

# **2X600MW ADILABAD SCCL TPP**

## **VOLUME – IIB**

### **TECHNICAL SPECIFICATION FOR BUTTERFLY VALVES (WATER SERVICE)**

**SPECIFICATION NO. PE-TS-381-100-M008**



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

	TITLE:		SPECIFICATION NO. PE-SS-999-100-Q001	
	PREAMBLE		VOLUME	
			SECTION	
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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.

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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## SECTION-A

### SCOPE OF ENQUIRY

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## SCOPE OF ENQUIRY

### 1. SCOPE

This enquiry covers the Design, Manufacture, Inspection & Testing at vendor's and/or his sub-vendor's works, proper packing and delivery to site of Butterfly Valves(water system) complete with all accessories as per the requirements mentioned in different sections of the specification for 2X600MW ADILABAD SCCL TPP.


### 2. GENERAL TECHNICAL INSTRUCTIONS

- a) It is not the intent to specify herein all the details of design and manufacture. However the equipment shall conform in all respects to high standards of design, engineering and workmanship, and shall be capable of performing the required duties in a manner acceptable to Engineer/ Owner, who will interpret the meaning of drawing and specifications, and shall be entitled to reject any component or material, which in his judgement is not in full accordance herewith.
- b) The omission of specific reference to any component/ accessories necessary for the proper performance of Butterfly Valves (water system) shall not relieve the bidder of the responsibility of providing such facilities to complete the supply of Butterfly Valves (water system) at quoted prices.
- c) Design/ drawings/ data sheets etc. shall be subject to approval of BHEL as per specification, in the event of order.
- d) BHEL's / customer's representative shall be given access to the shop in which the equipment are being manufactured or tested and all test records shall be made available to him.
- e) The equipment covered under this specification shall not be despatched unless the same have been finally inspected, accepted and shipping release issued by BHEL.

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## SECTION-B


### PROJECT INFORMATION

	<b>TECHNICAL SPECIFICATION CAST IRON GATE, GLOBE &amp; NON RETURN VALVES 2X600MW ADILABAD SCCL TPP</b>	SPECIFICATION NO. PE-TS-381-100-M002	
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### PROJECT INFORMATION

The proposed 2 x 600 MW Adilabad Thermal Power Project would be set up by SINGARENI COLLIERIES COMPANY LTD. (a Government of INDIA Undertaking), near Pegadapalli village, Jaipur Mandal, District-Adilabad of Andhra Pradesh. The bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually bidding on BHEL/OWNER. All relevant site data/information as may be necessary shall have to be obtained/collected by the bidder.


Sl. No.	FEATURES	DETAILS
1	Owner	SINGARENI COLLIERIES COMPANY LTD.
	Consultant	NTPC
2	Site Location	Located near Pegadapalli village, Jaipur Mandal, District-Adilabad of Andhra Pradesh. The site is 14.6Km from nearest town Mancheri and 4.6 Km from State Highway.
3	Nearest Airport	Shamshabad Airport, Hyderabad (250 Km)
4	Nearest Railway Station	Mancheri railway station on Nagpur-Kazipet Main rail line of South Central Railway, located at a distance of about 14.6 kms.

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## SECTION-C

# SPECIFIC TECHNICAL REQUIREMENTS



	<b>SPECIFIC TECHNICAL REQUIREMENTS BUTTERFLY VALVES (WATER SYSTEM) 2X600MW ADILABAD SCCL TPP</b>		SPECIFICATION NO. PE-TS-381-100-M008
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## 1. GENERAL

- 1.1 The valves shall meet the technical requirements and conform to the standard technical specifications, Data sheet A-1 & Data sheet-A2 of Section D. In addition, the requirements of this Section-C shall also be complied with. However, wherever the details given in standard technical specification of Section-D and Data sheets A-1 & A2 are different, the requirements of Data sheet A-1 & A2 shall prevail. Similarly in the event of contradictions between Section -C & Section -D/ Data sheet A-1 & A2, Section -C will prevail.
- 1.2 The technical requirements for valves shall, in general, be as per the attached standard Technical specification for Valves, and Data sheets A-1 and A-2 of Vol. II B Section D.

## 2. SCOPE OF SUPPLY

- 2.1 The valves complete with all accessories shall be supplied as per Data sheets A-1 & Data sheet-A2 of Section D. For detail refer the same. Each valve (quantity and other details specified in Data Sheet-A-1) shall be complete with the following accessories.
- i) Lifting arrangement provision for handling i.e., lifting lugs, eye bolts etc.
  - ii) Actuators and limit switches as required to make valve complete in all respects.
- 2.2 Commissioning spares, if any.
- 2.3 Set of special tools and tackles if required for the maintenance, erection etc. of the equipment supplied.
- 2.4 Mandatory spares as applicable depending upon the project requirement.
- 2.5 Finish paints for touch-up painting of equipment after erection at site in sealed containers.
- 2.6 Various drawings, datasheets, operation and maintenance manuals etc., as specified in Data Sheet-C.


## 3. EXCLUSIONS:

The following are excluded from the bidder's scope:

- a) Counter flanges and their nuts and bolts..
- b) Erection & Commissioning of equipment at site.

## 4. QUALITY ASSURANCE

The Quality Plans enclosed with this specification specify minimum quality control requirement. During contract stage vendor shall furnish these Quality Plans duly signed & stamped for their compliance. Quality plans shall be approved by BHEL and customer (If necessary). All inspection and testing shall be carried out by BHEL and CUSTOMER (if necessary). In case inspection is by both BHEL and CUSTOMER, then the inspection can be carried out jointly or separately, which will be informed later.

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**SPECIFIC TECHNICAL REQUIREMENTS  
BUTTERFLY VALVES  
(WATER SYSTEM)  
2X600MW ADILABAD SCCL TPP**

**5 PAINTING REQUIREMENT:**

a) Non-Coastal locations:


Valve shall be painted externally after the necessary testing has been carried out. Just before the painting, valve bodies and other items shall be thoroughly cleaned with wire brush/hand tool (Sa1/St2/St3 as applicable). The valves shall be first painted with two coats of primer zinc Chromate to IS 2074 (alkyd medium) each coat of DFT minimum of 25 to 35 microns. Finish paint shall be of three(3) coats of synthetic enamel (alkyd medium) as per IS 2932 & each coat DFT of minimum 20-35 microns & the total DFT of primer & finish paint shall be 150 microns minimum. Colour shade of finished/final paint shall be shade no. 217 of IS 5 or Grey as per RAL 9002.

**6 PACKING INSTRUCTIONS:**

- a) Each valve shall be drained, cleaned, prepared and suitably protected in such a way so as to minimize the possibility of damage and deterioration during transit and storage.
- b) The valve shall be dispatched in total assembled form.
- c) Discs of all valves shall be properly secured while dispatching so that there is no risk of damage to the disc & seat.
- d) Body ends shall be suitably sealed to protect them against damage during transit and storage.
- e) A thin sheet steel circular blanking plate of a diameter 6mm less than the bolt holes inner P.C.D. shall be firmly fixed to the flange faces by the application of adhesive after first ensuring that the flange faces have been thoroughly degreased. A thin coat of adhesive shall be applied to the flange face and the blanking plate and then allowed to dry for 15-20 minutes. The coated face of the blanking plate should then be offered up to the face of the flange taking care that the plate is concentric with the flange. Firm pressure shall be applied to ensure intimate contact between plate and flange. A wooden blank should then be bolted to the flange using a minimum of 4 bolts.
- f) Valve Tag Nos. shall be incorporated in all the dispatch documents.
- g) Proper care shall be taken to avoid damage to the painted surface during transit.
- h) All the valves shall be packed suitably in wooden cases in order to avoid damage during transit and also during storage at site in tropical climate conditions for a period of 15-18 months.

**7 SPARES**

- a) **Mandatory Spares:** These shall be as per Data Sheet-A1.
- b) **Recommended Spares:** List of recommended spares for 3 year reliable operation along with the unit price shall be indicated in the schedule of prices for recommended spares enclosed in Volume-III. Cost of Recommended spares shall not be included in the base price.
- c) Order for the spares may be placed simultaneously or otherwise at the option of purchaser.


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## 8 DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER

Bidder shall submit the following documents (enclosed in Vol III) duly filled, signed and stamped along with the bid:

- Compliance sheet
- Schedule of Deviations if any.
- Schedules of Price & Unit Price for each project.
- Schedule of declaration.

The above are the only documents which will be used for technical evaluation unless other documents are asked for during technical clarifications. Any other technical document enclosed with the bid shall be ignored for the purpose of technical evaluation. All other documents attached with the specification are for information of the vendor and no comments shall be marked on these.

