

1.1 All equipment covered under this specification shall be subject to inspection and test by the purchaser during manufacture, erection and commissioning. The approval of the purchaser of the results of the tests and inspection will not however, prejudice the right of the owner to reject the equipment if it does not comply with the specification when erected or does not give complete satisfactory service. The cost of all such tests shall be borne by the contractor.

1.2 Testing / Inspection procedures as detailed herein to give a basic quality control programme to be followed by the Bidder, are in no way comprehensive and in no way form a complete quality assurance programme. Any other inspection stage not mentioned in these clauses but required as per the Bidder's process control shall be deemed to be included. Any tests necessary from operation, safety and reliability point of view shall also be included. Such tests shall be subject to the approval / recommendation of the Purchaser.

1.3 The Bidder shall furnish the quality control procedures to be adopted for assuring quality of each equipment under this specification from the receipt of material at site, during storage, erection, pre-commissioning to final trial run and commissioning of the valves. These procedures shall necessarily include all checks / tests conducted at site for preservation, pre-assembly, alignment, positioning of equipment, foundation preparation, welding / bolting, heat

treatment, non-destructive examination, hydraulic test, performance test etc. The above shall be discussed and finalised with the Purchaser.

2.0 Shop Tests:

2.1 The contractor shall permit the Purchaser, if he so desires to maintain one or more of his representatives in the Contractor's shops and/or at the shops of his sub-contractors for the purpose of inspecting the various steps in the shop fabrication and the various tests to be performed for the materials supplied under this specification. The Purchaser's representative(s) shall have complete access to all parts of the shop wherein work under this specification is to be performed.

2.2 The contractor shall adopt good quality control procedures and provide inspection in his works and that of his sub-contractors to ensure the mechanical accuracy of components, compliance with drawings, identify and acceptability of all material, part and equipment. He shall conduct all tests required to ensure that the equipment furnished conforms to the requirements of the applicable codes. All tests and test procedures proposed by the manufacturer/fabricator shall be submitted to the purchaser for his prior approval. The purchaser shall be notified well in advance of the fabrication and major tests of the appurtenances and equipment, for the purpose of making general inspections and progress reports.

2.3 The Purchaser's representative shall have full access to the shops where the equipment to be supplied is being tested and all test records including records on heat treatment, radiography, ultrasonic test, magnetic particle test, material analyses etc. shall be made available to him. When the contractor offers finished

equipment for final inspection, notice of at least 15 days shall be given to the purchaser to enable his inspector to plan and carry out the inspection.

2.4 No material shall be despatched to the site from the manufacturers works until the owner has arranged for and carried out inspection to his satisfaction or has waived this requirement in writing.

2.5 Material test and analysis:

All materials shall be furnished in strict accordance with the applicable codes and the detailed specifications herein. All sources of material shall be disclosed and relevant test certificates giving precise details of identification of material, the physical and chemical properties of the material shall be submitted to the owner for approval. Test coupons shall be cast from the same melt for the body & disc.

2.6 Shell Test:-

All valves shall be subjected to shell test as per ANSI B16.34 and MSS-SP-61. All gaskets used for test shall be of the same material and design as specified for the finished products. Where mechanical gasket joints are broken following tests, new gaskets shall be fitted with the equipment and the joints shall be re-tested.

2.7 100% visual check shall be carried out for dimensions, end connection details and Surface finish of the equipment.

2.8 The complete inspection shall be carried out as per the owner's quality plan.

2.9 The inspection shall be carried out as per the drawing approved by the purchaser

Section VII
Documents to be furnished along with the offer

Note: a) All documents shall be in ENGLISH language only
b) Only units followed in this specification are to be used.

Sl.no	Description	To be filled by the bidder. Bidder's drawing or document reference (if not furnished "not furnished" with reason
1.0	General arrangement drawing of the valves with operators and other special accessories indicating clearly a) overall dimensions, b) Weight of valve, actuator & special accessories, c) Model no. d) Make & country of Manufacture, e) Rating/Design code f) Type g) End connection details h) Type of operator i) Make of operator and Model No. j) Valve Tag nos.	
2.0	Cross sectional drawing of the valve with operators and special accessories indicating minimum the following:	

	i) Names of all parts ii) Material of construction of all parts(Material specification shall not be in general terms like carbon steel, Alloy steel etc. Material specification shall conform to International standards. In case of Material specification other than ASTM, equivalent ASTM material specification to be indicated. No part of the valve to be left in the Tabulation).	
3.0	Minimum the following parts to be covered if applicable. a) Body b) Bonnet, Cap c) Disc d) Stem e) Plug f) Disc seat g) Stem guide h) Gasket i) Gland packing j) Bolts & studs k) Nuts	

	l) Hand wheel iii) Weight of all parts iv) Erection, commissioning and Mandatory Spares identification along with their Quantity. v) Weight of valve & actuator separately Total weight and flooded weight vi) Class rating as per ASME B16.34 vii) Make & Country of Manufacture viii) Actuator Make & Type ix) End connection details	
4.0	Relevant catalogues for the valves	
5.0	List of Tender deviations (It will be presumed that the bidder has no tender deviations in case bidder failing to furnish the same).	

Certified that all the information called for is available in the document or drawing indicated above.

Certified that our supply of valves will be in line with the Technical specification except the deviations furnished in Table IIIA and in the list of Tender deviations enclosed if any.

(signature of the bidder)

SECTION VIII

Documents to be furnished after award of the contract

Note:
a) All documents shall be in ENGLISH language only
b) Only units followed in this specification are to be used.
c) All documents shall contain the project name
d) Applicable valve tag nos.

Sl.no	Description	Ref. Drawing	No of days reqd. To submit for approval after LOA / TOA or to resubmit for approval after BHEL comments.	No. of copies to be sent for approval.	No of days to furnish final drg after final approval.	No of copies to be furnished after final approval.
1.0	General arrangement drawing as per point 1 , section VII.		15	5	5	15
2.0	Cross sectional drawing as per point 2 , section VII		15	5	5	15
3.0	Applicable catalogue of valve.		15	5	5	15

4.0	Erection, commissioning, operation and maintenance Manuel containing minimum of the following detail.		LATER	5	5	15
	1) General arrgt. & cross sectional arrgt. Drgs as per point 1&2 of section VII respectively		15	5	5	15
	2) Actuator data sheet and wiring diagram of actuators.					
	3) List of Ball & Roller bearing schedule.					
	4) List of lubrication oil schedule					
	5) Do's and Do not's for valves & actuators.					
	6) Erection procedure & precautions to be taken.					
	7) Commissioning procedure & precautions to be taken.					
	8) Operating & maintenance instructions.					

5.0	Test certificates.		Not Applicable.	Nil	45	15
	1) Raw material test certificates (chemical & mechanical)					
	2) Hydro test certificates.					
	3) Seat test certificates					
	4) Back seat test certificates					
	5) NDT & other test certificates as per ASME B 31.1					
6.0	IBR and other mandatory requirements if required.		Not Applicable	Nil	45	15
7.0	Reproducible of drawings in sl no: 1.0 & 2.0		Not Applicable	Nil	60	15

Certified that the drawings / documents will be submitted / furnished as per the above Table.

SECTION – III-- EQUIPEMENT SPECIFICATION

	BONGAIGAON	
1. High capacity Pressure control valve TAG No. AS 10	4-00-306-38581/REV00 (4 SHEETS)	
2. Low capacity Pressure control valve TAG No. AS 19	4-00-306-38582/REV00 (4 SHEETS)	
3. Common spray block valve TAG No. CD-15	4-00-306-38762/REV00 (4 SHEETS)	
4. High capacity spray CV TAG No. CD-02,CD-04	4-00-306-38583/REV00 (4 SHEETS)	
5 Low capacity spray CV TAG No. CD-08,CD-11	4-00-306-38584/REV00 (4 SHEETS)	
6.High capacity Desuperheater ,TAG NO:DESH-01	4-00-306-38585/REV00 (2 SHEETS)	
7.Low Capacity Desuperheater TAG No.DESH-02	4-00-306-38586/REV00 (2 SHEET)	
8.Schematic Arrangement of Aux. PRDS station	4-00-301-38579/REV00 (1 SHEET)	

CI 12/A

CONTROL VALVE SPECIFICATION SHEET

(IN ACCORDANCE WITH I.S.A. FORM S20.51)

PROJECT:
NTPC LTD
BONGAIGAON TPP (3x250 MW)

CUST.No: 6990,6991&6992

GENERAL: THIS IS TO BE READ ALONG WITH TECHNICAL SPECIFICATION PC: TSP: BONGAI:001002 &003

1. Valve tag No. : AS-10
2. Service : High capacity PR valve
3. Line No./Vessel No. :
4. Qty. required : ONE
5. Manufacturer : *
6. Model No. : *
7. Rating : ASME CL. 2500 Spl.
8. Total Qty Required : 1 Nos

BODY:

9. Type : Thru ☑ 3 Way ☐ Z type ☐ Angle ☐ ☐
10. Form : Globe ☑ Ball ☐ Butterfly ☐ ☐
11. Size : *
12. Port Size : * (bidder to match size of control valve with given 'd1' values)
13. Connecting Pipe size /EP
    Steam Inlet : OD 219.1 x 36(P22)
    Steam Outlet : ID 260 x 51(P22)
14. Body rating : ASME CL. 2500 Spl.
16. Bonnet type : Standard ☐ Finned ☑ Extended ☑ Pr. seal ☐ ☐
17. Material : Body : ASTM A 182 Gr. F22
    Packing: GRAFOIL
    Bolting : *
18. Flow direction : HORIZONTAL
19. Suitable matching pieces to match with pipe size specified shall be offered.

15. Type of end connections : Screwed ☐ NPI ☐ Flanged ☐ ANSI ☐ BW ☑ (Steam side) BSPT ☐ ☐ DIN ☐ SW ☐ BS ☐ ☐

Edge Preparation as per BPS.

