

2X660MW ENNORE SEZ STPP.

TECHNICAL SPECIFICATION FOR STEEL GATE, GLOBE AND NON RETURN VALVES

SPECIFICATION NO. PE-TS-412-100-M001



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

	TECHNICAL SPECIFICATION STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: -
	REV. NO.: 00		DATE: 28.03.2017
	SHEET 1 OF 1		

CONTENTS

S No.	SECTION	TITLE	NO. OF SHEETS
1.	SECTION-I	SPECIFIC TECHNICAL REQUIREMENTS	6
2.	SECTION-II	i) DATA SHEET-A ii) QUALITY PLAN iii) ACTUATOR DATA SHEET iv). COMPLIANCE SHEET	3 10 5 1

	TECHNICAL SPECIFICATION STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: -
	REV. NO.: 00		DATE:28.03.2017
	SHEET 1 OF 1		

SECTION-I

SPECIFIC TECHNICAL REQUIREMENTS

	SPECIFIC TECHNICAL REQUIREMENTS STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: I
	REV. NO.: 00		DATE:28.03.2017
	Sheet 1 of 6		

1. GENERAL

- 1.1 The valves shall meet the technical requirements and conform to the requirements of Section-I and Data sheet-A of Section-II. However, in the event of contradictions between Section-I & Section-II/Data Sheet-A, Data Sheet-A will prevail.
- 1.2 The technical requirements for valves shall, in general, be as per the attached Data Sheet A of Section-II.

2. SCOPE OF SUPPLY

- 2.1 The valves complete with all accessories shall be supplied as per Data sheet-A of Section-I. For detail refer the same. Each valve (quantity and other details specified in Data Sheet-A) 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.

3. CODES AND STANDARDS

- 3.1 The design, material, construction, manufacture, inspection and testing of valves shall conform to the latest applicable codes and standards.

The design and testing of valves covered under this specification shall be governed by the following standards. However, the valves conform to other International Standards may be acceptable provided they are equivalent or superior to those listed below:

S.NO.	DESCRIPTION	DESIGN STANDARD	TESTING STANDARD
1	For Gate, Globe and Non-Return valves of sizes 50 mm and smaller	BS EN ISO 15761/ANSI B16.34	ISO 5208/ ASME B16.34
2	Gate valves of sizes 65 mm to 1050 mm.	BS EN ISO 10434/ANSI B16.34/ ANSI B16.10/API 600	ISO 5208/ API 598/ASME B16.34
3	Globe valves of sizes 65 mm to 400 mm.	BS:1873 /ANSI B16.34/ ANSI B16.10	BSEN ISO 12266/ ASME B16.34
4	Non-return valves of sizes 65 mm to 1000 mm.	BS:1868 /API-594/ANSI B16.34/ ANSI B16.10*	BSEN ISO 12266/ ASME B16.34

NOTE: *- Face to face dimension for NRV above 600NB size shall be referred from ANSI B16.47.

	SPECIFIC TECHNICAL REQUIREMENTS STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: I
	REV. NO.: 00		DATE: 28.03.2017
	Sheet 2 of 6		

- 3.2 In case of any conflict between the above codes/ standards and this specification, the latter shall prevail and in case of any further conflict in the matter, the interpretation of the specification by the Engineer shall be final and binding.

4. DESIGN REQUIREMENTS

- 4.1 The valves shall be used for services like steam, condensate water, feed water, D.M. Water, oil and gas unless otherwise specified in Data Sheet-A1. 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.
- 4.2 Valves coming under the purview of IBR shall satisfy all the conditions of IBR.
- 4.3 Unless otherwise specified, all valves of sizes up to and including 50 mm NB shall have a forged steel body & sizes 65 mm NB & above shall have cast steel body.

5. Materials

- 5.1 The materials of construction of main parts of the Gate, Globe, and non-return valves shall be as specified in Data Sheet-A.
- 5.2 The materials of construction of the remaining parts shall be as per the relevant standard governing the valves and to suit service conditions. These materials shall be subject to purchaser's approval.

6. CONSTRUCTIONAL FEATURES

- 6.1 End Connections:
- 6.1.1 Socket details of valves with socket welding ends shall be as per ANSI B16.11 and shall suit pipe size indicated in Data Sheet-A.
- 6.1.2 The edge profile for valves with butt welding ends shall be as per ANSI B16.25 and shall suit pipe size indicated in Data Sheet-A.
- 6.1.3 All valves with Flanged ends shall have raised face flanges and drilling details as per ANSI B16.5. For Rubber lined valves, face of flange shall be flat face.
- 6.2 Gate and Globe valves shall be of outside screw and yoke type with rising spindle and shall be capable of being closed against the design pressure.
- 6.3 All Gate, Globe and check valves shall have an arrow indicating the direction of flow cast or embossed on the valve body. The direction of flow for globe valves shall be from under to over the disc.
- 6.4 Gate and globe valves shall have back seating arrangement for replacement of packing while working under full working pressure.
- 6.5 Gate and globe valves of size 50 mm/NB and above shall be provided with position indicator unless otherwise specified.
- 6.6 For Globe valves of size 50 mm/NB and above, the disc shall be free to revolve on the spindle.
- 6.7 Globe valves for regulating duties shall be provided with spherical type disc or parabolic type disc and shall be capable of regulating the flow from zero flow to fully open. All regulating valves shall be designed to prevent erosion of valve discs and seats when the valves are operated partially opened.
- 6.8 Differential hardness shall be provided between seat and disc facings. Stellite thickness shall be minimum 3 mm unless otherwise specified.
- 6.9 All gate valves of 600 lbs. and higher-pressure rating shall have flexible wedge or parallel slide type of disc.
- 6.10 All valves of pressure rating up to 600 lbs. shall have bolted bonnet construction and 900 lbs. and above shall have bonnet construction of the pressure seal type.

	SPECIFIC TECHNICAL REQUIREMENTS STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: I
	REV. NO.: 00		DATE: 28.03.2017
	Sheet 3 of 6		

- 6.11 Eye bolts shall be provided to facilitate handling heavy valves or part of valves, where the weight is greater than 500 Kg.
- 6.12 Gate and globe valves shall be required with integral bypass valve, if specified in Data Sheet-A. Size of the integral bypass shall conform to MSS-SP-45 as a minimum standard.
- 6.13 All gate and globe valves shall be closed by rotating the hand wheel in the clockwise direction when looking at the face of the hand wheel. Where valves are not of the rising pattern, the hand wheel shall also be rotated in clockwise direction to close the valve when viewed from the outer end of the spindle. In case where the hand wheel is not directly attached to the valve spindle, suitable gearing shall be introduced to reconcile the above condition. The face of each hand wheel shall be clearly marked "Open" and "Shut" with arrows indicating the direction of rotation to which they refer. Each valve hand wheel shall be fitted with a circular nameplate of an approved material indicating the valve Tag No., duty or service condition intended and the function of the valve. For valves of smaller size, a permanent steel tag may be fixed on the valve body indicating the purchaser's valve Tag Number and service. The above are in addition to rating plates and labels being provided by the manufacturer.
- 6.14 All valves upto 50 mm shall have reduced sized ports and 65 mm and above shall have full sized Ports.
- 6.15 All valves shall be fitted with indicators so that it may be readily seen whether the valves are open or shut.
- 6.16 All Gate, globe and check valves shall be designed for reconditioning of seating surfaces and replacement of Stem & Disc without removing the valve body from pipe line.
- 6.17 Stop check valves shall have full floating and accurately guided discs.
- 6.18 The body seat for Swing check valves shall be inclined to such an angle to minimize chatter.
- 6.19 Check valves shall be provided with outside lever & counter weight if specified in Data Sheet A, for quick closing in case of low velocities so that a minimum pressure is required to open disc and that resistance to flow past the disc is minimized.

7. SPECIAL FEATURES OF VALVES

- 7.1 Extension spindle arrangement:
 - 7.1.1 Extension spindle/ chain operation to the valves shall be provided wherever required as specified in Data Sheet A.
 - 7.1.2 Where required as specified in Data Sheet A, valve yoke/spindles shall be lengthened so that the hand wheel is at a height of approximately one meter above the level of the floor or platform from which the valve is to be operated.
- 7.2 Locking arrangement
For valves that are to be kept locked in full "Open" or "Close" position, if specified in Data Sheet A, the locking arrangement shall be provided with a non-detachable locking arrangement.
- 7.3 Valves for Vacuum Service:
 - 7.3.1 Valves of size up to 50 NB and operating under vacuum shall be offered with long neck gland & special and deep gland packing in order to avoid ingress of atmospheric air entry to the system through gland of the valves. In such case the depth of the stuffing box shall be at least 25% more than the normal valves and suitable for vacuum service.