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## SECTION-D

### STANDARD TECHNICAL SPECIFICATIONS

**D1: FOR VALVES**

**D2: FOR ACTUATORS**

**DATA SHEET – C**

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## 1.0 GENERAL

This specification covers the design, materials, construction features, manufacture, inspection and testing of Butterfly valves (soft seated) complete with all accessories at Vendor's or/ and sub-Vendor's works inclusive of painting and packing requirements.

## 2.0 CODES AND STANDARDS:

2.1 The design and manufacture of the butterfly valves shall suit the design parameters specified in Datasheet-A1 & comply with the requirements of latest revisions of the following standards. However, the testing shall be as per AWWA C504 including disc strength test (all sizes of valves), gear box POD Test & Valve POD test.

- a) American Water Works Association standard AWWA C504.
- b) BS EN 593 (replaces BS 5155).

2.2 In case of any conflict between the above Codes/Standards and this specification, the latter shall prevail and in case any further conflict in this matter, the interpretation of the specification by the purchaser shall be final & binding.

## 3.0 DESIGN REQUIREMENTS:

3.1 Valves for design pressure up to 10.5 kg/cm<sup>2</sup> shall be offered as per AWWA C504 in CI.150 rating. Valves of size 65 NB (which is not mentioned in AWWA) shall be offered as per BSEN 593(replaces BS-5155). Valves for design pressure greater than 10.5 kg/cm<sup>2</sup> shall be offered as per BSEN 593.

3.2 All valves shall be suitable for the service conditions i.e. flow, temperature and pressure under which they are required to operate and those performing similar duties shall be interchangeable with each other unless otherwise specified.

3.3 The butterfly valves shall be suitable for Indoor/outdoor installation with shaft either in horizontal or vertical position.

3.4 The butterfly valves shall be of short body, double flanged, minimum double offset seat design and either eccentric or a concentric disc configuration type, with shaft suitable for mounting either in horizontal or vertical position. The design should ensure bubble tight shut off at the design pressure as indicated in the Data sheet-A1. Flanges shall be as per ASME B16.1/16.5 for valves manufactured as per AWWA C504 and BS EN 1092-1/ BS EN 1092-2 for valves manufactured as per BS EN 593 design. Flanges shall be flat face for cast iron & raised face for steel.

## 3.5 Materials


3.5.1 The materials of construction of main parts of the butterfly valves shall be specified in Data sheet-A1.

3.5.2 The materials of construction of the remaining parts shall be as per relevant standard governing the valves and to suit the service conditions. These materials shall be subject to approval of the purchaser.

3.5.3 Materials used in manufacture of valves shall be of tested quality.

## 3.6 ACCESSORIES:

The butterfly valve shall be complete with electric operators if specified in Data sheet-A1. Valves with manual operation up to 150 NB size shall be lever operated and for sizes greater than 150 NB they shall be gear operated (gearing mechanism totally enclosed in the casing). Gear Box shall be POD tested as per AWWA C504.

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#### 4.0 CONSTRUCTION FEATURES

##### 4.1 Valve Body

4.1.1 The valve body shall have integral flanges (for flanged type valve) and hubs for shaft bearing housing (for AWWA standard valves). The minimum body shell thickness and minimum diameter of seat bore shall be as per the requirement of the applicable table of AWWA-C504. For BS standard valves, body rating for ductile iron shall be as per ASME B16.42 and for steel and alloy or special materials shall be as per ASME B16.34 (standard class).

4.1.2 An arrow shall be embossed/ engraved and painted on outside of body to clearly indicate the direction of flow.

##### 4.2 Valve Shaft

4.2.1 The shaft of each butterfly valve shall be securely attached to the disc through Bolting, Riveting, threading, upsetting or cross pinning, adequately locked.

4.2.2 Valve shaft design shall consist of one piece unit extending completely through the valve disc, or may be the "Stub Shaft" type which consists of two separate shafts inserted into the disc. Each stub shaft shall be inserted into the valve disc hubs for a minimum distance of at least 1.5 times shaft diameter. The connection between the shaft and the disc shall be designed to transmit shaft torque equivalent to at least 75% of the torsional strength of the minimum required shaft diameter. The minimum shaft diameter shall be as per the relevant standard and shall be such that it will safely sustain the maximum differential pressure across the closed valve and transmit the maximum torque required to operate the valve.

4.2.3 Surface finish for shaft shall be minimum 16 RMS in the area of gland packing

##### 4.3 Valve Disc:

The valve disc shall have no external ribs transverse to the flow and shall sustain full differential pressure across a closed valve disc without exceeding a working stress of one fifth of the tensile strength of the material used. The valve disc shall be designed to rotate 90° from full open to tight shut off position. The thickness of valve disc shall be designed as per applicable standard.

##### 4.4 Body Seat & Disc Seal (Valve seat)

The soft seat shall be of replaceable type of suitable grade resilient material, adequately reinforced, securely attached to the disc or to the body, and shall be designed to provide bubble tight shut off under all operating conditions. The soft seat/ seal shall be attached by clamping ring, bolting or other suitable methods as per the standard design of the manufacturer. All clamping rings, bolts/studs, nuts used shall be of stainless steel. The sealing ring on the disc shall be continuous type and easily replaceable.


The mating seat surface accordingly shall be on valve body or disc and shall be of stainless steel and securely attached to the body/disc by directly clamping, bolting or suitable methods. All clamps, retaining rings, nuts, screws / all hardware shall be of stainless steel.

##### 4.5 Valve Bearing:

Each butterfly valve shall be fitted with sleeve type bearings contained in the hub of the valve body. The bearing shall be of self lubricating type and the coefficient of friction of bearing material shall not exceed 0.25 when rubbing at the maximum bearing pressure. The housing for this bearing shall be rigidly attached to the valve body. Thrust bearings shall also be provided for vertical shaft installation. For valves of 350 NB and larger, the bearing should be capable of taking axial thrust also. The material of the bearing shall be self-lubricated type & low coefficient of friction and in accordance with the relevant standard.

##### 4.6 Shaft Seal:

Wherever the shaft projects through the valve body for operation connection, a shaft seal shall be provided. Shaft seal shall be designed for use of Standard 'O' rings seals (minimum 2 nos. for each side for inner face & 2 nos. at outer face and they shall be contained in a removable corrosion resistant recess. Shaft seals shall be designed to allow its replacement without removal of the valve shaft. If gland packing is provided then gland & gland flange both shall be in two pieces construction for uniform tightening.

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#### 4.7 Nameplate:

Each valve shall be fitted with a circular Stainless steel 2mm thick nameplate indicating the valve Tag No. and service description given in Data sheet-A1. All details shall be engraved 1 mm deep and filled with black enamel paint.

#### 4.8 All valves shall be fitted with position indicators to indicate valves 'open' and 'shut' position..

#### 4.9 The stops which limit the travel of any valve in the 'Open' or 'Shut' position shall be arranged exterior to the valve body.

#### 4.10 All valves shall be closed by rotating the hand wheel in a clockwise direction when looking at the face of the hand wheel. The pulling force required on hand wheel rim shall not exceed 25 Kgf when operating the valve under full flow and operating pressure. The face of each hand wheel shall be clearly marked with the words 'Open' and 'Shut' with arrows adjacent to indicate the direction of rotation to which each refers.

#### 4.11 Special attention shall be given to the operating mechanism (gear box) for large size valves (200 NB & above) in order that quick and easy operation is obtained and maintenance is kept to a minimum.

#### 4.12 Eyebolts shall be provided where necessary to facilitate handling of heavy valves or part of valves.

#### 4.13 All valves and accessories shall be designed for easy dismantling and maintenance.

#### 4.14 Wherever practicable, heavy valves of total weight including actuator drive motor, etc. equal to or greater than 500 Kgs. shall be provided with suitable lugs to permit direct suspension by hanger rods or direct resting on bottom support, as applicable.

### 5.0 SPECIAL FEATURES:

#### 5.1 Gland Sealing Arrangement:

All valves required with this arrangement shall be provided with 3/8" BSP connection (duly plugged) for water sealing. Sealing water shall be supplied at 4 ata and 50°C unless otherwise specified.

#### 5.2 Motorised Valves:

##### 5.2.1 The motorised valves shall be offered with the electric actuators of reputed make. A particular make and type of actuator shall be designed for the maximum differential working pressure. However, the stall torque of the selected actuators shall be minimum 1.5 times the valve unseating torque requirement at the maximum differential working pressure (design pressure) and required operating time as mentioned in Datasheet A-1/ Datasheet A-2.


##### 5.2.2 Electric actuators shall be mounted directly on the valves.

##### 5.2.3 The motors, gearing and disengaging hand wheel shall be adequate to open and close the valve under maximum differential pressure and shall be completely assembled on the respective valve and shop tested before shipment.