TRIM:

20. No. of ports : *
21. Type : Balanced ☑ Unbalanced ☐
22. Plug characteristics: ~~L/LV~~/EP ✓ / ~~MODIFIED EP~~
23. Guiding : Cage ☑ Port ☐ Top ☐ Bottom ☐
24. Stem material :
25. Plug material :
26. Seat material :
27. Disc material :
28. stem guide material :

    } 410/CoCr-A OR EQUIVALENT

29. Cage Material : F22 Ion Nitrided (or) Better

ACTUATOR:

30. Type : Electric ☐ Pneumatic ☑ Hydraulic ☐ DA/RA(Air To Close) ✓
31. Size : *
32. Supply : 45 PSIG
33. Failsafe position of valve. : Stayput ☑ Full Close ☐ Full Open ☐
34. Diaphragm/Cylinder pressure at Valve full open : * Valve full close :
35. Force required for process & Force available at actuator. : *
36. Actuator sizing ΔP : *
37. If actuator electric fill in data sheet as per annexure furnished and shall comply with annexure-I specification. : NAPL

REV	DATE	ALTERATION	PREPARED	APPROVED	APPROVED
00	12/10/09	FRESH ISSUE	PARAMESH	R.PRABHA	C.V.NATHAN

DRG NO: 4-00-306-38581 REV 00

POSITIONER: SMART SIEMEN MAKE
MODEL NO: 6DR5211 -0EN00-0AA0+6DR4004-8J

38. Type : Pneumatic ☐ Electronic ☐
DA/RA Electro Pneumatic (SMART) ☑

39. If Electronic : Type :
Model : Solid plate deversing contactors
Main contactor : Solid state thyristor: ☐
Relay Switching : ☐
Also refer annexure – II
position indicator reqd. for Valve & VCB

40. If Pneumatic : Type : *
Model : *
Split range : Yes ☐ No ☑
Controller Input & Output Signal Value : 4–20 mA
Air supply : 45 PSIG
input/Output Pr. guage :
Required : Yes ☑ No ☐
By pass provision : Yes ☐ No ☑
Action : Direct ☐ Reverse ☐ Both ☑
Cam : =% ☐ Linear ☐ Both ☑

ACCESSORIES:

41. Handwheel : Yes ☑ Side ☑ Top ☐
42. Air filter : Yes ☑ No ☐
Filter Size : 5 Micron ☑ 25 Micron ☐
43. Limit Switches : Yes ☑ No ☐
Qty. : 1 at full open &
: 1 at full close
Rating : 240v. 5Amp. ac
No of contacts per switch : 2No + 2NC

44. Solenoid valve to effect
Stayput : Yes ☑ No ☐
Type : 3 Way universal : Yes ☑ No ☐
Rating : 24V DC 2 wire
Class H coil : Yes ☑ No ☐
45. Vol. booster : Yes ☐ No ☑
46. Travel time : < 10 sec
47. Installation : Indoor ☐ Outdoor ☑
48. All accessories enclosure : *

49. Position transmitter : Yes ☐ No ☑
Type : Pnuematic : ☐ Electronic Non contact type ☑
Rating : 2 wire 24V DC: ☑ ☐
Output : 4–20 ma : ☑ 3–15 paig ☐
50. Torque Switches : Yes ☐ No ☑
Qty. :
Rating :
51. Air lock : Yes ☑ No ☐
Function : TO EFFECT STAYPUT
Type * : 3 Way single acting ☐
: 3 Way double acting ☐
52. Ambience : Dusty corrosive ☑
Toxic hazardous : ☐ ☐
53.1. Local position Indicator : Required.
53.2. I/P converter with A/F regulator : Not Required (FAIL FREEZE TYPE)
53.3 Integral JB : 36 Way JB required
2 No s of 9 pin plug & socket connector.
1 No of 5 pin plug & socket connector.

MISCELLANEOUS:

54. Seat leakage : ASME FCI/RP 70.2 ☑ CLASS IV
I.S.A : ☐ ☐
55. Approx. weight (total) : *
56. Space requirements for online servicing : *

57. Valve sizing as per
ISA 75.01 : Yes ☑ No ☐
58. Noise Level : Less than 85 DBA at 1m from Valve & Piping System.
59. Intertubing Diagram : As per Enclosed.
60. Performance Data
Linearity : ± 1 % Hyterisis : ± 0.5 %
Sensitivity : ± 0.5 % Accuracy (overall) : ± 2 %

VALVE SIZING DATA:

61. Medium : SH Steam ☑ Sat. Steam ☐
Water ☐ ☐
62. Flow rate in T/Hr
63. Operating inlet pressure in Kg/cm^2 (a)
64. Operating inlet temperature in °C
65. Outlet pressure in Kg/cm^2 (a)
66. Viscosity
67. Operating (required) Cv
68. Operating noise level at 1.5 metre
69. Outlet velocity

CONDITION				
1	2	3	4	5
REFER DRAWING No. 4–00–306–38581 sht 4 of 4 FOR VALVE SIZING DATA				

REFER STANDARD TABLE

x	x	x	x	x
<85	dba	(for all conditions)		
*	*	*	*	*

DATE	PREPARED	APPROVED	APPROVED	DRG. NO:	REV
12/10/09	PARAMESH	R.PRABHA	C V NATHAN	4–00–306–38581	00

DESIGN DATA:

70. Design Pressure Kg/cm^2(g) 167.1
71. Design Temperature °C : 545
72. Rated/Design/Selected Cv of valve :
73. Velocity restriction :*
74. Operating lift restriction : 15 to 80 % .
75. lift at various operating Conditions 1 TO 6 : *
76. Down stream limitations : *
77. Up stream limitations : *
78. Increase in signal Air : To open the Valve

TESTING/INSPECTION:

79. Hydraulic test report : Yes ☑ No ☐
80. Radiography : Critical Parts : ☑ Total ☐
Not required : ☐ ☐
81. IBR test report : Reqd. : ☑ ☐
82. Type test : Capacity Evaluation by ISA S39.2/5 39.4 : Required.
83. Valve functional test : Yes ☑ No ☐
84. Accessories functional Test : Yes ☑ No ☐
85. Seat leakage test : Yes ☑ No ☐
86. Material test report : Yes ☑ No ☐
87. Customer Inspection :
In process : Yes ☑ No ☐
Final : Yes ☑ No ☐
88. Third Party inspection : Yes ☐ No ☐

DOCUMENTATION: (Required)

89. With bid. (3 sets)
Catalogues : Yes ☑ No ☐
Dimensional drawing : Yes ☑ No ☐
All data sheets : Yes ☑ No ☐
Recommendation / Limitation : Yes ☑ No ☐
Confirmatory report : Yes ☑ No ☐
Contrary report : Yes ☑ No ☐
Deviation report : Yes ☑ No ☐
90. Quality plan (enclosed) : Yes ☑ No ☐
91. With equipment :
Dimensional drawing : 15 Sets
O & M ** : --do--
Data Sheets : --do--
Test certificate : 1RTF + 3 Sets
92. Valve sizing, actuator sizing, noise level calculations required with bid(with formulae) : Yes ☑ No ☐
93. --

SPARES:

94. Commissioning spares : *
95. Mandatory spares : As per specification
96. 2/3 Years maintenance spares : *

OTHERS:

97. Bidders experience list : Required ☑ Not required ☐
98. Operational feed back of such valves supplied elsewhere : Required ☑ Not required ☐
99. Equipment guarantee : Required ☑ Not required ☐
100. System guarantee : Required ☑ Not required ☐
101. Service contract for 5 Years : - To quote seperately
102. Commissioning of the valves : Required ☐ Not required ☑

NOTES:

1. * DENOTES BIDDER TO SPECIFY
2. ** VIDEO MANUAL PREFERRED.

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	DRG. NO:	REV
DATE	PREPARED	APPROVED	APPROVED	4-00-306-38581	00

BHEL

AUXILIARY PRDS SIZING CALCULATION

4-00-306-38581

PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)

SHEET NO. 4 OF 4

SIZING DATA FOR HIGH CAPACITY PRESSURE REDUCING VALVE

SL.NO.	PARAMETERS	CONDITION-1 (15% LOAD), (COLD START) (Case-1)	CONDITION-2 (30% LOAD) (HOT/ COLD) (Cases -3 & 4)	CONDITION-3 (100 % + SECOND UNIT START-UP REQT. + INTERMITTENT REQT.) (Case-8)	CONDITION-4 15 % LOAD, (HOT START) (Case- 2)
1.0	INLET OF AUX. PRDS (INLET OF PRV)				
1.1	PRESSURE (kg/cm^2 (a))	38	82/46	150.00	82.00
1.2	TEMPERATURE (^0C)	395	495/430	537.0	440.0
1.3	FLOW (T/Hr)	63.77	70.4/82.2	107.20	67.17
2.0	OUTLET OF AUX. PRDS (AFTER DESUPERHEATING)				
2.1	PRESSURE (kg/cm^2 (a))	16.0	16.0	16.0	16.0

1. CONDITION 1 IS THE CAPABILITY CHECK POINT

CI 12/A

CONTROL VALVE SPECIFICATION SHEET

(IN ACCORDANCE WITH I.S.A. FORM S20.51)

PROJECT:
NTPC LTD
BONGAIGAON TPP (3x250 MW)

CUST.No:6990,6991&6992

GENERAL:THIS IS TO BE READ ALONG WITH TECHNICAL SPECIFICATION PC: TSP: BONGAI:001002 &003

1. Valve tag No. : AS-19
2. Service : Low capacity Pressure Control valve
3. Line No./Vessel No. :
4. Qty. required : ONE
5. Manufacturer : *
6. Model No. : *
7. Rating : ASME CL. 600
8. Total Qty Required : 1 No

BODY:

9. Type : Thru ☑ 3 Way ☐ Z type ☐ Angle ☐ ☐
10. Form : Globe ☑ Ball ☐ Butterfly ☐ ☐
11. Size : *
12. Port Size : * (Bidder to match size of control valve with given 'd1' values)
13. Connecting pipe size
    Inlet : OD 114.3x6.02(SA 106 GrC)
    Outlet : OD 168.3 x 7.11(SA 106 GrC)
14. Body rating : ASME CL. 600
16. Bonnet type : Standard ☐ Finned ☑ Extended ☑ Pr. seal ☐ ☐
17. Material : Body : ASTM A 216 Gr WCC
    Packing: GRAFOIL
    Bolting : *
18. Flow direction : HORIZONTAL
19. Suitable matching pieces to match with pipe size specified shall be offered.

15. Type of end connections :

Screwed	☐	BW	☑	SW	☐
NPI	☐	BSPT	☐	BS	☐
Flanged	☐		☐		☐
ANSI	☐	DIN	☐		

Edge Preparation as per BPS.

TRIM:

20. No. of ports : *
21. Type : Balanced ☑ ✓Unbalanced ☐
22. Plug characteristics: ~~L/LV~~/EP / ~~MODIFIED EP~~
23. Guiding : Cage ☑ Port ☐ Top ☐ Bottom ☐
24. Stem material :
25. Plug material :
26. Seat material :
27. Disc material :
28. stem guide material :

17.4 PH SST / SS 316 OR EQUIVALENT

29. --

ACTUATOR:

30. Type : Electric ☐ Pneumatic ☑ Hydraulic ☐ ✓DA/RA(Air To Close)
31. Size : *
32. Supply : 45 PSIG
33. Failsafe position of valve. : Stayput ☑ Full Close ☐ Full Open ☐
34. Diaphragm/Cylinder pressure at Valve full open : * Valve full close :
35. Force required for process & Force available at actuator. : *
36. Actuator sizing ΔP : *
37. If actuator electric fill in data sheet as per annexure furnished and shall comply with annexure-I specification. : NAPL

REV	DATE	ALTERATION	PREPARED	APPROVED	APPROVED
00	12/10/09	FRESH ISSUE	PARAMESH	R.PRABHA	C.V.NATHAN

DRG. NO: 4-00-306-38582 REV 00

POSITIONER: SMART SIEMEN MAKE MODEL NO: 6DR5211-0EN00-0AA0+6DR4004-8J

38. Type : Pneumatic ☐ Electronic ☐
DA/RA
Electro Pneumatic (SMART) ☑

39. If Electronic : Type :
Model : Solid plate deversing contactors
Main contactor : Solid state thyristor: ☐
Relay Switching : ☐
Also refer annexure – II
position indicator reqd. for Valve & VCB

40. If Pneumatic : Type : *
Model : *
Split range : Yes ☐ No ☑
Controller Input & Output Signal Value : 4-20 mA
Air supply : 45 PSIG
Input/Output Pr. guage :
Required : Yes ☑ No ☐
By pass provision : Yes ☐ No ☑
Action : Direct ☐ Reverse ☐ Both ☑
Cam : =% ☐ Linear ☐ Both ☑