	SPECIFIC TECHNICAL REQUIREMENTS STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: I
	REV. NO.: 00		DATE:28.03.2017
	Sheet 4 of 6		

7.3.2 All valves of size 65NB and above and operating under vacuum conditions shall be provided with water sealed glands. Valves with sealed gland arrangement shall be required with 3/8" BSP connections duly plugged on both sides of the bonnet. Sealing water shall be supplied at 4 ata and 50°C, unless otherwise stated in Data sheet-A.

7.4 Valves with limit switch:
Valves with limit switches (as mentioned in Data sheet- A) shall be required only for indication or for interlocking with some equipment. Valves with such provision shall be offered with required number of limit switches for open/close position of the valve. The limit switches for this application shall have one normally open and one normally closed contact. The limit switches shall be cutler hammer/Siemens/Honeywell make and limit switch housing shall be weather proof. The limit switches shall also be wired to a terminal box.

7.5 Motorised Valves

7.5.1 The motorised valves shall be offered with the electric actuators of reputed make observing strict quality control and approved by reputed customers. 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.

7.5.2 Electric actuators shall be mounted directly on the valves.

7.5.3 In case integral bypass is provided to the main valve which is motorised, the integral bypass valve shall also be motorised. Actuator shall be provided with hand wheel also for manual operation.

7.5.4 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.

7.6 Steel Non return valves(NRV) with size greater than & equal to 600NB shall be provided with Hydraulic Dashpot arrangement. Dashpot shall be of reputed make observing strict quality control and approved by reputed customers.

8. MANUFACTURE OF VALVES

8.1 Valve castings shall be procured from foundries observing strict quality control and approved by reputed customers.

8.2 Particular care shall be taken to ensure that all foundry sand and loose material is properly removed from castings by fettling before the valve's manufacture is started.

9. LUBRICATION:

9.1 Provision shall be made for suitable lubrication wherever necessary to ensure a smooth easy operation and freedom from undue wear.

9.2 Where oil filled gear boxes are used they shall be provided with filling and drain plugs, oil level gauges or dip sticks. Housing for ball and roller bearings shall be packed with grease at the time of assembly.

9.3 Choice of oil and grease for all motor drives shall be based on ambient temperature of 60°C.

9.4 Type of oil/grease to be used and its annual consumption (based on 100 operations per year) shall be indicated by the bidder.

	SPECIFIC TECHNICAL REQUIREMENTS STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: I
	REV. NO.: 00		DATE: 28.03.2017
	Sheet 5 of 6		

10. QUALITY ASSURANCE, TESTING AND INSPECTION

- 10.1 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.
- 10.2 All valves shall be tested and inspected as per the approved quality plan. The minimum requirements are as indicated in attached quality plan. However, in case of order on the vendor, the QP shall be finalized by vendor with customer without any financial implications to meet customer project technical requirements.
- 10.3 Hydrostatic/Air Tests:
- 10.3.1 Manually operated valves: All valves shall be tested hydraulically for strength, tightness of seats and tightness, of back seating at the pressures as mentioned in BSEN ISO 12266/ISO 5208/ API 598/ASME B16.34
- 10.3.2 Motor operated Valves:
- All the motor operated valves shall be tested hydraulically for seat/backseat with the motor actuator at a pressure as specified in the actuator data sheet of Data sheet-B.
 - Motorized valves shall also be tested hydraulically for body, seat and backseat at the pressures as mentioned in BSEN ISO 12266/ISO 5208/ API 598/ASME B16.34 with hand wheel on the actuator.
 - All electric actuators shall be tested for seat tightness test at 1.1 times of design/ operating pressure.
- 10.4 Gate and Globe valves seats shall also be tested on air at a pressure of 7kg/cm².
- 10.5 Dimensional and functional checks shall be carried out.
- 10.6 Valves coming under the purview of IBR shall be inspected by Independent Inspecting Authority approved by Indian Boiler Board and the test certificate in IBR form III-C duly countersigned by IBR approved authority shall be submitted.

11. PAINTING REQUIREMENT (FOR DUPLEX SS):

- 11.1 No painting required for Duplex SS valves.

12. PACKING INSTRUCTIONS:

- 12.1 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.
- 12.2 The valve shall be dispatched in total assembled form.
- 12.3 Discs of all valves shall be properly secured while dispatching so that there is no risk of damage to the disc & seat.
- 12.4 Body ends shall be suitably sealed to protect them against damage during transit and storage.
- 12.5 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 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

	SPECIFIC TECHNICAL REQUIREMENTS STEEL GATE, GLOBE AND NON RETURN VALVES		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION: I
	REV. NO.: 00		DATE: 28.03.2017
	Sheet 6 of 6		

flange. A wooden blank should then be bolted to the flange using a minimum of 4 bolts.

- 12.6 Valve Tag Nos. shall be incorporated in all the dispatch documents.
- 12.7 Proper care shall be taken to avoid damage to the painted surface during transit.
- 12.8 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.

13. SPARES:

- a) **Mandatory Spares:** NIL
- b) Order for the spares may be placed simultaneously or otherwise at the option of purchaser.

14. DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER:

Bidder shall submit the following documents duly filled, signed and stamped along with the bid:

- a) Compliance sheet
- b) Documents as per the list indicated in the NIT.

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.

15. 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.

	SPECIFICATION NO. PE-TS-412-100-M001	
	SECTION: -	
	REV. NO.: 00	DATE:28.03.2017
	SHEET 1 OF 1	

TECHNICAL SPECIFICATION **STEEL GATE, GLOBE AND NON** **RETURN VALVES**

SECTION-II

- DATA SHEET – A
- QUALITY PLAN
- ACTUATOR DATA SHEET
- COMPLIANCE SHEET

DATA SHEET-A PACKAGE: STEEL(GATE/GLOBE/NRV) 2X660MW ENNORE SEZ STPP.																		SPEC. NO. PE-TS-412-100-M001			
																		SECTION:II			
																		REV.00, DATE 31.03.2017			
																		SHEET 1 OF 3			
1	2	3	4	5	6		7	8	9	10	11	12	13	14		15	16			17	18
SL NO.	TAG NOS.	TYPE OF VALVE	SIZE mm (NB)	OPERATION	DESIGN		SERVICE	RATING, DESIGN & TESTING CODE	BODY, BONNET & DISC MATERIAL	HINGE PIN MATERIAL	BODY & DISC SEAT AND OTHER TRIM MATERIAL	END CONN	SPECIAL FEATURES	MATCHING PIPE OD X THKN		VALVES QUANTITY	+++COMMISSIONING SPARES			MAND. SPARES	REMARKS
					PRESSURE KG/CM2(G)	TEMP (DEG C)								MM	MM		BONNET/ COVER GASKET (NOs)	GLAND PACKING (SETS)	ACTUATOR O-RING AND SEAL (SETS)		
1	ACW 24.26 (EACH 2 Nos.) REST DRAINVENT VALVES	GV	150	MAN	8	60	ACW SYSTEM	#150 OF BSEN ISO 10434	DUPLEX SS (UNS 31603/ UNS 32205)	-	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	168.3	3.40	50	50	-	NA		
2	CW- 23, 27, 31, 40, 42, 48, 50, 54, 56, 71 TO 80 (EACH 2 Nos.), CW 33, 35, 37, 62 TO 66 (EACH 1 No.), ACW- 57 (EACH 1 No.), ACW- SWI-13, 17, 19, 21, 23, SWI- 81 TO 75 (EACH 1 No.) REST DRAINVENT VALVES	GV	200	MAN	5.5/ 6/ 10	60	CW & SEA WATER INTAKE SYSTEM	#150 OF BSEN ISO 10434	DUPLEX SS (UNS 31603/ UNS 32205)	-	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	219.1	6.40	95	95	-	NA		
3	PW- 60 (EACH 1 No.)	GV	200	MO	10	60	PW SYSTEM	#150 OF BSEN ISO 10434	DUPLEX SS (UNS 31603/ UNS 32205)	-	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	OPEN/CLOSE TIME SHALL BE 40 TO 60 SEC.	219.1	6.40	1	1	1	NA		
4	SWI-80 (EACH 1 No.), ACW 31 TO 35 (EACH 2 Nos.) REST DRAINVENT VALVES	GLV	25	MAN	7.5	60	SEA WATER INTAKE SYSTEM	#600 OF BSEN ISO 15761	DUPLEX SS (UNS 31603/ UNS 32205)	-	DUPLEX SS (UNS 31603/ UNS 32205)	SOCKET WELDED AS PER ASME B16.11	-	33.4	3.38	26	26	-	NA		
5	PW 96-100 (EACH 1 No.), ACW 36 TO 45 (EACH 2 Nos.) REST DRAINVENT VALVES	GLV	50	MAN	8	60	ACW/ PLANT WATER SYSTEM	#600 OF BSEN ISO 15761	DUPLEX SS (UNS 31603/ UNS 32205)	-	DUPLEX SS (UNS 31603/ UNS 32205)	SOCKET WELDED AS PER ASME B16.11	-	60.8	4.50	35	35	-	NA		
6	ACW 25, 27 (EACH 2 Nos.)	GLV	150	MAN	8	60	ACW SYSTEM	#150 OF BS 1673	DUPLEX SS (UNS 31603/ UNS 32205)	-	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	168.3	3.40	4	4	-	NA		
7	CW 51, 52 (EACH 2 Nos.)	NRV	200	AUTO	10	60	CW SYSTEM	#150 OF BS 1668	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	219.1	6.40	4	4	-	NA		
8	PW 06, 07, 08 (EACH 1 No.)	NRV	400	AUTO	10	60	PLANT WATER INTAKE SYSTEM	#150 OF BS 1668	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	406.4	8.00	3	3	-	NA		
9	ACW 01, 03 (EACH 2 No.)	NRV	900	AUTO	8	60	ACW SYSTEM	#150 OF API 584	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	813	10.00	4	4	-	NA	NRV4 TO BE PROVIDED WITH HYDRAULIC DASHPOT ARRANGEMENT	
10	CW 10, 11, 12 (EACH 1 No.)	NRV	900	AUTO	5	60	CW SYSTEM	#150 OF API 584	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	914	10.00	3	3	-	NA	NRV4 TO BE PROVIDED WITH HYDRAULIC DASHPOT ARRANGEMENT	
11	SWI 01, 02, 03, 04 (EACH 1 No.)	NRV	1000	AUTO	7.5	60	ACW SYSTEM	#150 OF API 584	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	DUPLEX SS (UNS 31603/ UNS 32205)	FLANGED AS PER ASME B16.5 R/F	-	1016	10.00	4	4	-	NA	NRV4 TO BE PROVIDED WITH HYDRAULIC DASHPOT ARRANGEMENT	
TOTAL															229	229	211	1			

