TANGEDCO

1x800 MW TANGEDCO NORTH CHENNAI TPP

TECHNICAL SPECIFICATION

FOR

STEEL GATE, GLOBE AND NON RETURN VALVES

SPECIFICATION NO. PE-TS-423-100-M001

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

CONTENTS

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 confirm 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: *- NRV above 600NB size shall be from ANSI B16.47.

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.

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.

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.

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:

a. 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.

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.

c. 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:

No painting is required as all valves are Stainless Steel.

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

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. 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.

14. 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.

SECTION-II

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

DATA SHEET-A
BILL OF MATERIAL FOR STEEL(GATE/GLOBE/NRV) PACKAGE

SPECIFICATION NO. PE-TS-423-100-M001
SECTION:II
REV.00, DATE 05.04.2017

1	2	3	4	5	6	7	8	9	10	11	12	13	14		15	16			17
					DESIGN								MATCHING			+++COMMISIONI			
SL NO.	TAG NUMBER.	TYPE OF VALVE	SIZE mm (NB)	OPERATION	PRESSURE KG/CM2(G)	TEMP(DEG°C)	SERVICE	RATING, DESIGN & TESTING CODE	BODY,BONNET & DISC MATERIAL	HINGE PINMATERIAL	BODY & DISC SEAT AND OTHER TRIM MATERIAL	END CONN	SPECIAL FEATURES	MM	MM	VALVES QUANTITY	BONNET/ COVER GASKET (NOS)	GLAND PACKING (SETS)	ACTUATOR O-RING AND SEAL (SETS)	REMARKS
DMCW SYSTEM																				
1	DMCW40, DMCW42	GLV	200	MAN	10	60	DMCW SERVICE	Class 150 of BS 1873	Equivalent casting grade of SS 316L grade	--	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	219.10	6.40	2	2	2	0	
2	DMCW17, DMCW19, DMCW48, DMCW50	GLV	150	MAN	10	60	DMCW SERVICE	Class 150 of BS 1873	Equivalent casting grade of SS 316L grade	--	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	166.50	5.40	4	4	4	0	
3	DMCW123	GLV	150	MO	12	60	DMCW SERVICE	Class 150 of BS 1873	Equivalent casting grade of SS 316L grade	--	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	1. OPEN /CLOSE TIME SHALL BE 40-60 SEC. 2. INCHING TYPE	166.50	5.40	1	1	1	1	VALVE TO BE SUPPLIED WITH INTEGRAL STARTER
4	DMCW58	GLV	100	MAN	10	60	DMCW SERVICE	Class 150 of BS 1873	Equivalent casting grade of SS 316L grade	--	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	115.00	5.40	1	1	1	0	
5	DMCW44, DMCW46, DMCW116	GLV	80	MAN	12	60	DMCW SERVICE	Class 150 of BS 1873	Equivalent casting grade of SS 316L grade	--	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	89.50	4.80	3	3	3	0	
6	DMCW20, DMCW21, DMCW22, DMCW23, DMCW171-DMCW190, DMCW111, DMCW112, DMCW113, DMCW114, DMCW119, DMCW120	GLV	50	MAN	12	60	DMCW SERVICE	Class 800 of BSEN ISO 15761	SS 316L	--	SS 316L	SOCKET WELDED as per ASME B16.11	--	60.80	4.50	31	31	31	0	
	DMCW70													60.3	3.9					
7	DMCW62	GLV	50	MO	10	60	DMCW SERVICE	Class 800 of BSEN ISO 15761	SS 316L	--	SS 316L	SOCKET WELDED as per ASME B16.11	1. OPEN /CLOSE TIME SHALL BE 40-60 SEC. 2. INCHING TYPE	60.3	3.9	2	2	2	2	VALVE TO BE SUPPLIED WITH INTEGRAL STARTER
	DMCW63													60.8	4.5					
8	DMCW32, DMCW33, DMCW34, DMCW35, DMCW36, DMCW37	GLV	40	MAN	10	60	DMCW SERVICE	Class 800 of BSEN ISO 15761	SS 316L	--	SS 316L	SOCKET WELDED as per ASME B16.11	--	48.80	4.00	6	6	6	0	
9	DMCW65, DMCW56, DMCW64, DMCW69, DMCW125	GLV	25	MAN	12	60	DMCW SERVICE	Class 800 of BSEN ISO 15761	SS 316L	--	SS 316L	SOCKET WELDED as per ASME B16.11	--	33.40	3.40	5	5	5	0	
	DMCW54, DMCW55, DMCW61, DMCW71, DMCW72, DMCW73, DMCW74, DMCW121, DMCW122, DMCW151-DMCW170, 22 as per layout													34.20	4.00	51	51	51	0	
10	DMCW39, DMCW41	GV	200	MAN	10	60	DMCW SERVICE	Class 150 of BSEN 10434	Equivalent casting grade of SS 316L grade	-	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	219.10	6.40	2	2	2	0	
11	DMCW16, DMCW18, DMCW47, DMCW49	GV	150	MAN	10	60	DMCW SERVICE	Class 150 of BSEN 10434	Equivalent casting grade of SS 316L grade	-	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	166.50	5.40	4	4	4	0	
12	DMCW57, DMCW66, DMCW67, DMCW124	GV	100	MAN	12	60	DMCW SERVICE	Class 150 of BSEN 10434	Equivalent casting grade of SS 316L grade	-	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	115.00	5.40	4	4	4	0	
13	DMCW43, DMCW45, DMCW115	GV	80	MAN	12	60	DMCW SERVICE	Class 150 of BSEN 10434	Equivalent casting grade of SS 316L grade	-	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	89.50	4.80	3	3	3	0	
14	DMCW04, DMCW05, DMCW06	NRV	500	-	10	60	DMCW SERVICE	Class 150 of BS 1868	Equivalent casting grade of SS 316L grade	Equivalent casting grade of SS 316L grade	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	508.00	8.00	3	3	0	0	
15	DMCW103, DMCW104	NRV	300	-	12	60	DMCW SERVICE	Class 150 of BS 1868	Equivalent casting grade of SS 316L grade	Equivalent casting grade of SS 316L grade	Equivalent casting grade of SS 316L grade	FLANGED as per Class 150 of ASME B16.5 R/F	--	323.90	6.40	2	2	0	0	
16	DMCW68, DMCW126	NRV	25	--	12	60	DMCW SERVICE	Class 800 of BSEN ISO 15761	SS 316L	SS 316L	SS 316L	SOCKET WELDED as per ASME B16.11	--	33.40	3.40	2	2	0	0	