ACCESSORIES:

41. Handwheel : Yes ☑ Side ☑ Top ☐
42. Air filter : Yes ☑ No ☐
Filter Size : 5 Micron ☑ 25 Micron ☐
43. Limit Switches : Yes ☑ No ☐
Qty. : 1 at full open &
: 1 at full close
Rating : 240v. 5Amp. ac
No of contacts per switch : 2No + 2NC
44. Solenoid valve to effect
Stayput : Yes ☑ No ☐
Type : 3 Way universal : Yes ☑ No ☐
Rating : 24V DC 2 wire
Class H coil : Yes ☑ No ☐
45. Vol. booster : Yes ☐ No ☑
46. Travel time : <10 SEC
47. Installation : Indoor ☐ Outdoor ☑
48. All accessories enclosure : *

49. Position transmitter : Yes ☐ No ☑
Type : Pnuematic : ☐ Electronic Non contact type ☑
Rating : 2 wire 24V DC: ☑ ☐
Output : 4-20 ma : ☑ 3-15 paig ☐
50. Torque Switches : Yes ☐ No ☑
Qty. :
Rating :
51. Air lock : Yes ☑ No ☐
Function : TO EFFECT STAYPUT
Type * : 3 Way single acting ☐
: 3 Way double acting ☐
52. Ambience : Dusty corrosive ☑
Toxic hazardous : ☐ ☐
53.1. Local position Indicator : Required.
53.2. I/P converter with A/F regulator : Not Required (FAIL FREEZE TYPE)
53.3 Integral JB : 36 Way JB required
2 No s of 9 pin plug & socket connector.
1 No of 5 pin plug & socket connector.

MISCELLANEOUS:

54. Seat leakage : ASME FCI/RP 70.2 ☑ CLASS IV
I.S.A : ☐ ☐
55. Approx. weight (total) : *
56. Space requirements for online servicing : *

57. Valve sizing as per ISA 75.01 : Yes ☑ No ☐
58. Noise Level : Less than 85 DBA at 1m from Valve & Piping System.
59. Intertubing Diagram : As per Enclosed.
60. Performance Data
Linearity : ± 1 % Hyterisis : ± 0.5 %
Sensitivity : ± 0.5 % Accuracy (overall) : ± 2 %

VALVE SIZING DATA:

61. Medium : SH Steam ☐ Sat. Steam ☑
Water ☐ ☐
62. Flow rate in T/Hr
63. Operating inlet pressure in Kg/cm^2 (a)
64. Operating inlet temperature in °C
65. Outlet pressure in Kg/cm^2 (a)
66. Viscosity : --
67. Operating (required) Cv
68. Operating noise level at 1.5 metre
69. Outlet velocity

CONDITION				
1	2	3	4	5
REFER DRAWING No. 4-00-306-38582 OF SHT 4 OF 4 FOR VALVE SIZING DATA				

REFER STANDARD TABLE

*	*	*	*	*
<85	dba	(for all conditions)		
*	*	*	*	*

DATE	PREPARED	APPROVED	APPROVED	DRG. NO:	REV
12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	4-00-306-38582	00

DESIGN DATA:

70. Design Pressure Kg/cm^2(g) : 48 Kg/Cm^2 (g)
71. Design Temperature °C : 365 °C
72. Rated/Design/Selected Cv of valve : *
73. Velocity restriction : *
74. Operating lift restriction : 15 to 80 % .
75. lift at various operating Conditions 1 TO 6 : *
76. Down stream limitations : *
77. Up stream limitations : *
78. Increase in signal Air : To open the Valve

TESTING/INSPECTION:

79. Hydraulic test report : Yes ☑ No ☐
80. Radiography : Critical Parts : ☑ Total ☐
Not required : ☐ ☐
81. IBR test report : Reqd. : ☑ ☐
82. Type test : Capacity Evaluation by ISA S39.2/5 39.4 : Required
83. Valve functional test : Yes ☑ No ☐
84. Accessories functional Test : Yes ☑ No ☐
85. Seat leakage test : Yes ☑ No ☐
86. Material test report : Yes ☑ No ☐
87. Customer Inspection :
In process : Yes ☑ No ☐
Final : Yes ☑ No ☐
88. Third Party inspection : Yes ☐ No ☐

DOCUMENTATION: (Required)

89. With bid. (3 sets)
Catalogues : Yes ☑ No ☐
Dimensional drawing : Yes ☑ No ☐
All data sheets : Yes ☑ No ☐
Recommendation / Limitation : Yes ☑ No ☐
Confirmatory report : Yes ☑ No ☐
Contrary report : Yes ☑ No ☐
Deviation report : Yes ☑ No ☐
90. Quality plan (enclosed) : Yes ☑ No ☐
91. With equipment :
Dimensional drawing : 15 Sets
O & M : ---do---
Data Sheets : ---do---
Test certificate : 1RTF + 3 Sets
92. Valve sizing, actuator sizing, noise level calculations required with bid(with formulae) : Yes ☑ No ☐
93. ---

SPARES:

94. Commissioning spares : *
95. Mandatory spares : As per specification
96. 2/3 Years maintenance spares : *

OTHERS:

97. Bidders experience list : Required ☑ Not required ☐
98. Operational feed back of such valves supplied elsewhere : Required ☑ Not required ☐
99. Equipment guarantee : Required ☑ Not required ☐
100. System guarantee : Required ☑ Not required ☐
101. Service contract for 5 Years : – To quote seperately
102. Commissioning of the valves : Required ☐ Not required ☑

NOTES:

1. * DENOTES BIDDER TO SPECIFY

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	DRG. NO: 4-00-306-38582	REV 00
DATE	PREPARED	APPROVED	APPROVED		

BHEL	AUXILIARY PRDS SIZING CALCULATION						4-00-306-38582
	PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)						SHEET NO. 4 OF 4
	SIZING DATA FOR LOW CAPACITY PRESSURE REDUCING VALVE						
	SL.NO.	PARAMETERS	CONDITION-1 (Case-6) NR AT 40% LOAD	CONDITION-2 (Case-6) NR AT 100% LOAD	CONDITION-3 (Case-5) NR AT 40% LOAD	CONDITION-4 (Case-7) NR + Intermittent Requirements	
	1.0	INLET OF PRV					
	1.1	PRESSURE (kg/cm^2 a)	16.80	41.37	16.80	41.37	
	1.2	TEMPERATURE (^{O}C)	315.9	343.7	315.9	343.7	
	1.3	FLOW (T/Hr)	48.47	48.47	58.69	75.79	
	2.0	OUTLET OF PRV					
	2.1	PRESSURE (kg/cm^2 a)	16.00	16.0	15.94	16.00	

NOTES :-

1. VALVE SELECTED SHALL BE SUITABLE FOR PASSING 79.4 T/H AT RATED PARAMETERS.
2. CONDITION 3 IS THE CAPABILITY CHECK POINT

CI 12/A

CONTROL VALVE SPECIFICATION SHEET

(IN ACCORDANCE WITH I.S.A. FORM S20.51)

PROJECT:
NTPC LTD.
BONGAIGAON TPP (3x250 MW)

CUST.No: 6990,6991&6992

GENERAL:THIS IS TO BE READ ALONG WITH TECHNICAL SPECIFICATION PC:TSP:BONGAI:001, 002 & 003

1. Valve tag No. : CD-15
2. Service : SPRAY WATER COMMON BLOCK VALVE.
3. Line No./Vessel No. :
4. Qty. required per unit : ONE
5. Manufacturer : *
6. Model No. : *
7. Rating : ASME CL.800
8. Total Qty Required : 1 No

BODY:

9. Type : Thru ☑ 3 Way ☐ Z type ☐ Angle ☐
10. Form : Globe ☑ Ball ☐ Butterfly ☐
11. Size : *
12. Port Size : *
13. Connecting pipe size : Inlet : OD 60.3 x 5.54 Outlet : OD 60.3 x 5.54
14. Body rating : ASME CL.800
16. Bonnet type : Standard ☑ Finned ☐ Extended ☐ Pr. seal ☐
17. Material : Body : SA105 Packing: GRAFOIL Bolting : *
18. Flow direction : HORIZONTAL
19. Suitable matching pieces to match with pipe size specified shall be offered.

15. Type of end connections : Screwed ☐ NPI ☐ Flanged ☐ ANSI ☐ BW ☐ BSPT ☐ DIN ☐ SW ☑ BS ☐

Edge Preparation as per BPS.

TRIM:

20. No. of ports : *
21. Type : Balanced ☑ Unbalanced ☐
22. Plug characteristics: QUICK OPENING
23. Guiding : Cage ☑ Port ☐ Top ☐ Bottom ☐
24. Stem material : 316 SST Strain Hardened
25. Plug material :
26. Seat material :
27. Disc material :
28. stem guide material : } 17.4 PH SST/416C SST OR EQUIVALENT
29. ---

ACTUATOR:

30. Type : Electric ☐ Pneumatic ☑ Hydraulic ☐ DA/RA(Air To Close) ✓
31. Size : *
32. Supply : 45 PSIG
33. Failsafe position of valve. : Stayput ☑ Full Close ☐ Full Open ☐
34. Diaphragm/Cylinder pressure at Valve full open : * Valve full close :
35. Force required for process & Force available at actuator. : *
36. Actuator sizing ΔP : *
37. If actuator electric fill in data sheet as per annexure furnished and shall comply with annexure-I specification. : NAPL

REV	DATE	ALTERATION	PREPARED	APPD./C&I	APPROVED
00	12.10.09	FRESH ISSUE	PARMESH	R.PRABHA	C V N

DRG. NO: 4-00-306-38762 REV 00

POSITIONER: NOT REQUIRED

38. Type : Pneumatic ☑ Electronic ☐
DA/RA Electro Pneumatic ☐

39. If Electronic : Type :
Model : Solid plate deversing contactors
Main contactor : Solid state thyristor: ☐
Relay Switching : ☐
Also refer annexure – II
position indicator reqd. for Valve & VCB

40. If Pneumatic : Type : *
Model : *
Split range : Yes ☐ No ☐
Controller Input & Output Signal Value : 4–20 mA
Air supply : 45 PSIG
Input/Output Pr. guage :
Required : Yes ☐ No ☐
By pass provision : Yes ☐ No ☐
Action : Direct ☐ Reverse ☐ Both ☐
Cam : =% ☐ Linear ☐ Both ☐

ACCESSORIES:

41. Handwheel : Yes ☑ Side ☑ Top ☐
42. Air filter : Yes ☑ No ☐
Filter Size : 5 Micron ☑ 25 Micron ☐
43. Limit Switches : Yes ☑ No ☐
Qty. : 1 at full open &
: 1 at full close
Rating : 240v. 5Amp. ac
No of contacts per switch : 2No + 2NC
44. Solenoid valve as pilot device
Stayput : Yes ☐ No ☐
Type : 4 Way Dual coil Universal: Yes ☑ No ☐
Rating : 24V DC 2 wire
Class H coil : Yes ☑ No ☐
45. Vol. booster : Yes ☐ No ☑
46. Travel time : < 10 Sec.
47. Installation : Indoor ☐ Outdoor ☑
48. All accessories enclosure : *