NOTES
1. LEGENDS: MAN=MANUAL, MO=MOTORISED, GV=GATE VALVE, GLV=GLOBE VALVE, NRV=NON RETURN VALVE
2. +++ COMMISSIONING SPARES: a) ONE SET OF GLAND PACKING & BONNET GASKET FOR EACH GATE (GLOBE VALVE)
b) ONE NO. OF COVER GASKET FOR SWING CHECK NON RETURN VALVE.
3. MAIN VALVE PRICES SHALL BE EXCLUSIVE OF COST OF COMMISSIONING SPARES PRICES.
4. BIDDER IS REQUIRED TO QUOTE UNIT PRICE OF EACH AND EVERY ITEMS UNDER COMMISSIONING SPARES SEPARATELY AND INDIVIDUALLY (I.E. PRICES OF ALL COMMISSIONING SPARES SHALL NOT BE CLUBBED/INCLUDED IN THE UNIT PRICES OF MAIN VALVES).

	DATA SHEET-A STEEL GATE/ GLOBE /NRV 2X660MW ENNORE SEZ STPP.		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION : II
	REV. NO.: 00		DATE: 31.03.2017
	Sheet 2 of 3		

MATERIAL OF CONSTRUCTION
DUPLEX SS(UNS31803/UNS32205) GATE/GLOBE VALVES

SERVICE: SEA WATER

SL.NO	PART NAME	MATERIAL REQUIRED
1	BODY	DUPLEX SS(UNS31803/UNS32205)
2	BONNET/YOKE	DUPLEX SS(UNS31803/UNS32205)
3	WEDGE	DUPLEX SS(UNS31803/UNS32205)
4	STEM, BACK SEAT	DUPLEX SS(UNS31803/UNS32205)
5	BODY SEAT RING, WEDGE/DISC SEAT RING	DUPLEX SS(UNS31803/UNS32205) (BODY SEAT RING TO STELLITED).
6	YOKE SLEEVE	SS-316L
7	GLAND PACKING	GRAFOIL
8	GLAND	SS-316L
9	GLAND FLANGE	SS-316L
10	BOLTS	STEEL(ASTM A193 Gr.B7)
11	NUTS	STEEL(ASTM A 194 Gr.2H)
12	HANDWHEEL	MALLEABLE IRON OR EQUIVALENT
13	STEM PROTECTION COVER	PVC (TRANSPARENT)
14	GASKET	SWG (GRAFOIL)
15	Name plate (For valve tag nos.)	SS316 (2 MM THICK)

NOTE: 1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. NO. 1 TO 6 OF DATA SHEET-A.
2.MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITBALE FOR SEA WATER APPLICATION.

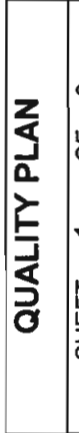
	DATA SHEET-A STEEL GATE/ GLOBE /NRV 2X660MW ENNORE SEZ STPP.		SPECIFICATION NO. PE-TS-412-100-M001
			SECTION : II
	REV. NO.: 00		DATE: 31.03.2017
	Sheet 2 of 3		

MATERIAL DATA SHEET
DUPLEX SS(UNS31803/UNS32205) NON RETURN VALVE

SERVICE: SEA WATER

<u>SL.NO</u>	<u>PART NAME</u>	<u>MATERIAL (REQUIRED)</u>
1	Body	DUPLEX SS(UNS31803/UNS32205)
2	Cover	DUPLEX SS(UNS31803/UNS32205)
3	Disc (Fully guided)	DUPLEX SS(UNS31803/UNS32205)
4	Disc nut/ washer	DUPLEX SS(UNS31803/UNS32205)
5	Body seat ring	DUPLEX SS(UNS31803/UNS32205)+ STELLITED
6	Gasket	SWG SS316 (GRAFOIL)
7	Bolts	ASTM A193 Gr. B7
8	Nuts	ASTM A 194 Gr.2H
9	Name plate (For valve tag nos.)	SS316 (2 mm Thick)

NOTE: 1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. NO. 7 TO 11 OF DATA SHEET-A.
2. MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER APPLICATION.



CUSTOMER:TANGEDCO

VENDOR:

PROJECT: 2X660MW EN
QP NO. PE-QP-412-100-M004A

Z STPP.
DT.31.03.17

SPEC. NO.: PE

SPEC. NO:PE-TS-412-100-M001

SHEET 1 OF 3		SYSTEM LP PIPING VALVES (COOLING WATER SYSTEMS)		ITEM: FORGED STEEL/DUPLEX SS GATE, GLOBE VALVE SIZE 25 TO 50 NB CL. 800, MANUAL/ MOTORISED		SECTION		VOLUME		
S.N O.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CAT E- GO RY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
									P	W

[illegible]

	BHEL	PARTICULARS	BIDDER/VENDOR
		NAME	
		SIGNATURE	
		DATE	
	CONVINCE KUMAR MARY 		
	31.3.17		
			BIDDER'S/ VENDOR'S COMPANY SEAL

		QUALITY PLAN		CUSTOMER: TANGEDCO		PROJECT: 2X660MW ENNORE SEZ STPP.		SPEC. NO.: PE-TS-412-100-M001				
				VENDOR:		QP NO. PE-QP-412-100-M004A		REV. 0, DT. 31.03.17		SPEC. TITLE:		
				SYSTEM LP PIPING VALVES (COOLING WATER SYSTEMS)		ITEM: FORGED STEEL/DUPLEX SS GATE, GLOBE VALVE SIZE 25 TO 50 NB CL, 800, MANUAL/ MOTORISED		SECTION		VOLUME		
				CHARACTERISTICS CHECKED		REFERENCE DOCUMENT		ACCEPTANCE NORMS		FORMAT OF RECORD		
S.N O.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CAT E-GO RY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	ASME B16.34 & APPD DRG.	ANSI B16.34 & TECH SPEC. APP DRG./ANSI B16.34	TEST CERT.	2	2	1	REMARKS