DATA SHEET-A
BILL OF MATERIAL FOR STEEL(GATE/GLOBE/NRV) PACKAGE

SPECIFICATION NO. PE-TS-423-100-M001
SECTION:II
REV.00, DATE 05.04.2017

1	2	3	4	5	6		7	8	9	10	11	12	13	14		15	16			17
					DESIGN									MATCHING			+++COMMISIONI			
SL NO.	TAG NUMBER.	TYPE OF VALVE	SIZE mm (NB)	OPERATION	PRESSURE KG/CM2(G)	TEMP(DEG°C)	SERVICE	RATING, DESIGN & TESTING CODE	BODY,BONNET & DISC MATERIAL	HINGE PINMATERIAL	BODY & DISC SEAT AND OTHER TRIM MATERIAL	END CONN	SPECIAL FEATURES	MM	MM	VALVES QUANTITY	BONNET/ COVER GASKET (NOS)	GLAND PACKING (SETS)	ACTUATOR O-RING AND SEAL (SETS)	REMARKS
CW & ACW SYSTEM																				
17	ACW-24-27	GV	25	MAN	10	60	ACW SERVICE	Class 800 of ASME B16.34	DUPLSEX SS	-	DUPLSEX SS	SOCKET WELDED as per ASME B16.11	--	33.4	3.38	4	4	4	0	
18	ACW-28-33	GV	50	MAN	10	60	ACW SERVICE	Class 800 of ASME B16.34	DUPLSEX SS	-	DUPLSEX SS	SOCKET WELDED as per ASME B16.11	--	60.3	3.91	6	6	6	0	
19	ACW-15, 17, 19, 21, CW-06, 08, 10, 12, CW-18,20, 23, 24	GV	150	MAN	10	60	ACW SERVICE	Class 150 of BSEN 10434	DUPLSEX SS	-	DUPLSEX SS	FLANGED as per Class 150 of ASME B16.5 R/F	--	168.3	3.40	12	12	12	0	
20	CW-13, 14, 15, 16	GV	200	MAN	5	60	CW SERVICE	Class 150 of BSEN 10434	DUPLSEX SS	-	DUPLSEX SS	FLANGED as per Class 150 of ASME B16.5 R/F	--	219.1	6.40	4	4	4	0	
21	ACW-16, 18, 20, 22	GLV	150	MAN	10	60	ACW SERVICE	Class 150 of BS 1873	DUPLSEX SS	-	DUPLSEX SS	FLANGED as per Class 150 of ASME B16.5 R/F	--	168.3	3.40	4	4	4	0	
														TOTAL		**156**	**156**	**149**	**3**	

NOTES
1. LEGENDS: MAN=MANUAL, MO=MOTORISED, GV=GATE VALVE, GLV=GLOBE VALVE NRV=NON RETURN VALVE
2. COMMISSIONING SPARES:ONE SET OF GLAND PACKING & 1 NO. BONNET GASKET FOR EACH GATE VALVE ;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. IN THE UNPRICED SCHEDULE:
 i. BIDDER TO INDICATE/FILL ALL PRICES OF COMMISSIONING SPARES, ITEM WISE. PRICES SHALL NOT BE CLUBBED OR INCLUDED IN MAIN VALVE OR ANY OTHER ITEM(S).”
 ii. BIDDER TO INDICATE FREIGHT CHARGES SEPARATELY. FREIGHT CHARGES SHALL NOT BE INCLUDED IN EX-WORKS PRICE.