49. Position transmitter : Yes ☑ No ☐
Type : Pnuematic : ☐ Electronic Non contact type ☑
Rating : 2 wire 24V DC: ☑ ☐
Output : 4–20 ma : ☑ 3–15 paig ☐
50. Torque Switches : Yes ☐ No ☑
Qty. :
Rating :
51. Air lock : Yes ☑ No ☐
Function : TO EFFECT STAYPUT
Type * : 3 Way single acting ☐
: 3 Way double acting ☐
52. Ambience : Dusty corrosive ☑
Toxic hazardous : ☐ ☐
53.1. Local position Indicator : Required.
53.2. I/P converter with A/F regulator : Not Required
53.3 Integral JB : 36 Way JB required
2 No s of 9 pin plug & socket connector.
1 No of 5 pin plug & socket connector.
53.4 All electrical terminating : plug & socket type

MISCELLANEOUS:

54. Seat leakage : ASME FCI/RP 70.2 ☑ CLASS V
I.S.A : ☐ ☐
55. Approx. weight (total) : *
56. Space requirements for online servicing : *

57. Valve sizing as.per ISA 75.01 : Yes ☑ No ☐
58. Noise Level : Less than 85 DBA at 1m from Valve & Piping System.
59. Intertubing Diagram : As per Enclosed.
60. Performance Data
Linearity : ± 1 % Hyterisis : ± 0.5 %
Sensitivity : ± 0.5 % Accuracy (overall) : ± 2 %

VALVE SIZING DATA:

61. Medium : SH Steam ☐ Sat. Steam ☑
Water ☐ ☐
62. Flow rate in T/Hr
63. Operating inlet pressure in Kg/cm^2 (a)
64. Operating inlet temperature in °C
65. Outlet pressure in Kg/cm^2 (a)
66. Viscosity : --
67. Operating (required) Cv
68. Operating noise level at 1.0 metre from valve surface
69. Outlet velocity

CONDITION				
1	2	3	4	5
REFER DRAWING No. 4–00–306–38762 SHT 4 OF 4 FOR VALVE SIZING DATA				

REFER STANDARD TABLE

*	*	*	*	*
<85	dba	(for all conditions)		
*	*	*	*	*

12.10.09	PARMESH	R.PRABHA	C V N	DRG. NO: 4–00–306–38762	REV 00
DATE	PREPARED	APPD./C&I	APPROVED		

DESIGN DATA:

70. Design Pressure Kg/cm^2(g) : 30 Kg/Cm ^{2}(g)
71. Design Temperature °C : 55°C
72. Rated/Design/Selected Cv of valve : *
73. Velocity restriction : *
74. Operating lift restriction : –
75. lift at various operating Conditions 1 TO 6 : *
76. Down stream limitations : *
77. Up stream limitations : *
78. Increase in signal Air : To open the Valve

TESTING/INSPECTION: (AS PER M/S NTPC APPROVED QUALITY PLAN:)

79. Hydraulic test report : Yes ☑ No ☐
80. Radiography : Critical Parts : ☑ Total ☐
Not required : ☐ ☐
81. IBR test report : Reqd. : ☑ ☐
82. Type test : Capacity Evoluation by *
ISA S39.2/5 39.4 : Required.
83. Valve functional test : Yes ☑ No ☐
* Type test to be done atleast for one no on this consignment.
84. Accessories functional : Yes ☑ No ☐
Test :
85. Seat leakage test : Yes ☑ No ☐
86. Material test report : Yes ☑ No ☐
87. Customer Inspection :
In process : Yes ☑ No ☐
Final : Yes ☑ No ☐
88. Third Party inspection : Yes ☐ No ☐

DOCUMENTATION: (Required)

89. With bid. (3 sets)
Catalogues : Yes ☑ No ☐
Dimensional drawing : Yes ☑ No ☐
All data sheets : Yes ☑ No ☐
Recommendation / Limitation : Yes ☑ No ☐
Confirmatory report : Yes ☑ No ☐
Contrary report : Yes ☑ No ☐
Deviation report : Yes ☑ No ☐
90. Quality plan : Yes ☑ No ☐
91. With equipment :
Dimensional drawing : 15 Sets
O & M : --do--
Data Sheets : --do--
Test certificate : 1RTF + 3 Sets
92. Valve sizing, actuator sizing, noise level calculations required with bid(with formulae) : Yes ☑ No ☐
93. --

SPARES:

94. Commissioning spares : *
95. Mandatory spares : As per specification
96. 2/3 Years maintenance spares : *

OTHERS:

97. Bidders experience list : Required ☑ Not required ☐
98. Operational feed back of such valves supplied elsewhere : Required ☑ Not required ☐
99. Equipment guarantee : Required ☑ Not required ☐
100. System guarantee : Required ☑ Not required ☐
101. Service contract for 5 Years : – To quote seperately
102. Commissioning of the valves : Required ☐ Not required ☑

NOTES:

1. * DENOTES BIDDER TO SPECIFY

12.10.09	PARAMESH	R.PRABHA	C V N	DRG. NO: 4-00-306-38762	REV 00
DATE	PREPARED	APPD./C&I	APPROVED		

BHEL		AUXILIARY PRDS SIZING CALCULATION						4-00-306-38762				
		PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)						SHEET NO. 4 OF 4				
		SIZING DATA FOR COMMON BLOCK VALVE CD-15(BLOCK VALVE)										
	SL.NO.		CONDITION-1	CONDITION-2	CONDITION-3	CONDITION-4	CONDITION-5	CONDITION-6	CONDITION-7	CONDITION-8		
		PARAMETERS	NORMAL REQT.	(100 % + SECOND UNIT START-UP REQT. + INTERMITTENT REQT.)	15% LOAD (COLD START)	15% LOAD (HOT START)	UP TO 30% COLD START UP	UP TO 30% HOT START UP	UP TO 40%	NORMAL RUNNING+INTERMITTENT REQT.)		
	1.0	INLET OF VALVE										
	1.1	PRESSURE (kg/cm^2 a)	23	23	26	26	26	26	26	23		
	1.2	TEMPERATURE (^{O}C)	49	49	46	46	46	46	46	49		
	1.3	OUTLET OF SPRAY CONTROL STATION										
	2.0											
	2.1	PRESSURE (kg/cm^2 a)	22	22	25	25	25	25	25	22		
	2.2	TEMPERATURE (^{O}C)	49	49	46	46	46	46	46	49		
	2.3	FLOW (T/Hr)	3.70	22.90	8.70	10.22	13.90	12.90	8.83	13.93		

NOTE: THE VALVE WILL BE PROCURED SUCH THAT PR DROP SHOULD NOT EXCEED 1 KG/SQ.CM AT ANY CONDITION.

CI 12/A

CONTROL VALVE SPECIFICATION SHEET

(IN ACCORDANCE WITH I.S.A. FORM S20.51)

PROJECT:
NTPC LTD
BONGAIGAON TPP(3x250 MW)

CUST.No: 6990,6991&6992

GENERAL:THIS IS TO BE READ ALONG WITH TECHNICAL SPECIFICATION PC: TSP: BONGAI:001002

1. Valve tag No. : CD-02 & CD-04
2. Service : HIGH capacity Spray Control valve
3. Line No./Vessel No. :
4. Qty. required : ONE
5. Manufacturer : * &003
6. Model No. : *
7. Rating : ASME Cl 800
8. Total Qty Required : 1 No

BODY:

9. Type : Thru ☑ 3 Way ☐ Z type ☐ Angle ☐ ☐
10. Form : Globe ☑ Ball ☐ Butterfly ☐ ☐
11. Size : *
12. Port Size : *
    (bidder to match size of control valve with connecting pipe size)
13. Connecting pipe size : Inlet : OD 60.3x5.54
    Outlet : OD 60.3x5.54
14. Body rating : ASME Cl 800
16. Bonnet type : Standard ☑ Finned ☐ Extended ☐ Pr. seal ☐ ☐
17. Material : Body : A 105
    Packing: GRAFOIL
    Bolting : *
18. Flow direction : HORIZONTAL
19. Suitable matching pieces to match with pipe size specified shall be offered.

15. Type of end connections : Screwed ☐ BW ☐ SW ☑
    NPI ☐ BSPT ☐ BS ☐
    Flanged ☐ ☐ ☐
    ANSI ☐ DIN ☐

Edge Preparation as per BPS.

TRIM: MULTI STAGE.

20. No. of ports : *
21. Type : Balanced ☑ Unbalanced ☐
22. Plug characteristics: EQUAL %
23. Guiding : Cage ☑ Port ☐ Top ☐ Bottom ☐
24. Stem material :
25. Plug material :
26. Seat material :
27. Disc material :
28. stem guide material :

    } 17.4 PH SS / SS 316 OR EQUIVALENT

29. ---

ACTUATOR:

30. Type : Electric ☐ Pneumatic ☑ Hydraulic ☐ DA/RA(Air To Close) ✓
31. Size : *
32. Supply : 45 PSIG
33. Failsafe position of valve. : Stayput ☑ Full Close ☐ Full Open ☐
34. Diaphragm/Cylinder pressure at Valve full open : * Valve full close :
35. Force required for process & Force available at actuator. : *
36. Actuator sizing ΔP : *
37. If actuator electric fill in data sheet as per annexure furnished and shall comply with annexure-I specification. : NAPL

REV	DATE	ALTERATION	PREPARED	APPROVED	APPROVED
00	12/10/09	FRESH ISSUE	PARAMESH	R.PRABHA	C.V.NATHAN

DRG. NO: 4-00-306-38583 REV 00

POSITIONER: SMART SIEMEN MAKE
MODEL NO: 6DR5211-0EN00-0AA0+6DR4004-8J

38. Type : Pneumatic ☐ Electronic ☐
DA/RA Electro Pneumatic ☑
(Smart)

39. If Electronic : Type :
Model : Solid plate deversing contactors
Main contactor : Solid state thyristor: ☐
Relay Switching : ☐
Also refer annexure – II
position indicator reqd. for Valve & VCB

40. If Pneumatic : Type : *
Model : *
Split range : Yes ☐ No ☐
Controller Input & Output Signal Value : 4–20 mA
Air supply : 45 PSIG
Input/Output Pr. guage :
Required : Yes ☑ No ☐
By pass provision : Yes ☐ No ☑
Action : Direct ☐ Reverse ☐ Both ☑
Cam : =% ☐ Linear ☐ Both ☑

ACCESSORIES:

41. Handwheel : Yes ☑ Side ☑ Top ☐
42. Air filter : Yes ☑ No ☐
Filter Size : 5 Micron ☑ 25 Micron ☐
43. Limit Switches : Yes ☑ No ☐
Qty. : 1 at full open &
: 1 at full close
Rating : 240v. 5Amp. ac
No of contacts per switch : 2No + 2NC

44. Solenoid valve as Stayput : Yes ☑ No ☐
Type : 3 Way universal : Yes ☑ No ☐
Rating : 24V DC 2 wire
Class H coil : Yes ☑ No ☐
45. Vol. booster : Yes ☐ No ☑
46. Travel time : <10 sec
47. Installation : Indoor ☐ Outdoor ☑
48. All accessories enclosure : *

49. Position transmitter : Yes ☐ No ☑
Type : Pnuematic : ☐ Electronic Non contact type ☑
Rating : 2 wire 24V DC: ☑ ☐
Output : 4–20 ma : ☑ 3–15 paig ☐
50. Torque Switches : Yes ☐ No ☑
Qty. :
Rating :
51. Air lock : Yes ☑ No ☐
Function : TO EFFECT STAYPUT
Type * : 3 Way single acting ☐
: 3 Way double acting ☐
52. Ambience : Dusty corrosive ☑
Toxic hazardous : ☐ ☐
53.1. Local position Indicator : Required.
53.2. I/P converter with A/F regulator : Not Required (FAIL FREEZE TYPE)
53.3 Integral JB : 36 Way JB required
2 No s of 9 pin plug & socket connector.
1 No of 5 pin plug & socket connector.