2.0	SS/ STELLITE DEPOSIT ON DISC & BODY SEAT	1. SURFACE DEFECTS	CR	PT	100%	ASME B16.34 & APPD DRG.	ANSI B16.34 & TECH SPEC. APP DRG./ANSI B16.34	TEST CERT.	2	2	1	
3.0	IN-PROCESS INSPECTION											
3.1	MACHINING OF ALL COMPONENTS	1. DIMENSIONS, WORKMANSHIP AND FINISH 2. SURFACE & SUB SURFACE DEFECTS	MA CR	MEAS., VISUAL 1. PT (machined hard surfaces)	100% 100%	MFG. DRG. ASME B16.34 AND TECH SPEC.	MFG. DRG. ASME B16.34 AND TECH SPEC.	LOG BOOK -DO-	2 2	- 2	- -	
3.2	DISC & SEAT RING	1. LAPPING	CR	BLUE MATCHING	100%	UNIFORM METAL TO METAL CONTACT		INSPN. REPORT	2	2	-	
4.0	TESTING											
4.1	BODY, SEAT, BACK SEAT	1. LEAK TIGHTNESS OF BODY 2. LEAK TIGHTNESS OF BACK SEAT AND SEAT 3. LEAK TIGHTNESS OF SEAT	CR CR CR	HYDRAULIC TEST HYDRAULIC TEST PNEUMATIC TEST	100% * 100% * 100% *	APPD. DRG./ TECH. SPEC. APPD. DRG./ TECH. SPEC. -DO	NO LEAKAGE LEAKAGE PERMISSIBLE AS PER API 596 -DO-	INSPN REPORT -DO- -DO-	2 2 2	2,1 2,1 2,1	- - -	
4.2	SEAT & BACK SEAT FOR MOTORISED PNEU. VALVES WITH ACTUATOR	1. LEAK TIGHTNESS OF SEAT	CR	HYDRAULIC SEAT	100% *	APPD. DRG./TECH. SPEC.	-DO-	INSPN. REPORT	2	2,1	-	
4.3	OPERATIONAL TESTING											
	1. MANUALLY OPERATED VALVES	1. SMOOTH & FULL OPENING AND CLOSING	CR	MANUAL	100% *	TECH. SPEC.	SMOOTH OPERATION OF VALVES & CLEAR BORE	INSPN REPORT	2	2,1	-	

BHEL		BIDDER/VENDOR	
		PARTICULARS NAME SIGNATURE DATE	
31.3.17		BIDDER'S/ VENDOR'S COMPANY SEAL	

		QUALITY PLAN		CUSTOMER: TANGEDCO		PROJECT: 2X660MW ENNORE SEZ STPP.		SPEC. NO: PE-TS-412-100-M001	
				VENDOR:		Q.P. NO. PE-QP-412-100-M004A		REV. 0, DT. 31.03.17	
SHEET 3 OF 3		CHARACTERISTICS CHECKED		SYSTEM LP PIPING VALVES (COOLING WATER SYSTEMS)		ITEM: FORGED STEEL/DUPLEX SS GATE, GLOBE VALVE SIZE 25 TO 50 NB CL. 800, MANUAL/ MOTORISED		SECTION VOLUME	
S.N. O.	COMPONENT/ OPERATION	CAT E-GO RY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
								P W V	

2. MOTOR OPERATED VALVES	1. ASCENDING & DESCENDING LIFT CHARACTERISTIC	CR	ELECTRICAL	100%*	APPD. DRG./TECH. SPEC./IS9334	APPD. DRG./TECH. SPEC./IS9334	INSPN. REPORT	2	2.1	-	
	2. LIMIT/TORQUE SWITCH SETTING FOR OPENING AND CLOSING TIME	CR	ELECTRICAL	100%*	APPD. DRG./TECH. SPEC./IS9334	APPD. DRG./TECH. SPEC./IS9334	INSPN. REPORT	2	2.1	-	
5.0 COMPLETE VALVES	1. OVERALL DIMENSION	MA	MEAS	SAMPLE	APPD. DRG.	APP. DRG.	-DO-	2	2.1	-	
6.0 END CONNECTION DETAILS	1. DIMENSIONS	MA	MEAS.	100%	APPD. DRG. / RELV. STD	APPD. DRG. / RELV. STD	-DO-	2	2.1	-	
7.0 FINAL INSPECTION	1. CLEANLINESS & COMPLETENESS, NAME WITH VALVE TAG NOS.	MA	VISUAL	100%	APPD. DRG./TECH. SPEC.	APPD. DRG./TECH. SPEC.	INSPN. REPORT	2	2	-	
8.0 PACKING	AS PER BHEL TECH. SPEC	MA	VISUAL	100%	AS PER TECH. SPEC	AS PER BHEL TECH. SPEC	SOFT COPY OF PHOTOGRAPH	2	2	-	PHOTOGRAPH OF WOODEN CASES HAVING DULY PACKED VALVES TO BE FURNISHED TO BHEL-PEM FOR VERIFICATION TO OBTAIN MDCC.

ABBREVIATIONS

CR = CRITICAL CHARACTERISTIC P = PERFORMED BY W = WITNESSED BY V = VERIFIED BY

MA = MAJOR CHARACTERISTIC 1 = PURCHASER (BHEL) 2 = VENDOR

MI = MINOR CHARACTERISTIC

PT = PENETRANT TEST,

NOTE: * 10% OR MIN. 2 Nos. AT RANDOM BY BHEL/CUSTOMER & 100% BY VENDOR FOR EACH TYPE, SIZE & RATING.

BHEL <i>Gandhiya moye</i> <i>31.03.17</i>	PARTICULARS		BIDDER/VENDOR
	NAME		
	SIGNATURE		
	DATE		
			BIDDER'S/ VENDOR'S COMPANY SEAL

		QUALITY PLAN		CUSTOMER: TANGEDCO BIDDER/VENDOR:		PROJECT: 2X660MW ENNORE SEZ STPP. QP NO. PE-QP-412-100-M004B		SPEC. NO. PE-TS-412-100-M001 REV. 0, DT. 31.03.17	
SHEET 1 OF 4		CHARACTERISTICS CHECKED		SYSTEM: LP PIPING		ITEM: DUPLEX SS/ STEEL GATE/ GLOBE VALVE (ABOVE 50NB SIZE)		SPEC. TITLE SECTION VOLUME	
S.NO.	COMPONENT/ OPERATION	CATE- GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
								P W V	

S.NO.	COMPONENT/ OPERATION	CATE- GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY	REMARKS
1.0	MATERIALS								
1.1	BODY, BONNET, YOKE, WEDGE/DISC, SEAT, SPINDLE, BODY SEAT, BACK SEAT, THRUST PLATE	MA	PHYS. CHEM. TESTS	ONE/ HEAT	APPD. DRG./ TECH. SPEC.	APPD. DRG./ TECH. SPEC.	TEST CERT.	3/2	1
	1. PHYS. CHEM. PROPS	MA	REVIEW OF H.T. RECORDS	100%	-DO-	-DO-	H.T. INTERNAL INSPN RECORDS	3/2	2
	2. HEAT TREATMENT	MA	VISUAL	100%	MSS-SP-55	MSS-SP-55	INSPN. REPORT	3/2	1
	3. SURFACE DEFECTS	CR	PT/MPI	100%	ANSI B16.34 AND TECH. SPEC.	ANSI B16.34 AND TECH. SPEC.	INSPN. REPORT	3/2	2
	a) CASTINGS	CR	RT/UT	100%	ANSI B16.34 AND TECH. SPEC.	ANSI B16.34 AND TECH. SPEC.	INSPN. REPORT	3/2	1
	1. SURFACE DEFECTS	CR	1. PT/ MPI	100%	ANSI B16.34 AND TECH. SPEC.	ANSI B16.34 AND TECH. SPEC.	INSPN. REPORT	3/2	2
	2. SUB-SURFACE DEFECTS	CR	2. UT	100%	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	INSPN. REPORT	3	1, 2
	b) FORGINGS	MA	MECH., ELEC. TESTS	100%					
	1) SURFACE DEFECTS	MA							
	2) SUB-SURFACE DEFECTS	MA							
	1. TORQUE TESTING & SETTING OF TORQUE SWITCH	MA							
	2. TRAVEL/STROKE	MA							
	3. TRAVEL TIME	MA							
	4. OPERATION OF LIMIT SWITCH	MA							
	5. MANUAL OPERATION THROUGH HAND WHEEL	MA							
	6. OPERATION TEST WITH POWER SUPPLY VARIATION ENERGISES TO OPEN/CLOSE	MA							
1.2	BODY, BONNET & DISC/ WEDGE								
	1. MPI FOR ALL SIZES & RATING FOR CCS/CAS VALVES								
	2. PT FOR SS VALVES								
	RT ON CHANGE OF SECTION FOR 1. ALL SS VALVES.								
	(RT FILM REVIEW BY BHEL)								
	1. PT ALL SS VALVES								
1.3	1. ELECTRIC ACTUATORS								

BHEL		PARTICULARS		BIDDER/VENDOR	
31.03.17		NAME		BIDDER'S/ VENDOR'S COMPANY SEAL	
31.03.17		SIGNATURE		BIDDER'S/ VENDOR'S COMPANY SEAL	
31.03.17		DATE		BIDDER'S/ VENDOR'S COMPANY SEAL	