##### 5.2.4 Gear box and Electric Actuator shall also meet the inspection & testing requirements of latest revision of AWWA C504/AWWA C540.

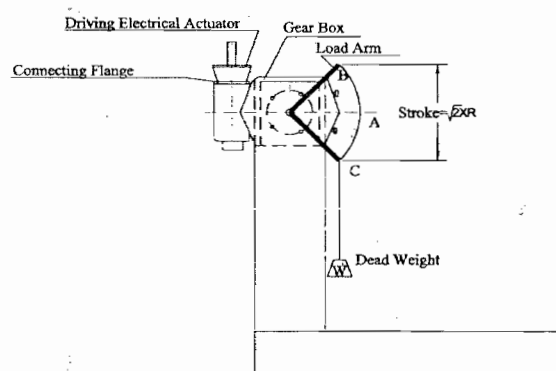
### 6.0 INSPECTION AND TESTING:-

- All inspection & Testing for valve, Gear box and actuators shall be as per the requirements of the relevant standard.
- All electric actuators shall be tested for seat tightness test at 1.1 times of design/ operating pressure.
- The minimum NDT/testing and inspection requirements for valve, Gear Box, electric actuator etc. shall be as per the attached Quality Plan. However, in case of order, final inspection and testing shall be carried out as per the final approved quality plan without any price implications.

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#### 6.1 P.O.D. Tests:

- POD (Proof-of-design) Test as per AWWA C504 is required to be carried out for valves. In case the valve POD Test has been done earlier, only Test Report of POD test for same model/ type/size/ rating is required to be submitted for verification. If POD test for valves/gear box are required to be carried out than the vendors shall do so at their own cost. No extra charge on this account will be admissible to the vendors.
- Gear Box and Electric Actuator shall be designed & tested in accordance with latest editions of AWWA C 504(valve) and AWWA C 540 (actuator) respectively. Gear Box shall be designed to hold the valve disc in intermediate position between full open and full closed position without creeping or fluttering.
- For valves designed and manufactured as per AWWA and BS, valve POD shall follow the guidelines of AWWA-C-504. Actuators shall meet the requirements of POD test of AWWA-C-540.
- Gear box POD test: - Valve POD and gear box POD tests should be done separately. Gear box POD test shall be done as per the procedure described below or as per the procedure agreed between purchaser & vendor.
- Gear box POD Test shall be carried out only at full rated torque of gear box, throughout the full cycle of testing i.e. at no point during each full cycle of testing; the applied torque should be less than the full rated torque of Gear Box. Refer Sketch below for Gear Box POD test set up. Dead weight and length of arm shall be so selected that the torque generated at point "C" and "B" shall in no case be less than the full rated torque of the gear box.




TEST SET UP

FIG. 1

#### 7.0 PERFORMANCE GUARANTEE:

- The vendor shall guarantee the material & workmanship of all components as well as operation of the equipment as per the requirements of the specification.
- The vendor shall also guarantee for each of the butterfly valve for the following:
  - Minimum pressure drop
  - The valve opening and closing time as specified in specific requirements for electric operated valves.



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#### 8.0 SURFACE PREPARATION & PAINTING


The surface preparation of all exterior and interior surfaces of valves shall include the following:

- a) Removal of oil, grease and dirt.
- b) Removal of rust and scale etc.
- c) Sand blasting/ shot blasting.

All exterior surfaces of valves shall be painted with primer and finish coated with coating of min. 150 microns thickness. Color shade etc. shall be subject to BHEL/ Customer approval.

#### 9.0 CLEANING AND PROTECTION FOR DESPATCH:

- 9.1 Each valve shall be drained, cleaned, prepared and suitably protected in such a way so as to minimize the possibility of damage and deterioration during transit and storage.
- 9.2 Discs of all valves shall be unseated when they are dispatched but care shall be taken to ensure that there is no risk of damage to the disc.
- 9.3 Body ends shall be suitably sealed to protect them against damage during transit and storage.
- 9.4 Valve Tag Nos. shall be incorporated in all the dispatch documents.
- 9.5 A thin sheet steel circular blanking plate of a diameter 6mm less than the bolt holes inner P.C.D. shall be firmly fixed to the flange faces by the application of adhesive after first ensuring that the flanges faces have been thoroughly degreased. A thin coat of adhesive shall be applied to the flange face and the blanking plate and then allowed to dry for 15-20 minutes. The coated face of the blanking plate should then be offered up to the face of the flange taking care that the plate is concentric with the flange. Firm pressure shall be applied to ensure intimate contact between plate and flange. A wooden blank should then be bolted to the flange using a minimum of 4 bolts.

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## SECTION-D1

### VALVES

# STANDARD TECHNICAL SPECIFICATION DATA SHEET – A1 QUALITY PLAN (NON-NTPC PROJECTS) QUALITY PLAN (NTPC PROJECTS)



DATA SHEET-A1  
BUTTERFLY VALVES ( WATER SYSTEM)  
2x600MMW ADILABAD SCCL TPP

SPECIFICATION NO. PE-TS-381-100-M008

VOL. II B


SECTION D

REV. NO. 00 DATE 02.02.2013

SHEET 1 OF 2

1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17			
SL NO.	TAG NOS	TYPE OF VALVE	SIZE mm (NB)	OPERATION	DESIGN		RATING, DESIGN & TESTING CODE	BODY & DISC MATERIAL	TRIM MATERIAL	END CONN	SPECIAL FEATURES	MATCHING PIPE OD X THIN		***COMMISSIONING SPARES			MANDATORY SPARES (COMPLETE VALVES)	
					TEMP (°C)	PRESSURE (KG/CM <sup>2</sup> G)						MM	MM	MAIN VALVES WITHOUT COMMISSIO	ROCKET COVER GASKET (NOS)	GLAND PACKING (SETS)		ACTUATOR SPARES SETS
1	ECW-46, 50 (EACH 2 NOS), PW-11 TO 16, 18, 60 TO 66, 68, SW-17, 22, 23, 25, 32, 40, 44, 46, 53 (EACH 1 NO.)	BUTTERFLY VALVE	65	MAN	10	60	WATER (ECW, PW, SW)	PN 10 OF BS EN 593 (BS 5155)	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	LEVER OPERTD., SOFT SEAT	76.6	4.5	31	31	31	2
2	ECW-91, 92 (EACH 2 NOS),	BUTTERFLY VALVE	65	MAN	12	60	WATER (ECW)	PN 10 OF BS EN 593 (BS 5155)	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	LEVER OPERTD., SOFT SEAT	76.6	4.5	4	4	4	2
3	PW-5, 6, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 (EACH 2 NOS.)	BUTTERFLY VALVE	80	MAN	10	60	WATER (SW)	CLASS 150 OF AWWA C504	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	LEVER OPERTD., SOFT SEAT	89.5	4.8	10	10	10	2
4	ECW-22 TO 27 (EACH 2 NOS.),	BUTTERFLY VALVE	100	MAN	7.5	60	WATER (ACW, ECW, SW)	CLASS 150 OF AWWA C504	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	LEVER OPERTD., SOFT SEAT	115	5.4	42	42	42	3
5	PW-21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 (EACH 1 NO.)	BUTTERFLY VALVE	100	MO	10	60	WATER (PW, SW)	CLASS 150 OF AWWA C504	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	MOTORISED ACTUATOR WITH INTEGRAL STARTERS OT-40, 46 SECS	115	5.4	4	4	4	2
	ECW-25 TO 34 (EACH 2 NOS.),	BUTTERFLY VALVE	150	MAN	5													
6	ECW-35 TO 38, 39, 40, 41, 42, 52 TO 55 (EACH 1 NOS.), PW-3, 4, 7 TO 10, 11, 12, 13, 36 TO 39 (EACH 1 NO.)	BUTTERFLY VALVE	150	MAN	10	60	WATER (CW, ECW, PW)	CLASS 150 OF AWWA C504	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	LEVER OPERTD., SOFT SEAT	166.5	5.4	56	56	56	3
7	ECW-46 TO 59 (EACH 2 NOS.),	BUTTERFLY VALVE	200	MAN	10		WATER (ECW)	CLASS 150 OF AWWA C504	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	GEAR OPERTD., SOFT SEAT	219.1	6	16	16	16	2
	CW-14, 15, 23 & 24 (EACH 2 NOS.)	BUTTERFLY VALVE	200	MO	10	60	WATER (ECW)	CLASS 150 OF AWWA C504	2% N CAST IRON AS PER IS 210 FG 260 EPOXY COATED	SS-410	DOUBLE FLANGED FLAT FACED & DRILLING AS PER ASME B16.1 CLASS 125	MOTORISED ACTUATOR WITH INTEGRAL STARTERS OT-40, 46 SECS	219.1	6	2	2	2	2