MISCELLANEOUS:

54. Seat leakage : ASME FCI/RP 70.2 ☑ CLASS V
I.S.A : ☐ ☐
55. Approx. weight (total) : *
56. Space requirements for online servicing : *

57. Valve sizing as per ISA 75.01 : Yes ☑ No ☐
58. Noise Level : Less than 85 DBA at 1m from Valve & Piping System.
59. Intertubing Diagram : As per Enclosed.
60. Performance Data
Linearity : ± 1 % Hyterisis : ± 0.5 %
Sensitivity : ± 0.5 % Accuracy (overall) : ± 2 %

VALVE SIZING DATA:

61. Medium : SH Steam ☑ Sat. Steam ☐
Water ☐ ☐
62. Flow rate in T/Hr
63. Operating inlet pressure in Kg/cm^2 (a)
64. Operating inlet temperature in °C
65. Outlet pressure in Kg/cm^2 (a)
66. Viscosity : --
67. Operating (required) Cv
68. Operating noise level at 1.5 metre
69. Outlet velocity

CONDITION				
1	2	3	4	5
REFER DRAWING No. 4-00-306-38583 sht 4 of 4 FOR VALVE SIZING DATA				

REFER STANDARD TABLE

*	*	*	*	*
<85	dba	(for all conditions)		
*	*	*	*	*

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN
DATE	PREPARED	APPROVED	APPROVED

DRG. NO: 4-00-306-38583 REV 00

DESIGN DATA:

70. Design Pressure Kg/cm^2(g) : 30 Kg/Cm^2 (g)
71. Design Temperature °C : 55 °C
72. Rated/Design/Selected Cv of valve : *
73. Velocity restriction : *
74. Operating lift restriction : 15 to 80 % .
75. lift at various operating Conditions 1 TO 6 : *
76. Down stream limitations : *
77. Up stream limitations : *
78. Increase in signal Air : To open the Valve

TESTING/INSPECTION:

79. Hydraulic test report : Yes ☑ No ☐
80. Radiography : Critical Parts : ☑ Total ☐
Not required : ☐ ☐
81. IBR test report : Reqd. : ☑ ☐
82. Type test : Capacity Evoluation by ISA S39.2/5 39.4 : Required.
83. Valve functional test : Yes ☑ No ☐
84. Accessories functional : Yes ☑ No ☐
Test :
85. Seat leakage test : Yes ☑ No ☐
86. Material test report : Yes ☑ No ☐
87. Customer Inspection :
In process : Yes ☑ No ☐
Final : Yes ☑ No ☐
88. Third Party inspection : Yes ☐ No ☐

DOCUMENTATION: (Required)

89. With bid. (3 sets)
Catalogues : Yes ☑ No ☐
Dimensional drawing : Yes ☑ No ☐
All data sheets : Yes ☑ No ☐
Recommendation / Limitation : Yes ☑ No ☐
Confirmatory report : Yes ☑ No ☐
Contrary report : Yes ☑ No ☐
Deviation report : Yes ☑ No ☐
90. Quality plan (enclosed) : Yes ☑ No ☐
91. With equipment :
Dimensional drawing : 15 Sets
O & M : ---do---
Data Sheets : ---do---
Test certificate : 1RTF + 3 Sets
92. Valve sizing, actuator sizing, Cavitation check, noise level calculations required with bid(with formulae) : Yes ☑ No ☐
93. ---

SPARES:

94. Commissioning spares : *
95. Mandatory spares : As per specification
96. 2/3 Years maintenance spares : *

OTHERS:

97.	Bidders experience list :	Required	☑	Not required	☐
98.	Operational feed back of such valves supplied elsewhere :	Required	☑	Not required	☐
99.	Equipment guarantee :	Required	☑	Not required	☐
100.	System guarantee :	Required	☑	Not required	☐
101.	Service contract for 5 Years : – To quote seperately				
102.	Commissioning of the valves :	Required	☐	Not required	☑

NOTES:

1. * DENOTES BIDDER TO SPECIFY

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	DRG. NO: 4-00-306-38583	REV 00
DATE	PREPARED	APPROVED	APPROVED		

BHEL		AUXILIARY PRDS SIZING CALCULATION						4-00-306-38583
		PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)						SHEET NO. 4 OF 4
		SIZING DATA FOR HIGH TEMP SPRAY CONTROL VALVE CD-02,CD-04						
	SL.NO.		CONDITION-1	CONDITION-2	CONDITION-3	CONDITION-4	CONDITION-5	
		PARAMETERS	(15% LOAD) (Case-1)	(30% LOAD) (HOT/ COLD) (Cases -3 & 4)	(NORMAL RUNNING + INTERMITTENT REQT.) (Case-7)	ED	15 % LOAD, (HOT START) (Case-2)	
	1.0	INLET OF VALVE						
	1.1	PRESSURE (kg/cm^2 a)	25	25/25	22	22	25	
	1.2	TEMPERATURE (^{0}C)	46	46/46	49	49	46	
	1.3	OUTLET OF SPRAY CONTROL STATION						
	2.0							
	2.1	PRESSURE (kg/cm^2 a)	24	24/24	21	21	24	
	2.2	TEMPERATURE (^{0}C)	46	46/46	49	49	46	
	2.3	FLOW (T/Hr)	3.31	7.6/5.62	8.40	13.42	4.42	

NOTE: THE VALVE WILL BE PROCURED SUCH THAT PR DROP SHOULD NOT EXCEED 1 KG/SQ.CM AT ANY CONDITION.

Cl 12/A

CONTROL VALVE SPECIFICATION SHEET

(IN ACCORDANCE WITH I.S.A. FORM S20.51)

PROJECT:
NTPC LTD
BONGAIGAON TPP (3x250 MW)

CUST.No: 6990,6991&6992

GENERAL:THIS IS TO BE READ ALONG WITH TECHNICAL SPECIFICATION PC: TSP: BONGAI:001002 &003

1. Valve tag No. : CD-08 & CD-11
2. Service : LOW CAPACITY SPRAY CONTROL VALVE
3. Line No./Vessel No. : —
4. Qty. required : ONE
5. Manufacturer : *
6. Model No. : *
7. Rating : ASME CL. 800
8. Total Qty Required : 1 No

BODY:

9. Type : Thru ☑ 3 Way ☐ Z type ☐ Angle ☐ ☐
10. Form : Globe ☑ Ball ☐ Butterfly ☐ ☐
11. Size : *
12. Port Size : * (bidder to match size of control valve with connecting pipe size)
13. Connecting pipe size : Inlet : OD 48.3 x 5.08 Outlet : OD 48.3 x 5.08
14. Body rating : ASME CL. 800
16. Bonnet type : Standard ☑ Finned ☐ Extended ☐ Pr. seal ☐ ☐
17. Material : Body : A 105 Packing : GRAFOIL Bolting : *
18. Flow direction : HORIZONTAL
19. Suitable matching pieces to match with pipe size specified shall be offered.

15. Type of end connections : Screwed ☐ NPI ☐ Flanged ☐ ANSI ☐ BW ☐ BSPT ☐ ☐ DIN ☐ SW ☑ BS ☐ ☐

Edge Preparation as per BPS.

TRIM: MULTI STAGE.

20. No. of ports : *
21. Type : Balanced ☑ Unbalanced ☐
22. Plug characteristics: ~~L/LV~~/EP ✓ / ~~MODIFIED EP~~
23. Guiding : Cage ☑ Port ☐ Top ☐ Bottom ☐
24. Stem material : 316 SST Strain Hardened
25. Plug material :
26. Seat material :
27. Disc material :
28. stem guide material : } 17.4 PH SST/ 440C SST OR EQUIVALENT
29. —

ACTUATOR:

30. Type : Electric ☐ Pneumatic ☑ Hydraulic ☐ DA/RA(Air ✓ To Close)
31. Size : *
32. Supply : 45 PSIG
33. Failsafe position of valve. : Stayput ☑ Full Close ☐ Full Open ☐
34. Diaphragm/Cylinder pressure at Valve full open : * Valve full close :
35. Force required for process & Force available at actuator. : *
36. Actuator sizing ΔP : *
37. If actuator electric fill in data sheet as per annexure furnished and shall comply with annexure-I specification. : NAPL

REV	DATE	ALTERATION	PREPARED	APPROVED	APPROVED
00	12/10/09	FRESH ISSUE	PARAMESH	R.PRABHA	C.V.NATHAN

DRG. NO: 4-00-306-38584 REV 00

POSITIONER: SMART SIEMEN MAKE
MODEL NO: 6DR5211-0EN00-0AA0+6DR4004-8J

38. Type : Pneumatic ☐ Electronic ☐
DA/RA
Electro Pneumatic (SMART) ☑

39. If Electronic : Type :
Model : Solid plate deversing contactors
Main contactor : Solid state thyristor: ☐
Relay Switching : ☐
Also refer annexure – II
position indicator reqd. for Valve & VCB

40. If Pneumatic : Type : *
Model : *
Split range : Yes ☐ No ☑
Controller Input & Output Signal Value : 4–20 mA
Air supply : 45 PSIG
Input/Output Pr. guage :
Required : Yes ☑ No ☐
By pass provision : Yes ☐ No ☑
Action : Direct ☐ Reverse ☐ Both ☑
Cam : =% ☐ Linear ☐ Both ☑

ACCESSORIES:

41. Handwheel : Yes ☑ Side ☑ Top ☐
42. Air filter : Yes ☑ No ☐
Filter Size : 5 Micron ☑ 25 Micron ☐
43. Limit Switches : Yes ☑ No ☐
Qty. : 1 at full open &
: 1 at full close
Rating : 240v. 5Amp. ac
No of contacts per switch : 2No + 2NC
44. Solenoid valve to effect
Stayput : Yes ☑ No ☐
Type : 3 Way universal : Yes ☑ No ☐
Rating : 24V DC 2 wire
Class H coil : Yes ☑ No ☐
45. Vol. booster : Yes ☐ No ☑
46. Travel time : < 10 sec
47. Installation : Indoor ☐ Outdoor ☑
48. All accessories enclosure : *

49. Position transmitter : Yes ☐ No ☑
Type : Pnuematic : ☐ Electronic Non contact type ☑
Rating : 2 wire 24V DC: ☑ ☐
Output : 4–20 ma : ☑ 3–15 paig ☐
50. Torque Switches : Yes ☐ No ☑
Qty. :
Rating :
51. Air lock : Yes ☑ No ☐
Function : TO EFFECT STAYPUT
Type : 3 Way single acting ☐
: 3 Way double acting ☐
52. Ambience : Dusty corrosive ☑
Toxic hazardous : ☐ ☐
53.1. Local position Indicator : Required.
53.2. I/P converter with A/F regulator : Not Required (FAIL FREEZE TYPE)
53.3 Integral JB : 36 Way JB required
2 No s of 9 pin plug & socket connector.
1 No of 5 pin plug & socket connector.