[illegible]

	7. IR, HV, IR	MA	1/ TYPE	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET/ IS:9334	3RD PARTY TEST CERT.	3	-	2,1
	8.DEGREE OF PROTECTION	MA	WATER, DUST TEST	1/ TYPE	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET/ IS:9334	3	-	2,1
	9. DESIGN VERIFICATION	MA	TYPE TEST	1/TYPE	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET/ IS:9334	3	-	2,1
2.0	SS/ STELLITE DEPOSIT ON DISC & BODY SEAT, BACK SEAT	CR	PT	100%	ASTME:165 & TECH.SPEC. APP.DRG.	ANSI B16.34 & TECH.SPEC. APP. DRG./ ANSI B16.34	3/2	2	1
3.0	IN-PROCESS INSPECTION	MA	TESTING	100%			3/2	2	1
3.1	MACHINING OF ALL COMPONENTS INCLUDING BW ENDS	MA	MEAS., VISUAL	100%	MFG.DRG.		3/2	-	-
		CR	1. PT 2. MPI (ACCESSIBLE AREA OF BODY & BONNET)	100%	ANSI B16.34 AND TECH. SPEC./	ANSI B16.34 AND TECH. SPEC.	3/2	2	1
		CR	UT	100%	ANSI B16.34 AND TECH. SPEC./	ANSI B16.34 AND TECH. SPEC./	3/2	2	1
3.2	WEDGE/DISC & SEAT RING, SPINDLE AND BACK SEAT	CR	BLUE MATCHING	100%	UNIFORM METAL TO METAL CONTACT		3/2	-	2,1
4.0	ASSEMBLY	MA	MEAS.	100%	APPD.DRG.	APPD.DRG.	3/2	2,1	-
		MA	MEAS.	100%	-DO-	-DO-	3/2	2,1	-
		MA	MEAS.	100%	-DO-	-DO-	3/2	2,1	-
5.0	TESTING	CR	HYDRAULIC TEST	100%*	APPD. DRG./ TECH. SPEC.	NO LEAKAGE	3/2	2,1	-
5.1	BODY, SEAT, BACK SEAT	CR	HYDRAULIC TEST	100%*	APPD. DRG./ TECH. SPEC.	LEAKAGE PERMISSIBLE AS PER API 598	3/2	2,1	-
		CR	PNEUMATIC TEST	100%*	-DO	-DO-	3/2	2,1	-

BHEL	PARTICULARS	BIDDER/VENDOR	
Quoted for mwp	NAME		
	SIGNATURE		
31.03.17	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

		QUALITY PLAN		CUSTOMER: TANGEDCO BIDDER/VENDOR:		PROJECT: 2X660MW ENNORE SEZ STPP. QP NO. PE-QP-412-100-M004B REV. 0, DT. 31.03.17		SPEC. NO.: PE-TS-412-100-M001 SPEC. TITLE	
SHEET 3 OF 4		CHARACTERISTICS CHECKED		SYSTEM: LP PIPING		ITEM: DUPLEX SS/ STEEL GATE/ GLOBE VALVE (ABOVE 50NB SIZE)		SECTION VOLUME	
S.NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CATE- GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY P W V

5.2	SEAT & BACK SEAT FOR MOTORISED/ PNEU. VALVES WITH ACTUATOR OPERATIONAL TESTING	1. LEAK TIGHTNESS OF SEAT	CR	HYDRAULIC TEST	100%*	APPD. DRG./ TECH. SPEC.	--DO--	INSPN REPORT	3/2	2.1	-
5.3	1. MANUALLY OPERATED VALVES	1. SMOOTH & FULL OPENING AND CLOSING	CR	MANUAL	100%*	TECH. SPEC. APP. DRG./	SMOOTH OPERATION OF VALVES & CLEAR BORE	INSPN. REPORT	3/2	2.1	-
	2. MOTOR OPERATED VALVES	1. ASCENDING & DESCENDING LIFT CHARACTERISTIC 2. LIMIT/TORQUE SWITCH SETTING FOR OPENING AND CLOSING TIME 1. OVERALL DIMENSION	CR	ELEC.	100%*	TECH. SPEC./ IS:9334	APP. DRG./ TECH. SPEC./ IS:9334	INSPN. REPORT	3/2	2.1	-
6.0	COMPLETE VALVES	1. DIMENSIONS	MA	MEAS	SAMP-LE	APPD. DRG.	APP. DRG.	-DO-	3/2	2.1	-
7.0	END CONNECTION DETAILS	1. CLEANLINESS & COMPLETENESS, NAME WITH VALVE TAG NOS.	MA	MEAS.	100%	APPD. DRG./ RELV. STD	APPD. DRG./ RELV. STD	-DO-	3/2	2.1	-
8.0	FINAL INSPECTION	1. SURFACE PREPARATION 2. UNIFORMITY & THICKNESS	MA	VISUAL	100%	DRG./TECH. SPEC.	TECH. SPEC.	INSPN. REPORT	3/2	2	2.1
9.0	PAINTING	AS PER BHEL TECH. SPEC	MI	VISUAL MEASUREMENT	100%	TECH. SPEC.	TECH. SPEC.	-DO-	3/2	2	2.1
10.0	PACKING	AS PER BHEL TECH. SPEC	MA	VISUAL	100%	AS PER TECH. SPEC	AS PER BHEL TECH. SPEC	SOFT COPY OF PHOTOGRAPH	3/2	-	2.1

PHOTOGRAPH OF WOODEN CASES HAVING DULY PACKED VALVES TO BE FURNISHED TO BHEL-PEM FOR VERIFICATION TO OBTAIN MDCC

ABBREVIATIONS

CR = CRITICAL CHARACTERISTIC P = PERFORMED BY
 MA = MAJOR CHARACTERISTIC 1 = PURCHASER (BHEL)
 MI = MINOR CHARACTERISTIC 2 = WITNESSED BY VENDOR
 W = VERIFIED BY 3 = SUB VENDOR OF THE VENDOR

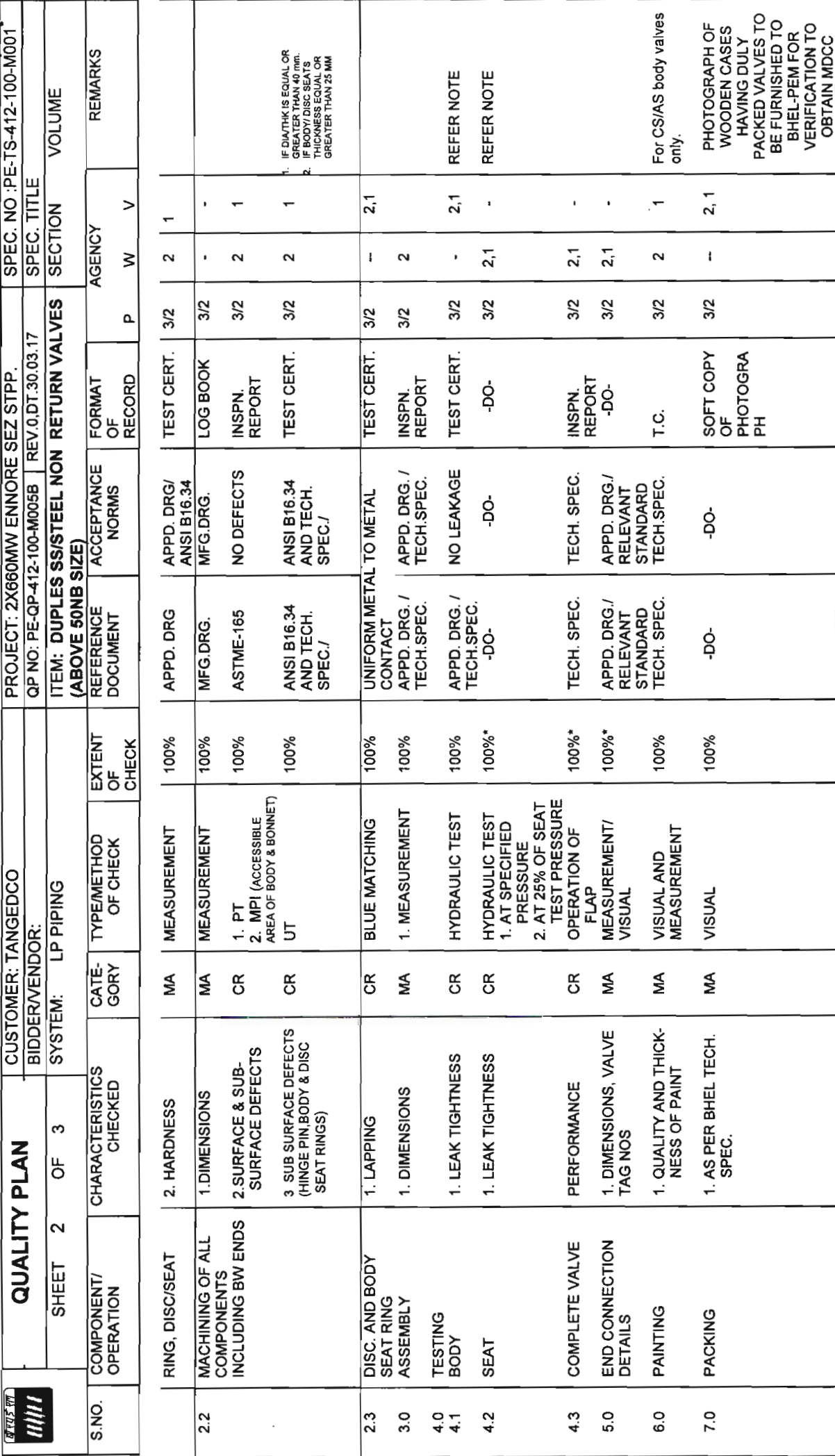
PT= PENETRANT TEST, UT= ULTRASONIC TEST, RT= RADIOGRAPHIC TEST MPI=MAGNETIC PARTIAL INSPECTION.