	<b>DATA SHEET-A1</b> <b>BUTTERFLY VALVES</b> <b>(WATER SYSTEM)</b> <b>2X600MW ADILABAD SCCL TPP</b>	SPECIFICATION NO. PE-TS-381-100-M008	
		VOLUME-IIB	
		SECTION : D	
		REV. NO.: 00	DATE: 18.09.2012
		Sheet 1 of 1	

**Material of Construction**

SL. NO	PART NAME	MATERIALS FOR CAST IRON VALVES	MATERIALS FOR STAINLESS STEEL BODY VALVES
1	BODY (FLAT FACED FLANGED SHORT BODY)	IS 210 Gr. FG 260 +2% Ni (EPOXY COATED)	ASTM A351 Gr. CF8M
2	DISC	IS 210 Gr. FG 260 +2% Ni (EPOXY COATED)	ASTM A351 Gr. CF8M
3	BODY SEAT	ASTM A240 TYPE 316/ OR 304 IF CALLED IN ANN-A	ASTM A240 TYPE 316
4	DISC SEAL	NITRILE RUBBER	EPT/ BUNA-N/ NEOPRENE
5	SEAL RETAINING RINGS	ASTM A240 TYPE 316	ASTM A240 TYPE 316
6	INTERNAL BOLTS/ HARDWARES	ASTM A 479 TYPE 316/ AISI 316	ASTM A 479 TYPE 316/ AISI 316
7	EXTERNAL HARDWARES BOLTS AND NUTS	ASTM A193 Gr.B7/ A194 Gr.2H	ASTM A193 Gr.B8M/ A194 Gr.8M
8	SHAFT	ASTM A 479 TYPE 410 CLASS 2	ASTM A 182 Gr. F 316
9	SHAFT SEALS - (O' RING)	PTFE/ BUNA-N / NITRILE RUBBER	PTFE/ BUNA-N / NITRILE RUBBER
10	GUIDE BUSH	ASTM A439 Gr.D2/ ASTM B62-85-5-5-5	ASTM A439 Gr.D2/ ASTM B62-85-5-5-5
11	BEARING	SLEEVE TYPE, SELF LUBRICATED	SLEEVE TYPE, SELF LUBRICATED
12	PACKING	PTFE / NITRILE	PTFE
13	PACKING FOLLOWER/ PLATE	ASTM A479 TYPE 316	ASTM A479 TYPE 316
14	THRUST PAD	ASTM A240 TYPE 316	ASTM A240 TYPE 316
15	BOTTOM PLATE/ CAP	ASTM A479 TYPE 316	ASTM A479 TYPE 316
16	BOTTOM GASKET/ 'O' RING	CAF/ EPDM	EPDM
17	GEARS (TOTALLY ENCLOSED)	STEEL TO IS: 2004 CL. 4 / EN8	STEEL TO IS: 2004 CL. 4 / EN8
18	HANDWHEEL/LEVER	MALLEABLE IRON ONLY, NO ALTERNATE MATERIAL ALLOWED	MALLEABLE IRON ONLY, NO ALTERNATE MATERIAL ALLOWED



MANUFACTURER'S NAME AND ADDRESS:-		MANUFACTURING QUALITY PLAN										PROJECT : 2X600MW ADILABAD SCCL TPP	
MFR.'s LOGO		ITEM: 2% NI CAST IRON BUTTERFLY VALVES WATER SYSTEM SIZE: 65NB TO 350 NB/CL. 150 7 PN 10/16 & SS BUTTERFLY VALVES WATER SYSTEM 100 NB/CL150 SUB-SYSTEM: WATER SYSTEM LP VALVES		QP NO.: PE-QP-999-100-M008 REV.NO.: 00 DATE: 18-09-2012		PAGE: 2 OF 6		CONTRACT NO. : MAIN-SUPPLIER : BHEL PEM NOIDA CUSTOMER :		PACKAGE : L.P. PIPING VALVES			
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY M C N		REMARKS		
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.		11.		
2.	2. Clamping ring/Body Seat Ring	Internal Defects	CR	UT	100%	ASTM A388	ASTME B 16.34 APPENDIX-IV	TC	✓	P/ W	V	THICKNESS 25mm & above	
	3. BODY GEARING (SS)	CHEMICAL	CR	IGC TEST	1/HEAT/ BATCH	ASTM A262	ASTME B 16.34 APPENDIX-IV	TEST REPORT	✓	P/ W	V		
<b>2.0 BOUGHT OUT ITEMS</b>													
2.1	Valve seal	Visual & Dim	MA	Visual / Measurement	100%	Tech Spec / Approved Drawing/ Data sheet	Approved Drawing/ Data sheet/ Relevant Standards	IR	✓	P	V		
	Tensile Strength		MA	Testing	1/Sample/Batch	IS:3400 (Part-1)	120kg/cm <sup>2</sup> (Min)	IR	✓	P	V		
	Elongation,		MA	Testing	1/Sample/Batch	IS:3400 (Part-1)	250%(Min)	IR	✓	P	V		
	Hardness		MA	Testing	1/Sample/Batch	Mfg Std	Approved Drg./70+/-5(Shore A)	IR	✓	P	V		
	Bleed Resistance		MA	Testing	1 / Batch (Type Test)	Sample to be kept in 33%HCL.DM water 48% NaOH 72 HRS	No Discoloration. Weight gain+0%to+2%	Supplier TC	✓	P	V		
<b>LEGEND:</b> * RECORDS, IDENTIFIED WITH "TICK" (✓) 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 COLUMN "N" AS 'W'													
MANUFACTURER/ SUB-SUPPLIER		MAIN-SUPPLIER		FOR NTPC USE				DOC. NO.		REV.-00		CAT...	
SIGNATURE								REVIEWED BY		APPROVED BY		APPROVAL SEAL	



MANUFACTURER'S NAME AND ADDRESS:-		MANUFACTURING QUALITY PLAN				PROJECT : 2X600MW ADILABAD SCCL TPP				
MFGR.'s LOGO		ITEM: 2% NI CAST IRON BUTTERFLY VALVES WATER SYSTEM SIZE: 65NB TO 350 NB/CL. 150 7 PN 10/16 & SS BUTTERFLY VALVES WATER SYSTEM 100 NB/CL150 SUB-SYSTEM: WATER SYSTEM LP VALVES		QP NO.: PE-QP-999-100-M008 REV.NO.: 00 DATE: 18-09-2012 PAGE: 3 OF 6		PACKAGE : L.P. PIPING VALVES CONTRACT NO. : MAIN-SUPPLIER : BHEL PEM NOIDA CUSTOMER :				
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK M C/N	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY M C N	REMARKS
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
		Ozone Resistance	MA	Testing	1 / Batch (Type Test)	ASTM D1149	No Cracks at 50 PPHM ozone	Supplier TC	P V	
		Ageing Test	MA	Testing	1 / Batch (Type Test)	ASTM D573 / REL STD	NO DETERIORATION	Supplier TC	P V	
		Hydraulic stability test after ageing	MA	Testing	1 / Batch (Type Test)	TECH-SPEC / AWWA C504	TECH-SPEC / AWWA C504	Supplier TC	P V	*Water absorption by volume to be < 2%
2 2	GEAR BOX A) GEAR, WORM GEAR & SHAFT	1. CHEM. & PHYS. PROPERTIES	MA	CHEM & PHYS. TESTS	1 / Batch	REL STD./DATA SHEET/MFG. DRG	REL STD./DATA SHEET/MFG. DRG	TEST CERT.	P V	
		2.HARDNESS	MA	MEASUREMENT	100%	REL STD./DATA SHEET/MFG. DRG	REL STD./DATA SHEET/MFG. DRG	TEST CERT.	P V	
		Appearance	MA	Visual	100%	Drawing / Data Sheet	Drawing / Data Sheet	IR	P/ W	
	B) Gear box Assembly	Performance	MA	Operation Test	100%	Rev. Std/Data sheet/ Mfg drg.	Rev. Std/Data sheet/ Mfg drg.	Supplier TC	P/ W	
		Dimensions	MA	Measure ment	100%	Rev. Std/Data sheet/ Mfg drg.	Rev. Std/Data sheet/ Mfg drg.	Insp. Report	P/ W	

MANUFACTURER/ SUB-SUPPLIER		MAIN-SUPPLIER		SIGNATURE		FORMAT NO.: QS-01-QAI-P-09/FI-R1	
						3/6	
<b>LEGEND:</b> * RECORDS IDENTIFIED WITH "TICK" (✓) 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 COLUMN "N" AS 'W'				FOR NTPC USE		DOC. NO. REV. -00 CAT...	
				REVIEWED BY		APPROVED BY	
						APPROVAL SEAL	