MISCELLANEOUS:

54. Seat leakage : ASME FCI/RP 70.2 ☑ CLASS V
I.S.A : ☐ ☐
55. Approx. weight (total) : *
56. Space requirements for online servicing : *
57. Valve sizing as per ISA 75.01 : Yes ☑ No ☐
58. Noise Level : Less than 85 DBA at 1m from Valve & Piping System.
59. Intertubing Diagram : As per Enclosed.
60. Performance Data
Linearity : ± 1 % Hyterisis : ± 0.5 %
Sensitivity : ± 0.5 % Accuracy (overall) : ± 2 %

VALVE SIZING DATA:

61. Medium : SH Steam ☐ Sat. Steam ☐
Water ☑ ☐
62. Flow rate in T/Hr
63. Operating inlet pressure in Kg/cm^2 (a)
64. Operating inlet temperature in °C
65. Outlet pressure in Kg/cm^2 (a)
66. Viscosity : – –
67. Operating (required) Cv
68. Operating noise level at 1.5 metre
69. Outlet velocity

CONDITION				
1	2	3	4	5
REFER DRAWING No. 4–00–306–38584 sht 4 of 4 FOR VALVE SIZING DATA				

REFER STANDARD TABLE

*	*	*	*	*
<85	dba	(for all conditions)		
*	*	*	*	*

DATE	PREPARED	APPROVED	APPROVED	DRG. NO:	REV
12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	4–00–306–38584	00

DESIGN DATA:

70. Design Pressure Kg/cm^2(g) : 30 Kg/Cm ^{2}(g)
71. Design Temperature °C : 55 °C
72. Rated/Design/Selected Cv of valve : *
73. Velocity restriction : *
74. Operating lift restriction : 15 to 80 % .
75. lift at various operating Conditions 1 TO 6 : *
76. Down stream limitations : *
77. Up stream limitations : *
78. Increase in signal Air : To open the Valve

TESTING/INSPECTION:

79. Hydraulic test report : Yes ☑ No ☐
80. Radiography : Critical Parts : ☑ Total ☐
Not required : ☐ ☐
81. IBR test report : Reqd. : ☑ ☐
82. Type test : Capacity Evoluation by ISA S39.2/5 39.4 : Required.
83. Valve functional test : Yes ☑ No ☐
84. Accessories functional : Yes ☑ No ☐
Test :
85. Seat leakage test : Yes ☑ No ☐
86. Material test report : Yes ☑ No ☐
87. Customer Inspection :
In process : Yes ☑ No ☐
Final : Yes ☑ No ☐
88. Third Party inspection : Yes ☐ No ☐

DOCUMENTATION: (Required)

89. With bid. (3 sets)
Catalogues : Yes ☑ No ☐
Dimensional drawing : Yes ☑ No ☐
All data sheets : Yes ☑ No ☐
Recommendation / Limitation : Yes ☑ No ☐
Confirmatory report : Yes ☑ No ☐
Contrary report : Yes ☑ No ☐
Deviation report : Yes ☑ No ☐
90. Quality plan (enclosed) : Yes ☑ No ☐
91. With equipment :
Dimensional drawing : 15 Sets
O & M : --do--
Data Sheets : --do--
Test certificate : 1RTF + 3 Sets
92. Valve sizing, actuator sizing, Cavitation check, noise level calculations required with bid(with formulae) : Yes ☑ No ☐
93. --

SPARES:

94. Commissioning spares : *
95. Mandatory spares : As per specification
96. 2/3 Years maintenance spares : *

OTHERS:

97. Bidders experience list : Required ☑ Not required ☐
98. Operational feed back of such valves supplied elsewhere : Required ☑ Not required ☐
99. Equipment guarantee : Required ☑ Not required ☐
100. System guarantee : Required ☑ Not required ☐
101. Service contract for 5 Years : -- To quote seperately
102. Commissioning of the valves : Required ☐ Not required ☑

NOTES:

1. * DENOTES BIDDER TO SPECIFY

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	DRG. NO: 4-00-306-38584	REV 00
DATE	PREPARED	APPROVED	APPROVED		

BHEL		AUXILIARY PRDS SIZING CALCULATION						4-00-306-38584			
		PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)						SHEET NO. 4 OF 4			
		SIZING DATA FOR LOW TEMP SPRAY CONTROL VALVE CD-08,CD-11									
	SL.NO.		CONDITION-1	CONDITION-2	CONDITION-3	CONDITION-4	CONDITION-5	CONDITION-6	CONDITION-7	CONDITION-8	
		PARAMETERS	30% LOAD (HOT START)	NORMAL REQT.	(100 % + SECOND UNIT START-UP REQT. + INTERMITTENT REQT.)	15% LOAD (HOT START)	15% LOAD (COLD START)	30% LOAD (COLD START)	UP TO 40%	NORMAL REQT+ INTERMITTENT REQ	
	1.0	INLET OF VALVE									
	1.1	PRESSURE (kg/cm^2 a)	25	22	22	25	25	25	25	22	
	1.2	TEMPERATURE (^{o}C)	46	49	49	46	46	46	46	49	
	1.3	OUTLET OF SPRAY CONTROL STATION									
	2.0										
	2.1	PRESSURE (kg/cm^2 a)	24	21	21	24	24	24	24	21	
	2.2	TEMPERATURE (^{o}C)	46	49	49	46	46	46	46	49	
	2.3	FLOW (T/Hr)	7.38	3.69	9.57	5.85	5.4	7.0	3.9	5.5	

NOTE: THE VALVE WILL BE PROCURED SUCH THAT PR DROP SHOULD NOT EXCEED 1 KG/SQ.CM AT ANY CONDITION.

NTPC LTD

BONGAIGAON THERMAL POWER PROJECT

L.T. DESUPERHEATER SPECIFICATION SHEET

01.	Designation/Tag No	: Auxiliary steam line / DESH - 02
02.	Quantity Required	: One
03.	Turndown ratio	: Bidder to specify
04.	Material	: ASTM A 106 Gr B
05.	Inlet connection/Outlet connection (Steam side)	: ø273 x 6.35 , STYLE= 'D' d1=260.3 : ø273 x 6.35 , STYLE= 'D' d1=260.3 (bidder to match with the given d1 values)
06.	End connection (Steam side)	: Butt Welded
07.	Spray water connection	: OD 48.3 x 5.08 (bidder to match size of control valve with connecting pipe size)
08.	End connection	: Butt Welded / Socket Welded
09.	Mounting arrangement	: VERTICAL (FLOW FROM TOP TO BOTTOM)
10.	Minimum straight length required U/S of Desuperheater	: BIDDER TO SPECIFY
11.	Minimum distance required downstream of DSH	: BIDDER TO SPECIFY
12.	Sizing Parameters	: Refer Drg.No.4-00-306-38586 sht 2 of 2
13.	Design Pressure	: 20 Kg / cm^2 (g)
14.	Design Temperature	: 350 °C
15.	Minimum distance required in D/S of DESH for temp. control sensing element	: BIDDER TO SPECIFY
16.	Minimum distance required in D/S of DESH for pressure control sensing element	: BIDDER TO SPECIFY
17.	IBR Certification required	: Yes
18.	Testing/Inspection	: As per purchaser approved vendor QP

19. Documents required during offer :

Catalogues, filled up data sheets, Sizing calculations, Turn down ratio calculation, Detailed drawing with BOM, Material specifications, Weight, Special requirements such as Liner, Upstream & Downstream straight length, O & M manual Quality plan indicating various checks for raw material in process & final inspection stage.

20. Documents required after Placement of Order

Catalogues, Final detailed drawing with BOM, Material specification, Weight, Final sizing, Turn down ratio calculation, Test certificates as per QP and O & M manual. — 20 sets plus 3 sets of CD's

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	DRG. NO: 4-00-306-38586	REV 00
DATE	PREPARED	APPROVED	APPROVED		

BHEL	AUXILIARY PRDS SIZING CALCULATION					4-00-306-38586				
	PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)					SHEET NO. 2 OF 2				
	SIZING DATA FOR DESUPERHEATER BETWEEN HIGH & LOW TEMP. AUX. STEAM HEADER									
	SL.NO.		CONDITION-1 (CASE-1)	CONDITION-2 (CASE-6)	CONDITION-3 (CASE-8)	CONDITION-4 (CASE-2)	CONDITION-5 (CASE-3)	CONDITION-6 (CASE-4)	CONDITION-7 (CASE-5)	CONDITION-8 (CASE-7)	
		PARAMETERS	15% LOAD (COLD START)	NORMAL REQT.	(100 % + SECOND UNIT START-UP REQT. + INTERMITTENT REQT.)	15% LOAD (HOT START)	UP TO 30% COLD START UP	UP TO 30% HOT START UP	UP TO 40%	NORMAL REQT+INTERMITTENT REQ	
	1.0	INLET OF DESUPERHEATER									
	1.1	PRESSURE (kg/cm^2 a)	16	16	16	16	16	16	16	16	
	1.2	TEMPERATURE (^{O}C)	310	310	310	310	310	310	310	310	
	1.3	FLOW (T/Hr)	58.69	38.28	103.55	63.27	70.1	80.2	41.9	59.0	
	2.0	OUTLET OF DESUPERHEATER									
	2.1	PRESSURE (kg/cm^2 a)	16	16	16	16	16	16	16	16	
	2.2	TEMPERATURE (^{O}C)	210	210	210	210	210	210	210	210	
	2.3	FLOW (T/Hr)	64.00	41.78	113.1	69.1	83.1	87.6	45.8	64.4	
	3.0	INLET OF SPRAY CONTROL STATION (OUTLET OF COMMON BLOCK VALVE)									
	3.1	PRESSURE (kg/cm^2 a)	24	21	21	24	24	24	24	21	
	3.2	TEMPERATURE (^{O}C)	46	49	49	46	46	46	46	49	
	3.3	FLOW (T/Hr)	5.31	3.50	9.57	5.80	6.5	7.4	3.9	5.4	

Note:1. Spray control systems shall be sized for 30 kg/cm2

NTPC LTD

BONGAIGAON THERMAL POWER PROJECT (3x250 MW)

H.C. DESUPERHEATER SPECIFICATION SHEET

01.	Designation/Tag No	: Auxiliary steam line / DESH – 01
02.	Quantity Required	: One
03.	Turndown ratio	: Bidder to specify
04.	Material	: ASTM A 335 P22
05.	Inlet connection/Outlet connection (Steam side)	: ø323.9 x 9.53 , STYLE= 'D', d1=304.8 : ø323.9 x 9.53 , STYLE= 'D', d1=304.8 (bidder to match with the given d1 values)
06.	End connection (Steam side)	: Butt Welded
07.	Spray water connection	: OD 60.3 x 5.54 (bidder to match size of control valve with connecting pipe size)
08.	End connection	: Butt Welded / Socket Welded
09.	Mounting arrangement	: HORIZONTAL
10.	Minimum straight length required U/S of Desuperheater	: BIDDER TO SPECIFY
11.	Minimum distance required downstream of DSH	: BIDDER TO SPECIFY
12.	Sizing Parameters	: Refer 4-00-306-38585 sht 02 of 02
13.	Design Pressure	: 20 Kg / cm^2 (g)
14.	Design Temperature	: 485 °C
15.	Minimum distance required in D/S of DESH for temp. control sensing element	: BIDDER TO SPECIFY
16.	Minimum distance required in D/S of DESH for pressure control sensing element	: BIDDER TO SPECIFY
17.	IBR Certification required	: Yes
18.	Testing/Inspection	: As per purchaser approved vendor QP

19. Documents required during offer :

Catalogues, filled up data sheets, Sizing calculations, Turn down ratio calculation, Detailed drawing with BOM, Material specifications, Weight, Special requirements such as Liner, Upstream & Downstream straight length, O & M manual, Quality plan indicating various checks for raw material in process & final inspection stage.