BHEL		PARTICULARS		BIDDER/VENDOR	
		NAME			
		SIGNATURE			
3.02.17		DATE			
BIDDER'S/ VENDOR'S COMPANY SEAL					

		QUALITY PLAN				CUSTOMER: TANGEDCO		PROJECT: 2X660MW ENNORE SEZ STPP.		SPEC. NO: PE-TS-412-100-M001			
						BIDDER/VENDOR:		QP NO: PE-QP-412-100-M005B		REV.0, DT. 30.03.17		SPEC. TITLE	
						SYSTEM: LP PIPING		ITEM: DUPLES SS/STEEL NON RETURN VALVES (ABOVE 50NB SIZE)		SECTION		VOLUME	
S. NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CATE- GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	P	W	V	REMARKS	

1.0	MATERIALS	1. PHYSICAL, CHEMICAL PROPS.	MA	PHYS. CHEM. TESTS	1/HEAT	APPD. DRG./ TECH. SPEC.	APPD. DRG./ TECH. SPEC.	T.C.	3/2	2	1	CORRELATION REQD. FOR BODY & COVER.
1.1	BODY, COVER, BODY, SEAT RING, DISC, HINGE, HINGE PIN	2. HEAT TREATMENT	MA	REVIEW OF HT CHART RECORDS	100%	-DO-	-DO-	HT INTERNAL INSPN. RECORDS	3/2	2	2	SOLUTION ANNEALING FOR STAINLESS STEEL
		3. SURFACE DEFECTS	MA	VISUAL	100%	MSS-SP-55	MSS-SP-55	INSPN. REPORT	3/2	2	1	
1.2	BODY, COVER, HINGE & DISC	a) <u>CASTINGS</u> 1. SUB-SURFACE DEFECTS	CR	RT / UT	100%	ANSI B-16.34/ TECH. SPEC.	ANSI B-16.34/ TECH. SPEC.	T.C.	3/2	2	1	RT ON CHANGE OF SECTION FOR 1. ALL SS VALVES. (RT FILM REVIEW BY BHEL)
		2. SURFACE DEFECTS	CR	PT/MPI	100%	ASTME 165/ ASTME 709.	-DO-	T.C.	3/2	2	1	1. PT FOR SS VALVES
		b) <u>FORGINGS</u> 1. SURFACE DEFECTS	CR	1. PT/MPI	100%	ANSI B16.34/ TECH. SPEC.	ANSI B16.34/ TECH. SPEC.	INSPN. REPORT	3/2	2	1	1. PT ALL SS VALVES
		2. SUB-SURFACE DEFECTS	CR	2. UT	100%	-DO-	-DO-	-DO-	3/2	2	1	
2.0	IN PROCESS	1. SURFACE DEFECTS	CR	PENETRANT TEST	100%	ASTME-165	NO DEFECTS	TEST CERT.	3/2	2	1	
2.1	SS/STELLITE DEPOSIT ON BODY SEAT											

BHEL		PARTICULARS		BIDDER/VENDOR	
		NAME			
		SIGNATURE			
		DATE		31.03.17	
				BIDDER'S/VENDOR'S COMPANY SEAL	



	BHEL	PARTICULARS	BIDDER/VENDOR	BIDDER'S/ VENDOR'S COMPANY SEAL
	Govind W. more	NAME		
		SIGNATURE		
	31.08.12	DATE		

		QUALITY PLAN		CUSTOMER: TANGEDCO		PROJECT: 2X660MW ENNORE SEZ STPP.		SPEC. NO.: PE-TS-412-100-M001*	
				BIDDER/VENDOR:		QP NO: PE-QP-412-100-M005B		REV.0,DT:30.03.17	
SHEET 3 OF 3		CHARACTERISTICS CHECKED		SYSTEM: LP PIPING		ITEM: DUPLES SS/STEEL NON RETURN VALVES (ABOVE 50NB SIZE)		SECTION VOLUME	
S.NO.	COMPONENT/ OPERATION			CATE- GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD
									P W V
									REMARKS

ABBREVIATIONS

CR = CRITICAL CHARACTERISTIC P = PERFORMED BY W = WITNESSED BY V = VERIFIED BY
MA = MAJOR CHARACTERISTIC 1 = PURCHASER (BHEL) 2 = VENDOR 3 = SUB VENDOR OF THE VENDOR
PT= PENETRANT TEST, UT= ULTRASONIC TEST, RT= RADIOGRAPHIC TEST MPI=MAGNETIC PARTICAL INSPECTION.

NOTE: A) MATERIAL TEST CERTIFICATES (IBR CERTIFICATES IN FORM III-C) WITH PROPER IDENTIFICATION AND CO-RELATION SHALL BE FURNISHED FOR BODY & BONNET FOR VALVES UNDER PERVIEW OF IBR.

B) FOR OTHERS PARTS MATERIAL TEST CERTIFICATES SHALL BE FURNISHED.

C) HYDRAULIC AND AIR TEST CERTIFICATES SHALL BE FURNISHED. FOR VALVES COMING UNDER IBR, TEST CERTIFICATES IN IBR FORM III-C SHALL BE FURNISHED.

* = 10% OR MIN. 2 Nos. AT RANDOM BY BHEL/CUSTOMER & 100% BY VENDOR FOR EACH TYPE, SIZE & RATING.

BHEL <i>Ganesh kr. moye</i> <i>31.03.17</i>	PARTICULARS	BIDDER/VENDOR
	NAME	
	SIGNATURE	
	DATE	BIDDER'S/ VENDOR'S COMPANY SEAL

DATA SHEET FOR

					PROJECT- 2 X 660 MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI														
JOB NO. 412							OWNER		TAMILNADU GENERATION AND DISTRIBUTION CORPORATION LIMITED										
STATUS CONTRACT							OWNER'S CONSULTANT		DESEIN PRIVATE LIMITED DESEIN HOUSE, NEW DELHI										
PRINT SCALE 																			
REV.	DATED.	ALTD	CHD	APPD			EPC CONTRACTOR		BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA				DEPT CODE		NAME	SIGN	DATE		
02	28.03.2017	SK <i>SK</i>	SCS <i>SCS</i>	SCS <i>SCS</i>									I		AR	-SD-	27.04.15		
1	REVISED IN LINE WITH COMPLIANCE TO MOM DTD 19-20.01.17 AT TANGEDCO.													DSGN	AR	-SD-	27.04.15		
														CHD	SCS	-SD-	27.04.15		
														APPD	SCS	-SD-	27.04.15		
REV.	DATED.	ALTD	CHD	APPD	TITLE														
01	14.02.2017	SK -SD-	SCS-SD-	SCS-SD-	DATA SHEET FOR MOTORISED VALVE ACTUATOR														
1	REVISED IN LINE WITH MOM DTD 19-20.01.17 AT TANGEDCO.														DEPT.	SCALE	DRAWING NO. PE-DG-412-145-I902		
															SIGN				
															DATE				
															SHEET 1 OF 4		REV 02		



SPECIFICATION FOR MOTORISED VALVE ACTUATOR

SPECIFICATION NO.: PE-DG-412-145-I902

VOLUME II B

SECTION D

REV. NO. 02

DATE: 28.03.17

SHEET 1 OF 3

Data Sheet A & B

DATA SHEET-A
(TO BE FILLED BY PURCHASER)