ENG. DIV./QA&I






MANUFACTURER'S NAME AND ADDRESS:-		MANUFACTURING QUALITY PLAN					PROJECT : 2X600MW ADILABAD SCCL TPP						
MFR.'s LOGO		ITEM: 2% NI CAST IRON BUTTERFLY VALVES WATER SYSTEM SIZE: 65NB TO 350 NB/CL. 150 7 PN 10/16 & SS BUTTERFLY VALVES WATER SYSTEM 100 NB/CL150 SUB-SYSTEM: WATER SYSTEM LP VALVES		QUANTUM OF CHECK		REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY		REMARKS	
SL. NO	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	M	C/N	7.	8.	9.	D*	M	C	N
1.	2.	3.	4.	5.	6.		7.	8.	9.	D*	10.		11.
		Torque Transmitting (Gear Box) Models Nos. PAC-02, PAC-02A & PAC-02AE	MA	Torque Test (at 2 times of gear box rated torque)	1 / Model / Size/ Torque rating	1 / Model / Size/ Torque rating	AWWA C504 (CL4.5.8.5.8)	AWWA C504 (CL4.5.8.5.8)	TC	✓	P/ W	V	V
		Design Verification (Gear Box) Models Nos. PAC-02, PAC-02A & PAC-02AE	MA	Cycle Test (Gear Box POD Test)	1 / Model / Size/ Torque rating	1 / Model / Size/ Torque rating	Clause 4.5.8.5.9 of AWWA C504/06 / Approved procedure for cycle test	Clause 4.5.8.5.9 of AWWA C504/06 / Approved procedure for cycle test	TC	✓	P/ W	* V W	*Verification of test reports/certificates, cycle test (gear box POD test) on same model & size/rating if carried out earlier for any NTPC Project.
2.3	Electrical Actuators	Inspection & testing shall be as per NTPC approved RQP of ELECTRIC ACTUATORS of manufacturer of electric actuators.			One of each size/ model	One of each size/ model	AWWA C540	As per AWWA C540	TEST CERT	✓	-	-	-
		Design Verification	MA	Type Test	One of each size/ model	One of each size/ model			TEST CERT	✓	P/ W	V	Furnish Test Cert. For design verification of actuator
3.0	INPROCESS INSPECTION												
3.1	Machining of Body, Disc, shaft & SEAT RING	Surface Defects	CR	Visual	100%	100%	FINISH	No surface defects	INSP REPORT	✓	P/ W	V	V
		Dimension	MA	Measurement	1 / Batch	1 / Batch	Mfg Drawing	Mfg Drawing	Log Book		P/ W	-	-
		Surface Defects	CR	LPI	100%	100%	ASTM E165	No surface Defects	INSP REPORT	✓	P/ W	V	V

MANUFACTURER/ SUB-SUPPLIER		SIGNATURE		LEGEND: * RECORDS, IDENTIFIED WITH "TICK" (✓) 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 COLUMN "N" AS "W"		FOR NTPC USE		DOC. NO.		REV. -00		CAT...	







	<b>TECHNICAL SPECIFICATION</b> <b>BUTTERFLY VALVES</b> <b>(WATER SYSTEM)</b> <b>2X600MWW ADILABAD SCCL TPP</b>		SPECIFICATION NO. PE-TS-381-100-M008	
			VOLUME : IIB	
			SECTION: D	
			REV. NO.: 00	DATE: 18.09.2012
			SHEET 1	OF 1

## SECTION-D2

## ACTUATORS

## DATA SHEET – A2 WIRING DIAGRAM

# MOTOR OPERATED VALVE ACTUATOR

## DATA SHEET A2

NTPC DRAWING NO.

OWNER :



**THE SINGARENI COLLIERIES COMPANY LTD.**

(A Government Company)  
POWER PROJECT DIVISION

CONSULTANT :



एन टी पी सी लिमिटेड

**NTPC Limited**  
(A Government of India Enterprise)  
CONSULTING WING

PROJECT :

**SCCL COAL BASED THERMAL POWER PLANT**  
(2 X 800MW)

PACKAGE :

**BOILER TURBINE GENERATOR PACKAGE**

CONTRACTOR :



**BHARAT HEAVY ELECTRICALS LTD.**  
POWER SECTOR  
PROJECTS ENGINEERING MANAGEMENT  
NEW DELHI

DEPT

CODE

NAME

SIGN

DATE

DRN

MS

13.04.12

CHD

MK

13.04.12

APPD


SHB

13.04.12

TITLE

**MOTOR OPERATED VALVE ACTUATOR DATA SHEET**

						DEPT.	SCALE	DRAWING NO.	
						SIGN		PE-ID-381-145-1902	
						DATE		SHEET 1 OF 5	REV. 00

	<b>SPECIFICATION SHEET FOR MOTORISED VALVE ACTUATOR</b>  <b>2 x 600MW SINGARENI - SCGL TPP</b>		SPECIFICATION NO.: PE-ID-381-145-I902	
			VOLUME	
			SECTION	
			REV. NO.	00
	SHEET		2	OF
TAG No :- Qty :-.....Nos.....				
<b>Data Sheet A &amp; B</b>				
DATA SHEET-A (TO BE FILLED BY PURCHASER)			DATA SHEET-B (TO BE FILLED-UP BY BIDDER)	
<b>GENERAL*</b>	* PROJECT	<b>2 x 600MW SINGARENI - SCCL TPP</b>		
	OFFER REFERENCE			
	* TAG NO. SERVICE			
	* DUTY	<input type="checkbox"/> ON / OFF <input type="checkbox"/> INCHING		
	* LINE SIZE (inlet/outlet): MATERIAL			
	* VALVE TYPE	<input type="checkbox"/> GLOBE <input type="checkbox"/> GATE <input type="checkbox"/> REG. GLOBE <input type="checkbox"/> BUTTERFLY		
	* OPENING / CLOSING TIME	.....	SECONDS	
	* WORKING PRESSURE	.....	KG/SQ.CM.	
	AMBIENT CONDITION	SHALL BE SUITABLE FOR CONTINUOUS OPERATION UNDER AN AMBIENT TEMP. OF 0-55 DEG C AND RELATIVE HUMIDITY OF 0-95%		
	VALVE SEAT TEST PRESS	BIDDER TO SPECIFY		
	REQUIRED VALVE TORQUE	BIDDER TO SPECIFY		
	ACTUATOR RATED TORQUE	BIDDER TO SPECIFY		
<b>CONSTRUCTION AND SIZING</b>	CONSTRUCTION	TOTALLY ENCLOSED, WEATHER PROOF, IP:55		
	MECHANICAL POSITION INDICATOR	TO BE PROVIDED FOR 0-100% TRAVEL		
	BEARINGS	DOUBLE SHIELDED, GREASE LUBRICATED ANTI-FRICTION.		
	GEAR TRAIN FOR LIMIT SWITCH/TORQUE SWITCH OPERATION	METAL (NOT FIBRE GEARS). SELF-LOCKING TO PREVENT DRIFT UNDER TORQUE SWITCH SPRING PRESSURE WHEN MOTOR IS DE-ENERGIZED.		
	SIZING	OPEN/CLOSE AT RATED SPEED AGAINST DESIGNED DIFFERENTIAL PRESSURE AT 90 % OF RATED VOLTAGE. FOR ISOLATING SERVICE THREE SUCCESSIVE OPEN-CLOSE OPERATIONS OR 15 MINS. WHICHEVER IS HIGHER. . For regulating service 150 starts/Hr min.		
<b>HANDWHEEL</b>	* REQUIRED	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		
	* ORIENTATION	<input type="checkbox"/> TOP MOUNTED <input type="checkbox"/> SIDE MOUNTED		
	TO DISENGAGE AUTOMATICALLY DURING MOTOR OPERATION.			
<b>ELECTRIC ACTUATOR</b>	ACTUATOR MAKE/MODEL	BIDDER TO SPECIFY		
	MOTOR MAKE / MODEL / TYPE / RATING (KW)	BIDDER TO SPECIFY		
	MOTOR TYPE	SQUIRREL CAGE INDUCTION MOTOR, STARTING CURRENT LIMITED TO SIX TIMES THE RATED CURRENT.		
	ACTUATOR WIRING DIAGRAM & No.	<input checked="" type="checkbox"/> BIDDER TO ENCLOSE <input type="checkbox"/> ENCLOSED		
	COLOUR SHADE	<input checked="" type="checkbox"/> BLUE (RAL 5012) ENAMEL/ GREY ENAMEL PAINT(SHADE 631 AS PER IS.5) OR EQUIVALENT <input type="checkbox"/> .....		
	SHAFT RPM	BIDDER TO SPECIFY		
	OLR SET VALUE	BIDDER TO SPECIFY		
	STARTING / FULL LOAD CURRENT	BIDDER TO SPECIFY		
	NO. OF REV FOR FULL TRAVEL	BIDDER TO SPECIFY		
	@ PWR SUPP TO MTR / STARTER	415V±10%, 3PH, AC, 50Hz±5%, 10%(ABSOLUTE) COMBINED VOLTAGE & FREQUENCY VARIATION		
	@ CONTROL VOLTAGE REQUIREMENT	110V AC- TO BE DERIVED FROM THE POWER SUPPLY TO THE STARTER		
	@ ENCLOSURE CLASS OF MOTOR	<input type="checkbox"/> IP 65 <input checked="" type="checkbox"/> IP 67 FOR OUTDOOR <input type="checkbox"/> FLAME PROOF <input checked="" type="checkbox"/> IP 55 FOR INDOOR, TOTALLY ENCL, SELF VENTILATED.		