20. Documents required after Placement of Order

Catalogues, Final detailed drawing with BOM, Material specification, Weight, Final sizing, Turn down ratio calculation, Test certificates as per QP and O & M manual. — 20 sets plus 3 sets of CD's

12/10/09	PARAMESH	R.PRABHA	C.V.NATHAN	DRG. NO:	REV
DATE	PREPARED	APPROVED	APPROVED	4-00-306-38585	00

BHEL	AUXILIARY PRDS SIZING CALCULATION							4-00-306-38585
	PROJECT TITLE : NTPC BONGAIGAON (3 X 250 MW)							SHEET NO. 2 OF 2
	SIZING DATA FOR HIGH CAPACITY DESUPERHEATER							
	SL.NO.		CONDITION-1	CONDITION-2	CONDITION-3	CONDITION-4	CONDITION-5	
		PARAMETERS	(15% LOAD) (Case-1)	(30% LOAD) (HOT/ COLD) (Cases -3 & 4)	(NORMAL RUNNING + INTERMITTENT REQT.) (Case-7)	(100 % + SECOND UNIT START-UP REQT. + INTERMITTENT REQT.) (Case-8)	15 % LOAD, (HOT START) (Case-2)	
	1.0	INLET OF DESUPERHEATER						
	1.1	PRESSURE (kg/cm^2 a)	16	16/16	16	16	16	
	1.2	TEMPERATURE (^{0}C)	378.3	451.5 / 399	474.5	474.5	396.5	
	1.3	FLOW (T/Hr)	63.67	70.4/82.2	67.66	107.20	67.15	
	2.0	OUTLET OF DESUPERHEATER						
	2.1	PRESSURE (kg/cm^2 a)	16	16/16	16	16	16	
	2.2	TEMPERATURE (^{0}C)	310	310	310	310	310	
	2.3	FLOW (T/Hr)	66.99	78.4/88.5	76.13	120.60	71.57	
	3.0	INLET OF SPRAY CONTROL STATION (OUTLET OF COMMON BLOCK VALVE)						
	3.1	PRESSURE (kg/cm^2 a)	24	24/24	21	21	24	
	3.2	TEMPERATURE (^{0}C)	46	46/46	49	49	46	
	3.3	FLOW (T/Hr)	3.31	8.02/6.02	8.47	13.42	4.56	

NOTES 1.High capacity PRDS shall have one reducing valve and desuperheater separately.
2. Spray control system shall be sized for 30kg/cm2

IRST ANGLE PROJECTION(ALL DIMENSIONS IN MILLIMETRES)

DRAWING No 4-00-301-38579

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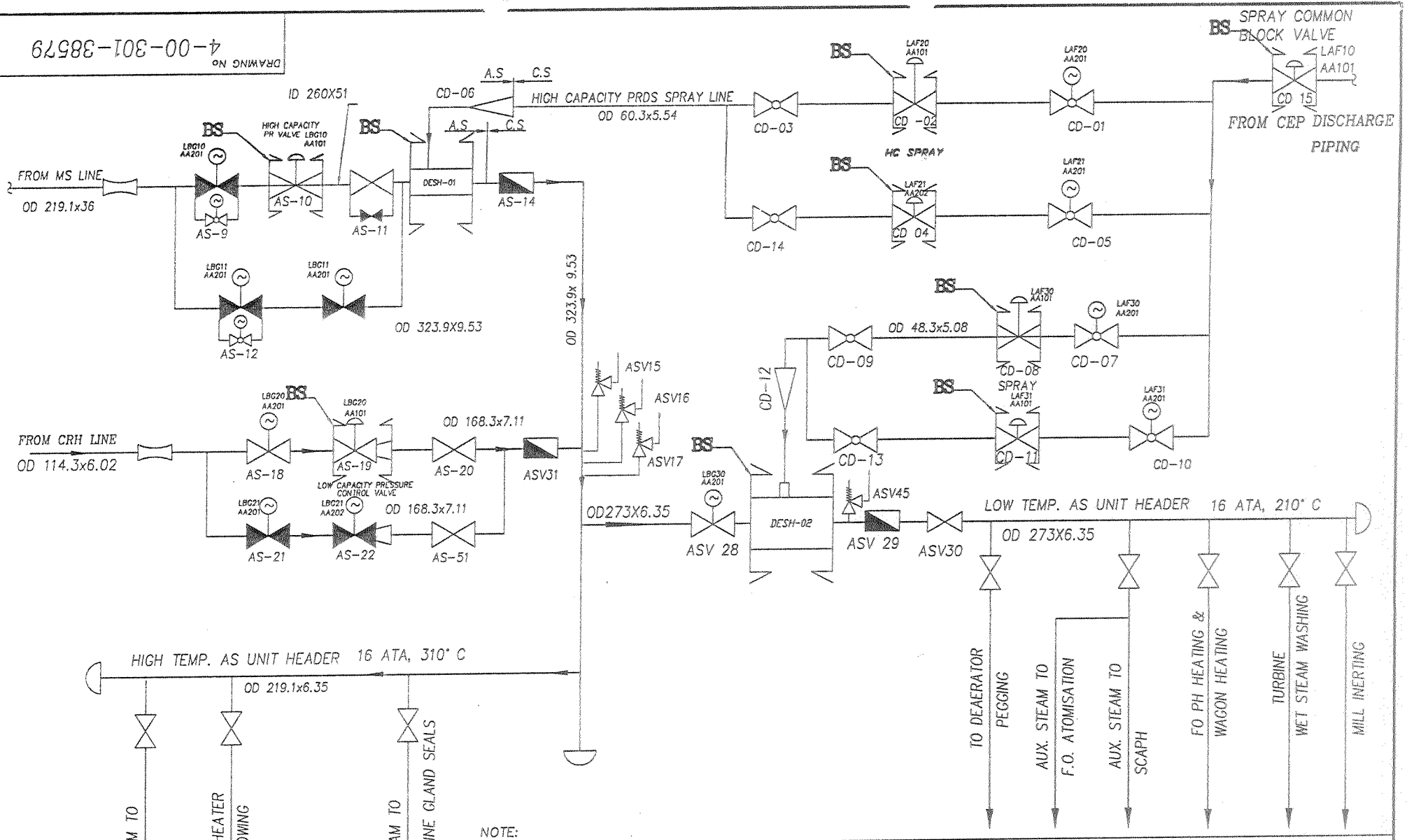


BONGAIGAON THERMAL POWER PROJECT
3X250MW

PREPARED	CHECKED	APPROVED
PARAMESH	PARAMESH	CV NATHAN

TITLE	DRAWING No	REV
AUX. PRDS STATION	4-00-301-38579	00

SIZE A4

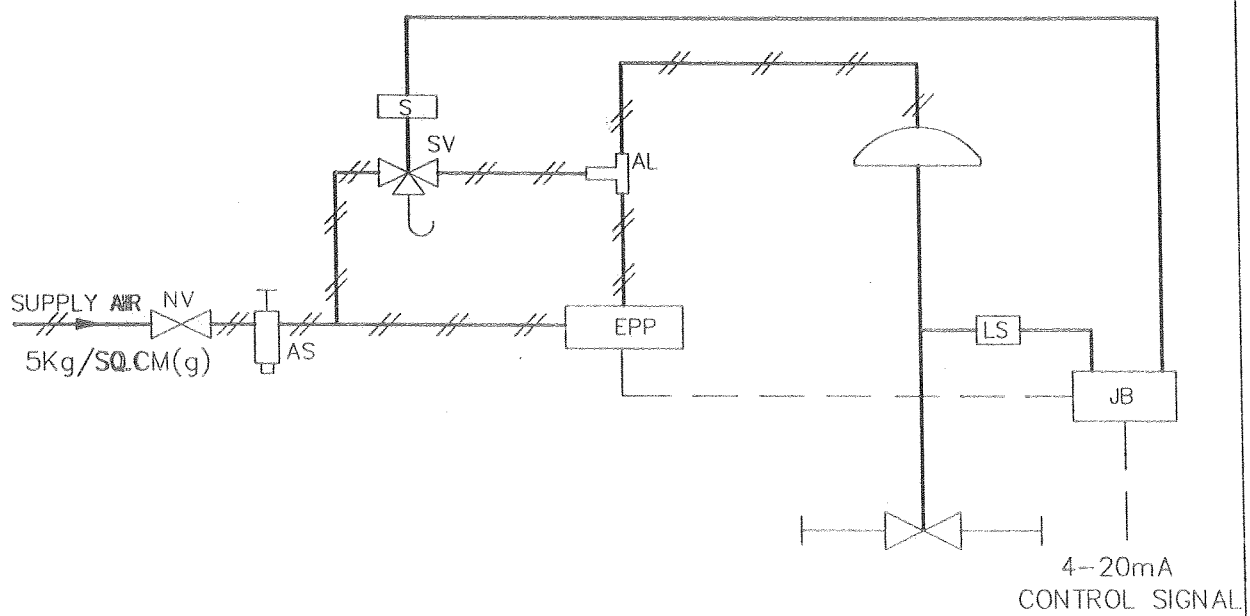
UX_PRDS_STATION.dwg

ANNEXURE – B

Bharat Heavy Electricals Limited
Piping Centre Chennai-17

BONGAIGAON 3x250 MW	Specification No.	Rev.No.	Sheet No.
	PC:TSP:BONGAI:001	00	01 OF 01

PNEUMATIC HOOK UP DIAGRAM FOR CONTROL VALVE



EPP –ELECTRO PNEUMATIC POSITIONER SMART TYPE
AS – AIR SET
AL – AIR LOCK
JB – JUNCTION BOX
LS – OPEN & CLOSE LIMIT SWITCHES
NV – BRASS ISOLATION VALVE
SV – SOLENOID VALVE
S – SOLENOID COIL

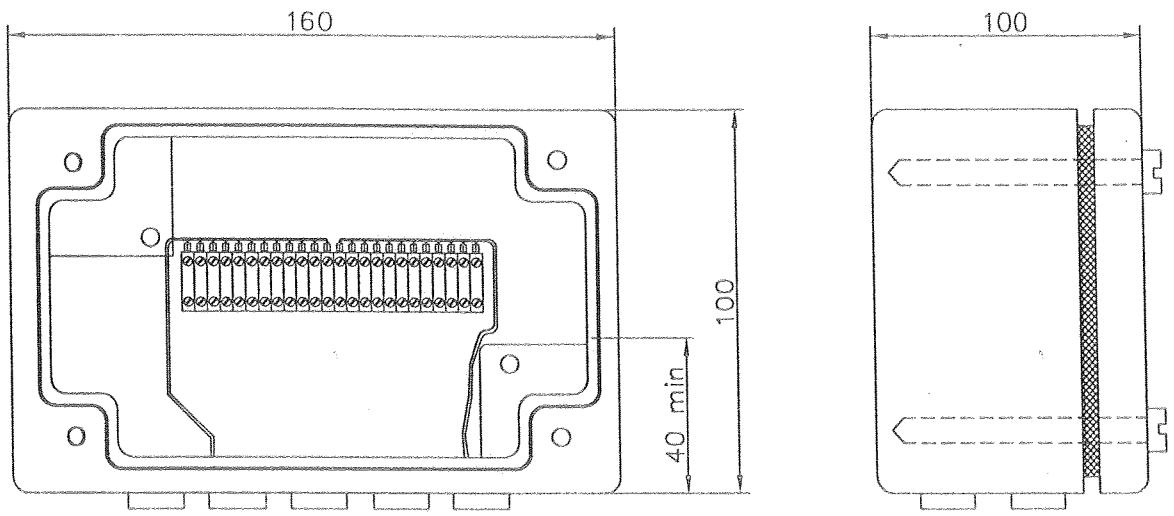
NOTE:
i) ALL REQUIRED FITTINGS SHALL BE PROVIDED BY VENDOR.
ii) SIZE OF VALVES / FITTINGS SHALL BE INDICATED BY VENDOR.