MATERIAL OF CONSTRUCTION
CAST STAINLESS STEEL GATE / GLOBE VALVES

SERVICE: SEA WATER

SL.NO	PART NAME	MATERIAL REQUIRED
1	BODY	EQUIVALENT CAST GRADE OF SS316L
2	BONNET/YOKE	EQUIVALENT CAST GRADE OF SS316L
3	WEDGE	EQUIVALENT CAST GRADE OF SS316L
4	STEM, BACK SEAT	ASTM A 479 TYPE 316L
5	BODY SEAT RING, WEDGE SEAT RING	ASTM A 479 TYPE 316L
6	YOKE SLEEVE	ASTM A 479 TYPE 316L
7	GLAND PACKING	GRAFOIL
8	GLAND	ASTM A 479 TYPE 316L
9	GLAND FLANGE	ASTM A 479 TYPE 316L
10	BOLTS	ASTM A193 Gr.B7
11	NUTS	ASTM A 194 Gr.2H
12	HANDWHEEL	MALLEABLE IRON OR EQUIVALENT
13	STEM PROTECTION COVER	PVC (TRANSPARENT)
14	GASKET	SWG (GRAFOIL)
15	Name plate	SS316 (2 MM THICK)

NOTE:

1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. No. 1 TO 5, 10 TO 13 OF DATA SHEET-A.
2. MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER APPLICATION.

MATERIAL DATA SHEET
FORGED STAINLESS STEEL GLOBE VALVE

SERVICE: SEA WATER

SL.NO	PART NAME	MATERIAL REQUIRED
1	BODY	ASTM A182 Gr.F316L
2	BONNET/YOKE	ASTM A182 Gr.F316L (BOLTED)
3	BODY SEAT RING (SCREWED)	ASTM A182 Gr.F316L + STELLITE
4	STEM, BACK SEAT	ASTMA 182 Gr.F316L (BACK SEAT STELLITE)
5	DISC (CONICAL/TAPER PLUG)	ASTM A182 Gr.F316L + STELLITE
6	DISC HOLDER FOR GLOBE VALVE	ASTM A182 Gr.F316L + STELLITE
7	YOKE SLEEVE	ASTM A182 Gr.F316L
8	GLAND PACKING	GRAFOIL
9	GLAND	AISI 316L
10	GLAND FLANGE	AISI316L
11	INDICATOR & INDICATING SCALE WITH FITTINGS	AISI316L
12	BOLTS	ASTM A193 Gr.B7
13	NUTS	ASTM A 194 Gr.2H
14	HANDWHEEL	MALLEABLE IRON OR EQUIVALENT
15	STEM PROTECTION COVER	PVC (TRANSPARENT)
16	GASKET	SWG (GRAFOIL)
17	Name plate (For valve tag nos.)	SS316 (2 MM THICK)
18	Painting details	No painting needs to be done as these are stainless steel body valves

NOTE:

1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. No.6 to 9 OF DATA SHEET-A.
2. MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER APPLICATION.

MATERIAL DATA SHEET
CAST STAINLESS STEEL NON RETURN VALVE

SERVICE: SEA WATER

SL.NO	PART NAME	MATERIAL (REQUIRED)
1.	Body	EQUIVALENT CAST GRADE OF SS316L
2.	Cover	EQUIVALENT CAST GRADE OF SS316L
3.	Disc (Fully guided)	EQUIVALENT CAST GRADE OF SS316L +STELLITE
4.	Disc nut/ washer	EQUIVALENT CAST GRADE OF SS316L
5.	Body seat ring	EQUIVALENT CAST GRADE OF SS316L +STELLITE
6.	Gasket	SWG SS316 (GRAFOIL)
7.	Bolts	ASTM A193 Gr.B7
8.	Nuts	ASTM A 194 Gr.2H
9.	Name plate	SS316 (2 mm Thick)
10.	Painting details	No painting needs to be done as these are stainless steel body valves

NOTE:

1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. No. 14 & 15 OF DATA SHEET-A.
2. MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER APPLICATION.

MATERIAL DATA SHEET
FORGED STAINLESS STEEL NON RETURN VALVE

SERVICE: SEA WATER

SL.NO	PART NAME	MATERIAL (REQUIRED)
1.	Body	ASTM A182 Gr.F316L
2.	Cover	ASTM A182 Gr.F316L
3.	Disc (Fully guided)	ASTM A182 Gr.F316L +STELLITE
4.	Disc nut/ washer	ASTM A182 Gr. F316L
5.	Body seat ring	ASTM A182 Gr. F316L+STELLITE
6.	Gasket	SWG SS316 (GRAFOIL)
7.	Bolts	ASTM A193 Gr.B7
8.	Nuts	ASTM A 194 Gr.2H
9.	Name plate	SS316 (2 mm Thick)
10.	Painting details	No painting needs to be done as these are stainless steel body valves

NOTE:

1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. No. 16 OF DATA SHEET-A.
2. MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER APPLICATION.