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

GENERAL*	* PROJECT	2x 660 MW ENNORE SUPERCRITICAL TPP		
	OFFER REFERENCE			
	* TAG NO. SERVICE	PW-86	PLANT WATER SYSTEM	
	* DUTY	☒ ON / OFF ☐ INCHING		
	* LINE SIZE (inlet/outlet): MATERIAL			
	* VALVE TYPE	☐ GLOBE ☒ GATE ☐ REG. GLOBE ☐ BUTTERFLY		
	* OPENING / CLOSING TIME			
	* WORKING PRESSURE			
	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		
	CONSTRUCTION AND SIZING	CONSTRUCTION	TOTALLY ENCLOSED, WEATHER PROOF, IP:68	
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 85% OF RATED VOLTAGE. FOR ISOLATING SERVICE THREE SUCCESSIVE OPEN-CLOSE OPERATIONS OR 15 MINS. WHICHEVER IS HIGHER. FOR INCHING SERVICE - 150 STARTS/HR MINIMUM & FOR REGULATING SERVICE - 600 STARTS/HR MINIMUM.		
HANDWHEEL	* REQUIRED	☒ YES ☐ NO		
	* ORIENTATION	☐ TOP MOUNTED ☐ SIDE MOUNTED		
	*TO DISENGAGE AUTOMATICALLY DURING MOTOR OPERATION.			
ELECTRIC ACTUATOR	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- INCLUSIVE OF I.S. TOLERANCE		
	ACTUATOR APPLICABLE WIRING DIAGRAM	☒ ENCLOSED (BIDDER TO CONFIRM) A: ☒ DRG. NO. 3-V-MISC-24227 R00 B: ☐ DRG. NO. 3-V-MISC-24550 R00 C: ☐ DRG. NO. 3-V-MISC-24283 R00 D: ☐ DRG. NO. 4-V-MISC-90271 R11 E: ☐ For Thyristor based Integral starter, Bidder/Vendor to furnish wiring diagram		
	COLOUR SHADE	☐ BLUE (RAL 5012) ☐		
	PAINT TYPE (## Refer Notes)	☐ ENAMEL ☒ EPOXY ☐		
	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, 3PH, AC		



SPECIFICATION FOR MOTORISED VALVE ACTUATOR

SPECIFICATION NO.: PE-DG-412-145-I902

VOLUME II B

SECTION D

REV. NO. 02

DATE: 28.03.17

SHEET 2 OF 3

Data Sheet A & B

DATA SHEET-A
(TO BE FILLED BY PURCHASER)

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

	@ CONTROL VOLTAGE REQUIREMENT	TO BE DERIVED FROM THE POWER SUPPLY TO THE STARTER ☐ 230 V ☐ 110 V	
	@ ENCLOSURE CLASS OF MOTOR	☒ IP 68 ☐ FLAME PROOF	
	@ INSULATION CLASS	CLASS-F TEMP. RISE LIMITED TO CLASS-B	
	@ WINDING TEMP PROTECTION	☒ THERMOSTAT (3 Nos., 1 IN EACH PHASE) ☐ _____	
	SINGLE PHASE / WRONG PHASE SEQUENCE PROTECTION	REQUIRED	
INTEGRAL STARTER	INTEGRAL STARTER	☒ REQUIRED ☐ NOT REQUIRED	
	TYPE OF SWITCHING DEVICE	☒ CONTACTORS ☐ THYRISTORS	
	TYPE	☒ CONVENTIONAL ☐ SMART (NON-INTRUSIVE)	
	STEP DOWN CONT. TRANSFORMER	☒ REQUIRED	
	OPEN / CLOSE PB	☒ REQUIRED ☐ NOT REQUIRED	
	STOP PB	☒ REQUIRED ☐ NOT REQUIRED	
	INDICATING LAMPS	☒ REQUIRED ☐ NOT REQUIRED	
	LOCAL REMOTE S/S	☒ REQUIRED ☐ NOT REQUIRED	
	STATUS CONTACTS FOR MONITORING	☒ REQUIRED ☐ NOT REQUIRED	
	INTEGRAL STARTER DISTURBED SIGNAL	REQUIRED (MOTOR THERMOSTAT TRIP, O/L RELAY OPERATED, CONT./POWER SUPPLY FAILED, PHASE LOSS, S/S IN LOCAL or OFF MODE, STOP PB OPTD, TORQUE OPEN/CLOSE CUTOFF)	
INTERPOSING RELAY/OPTO COUPLER (Applicable for integral Starter)	TYPE OF ISOLATING DEVICE	☐ INTERPOSING RELAY ☐ OPTO COUPLER ☐ EITHER	
	QUANTITY	☒ 2 NOs. ☐ 3 Nos. *	
	DRIVING VOLTAGE	☒ 20.5 – 24V DC ☐ _____ V DC	
	DRIVING CURRENT	☒ 125mA MAX ☐ _____ mA MAX	
	LOAD RESISTANCE	☒ > 192 ohms - <25 k ohms ☐ > _____ ohms - < _____ ohms	
TORQUE SWITCH (Not Applicable for Smart Actuator) (\$\$ Refer Notes)	MFR & MODEL NO.	BIDDER TO SPECIFY	
	OPEN / CLOSE	☒ 1 No. ☐ 2Nos. / ☒ 1 No. ☐ 2Nos	
	CONTACT TYPE	2 NO + 2 NC	
	RATING	5A 240V AC AND 0.5A 220V DC	
	CALIBRATED KNOBS(OPEN&CLOSE TS)	REQUIRED FOR SETTING DESIRED TORQUE	
	ACCURACY	+3% OF SET VALUE	
LIMIT SWITCH (Not Applicable for Smart Actuator) (\$\$ Refer Notes)	MFR & MODEL NO.	BIDDER TO SPECIFY	
	OPEN : INT : CLOSE	☐ 1 No. ☒ 2 Nos. 2 Nos. (ADJ.) ☐ 1 No. ☒ 2Nos.	
	CONTACT TYPE	2 NO + 2 NC	
	RATING (AC / DC)	5A 240V AC AND 0.5A 220V DC	

*For inching type drives IPR 3 Nos. to be considered for inching operation.



SPECIFICATION FOR MOTORISED VALVE ACTUATOR

SPECIFICATION NO.: PE-DG-412-145-I902

VOLUME II B

SECTION D

REV. NO. 02

DATE: 28.03.17

SHEET

3

OF

3

Data Sheet A & B

DATA SHEET-A
(TO BE FILLED BY PURCHASER)

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

POSITION TRANSMITTER	POSITION TRANSMITTER (For inching duty & other specific applications)	☐ REQUIRED ☒ NOT REQUIRED	
	MFR & MODEL NO.	BIDDER TO SPECIFY	
	TYPE	☐ ELECTRONIC (2 WIRE) R/I CONVERTER ☒ ELECTRONIC (2 WIRE) CONTACTLESS	
	SUPPLY	☒ 24V DC ☐	
	OUTPUT	☒ 4-20mA	
	ACCURACY	± 1% FS	
SPACE HEATER	@SPACE HEATER	REQUIRED	
	@ POWER SUPPLY (NON INTEGRAL)	230V AC, 1 PH., 50 Hz	
	@ POWER SUPPLY (INTEGRAL)	BIDDER TO SPECIFY	
	@ RATING		
TERMINAL BOX	ACTUATOR/MOTOR TERMINAL BOX	REQUIRED	
	ENCL CLASS ACTUATOR/MOTOR T.B.	@ ☒ IP 68 @ ☐	
	@ EARTHING TERMINAL	REQUIRED	
	PLUG & SOCKET (9 PIN) (FOR COMMD, LS/TS FEED BACK, PoT)	☐ REQUIRED ☒ NOT REQUIRED ☐ 2 NOS. ☐	
CABLE GLANDS	@ POWER CABLE GLAND	SIZE: suitable for 3Cx2.5sq mm Cu	
	@ SPACE HEATER CABLE GLAND	SIZE:-	
	OTHER CONTROL CABLE GLANDS	QUANTITY & SIZE: Cable gland suitable for 8Px0.5 sq mm & 2P x 0.5 sq mm cable.	
WEIGHT	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
- ACTUATOR SHALL HAVE HARDWIRED CONTACTS FOR FOLLOWING SIGNALS (a) ACTUATOR IN LOCAL MODE (b) ACTUATOR IN REMOTE MODE
- BIDDER TO ENSURE AVAILABILITY OF SPARE 1NO + 1NC LIMIT SWITCH & TORQUE SWITCH.
- SS TAG NAME PLATE SHALL BE PROVIDED.
- TEMPERATURE RISE SHALL BE RESTRICTED TO 70 DEG. C FOR AMBIENT TEMPERATURE OF 50 DEG C.
- CABLE GLANDS OF DOUBLE COMPRESSION TYPE, NI PLATED BRASS MATERIAL SHALL BE PROVIDED.
- 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.
- LOCAL DIGITAL POSITION INDICATOR SHALL BE PROVIDED FOR INCHING DUTY DRIVES.
- COMMANDS SHALL BE LATCHED AT INTEGRAL STARTER END.
- SWITCHES SHALL BE TERMINATED IN JB MOUNTED ON ACTUATOR.
- ACTUATORS FOR HAZARDOUS AREA SHALL BE CERTIFIED FLAME PROOF FOR ZONES 1 & 2.