PREPARED	CHECKED	APPROVED	DATE
PARAMESH	R. PRABHA	C.V.NATHAN	12/10/09

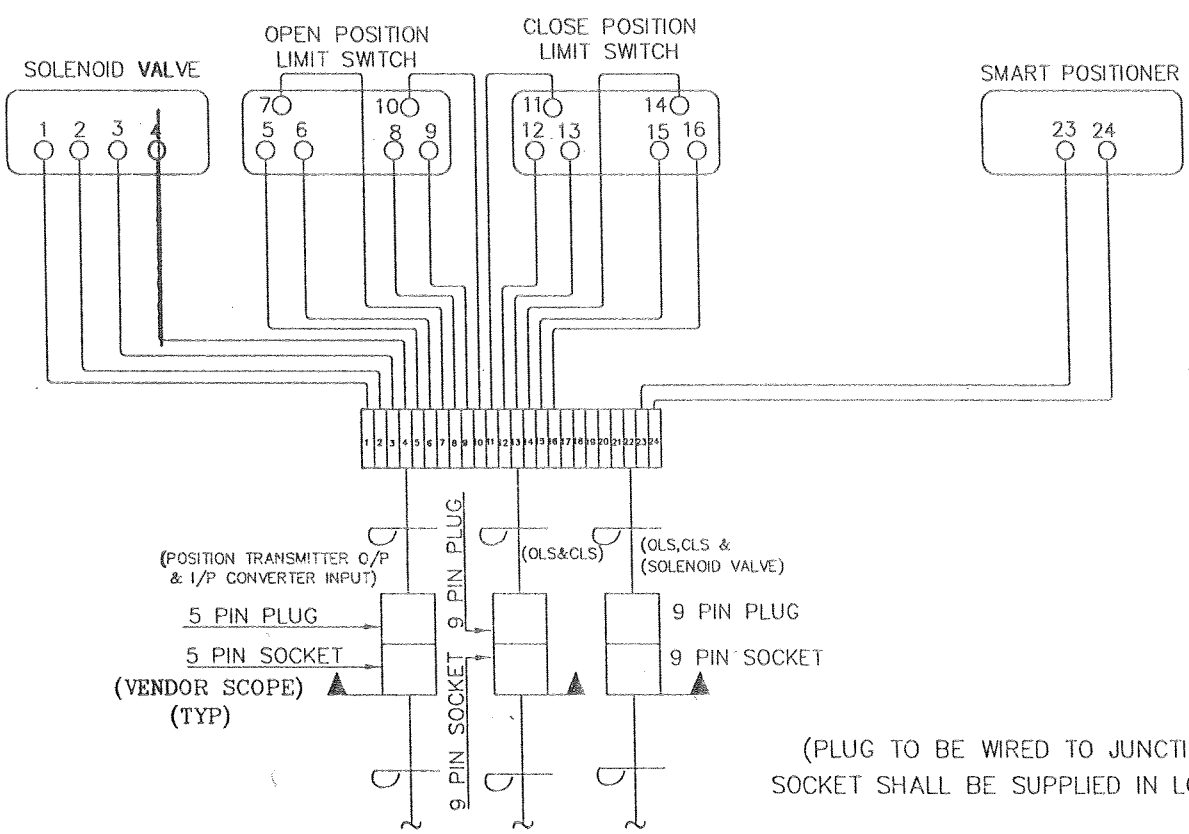
ANNEXURE – C

Bharat Heavy Electricals Limited
Piping Centre Chennai-17

BONGAIGAON 3x250 MW	Specification No.	Rev.No.	Sheet No.
	PC:TSP:BONGAI:001	00	01 OF 02



JUNCTION BOX



(PLUG TO BE WIRED TO JUNCTION BOX. SOCKET SHALL BE SUPPLIED IN LOOSE).

TERMINAL BOX WIRING DIAGRAM

PREPARED	CHECKED	APPROVED	DATE
PARAMESH	R. PRABHA	C.V.NATHAN	12/10/09

ANNEXURE – C

Bharat Heavy Electricals Limited
Piping Centre Chennai-17

BONGAIGAON 3x250 MW	Specification No.	Rev.No.	Sheet No.
	PC:TSP:BONGAI:001	00	02 OF 02

NOTE:-

1. ELMEX TERMINAL BLOCKS SHALL BE USED IN THE JUNCTION BOX.
2. THE VALVE MANUFACTURER SHALL DO THE WIRING AS SHOWN IN THIS DRAWING. TERMINATION SHALL BE DONE BY USING SUITABLE CRIMPING LUGS.
3. THE JUNCTION BOX SHALL BE MOUNTED SUITABLY ON THE VALVE FOR EASY ACCESSIBILITY.
4. MATERIAL OF JUNCTION BOX : ALUMINIUM.
5. THE JUNCTION BOX SHALL HAVE IP55 CLASS OF ENCLOSURE PROTECTION.
6. I) FROM THE POSITION TRANSMITTER TO THE JUNCTION BOX: THE CABLE SHALL ENTER THROUGH DOUBLE COMPRESSION TYPE BRASS CHROME PLATED CABLE GLAND SUITABLE FOR 0.5 SQ.MM TYPE-F INSTRUMENTATION CABLE . SUITABLE CABLE GLAND TO BE PROVIDED IN THE JUNCTION BOX.

   II) THE CABLING FROM JUNCTION BOX TO REMOTE CONTROL(DDCMIS): 5 PIN PLUG AND SOCKET SUITABLE FOR 2 PAIR F– TYPE INSTRUMENTATION CABLE TO IS BE PROVIDED IN THE JUNCTION BOX .

   III) FOR THE SOLENOID VALVE COMMAND FROM REMOTE CONTROL(DDCMIS): CABLE GLAND SUITABLE FOR 0.5 SQ.MM TYPE-G INSTRUMENTATION CABLE, 4 PAIR TO BE SUPPLIED IN THE JUNCTION BOX.
7. FLEXIBLE CONDUIT SHALL BE USED AND CONNECTED TO SUITABLE END CONNECTORS & PVC SEALED AT BOTH ENDS USING SUITABLE SEALANT. (EPOXY OR EQUIVALENT)
8. CONDUIT ENTRIES ARE PROVIDED ONLY AT THE BOTTOM.
9. MINIMUM GAP OF 25 MM IS TO BE LEFT BETWEEN THE TERMINALS OF ELECTRONIC POSITION TRANSMITTER & SOLENOID VALVE.
10. THE JUNCTION BOX SHALL HAVE EARTHING PROVISION.
11. CABLE DESIGNATION DETAIL :

    AND TWISTED PAIR INSTRUMENTATION CABLE. (CU– CONDUCTOR)
    TYPE– F : 0.5 SQ.MM, MULTIPAIR OVERALL SHIELDED INDIVIDUAL PAIR SHIELDED

    INSTRUMENTATION CABLE. (CU– CONDUCTOR)
    TYPE– G : 0.5 SQ.MM, MULTIPAIR OVERALL SHIELDED AND TWISTED PAIR

PREPARED	CHECKED	APPROVED	DATE
PARAMESH	R. PRABHA	C.V.NATHAN	12/10/09

ANNEXURE-D

CLAUSE NO.	TECHNICAL REQUIREMENTS
	CONTROL VALVES, ACTUATORS & ACCESSORIES
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 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 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 SH Spray Control, RH spray Control, Heavy Oil Heating, pressurizing and Control system shall have permissible leakage rate as per leakage Class V. All other control valves 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.
3.00.00	**VALVE MATERIALS**

Sr. No.	Service	Body material	Trim Material
1	Non-corrosive, non-flashing	Carbon steel ASTM-A216 Gr. WCB for fluid temperature below 275 Deg. C	316SS stellited with stellited faced guide posts and bushings.

	and non-cavitation service	Alloy steel ASTM-A217Gr. WC9 for fluid temperature above 275 Deg. C	
2.	Severe flashing/cavitation services	Alloy steel ASTM-A217 Gr. WC9	440 C
3.	Low flashing/cavitation service	Alloy steel ASTM-A217 Gr. WC6	17-4 PH SS
4.	Condensate, DM water service	316 SS	316 SS

NOTE Valve body rating shall meet the process pressure and temperature requirement as per ANSI B16.34.

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.

4.00.00 END PREPARATION

Valve body ends shall be either butt welded/socket welded, flanged (Rubber lined for condensate service) or screwed as finalized 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.

5.00.00 VALVE ACTUATORS

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.

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.

The travel time of the pneumatic actuators shall not exceed 10 seconds.

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
Software For Configuration And Diagnostic	Software	Windows Based Software. Software Shall Meet the Requirement For Configuration, Diagnostics, Calibration And Testing Of The Actuator
	Diagnostic/Test Features	Advanced Diagnostic Features Like Stroke Counter Or Travel Counter, Leakage In Actuators, On Line Partial Closure Test, Valve Signature Analysis, Step Response Test, Valve Friction /Jamming Detection Etc To Be Provided
	Factory Valve Signature Tests Reports (Pr Vs Valve Travel And Travel Vs I/P Signal) are to be provided.	
Hardware	PC	For Configuration/Software Ref PC Specified Under DDCMIS Section
Tests Certificates	Test certificates as per Manufacture 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 Characterization	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
	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

8.00.00	**TEST AND EXAMINATION** 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:
8.01.00	Non Destructive Test as per ANSI B-16.34.
8.02.00	Hydrostatic shell test in accordance with ANSI B 16.34 prior to seat leakage test.
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.
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.
8.05.00	CV Test: CV test shall be carried out as type test on each size, type and design of the valves as per ISA 75.02 standard and test report shall be furnished for Employer's approval.
9.00.00	**CONTROL VALVE QUANTITIES** Bidder shall furnish all the control valves under this main plant package as finalized 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.