MATERIAL OF CONSTRUCTION
DUPLEX SS GATE/GLOBE VALVES

SERVICE: SEA WATER

SL.NO	PART NAME	MATERIAL REQUIRED
1	BODY	DUPLEX SS
2	BONNET/YOKE	DUPLEX SS
3	WEDGE	DUPLEX SS
4	STEM, BACK SEAT	DUPLEX SS
5	BODY SEAT RING, WEDGE/DISC SEAT RING	DUPLEX SS (BODY SEAT RING TO BE 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	SS316 (2 MM THICK)

NOTE:

1. THIS DATA SHEET IS APPLICABLE FOR ITEMS GIVEN AT SL. No. 17 TO 21 OF DATA SHEET-A.
2. MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER APPLICATION.
3. THE BIDDER SHALL CLEARLY SPECIFY THE GRADE OF DUPLEX SS MATERIAL CONSIDERED IN THE OFFER FOR THESE SL. Nos. ITEMS. THE BIDDER SHALL PROVIDE VALVES WITH SAME OR SUPERIOR GRADE DURING CONTRACT STAGE.

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		VENDOR:	QP NO.PE-QP-423-100-M004A	REV. 00 DT. 05.04.2017	SPEC. TITLE:
	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.NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CAT E-GO RY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1.0	**MATERIALS**											
1.1	BODY,BONNET, DISC, SPINDLE,	1. PHYS,CHEM,PROPS	MA	PHYS,CHEM. TESTS	ONE/ HEAT	APPD. DRG./ TECH.SPEC.	APPD. DRG./ TECH.SPEC.	TEST CERT.	2	-	1	CORRELATION REQD. FOR BODY BONNET,
		2. HEAT TREATMENT	MA	REVIEW OF H.T.	100%	-DO-	-DO-	HT(TC)	-	-	1,2	SOLUTION ANNELING FOR STAINLESS STEEL
1.2	BODY, BONNET	1) SURFACE & SUB SURFACE DEFECTS	CR	PT	100%	ASME B16.34 AND TECH. SPEC.	AMSLE B16.34 AND TECH SPEC.	TEST CERT.	2	2	1	PT FOR SS VALVES
1.3	**ELECTRICAL ACTUATORS**											
		1. TORQUE TESTING & SETTING OF TORQUE SWITCH	MA	MECH., ELEC. TESTS	100%	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET./ IS:9334	ACTUATOR CERTIFICATE	-	-	2	
		2. TRAVEL TIME	MA									
		3. OPERATION OF LIMIT SWITCH	MA									
		4. MANUAL OPERATION THROUGH HAND WHEEL	MA									
		5. OPERATION TEST WITH POWER SUPPLY VARIATION ENERGISES TO OPEN/CLOSE	MA									
		6. IR, HV,IR	MA									
		7. DEGREE OF PROTECTION	MA	WATER, DUST TEST	1/ TYPE	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET/ IS:9334	ACTUATOR CERTIFICATE	-	-	2	
		8. DESIGN VERIFICATION	MA	TYPE TEST	ONE/MODEL/ TYPE/ SIZE /RATING	IS:9334	IS:9334	ACTUATOR CERTIFICATE	-	-	2	

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		VENDOR:	QP NO.PE-QP-423-100-M004A	REV. 00 DT. 05.04.2017	SPEC. TITLE:
	SHEET 2 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.NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CAT E-GO RY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	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.O	IN-PROCESS INSPECTION											
3.1	MACHINING OF ALL COMPONENTS	1. DIMENSIONS, WORKMANSHIP AND FINISH	MA	MEAS.,VISUAL	100%	MFG.DRG.	MFG.DRG.	LOG BOOK	2	-	-	
		2.SURFACE & SUB SURFACE DEFECTS	CR	1. PT (machined hard surfaces)	100%	ASME B16.34 AND TECH SPEC.	ASME B16.34 AND TECH SPEC.	-DO-	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	CR	HYDRAULIC TEST	100% *	APPD. DRG./ TECH. SPEC.	NO LEAKAGE	INSPN REPORT	2	2,1	-	
		2. LEAK TIGHTNESS OF BACK SEAT AND SEAT	CR	HYDRAULIC TEST	100% *	APPD. DRG./ TECH. SPEC.	LEAKAGE PERMISSIBLE AS PER API 596	-DO--	2	2.1	-	
		3. LEAK TIGHTNESS OF SEAT	CR	PNEUMATIC TEST	100% *	-DO	-DO-	-DO-	2	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	OPERATION AL 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	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		VENDOR:	QP NO.PE-QP-423-100-M004A	REV. 00 DT. 05.04.2017	SPEC. TITLE:
	SHEET 3 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.NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CAT E-GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
	2.MOTOR OPERATED VALVES	1.ASCENDING & DECENDING 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	SAMP-LE	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
MA =MAJOR CHARACTERISTIC
MI = MINOR CHARACTERISTIC
PT= PENETRANT TEST,

P= PERFORMED BY
1 = PURCHASER (BHEL)