# **SPECIFICATION SHEET FOR MOTORISED VALVE ACTUATOR**

**2 x 600MW SINGARENI - SCCL TPP**

SPECIFICATION NO.: PE-ID-381-145-I902

VOLUME

SECTION

REV. NO.

90

DATE: 13.04.12

SHEET

2

OF

5

TAG No :-

Qty :-.....Nos.....

## **Data Sheet A & B**

DATA SHEET-A  
(TO BE FILLED BY PURCHASER)

DATA SHEET-B  
(TO BE FILLED-UP BY BIDDER)

	@ INSULATION CLASS	<input type="checkbox"/> CLASS-B <input checked="" type="checkbox"/> CLASS-F WITH TEMPERATURE RISE LIMITED TO CLASS-B	
	@ CONTINUOUS OPERATION TIME	S2-15 MINUTES	
	@ POWER CABLE TYPE / SIZE	LATER (TO BE PROVIDED IN THE CONTRACT STAGE)	
	@ CONTROL CABLE TYPE / SIZE	LATER (TO BE PROVIDED IN THE CONTRACT STAGE)	
	@ WINDING TEMP PROTECTION	<input checked="" type="checkbox"/> THERMOSTAT <input checked="" type="checkbox"/> THERMISTOR WITH SWITCHING UNIT <input checked="" type="checkbox"/> 3 Nos., 1 IN EACH PH <input type="checkbox"/> ONE	
	SINGLE PHASE / WRONG PHASE SEQUENCE PROTECTION	REQUIRED	
<b>INTEGRAL STARTER</b>	INTEGRAL STARTER	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	TYPE OF SWITCHING DEVICE	<input checked="" type="checkbox"/> CONTACTORS <input type="checkbox"/> THYRISTORS	
	TYPE	<input checked="" type="checkbox"/> CONVENTIONAL <input type="checkbox"/> SMART (NCN-INTRUSIVE)	
	IF SMART		
	a) SERIAL LINK INTERFACE	<input type="checkbox"/> INTEGRAL <input type="checkbox"/> FIELD MOUNTED	
	b) SERIAL LINK PROTOCOL	<input type="checkbox"/> FOUNDATION FIELD-BUS <input type="checkbox"/> PROFI-BUS <input type="checkbox"/> TCP/IP <input type="checkbox"/> .....	
	c) SERIAL LINK MEDIA	<input type="checkbox"/> TWISTED PAIR Cu-CBL <input type="checkbox"/> CO-AXIAL Cu-CBL <input type="checkbox"/> QFC	
	d) HAND HELD PROGRAMMER	<input type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	e) MASTER STATION (See note-10)	<input type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	f) MASTER STN INTRFACE WITH DCS	<input type="checkbox"/> REQUIRED MODBUS <input type="checkbox"/> TCP/IP	
	g) DETAILS OF SPECIAL CABLE	<input type="checkbox"/> ENCLOSED <input type="checkbox"/> NOT REQUIRED	
	WIRING DIAGRAM & No.	<input checked="" type="checkbox"/> BIDDER TO ENCLOSE <input type="checkbox"/> ENCLOSED	
	STEP DOWN CONT. TRANSFORMER	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	OPEN / CLOSE PB	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	STOP PB	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	INDICATING LAMPS	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	LOCAL REMOTE S/S	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
STATUS CONTACTS FOR MONITORING	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED		
INTEGRAL STARTER DISTURBED SIGNAL	REQUIRED(O/L RELAY OPERATED, CONT./POWER SUPPLY FAILED,S/S IN LOCAL,TORQUE SWITCH OPTD MID WAY)		
<b>INTERPOSING RELAY</b> (Applicable for Integral Starter)	INTERPOSING RELAY	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	INTERPOSING RELAY (QUANTITY)	<input checked="" type="checkbox"/> 2 NOS. <input type="checkbox"/> 3 NOS.	
	DRIVING VOLTAGE	<input checked="" type="checkbox"/> 20.5 - 24V DC <input type="checkbox"/> _____ V DC	
	DRIVING CURRENT	<input checked="" type="checkbox"/> 125 mA MAX <input type="checkbox"/> _____ mA MAX	
	LOAD RESISTANCE	<input checked="" type="checkbox"/> > 192 ohms - < 25 K ohms <input type="checkbox"/> > _____ ohms - < _____ ohms	
<b>TORQUE SWITCH</b> (Not Applicable for Smart Actuator)	MECHANICAL LATCHING DEVICE	<input checked="" type="checkbox"/> REQUIRED(REFER NOTE-6)	
	MFR & MODEL NO.	BIDDER TO SPECIFY	
	OPEN / CLOSE	<input checked="" type="checkbox"/> 1 No. <input type="checkbox"/> 2Nos. / <input checked="" type="checkbox"/> 1 No. <input type="checkbox"/> 2Nos	
	CONTACT TYPE	2 NO + 2 NC	
	RATING	5A, 240 V AC / 0. 5A,220 V DC	
	ENCLOSURE	IP 55	
	CALIBRATED KNOBS(OPEN&CLOSE TS)	REQUIRED FOR SETTING DESIRED TORQUE	
	ACCURACY	+3% OF SET VALUE	
<b>LIMIT SWITCH</b> (Not Applicable for Smart Actuator)	MFR & MODEL NO.	BIDDER TO SPECIFY	
	OPEN : INT : CLOSE	<input type="checkbox"/> 1 No. <input checked="" type="checkbox"/> 2 Nos.	2 Nos. (ADJ.) <input type="checkbox"/> 1 No. <input checked="" type="checkbox"/> 2Nos.



# **SPECIFICATION SHEET FOR MOTORISED VALVE ACTUATOR**

**2 x 600MW SINGARENI - SCCL TPP**

SPECIFICATION NO.: PE-ID-381-145-I902

VOLUME

SECTION

REV. NO.

00

DATE: 13.04.12

SHEET

2

OF

5

TAG No :-

Qty :-.....Nos.....

## **Data Sheet A & B**

DATA SHEET-A  
(TO BE FILLED BY PURCHASER)

DATA SHEET-B  
(TO BE FILLED-UP BY BIDDER)

	CONTACT TYPE	2 NO + 2 NC	
	RATING (AC / DC)	5A, 240 V AC / 0. 5A,220 V DC	
	ENCLOSURE CLASS	IP 55	
<b>POSITION TRANSMITTER</b> (For Inching Duty Drives)	POSITION TRANSMITTER	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED	
	MFR & MODEL NO.	BIDDER TO SPECIFY	
	TYPE	<input checked="" type="checkbox"/> ELECTRONIC (2-WIRE) CONTACTLESS <input type="checkbox"/> ELECTRONIC (2 WIRE) R/I CONVERTER	
	SUPPLY	<input checked="" type="checkbox"/> 24V DC <input type="checkbox"/> .....	
	OUTPUT	<input checked="" type="checkbox"/> 4-20mA	
	ACCURACY	± 1% FS	
	ENCLOSURE CLASS	IP 55	
<b>TERMINAL BOX</b>	MOTOR TERMINAL BOX	REQUIRED	
	ACTUATOR TERMINAL BOX	REQUIRED	
	ENCL CLASS MTR T.B. / ACTUATOR T.B.	<input type="checkbox"/> IP65 <input checked="" type="checkbox"/> IP67.....	<input type="checkbox"/> IP65 <input checked="" type="checkbox"/> IP67.....
	@ EARTHING TERMINAL	PROVIDED	
	PLUG & SOCKET (9 PIN) (FOR COMMD, LS/TS FEED BACK, PoT)	<input checked="" type="checkbox"/> REQUIRED <input type="checkbox"/> NOT REQUIRED <input checked="" type="checkbox"/> 2 NOS. <input type="checkbox"/> .....	
<b>CABLE GLANDS</b>	@ POWER CABLE GLAND	SIZE : .....	
	@ SPACE HEATER CABLE GLAND	SIZE : .....	
	OTHER CONTROL CABLE GLANDS	QUANTITY & SIZE : TWO (SIZE TO BE FURNISHED LATER)	
<b>SPACE HEATER</b>	@ SPACE HEATER	REQUIRED	
	@ POWER SUPPLY		
	@ RATING		
<b>WEIGHT</b>	TOTAL WEIGHT (ACTUATOR + ACCESSORIES):	BIDDER TO SPECIFY _____ Kg.	