\$\$ TORQUE SWITCH & LIMIT SWITCH SHALL ACT INDEPENDENT OF EACH OTHER. TANDEM OPERATION IS NOT ACCEPTABLE.

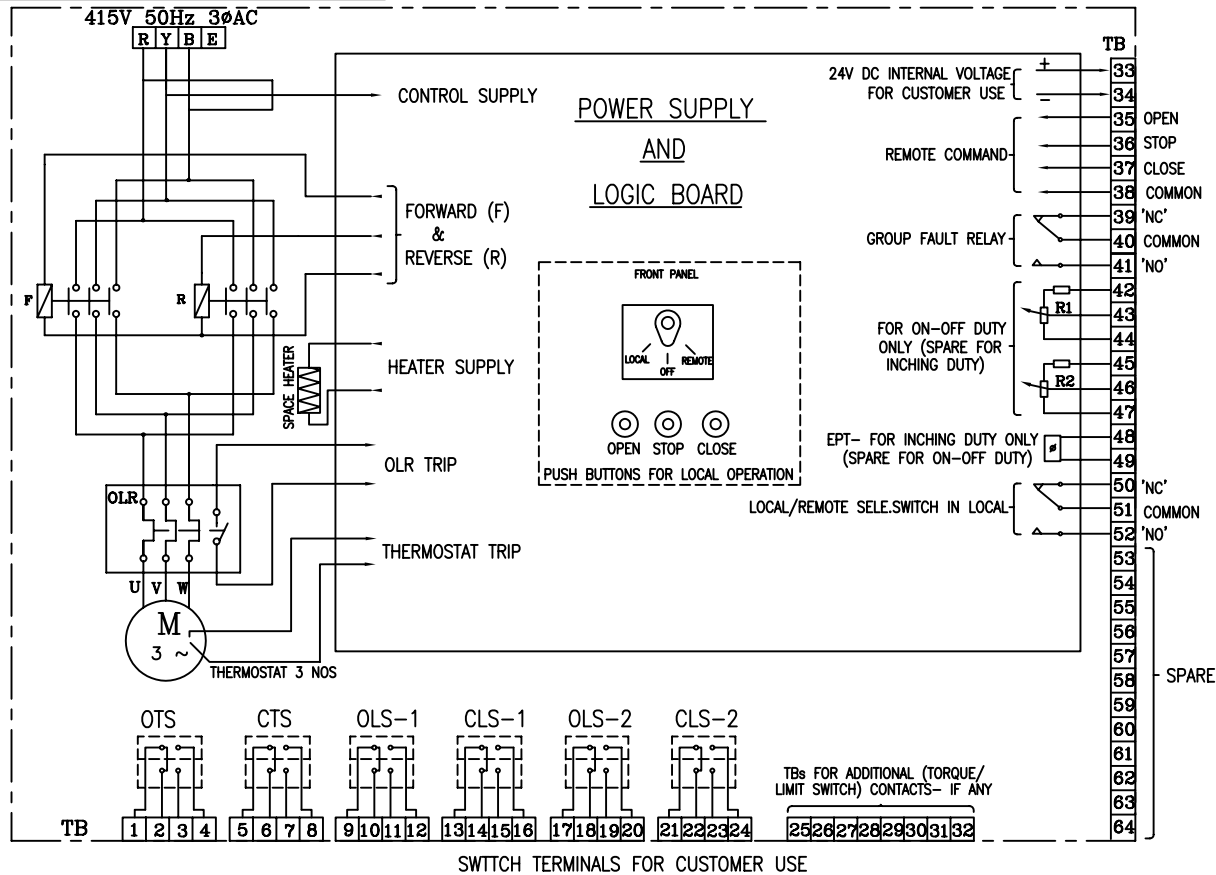
EPOXY PAINT IS RECOMMENDED FOR COASTAL AREAS.

NOTES* = TO BE FILLED BY MPL (LEAD AGENCY).

@= TO BE FILLED BY ES

3-V-MISC-24227

DRAWING NO.



CONTACT DEVELOPMENT DIAGRAM

OTS	1-2	OPEN AT OVER TORQUE DURING OPENING TRAVEL				
	3-4	CLOSE AT OVER TORQUE DURING OPENING TRAVEL				
CTS	5-6	OPEN AT OVER TORQUE DURING CLOSING TRAVEL				
	7-8	CLOSE AT OVER TORQUE DURING CLOSING TRAVEL				
OLS-1	9-10					
	11-12					
CLS-1	13-14					
	15-16					
OLS-2	17-18					
	19-20					
CLS-2	21-22					
	23-24					
SWITCH	TERMINAL NO.	FULL OPEN	a	INTERMEDIATE	b	FULL CLOSE
		VALVE POSITION				
 INDICATES CONTACT CLOSED						
 INDICATES CONTACT OPEN						
CONTACT RATING: 5A AT 250V AC & 0.5A AT 220V DC						

SETTING PROCEDURE OF POSITION LIMIT AND TORQUE SWITCH

VALVES	OPEN		CLOSE	
	MAIN	BACK UP	MAIN	BACK UP
GATE VALVE OF 100 mm AND ABOVE IN 1500 CL AND ABOVE RATINGS	OLS	OTS *	CLS	CTS
ALL OTHER GATE & GLOBE VALVES	OLS	OTS *	CTS	#
# - CLS NOT TO BE CONNECTED IN TRIP CIRCUIT				
* - BYPASS OTS FOR INITIAL 5% OF TRAVEL (FOR GATE VALVES ONLY)				

NOTE:-

- ALL TORQUE AND LIMIT SWITCHES (OTS, CTS, 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
- CTS - TORQUE SWITCHES FOR CW ROTATION (CLOSE)
- OTS - TORQUE SWITCHES FOR CCW ROTATION (OPEN)
- OLS-1, OLS-2 - LIMITSWITCHES FOR POSITION OPEN
- CLS-1, CLS-2 - LIMITSWITCHES FOR POSITION CLOSE
- EPT - ELECTRONIC POSITION TRANSMITTER (POTENTIOMETRIC TYPE, FOR INCHING DUTY)
- R1-R2-POTENTIOMETER 2 x 100 OHMS (FOR ON-OFF DUTY)
- FOR COMMANDS & EPT EITHER INTERNALLY GENERATED 24 VDC OR EXTERNAL SUPPLY OF 24VDC CAN BE USED
- M - MOTOR 3 ϕ 415V 50 Hz AC SUPPLY

REV	DATE	ALTERED
		CHD & APPD

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

TYPE OF PRODUCT OR NAME OF CUSTOMER/PROJECT		ELECTRICAL VALVE ACTUATORS (AC) WITH INTEGRAL STARTERS (DRAWN FOR INTERMEDIATE POSITION OF VALVES)						
 365-121		BHARAT HEAVY ELECTRICALS LTD., UNIT: HIGH PRESSURE BOILER PLANT. TIRUCHIRAPALLI-620014.		DRN	NAME N.P.ESWAR	SIGN N.P.	DATE 07.10.04	NO.OF VAR.
				CHD	D.DINAKARAN	D.D	07.10.04	
				APPD	K.ARUNACHALAM	K.A	07.10.04	
DEPT VL		SCALE	WEIGHT (KG).	REFERENCE INFORMATION				NO. OF ITEMS
CODE								
TITLE WIRING DIAGRAM (TERMINAL PLAN) FOR ACTUATOR WITH INTEGRAL STARTER				CARD CODE U 01	DRAWING NO. 3-V-MISC-24227			REV 0

	COMPLIANCE SHEET STEEL GATE/GLOBE/NRV- WATER SERVICE	SPECIFICATION NO. PE-TS-412-100-M001	
		SECTION : II	
		REV. NO.: 00	DATE: 28.03.2017
		Sheet 1 of 1	

A. I hereby comply/not comply (*) to all the requirements of this technical specification in totality.

In case the bidder does not comply to the technical specification, the deviations shall be explicitly listed in the technical deviation sheet of GCC. Deviations listed in technical deviation sheet shall only be considered.

Name of Bidder / Authorized Representative :-

Designation :-

Signature :-

Company Seal :-

Date :-