W= WITNESSED BY
2 = VENDOR

V = VERIFIED BY

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

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI	SPEC. NO :PE-TS-423-100-M001
		VENDOR:	QP NO: PE-QP-423-100-M005A REV. 0 DT. 05.04.2017	SPEC. TITLE
	SHEET 1 OF 1	SYSTEM: LP PIPING (WATER SYSTEM)	ITEM: **FORGED STEEL/DUPLEX SS NON RETURN VALVES SIZE 15 TO 50 NB CLASS 800**	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	AGENCY W	AGENCY V	REMARKS
1.0	MATERIALS											
1.1	BODY,COVER, DISC,	1. PHYSICAL, CHEMICAL PROPS.	MA	PHYS.CHEM. TESTS	1/HEAT	APPD. DRG./ TECH. SPEC.	APPD. DRG./ TECH. SPEC	T.C.	-	-	2,1	CORRELATION REQD. FOR BODY & COVER.
		2. HEAT TREATMENT	MA	REVIEW OF HT	100%	-DO-	-DO-	T.C RECORDS	-	-	2	SOLUTION ANNELING FOR STAINLESS STEEL
1.2	BODY, COVER & DISC	1. SURFACE DEFECTS	CR	PT	100%	ANSI B16.34/ TECH. SPEC.	ANSI B16.34/ TECH. SPEC.	INSPN REPORT	2	2	1	
2.0	IN PROCESS											
2.1	SS/STELLITE DEPO-SIT ON BODY SEAT RING, DISC/SEAT	1.SURFACE DEFECTS	CR	PENETRANT TEST	100%	ASTME-165	NO DEFECTS	TEST CERT.	2	2	1	
2.2	MACHINING OF ALL COMPONENTS	1.DIMENSIONS	MA	MEASUREMENT	100%	MFG.DRG.	MFG.DRG.	LOG BOOK	2	2	-	
		2.SURFACE & SUB-SURFACE DEFECTS	CR	PT	100%	ASTME-165	NO DEFECTS	INSPN. REPORT	2	2	-	
2.3	DISC. AND BODY SEAT RING	1. LAPPING	CR	BLUE MATCHING	100%	UNIFORM METAL TO METAL CONTACT		TEST CERT.	2	2	-	
3.0	ASSEMBLY	1. DIMENSIONS (overall dimensions)	MA	MEASUREMENT	100%	APPD. DRG. / TECH.SPEC.	APPD. DRG. / TECH.SPEC.	INSPN. REPORT	2	2		.
4.0	TESTING											
4.1	BODY	1. LEAK TIGHTNESS	CR	HYDRAULIC TEST	100%*	APPD. DRG. / TECH.SPEC.	NO LEAKAGE	TEST CERT.	2	2,1	-	
4.2	SEAT	1. LEAK TIGHTNESS	CR	HYDRAULIC TEST	100%*	-DO-	-DO-	-DO-	2	2,1	-	
5.0	END CONNECTION DETAILS	1. DIMENSIONS, VALVE TAG NOS	MA	MEASUREMENT/ VISUAL	100%*	APPD. DRG./ RELEVANT STANDARD	APPD. DRG./ RELEVANT STANDARD	-DO-	2	2,1	-	
6.0	PACKING	1. AS PER BHEL TECH. SPEC.	MA	VIS`UAL	100%	-DO-	-DO-	SOFT COPY OF PHOTOGRA PH	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 PT= PENETRANT TEST

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

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO.PE-QP-423-100-M004B	REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 1 OF 4	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	AGENCY W	AGENCY V	REMARKS
1.0	**MATERIALS**											
1.1	BODY,BONNET, YOKE,WEDGE/DISC, SEAT,SPINDLE, BODY SEAT, BACK SEAT, THRUST PLATE	1. PHYS,CHEM,PROPS	MA	PHYS,CHEM. TESTS	ONE/ HEAT	APPD. DRG./ TECH.SPEC.	APPD. DRG./ TECH.SPEC.	TEST CERT.	3/2	2	1	CORRELATION REQD. FOR BODY BONNET,
		2. HEAT TREATMENT	MA	REVIEW OF H.T. RECORDS	100%	-DO-	-DO-	H.T. INTERNAL INSPN RECORDS	3/2	2	2	SOLUTION ANNEALING FOR SS VALVES
		3. SURFACE DEFECTS	MA	VISUAL	100%	MSS-SP-55	MSS-SP-55	INSPN. REPORT	3/2	2	1	
1.2	BODY, BONNET & DISC/ WEDGE	**a) <u>CASTINGS</u>**										
		1. SURFACE DEFECTS	CR	PT/MPI	100%	ANSI B16.34 AND TECH. SPEC.	ANSI B16.34 AND TECH. SPEC.	INSPN REPORT	3/2	2	1	1. MPI FOR ALL SIZES & RATING FOR CCS/CAS VALVES **2.** PT FOR SS VALVES
		2. SUB-SURFACE DEFECTS	CR	RT/UT	100%	ANSI B16.34 AND TECH. SPEC.	ANSI B16.34 AND TECH. SPEC.	INSPN REPORT	3/2	2	1	**<u>RT ON CHANGE OF SECTION FOR</u>** 1. ALL SS VALVES, **(RT FILM REVIEW BY BHEL)**
		b) <u>FORGINGS</u>										
		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	1	1. .PT ALL SS VALVES
		2) SUB-SURFACE DEFECTS	CR	2. UT	100%	--DO-	--DO-	--DO-	3/2	2	1	
1.3	1. ELECTRIC ACTUATORS	1. TORQUE TESTING & SETTING OF TORQUE SWITCH	MA	MECH., ELEC. TESTS	100%	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET./ IS:9334	INSPN. REPORT	3	3/2	1, 2	
		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									