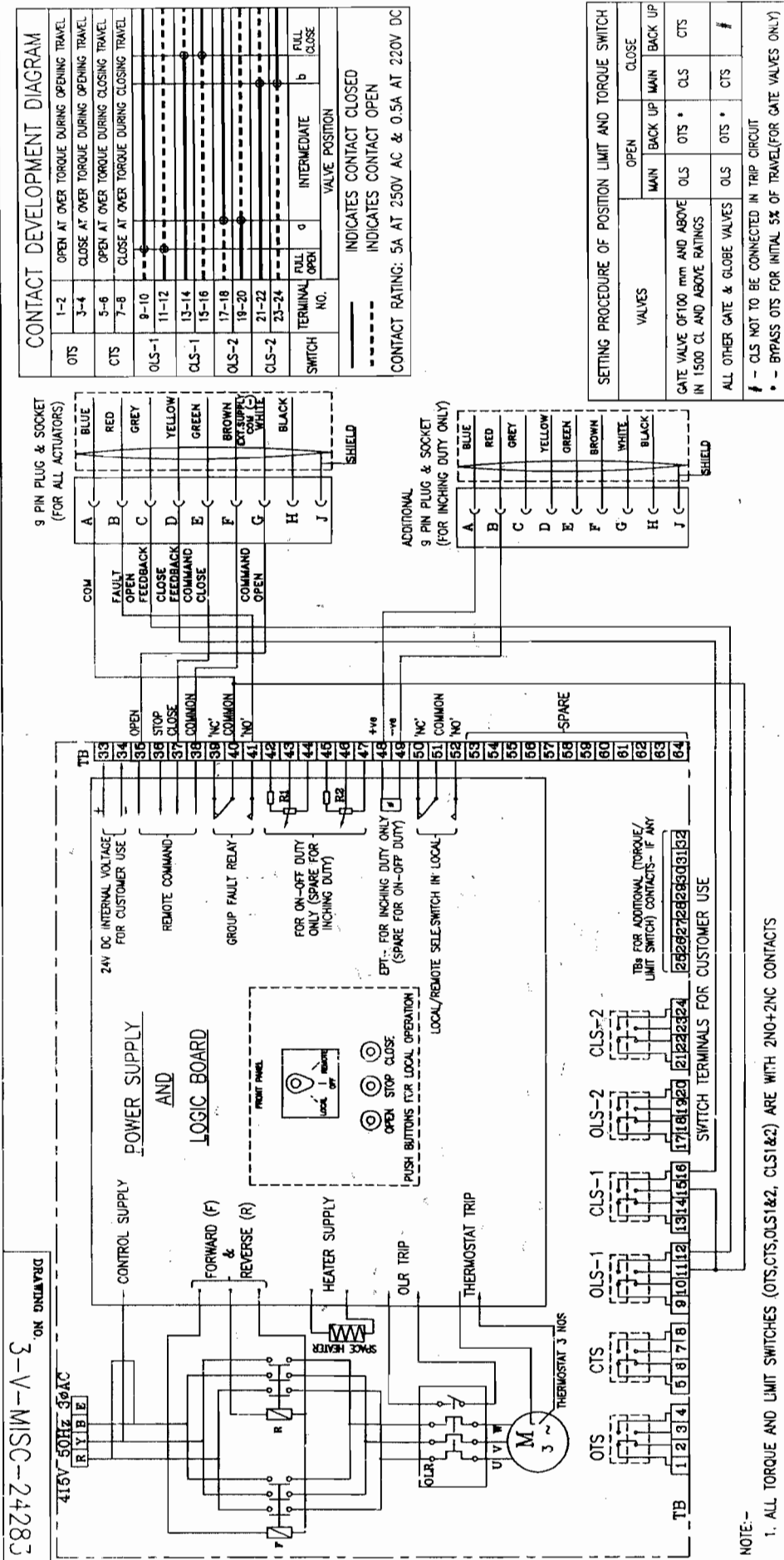
### **NOTES:**

- SCOPE: DESIGN, MANUFACTURE, INSPECTION, TESTING AND DELIVERY TO SITE OF ELECTRIC ACTUATOR FOR INCHING OR OPEN / CLOSE DUTY.
- CODES & STANDARDS: DESIGN AND MATERIALS USED SHALL COMPLY WITH THE RELEVANT LATEST NATIONAL AND INTERNATIONAL STANDARD. AS A MINIMUM, THE FOLLOWING STANDARDS SHALL BE COMPLIED WITH:  
IS-9334, IS-2147, IS-2148, IS-325, IS-2959, IS-4691 AND IS-4722
- TEMPERATURE RISE SHALL BE RESTRICTED TO 70 DEG. C FOR AMBIENT TEMPERATURE OF 50 DEG C.
- CABLE GLANDS OF DOUBLE COMPRESSION TYPE BRASS MATERIAL SHALL BE PROVIDED.
- THE MAKE OF THE MOTOR WILL BE ANY OF THE FOLLOWING: CGL / SIEMENS / ABB / NGEF / BHARAT BIJLI / KIRLOSKAR
- THE TORQUE SWITCHES SHALL BE PROVIDED WITH MECHANICAL LATCHING DEVICE TO PREVENT OPERATION WHEN UNSEATING FROM THE END 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 OPENS ON VALVE LEAVING END POSITION. THESE LIMIT SWITCHES ARE ADDITIONAL TO THE NUMBER OF LIMIT SWITCHES SPECIFIED ELSEWHERE.
- THE MOTOR SHALL OPERATE SATISFACTORILY UNDER THE +/- 10% SUPPLY VOLTAGE VARIATION AT RATED FREQUENCY, -5% TO +3% VARIATION IN FREQUENCY AT RATED SUPPLY VOLTAGE, SIMULTANEOUS VARIATION IN VOLTAGE & FREQUENCY THE SUM OF ABSOLUTE PERCENTAGE NOT EXCEEDING 10%.
- THE MOTOR SHALL BE SUITABLE FOR DIRECT ON LINE STARTING.

<b>NAME</b>  <b>SIGNATURE</b>  <b>DATE</b>	<b>PREPARED BY</b>	<b>CHECKED BY</b>	<b>APPROVED BY</b>	<b>COMPANY SEAL</b>  <b>NAME</b>  <b>SIGNATURE</b>  <b>DATE</b>
	MS	MK	SHB	
	13.04.2012	13.04.2012	13.04.2012	



NOTES\* = TO BE FILLED BY MPL (LEAD AGENCY), @ = TO BE FILLED BY ES






NOTE: -

1. ALL TORQUE AND LIMIT SWITCHES (OTS,OTS,OLS1&2, CLS1&2) ARE WITH 2NO+2NC CONTACTS '1NO+1NC' IS TERMINATED IN TBS 1-24, REMAINING CONTACTS ARE FOR INTERNAL USE.
- ANY SPARE CONTACTS WHICH ARE NOT USED INTERNALLY ARE TO BE TERMINATED IN TBS 25-32
2. CTS - TORQUE SWITCHES FOR CW ROTATION (CLOSE)
3. OTS - TORQUE SWITCHES FOR CCW ROTATION (OPEN)
4. OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION OPEN
5. CLS-1, CLS-2 - LIMITSWITCHES FOR POSITION CLOSE
6. EPT (ELECTRONIC POSITION TRANSMITTER)
7. R1-R2-POTENTIOMETER 2 x 100 OHMS (FOR ON-OFF DUTY)
8. FOR COMMANDS & EPT EITHER INTERNALLY GENERATED 24 VDC OR EXTERNAL SUPPLY OF 24VDC CAN BE USED
9. M - MOTOR 3ø 415V 50 Hz AC SUPPLY
10. TORQUE SWITCH BYPASS WITH LIMITSWITCH BOTH ON OPEN & CLOSE DIRECTION TO BE DONE INTERNALLY.

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		ELECTRICAL VALVE ACTUATORS (AC) WITH INTEGRAL STARTERS FOR NTPC PROJECTS (DRAWN FOR INTERMEDIATE POSITION OF VALVES)						
 385-121		BHARAT HEAVY ELECTRICALS LTD., UNIT: HIGH PRESSURE BOILER PLANT, TIRUCHIRAPPALLI-620014.		DRN N.P.ESWAR	NAME N.P.ESWAR	SIGN N.P.	DATE 17.03.05	NO. OF VAR.
DEPT	VL	SCALE	WEIGHT (KG).	APPD	KARUNACHALAM	K.A	17.03.05	
CODE		REFERENCE INFORMATION						
TITLE		 NTS		CARD CODE		DRAWING NO.		REV
FOR ACTUATOR WITH INTEGRAL STARTER WITH PLUG & SOCKET		FOR NTPC PROJECTS		U 01		3--V--MISC-24283		0

CAUTION:- The information on this document is the property of BHARAT HEAVY ELECTRICALS. It must not be used directly or indirectly in any way detrimental to the interest of the company.