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO.PE-QP-423-100-M004B	REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 2 OF 4	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	AGENCY W	AGENCY V	REMARKS
		7. IR,HV,IR	MA	〉								
		8.DEGREE OF PROTECTION	MA	WATER, DUST TEST	1/ TYPE	TECH. SPEC./ APPD. DRG./ DATA SHEET/ IS:9334	APPD. DRG./ DATA SHEET/ IS:9334	3RD PARTY TEST CERT.	3	-	2,1	
		9. DESIGN VERIFICATION	MA	TYPE TEST	1/TYPE	-DO-	-DO-	TEST INSPN REPORT	3	-	2,1	
2.0	SS/ STELLITE DEPOSIT ON DISC & BODY SEAT, BACK SEAT	1. SURFACE DEFECTS	CR	PT	100%	ASTME:165 & TECH.SPEC.	ANSI B16.34 & TECH.SPEC.	-DO-	3/2	2	1	
		2. HARDNESS	MA	TESTING	100%	APP.DRG.	APP. DRG./ ANSI B16.34	TEST CERT.	3/2	2	1	
3.O	IN-PROCESS INSPECTION											
3.1	MACHINING OF ALL COMPONENTS INCLUDING BW ENDS	1. DIMENSIONS, WORKMANSHIP AND FINISH	MA	MEAS.,VISUAL	100%	MFG.DRG.	MFG.DRG.	LOG BOOK	3/2	-	-	
		2.SURFACE & SUB- SURFACE DEFECTS	CR	1. PT 2. MPI (ACCESSIBLE AREA OF BODY & BONNET)	100%	ANSI B16.34 AND TECH. SPEC./	ANSI B16.34 AND TECH. SPEC.	-DO-	3/2	2	1	
		3.SUB SURFACE DEFECTS (SPINDLE, BODY / DISCS SEAT RING)	CR	UT	100%	ANSI B16.34 AND TECH. SPEC./	ANSI B16.34 AND TECH. SPEC./	-DO-	3/2	2	1	1. IF DIA/THK IS EQUAL OR GREATER THAN 40 mm. 2. IF BODY/ DISC SEATS THICKNESS EQUAL OR GREATER THAN 25 MM
3.2	WEDGE/DISC & SEAT RING, SPINDLE AND BACK SEAT	1. LAPPING	CR	BLUE MATCHING	100%	UNIFORM METAL TO METAL CONTACT		INSPN. REPORT	3/2	-	2,1	
4.0	ASSEMBLY	1. DIMENSIONS	MA	MEAS.	100%	APPD.DRG.	APPD.DRG.	-DO-	3/2	2,1	-	
		2. WEAR TRAVEL	MA	MEAS.	100%	-DO-	-DO-	-DO-	3/2	2,1	-	FOR GATE VALVES ONLY
		3. VALVE LIFT	MA	MEAS.	100%	-DO-	-DO-	-DO-	3/2	2,1	-	
5.0	TESTING											
5.1	BODY, SEAT, BACK SEAT	1. LEAK TIGHTNESS OF BODY	CR	HYDRAULIC TEST	100%*	APPD. DRG./ TECH. SPEC.	NO LEAKAGE	INSPN REPORT	3/2	2,1	-	REFER NOTE
		2. LEAK TIGHTNESS OF BACK SEAT AND SEAT	CR	HYDRAULIC TEST	100%*	APPD. DRG./ TECH. SPEC.	LEAKAGE PERMISSIBLE AS PER API 598	-DO--	3/2	2.1	-	REFER NOTE
		3. LEAK TIGHTNESS OF SEAT	CR	PNEUMATIC TEST	100%*	-DO	-DO-	-DO-	3/2	2.1	-	REFER NOTE