	<b>TECHNICAL SPECIFICATION BUTTERFLY VALVES (WATER SYSTEM) 2X600MW ADILABAD SCCL TPP</b>	SPECIFICATION NO. <b>PE-TS-38T-100-M008</b>	
		VOLUME : IIB	
		SECTION: <b>D</b>	
		REV. NO.: <b>00</b>	DATE: <b>18-09-2012</b>
		SHEET <b>1</b>	OF <b>1</b>

### **DATA SHEET - C**

Drawings/documents distribution schedule to be followed by the successful bidder:

1.0 The successful bidder shall submit the following drawings/documents within two weeks after award of contract.

- 1.1 Relevant drawings/leaflets for the valves showing following information.
  - i) Complete cross sectional arrangement of the valve.
  - ii) Binding dimensions, dismantling clearances & weights.
  - iii) Bill of material incorporating all the materials of construction of various parts along with BS/ASTM/IS standards to which the materials conform to.
  - iv) Special features, if any, as called for in the specific requirement
  - v) Type of oil/Grease wherever required and its annual consumption.
- 1.2 Relevant catalogue/leaflet of the actuators
- 1.3 Torque calculations of actuator selected.
- 1.4 Actuator data sheet with Wiring Diagram.
- 1.5 Quality Plan duly signed & stamped with bidder's seal.
- 2.0 The following shall be submitted within the stipulated time period as per vendor's drawings/ documents schedule, but not later than one month before first dispatch.
  - a) Drawings of components & details as deemed necessary.
  - b) Instruction manual for erection, operation and maintenance.
  - c) Storage instructions.
- 3.0 Before dispatch of the equipment the vendor shall furnish the following.
  - a) Material Test certificates.
  - b) Shop test reports and certificates.
- 4.0 Distribution of drawings / documents for all projects:  
After award of the contract the successful bidder shall furnish drawings/ documents as per following distribution schedule.

Sl. No.	Type of Document	No of Hard copies	No. of Soft copies
1	Documents submitted for Approval	2 Nos.	1 Nos.
2	Final Distribution(Approved Documents)	12 Nos.	1 Nos.
3	O&M Manuals	12 Nos.	2 Nos.

**2X600MW ADILABAD SCCL TPP**

**VOLUME – III**

**TECHNICAL SCHEDULES**


**FOR**

**BUTTERFLY VALVES (WATER SYSTEM)**

**SPECIFICATION NO. PE-TS-381-100-M008**

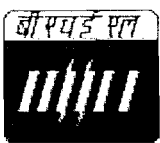


**BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR  
PROJECT ENGINEERING MANAGEMENT  
NOIDA, INDIA**

	<b>BUTTERFLY VALVES (WATER SYSTEM) 2X600MW ADILABAD SCCL TPP</b>		SPECIFICATION NO. PE-TS-381-100-M008	
			VOLUME : III	
			SECTION:	
			REV. NO.: 00	DATE: 18.09.2012
	SHEET 1 OF 1			

## CONTENTS

SL.NO	TITLE
1	COMPLIANCE SHEET
2	SCHEDULE OF DEVIATIONS
3	SCHEDULE OF DECLARATIONS
4	SCHEDULE OF PRICES

	<b>COMPLIANCE SHEET BUTTERFLY VALVES (WATER SYSTEM) 2X600MW ADILABAD SCCL TPP</b>	SPECIFICATION NO.:PE-TS-381100-M008	
		VOLUME : III	
		SECTION:	
		REV. NO. 00	DATE : 18.09.2012
		SHEET 1 OF 2	


**The bidder shall sign and return a copy of this compliance sheet along with his offer, indicating his compliance to the points specified herein:**

**A) Technical Details:** Bidder to tick whichever is applicable.

1.	Technical requirements as per Data sheet-A & Standard Technical Specification of Vol IIB Section-D	<b>Accepted</b>	<b>Not Accepted</b>
2.	Technical requirements as per Data sheet-A2 ( Actuator data sheet with wiring diagram) of Vol IIB Section-D	<b>Accepted</b>	<b>Not Accepted</b>
3.	Quality Plan	<b>Accepted</b>	<b>Not Accepted</b>
4.	Specific Technical requirements of Vol IIB Section-C	<b>Accepted</b>	<b>Not Accepted</b>
5.	Documentation requirement as per Data sheet-C of Vol IIB Section-D	<b>Accepted</b>	<b>Not Accepted</b>

- B) Deviations to the technical specification are not acceptable. However, if there are any deviations due to unavoidable reasons then the same to be clearly specified in the schedule of deviation. In case of no deviations, schedule of deviations to be filled as NIL by bidder.
- C) The offered materials should be either equivalent or superior to those specified. Also for components where material is not specified, the material used shall be suitable for intended duty.
- D) QP/ test procedures shall be submitted in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL/Customer approval in the event of order & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. All Inspection/ testing shall be as per approved QP. The charges for 3rd party inspection (Lloyds, TUV or equivalent) for foreign bidders shall be included in the base price of the equipment by the bidder. This 3rd party inspection agency shall be approved by BHEL and will be decided in contract stage.
- E) Valve POD test charges/ Gear box POD test charges or any other test charges, required as per this technical specification, shall not be included in the unit quoted prices of main valves as these tests are mandatory requirements of valve governing standard AWWA C504 and this enquiry specification . If the bidder has not carried these tests earlier, then the bidder is required to do them without any charges to BHEL in case of order. No extra charge on this account is admissible to bidders.

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

	<b>COMPLIANCE SHEET BUTTERFLY VALVES (WATER SYSTEM) 2X600MW ADILABAD SCCL TPP</b>		SPECIFICATION NO.:PE-TS-381100-M008	
			VOLUME : III	
			SECTION:	
			REV. NO. 00	DATE : 18.09.2012
			SHEET 2 OF 2	

- F) All drawings/data – sheets etc. to be submitted during contract shall be subject to BHEL/Customer review/ approval.
- G) GA drawings, as submitted with offer at tender stage are for reference purpose only and shall be subject to approval during contract stage.
- H) The commissioning spares (if any) are supplied on ‘As Required Basis’ & prices for same shall be quoted in the price bid format. If the bidder has not quoted for commissioning spares at tender stage and if the same are actually required during commissioning, then the same shall be supplied by bidder without any cost to BHEL.
- I) All drawings/documents in soft as well as hard copy shall be submitted within 2 weeks from placement of Purchase orders in the event of order. A technical representative of bidder shall come for meeting with BHEL along with revised documents within one week of receipt of BHEL comments to resolve all issues and incorporate all comments in the soft copy for further submission to customer if required. Further, on receipt of customer comments on the documents a technical representative from bidder shall come for meeting to resolve all issues and incorporate all comments in the soft copy at BHEL and resubmit the drawings /documents for CAT I approval and shall visit customer/customer’s consultant if required for across the table approval of documents.
- J) Any special tools & tackles, if required, shall be in bidder’s scope.
- K) Prices for recommended spares (if any) for three year operation shall be furnished separately and not to be included in the base price.
- L) The offered model design should be of bidder’s proven model and they should have designed, manufactured, supplied and tested the equipment of similar type and rating in at least Two (2) projects and be in satisfactory operation for last two (2) years.

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



TITLE

**\* SCHEDULE OF DEVIATIONS**

( ) From Technical Specifications (Volume –II B)

SPECIFICATION NO  
PE-TS-381-100-M008

VOL III

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We the undersigned hereby certify that the above mentioned are the only deviations.

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

	<b>TITLE</b>  <b>*SCHEDULE OF DECLARATIONS</b>	SPECIFICATION NO PE-TS-381-100-M008
		VOL III
		SHEET..... OF.....

\* Bidder shall include this schedule both in technical and Price offers

## DECLARATION

I .....certify that all the technical data and information pertaining to this specification are correct and are true representation of the equipment/system covered by our format proposal number Dated ..... and there is no deviation to the specification other than those listed in "Schedule of deviations" of this Vol III.

I hereby certify that I am duly authorized representative of the Bidder's company whose name appears above my signature.

Bidder's Company Name .....

Authorised representative's  
Signature .....

Name .....

Bidder's Name

The bidder hereby agrees to fully comply with the requirements and intent of this specification for the price indicated

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