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO.PE-QP-423-100-M004B	REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 3 OF 4	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	AGENCY W	AGENCY V	REMARKS
5.2	SEAT & BACK SEAT FOR MOTORISED/ PNEU. VALVES WITH ACTUATOR	1. LEAK TIGHTNESS OF SEAT	CR	HYDRUALIC TEST	100%*	APPD. DRG./ TECH. SPEC.	--DO--	INSPN REPORT	3/2	2.1	-	
5.3	OPERATION AL TESTING											
	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	CR	ELEC.	100%*	TECH. SPEC./ IS:9334	APP. DRG./ TECH. SPEC./ IS:9334	INSPN. REPORT	3/2	2,1	-	
		2. LIMIT/TORQUE SWITCH SETTING FOR OPENING AND CLOSING TIME	CR	ELEC.	100%*	APP. DRG./ TECH. SPEC./ IS:9334	TECH. SPEC./ APPD.DRG	INSP. REPORT	3/2	2,1	-	
6.0	COMPLETE VALVES	1. OVERALL DIMENSION	MA	MEAS	SAMP-LE	APPD.DRG	APP.DRG.	-DO-	3/2	2,1	-	
7.0	END CONNECTION DETAILS	1. DIMENSIONS	MA	MEAS.	100%	APPD. DRG. / RELV.STD	APPD. DRG. / RELV.STD	-DO-	3/2	2,1	-	
8.0	FINAL INSPECTION	1. CLEANLINESS & COMPLETENESS, NAME WITH VALVE TAG NOS.	MA	VISUAL	100%	APPD. DRG./TECH. SPEC.	APPD. DRG./ TECH. SPEC	INSPN. REPORT	3/2	2	2,1	
9.0	PAINTING	1. SURFACE PREPARATION	MI	VISUAL	100%	TECH.SPEC.	TECH. SPEC.	-DO-	3/2	2	2,1	
		2. UNIFORMITY & THICKNESS	MI	MEASUREMENT	100%	-DO-	-DO-	-DO-	3/2	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 W = WITNESSED BY V = VERIFIED BY
MA =MAJOR CHARACTERISTIC 1 = PURCHASER (BHEL) 2 = VENDOR 3 = SUB VENDOR OF THE VENDOR
MI = MINOR CHARACTERISTIC

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

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO.PE-QP-423-100-M004B	REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 4 OF 4	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	REMARKS

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	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
05.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI	SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO: PE-QP-423-100-M005B REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 1 OF 3	SYSTEM: POWER CYCLE/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	AGENCY P	AGENCY W	AGENCY V	REMARKS
1.0	MATERIALS											
1.1	BODY,COVER,BODY, SEAT RING, DISC, HINGE, HINGE PIN	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.
		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) CASTINGS** 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) FORGINGS 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											
2.1	SS/STELLITE DEPO-SIT ON BODY SEAT	1.SURFACE DEFECTS	CR	PENETRANT TEST	100%	ASTME-165	NO DEFECTS	TEST CERT.	3/2	2	1	

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
04.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO: PE-QP-423-100-M005B	REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 2 OF 3	SYSTEM: POWER CYCLE/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	AGENCY P	AGENCY W	AGENCY V	REMARKS
	RING, DISC/SEAT	2. HARDNESS	MA	MEASUREMENT	100%	APPD. DRG	APPD. DRG/ ANSI B16.34	TEST CERT.	3/2	2	1	
2.2	MACHINING OF ALL COMPONENTS INCLUDING BW ENDS	1.DIMENSIONS	MA	MEASUREMENT	100%	MFG.DRG.	MFG.DRG.	LOG BOOK	3/2	-	-	
		2.SURFACE & SUB-SURFACE DEFECTS	CR	1. PT 2. MPI (ACCESSIBLE AREA OF BODY & BONNET)	100%	ASTME-165	NO DEFECTS	INSPN. REPORT	3/2	2	1	
		3 SUB SURFACE DEFECTS (HINGE PIN,BODY & DISC SEAT RINGS)	CR	UT	100%	ANSI B16.34 AND TECH. SPEC./	ANSI B16.34 AND TECH. SPEC./	TEST CERT.	3/2	2	1	1. IF DIA/THK IS EQUAL OR GREATER THAN 40 mm. 2. IF BODY/ DISC SEATS THICKNESS EQUAL OR GREATER THAN 25 MM
2.3	DISC. AND BODY SEAT RING	1. LAPPING	CR	BLUE MATCHING	100%	UNIFORM METAL TO METAL CONTACT		TEST CERT.	3/2	--	2,1	
3.0	ASSEMBLY	1. DIMENSIONS	MA	1. MEASUREMENT	100%	APPD. DRG. / TECH.SPEC.	APPD. DRG. / TECH.SPEC.	INSPN. REPORT	3/2	2		
4.0	TESTING											
4.1	BODY	1. LEAK TIGHTNESS	CR	HYDRAULIC TEST	100%	APPD. DRG. / TECH.SPEC.	NO LEAKAGE	TEST CERT.	3/2	-	2,1	REFER NOTE
4.2	SEAT	1. LEAK TIGHTNESS	CR	HYDRAULIC TEST 1. AT SPECIFIED PRESSURE 2. AT 25% OF SEAT TEST PRESSURE	100%*	-DO-	-DO-	-DO-	3/2	2,1	-	REFER NOTE
4.3	COMPLETE VALVE	PERFORMANCE	CR	OPERATION OF FLAP	100%*	TECH. SPEC.	TECH. SPEC.	INSPN. REPORT	3/2	2,1	-	
5.0	END CONNECTION DETAILS	1. DIMENSIONS, VALVE TAG NOS	MA	MEASUREMENT/ VISUAL	100%*	APPD. DRG./ RELEVANT STANDARD	APPD. DRG./ RELEVANT STANDARD	-DO-	3/2	2,1	-	
6.0	PAINTING	1. QUALITY AND THICK-NESS OF PAINT	MA	VISUAL AND MEASUREMENT	100%	TECH. SPEC.	TECH.SPEC.	T.C.	3/2	2	1	For CS/AS body valves only.
7.0	PACKING	1. AS PER BHEL TECH. SPEC.	MA	VISUAL	100%	-DO-	-DO-	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

BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
04.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

	QUALITY PLAN	CUSTOMER: TANGEDCO	PROJECT: 1x800MW NORTH CHENNAI		SPEC. NO :PE-TS-423-100-M001
		BIDDER/VENDOR:	QP NO: PE-QP-423-100-M005B	REV. 00 DT. 05.04.2017	SPEC. TITLE
	SHEET 3 OF 3	SYSTEM: POWER CYCLE/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	AGENCY P W V	REMARKS

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BHEL	PARTICULARS	BIDDER/VENDOR	
Prabhjyot Singh	NAME		
	SIGNATURE		
04.04.2017	DATE		BIDDER'S/ VENDOR'S COMPANY SEAL

BHEL Maharatna Company	**COMPLIANCE SHEET** **STEEL GATE/GLOBE/NRV-** **WATER SERVICE**	SPECIFICATION NO. PE-TS-423-100-M016	
		SECTION : II	
		REV. NO.: 00	DATE: 05.04.2017
		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.

B. Specify DUPLEX SS grade for items at Sl. No. 17 to 21 of Data Sheet-A.
(***-** THE BIDDER SHALL PROVIDE VALVES WITH THE SAME OR SUPERIOR GRADE DURING CONTRACT STAGE)

Name of Bidder / Authorized Representative :- _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Designation :- _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Signature :- _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Company Seal :- _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Date :- _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

FORM NO. PEM-6666-0

	SPECIFICATION FOR MOTORISED VALVE ACTUATOR 1X800MW NORTH CHENNAI	SPECIFICATION NO.: PE-SS-423-145-I007
		REV. NO. 01
		DATE: 03.03.17
		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	1x 800 MW NORTH CHENNAI PROJECT	
	OFFER REFERENCE		
	* TAG NO. SERVICE		
	* DUTY	■ 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.	
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	
	@ 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	

FORM NO. PEM-6666-0

	SPECIFICATION FOR MOTORISED VALVE ACTUATOR 1X800MW NORTH CHENNAI	SPECIFICATION NO.: PE-SS-423-145-I007 REV. NO. 01 DATE: 03.03.17 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)
	@ 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)	
	IF SMART		
	a) SERIAL LINK INTERFACE	☐ INTEGRAL ☐ FIELD MOUNTED	
	b) SERIAL LINK PROTOCOL	☐ FOUNDATION FIELD-BUS ☐ PROFI-BUS ☐ DEVICE NET ☐……	
	c) SERIAL LINK MEDIA	☐ TWISTED PAIR Cu-CBL ☐ CO-AXIAL Cu-CBL ☐ OFC	
	d) HAND HELD PROGRAMMER	☐ REQUIRED ☐ NOT REQUIRED	
	e) TYPE OF HAND HELD PROGRAMMER	☐ BLUETOOTH ☐ INFRARED ☐.....	
	f) MASTER STATION	☐ REQUIRED ☐ NOT REQUIRED	
	g) MASTER STN INTRFACE WITH DCS	☐ MODBUS ☐ TCP/IP	
	h) DETAILS OF SPECIAL CABLE	☐ ENCLOSED ☐ NOT REQUIRED	
	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 (O/L RELAY OPERATED, CONT./POWER SUPPLY FAILED, S/S IN LOCAL or OFF MODE/STOP PB OPTD, TORQUE SWITCH OPTD. MID WAY/MOTOR THERMOSTAT TRIP)	
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) **($$ Refer Notes)**	MFR & MODEL NO.	BIDDER TO SPECIFY	
	OPEN / CLOSE	☐1 No. ■2Nos. / ☐1 No. ■2Nos	1
	CONTACT TYPE	2 NO + 2 NC	
	RATING	5A 240V AC AND 0.5A 220V DC	
	CALIBRATED KNOBS(OPEN&CLOSE TS)	REQUIRED FOR SETTING DESIRED TORQUE	
	ACCURACY	+3% OF SET VALUE	
LIMIT SWITCH (Not Applicable for Smart Actuator) **($$ 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	

FORM NO. PEM-6666-0

BHEL	**SPECIFICATION FOR MOTORISED VALVE ACTUATOR 1X800MW NORTH CHENNAI**	SPECIFICATION NO.: PE-SS-423-145-I007 REV. NO. 01 DATE: 03.03.17 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	1
	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. ☐ ----------	1
CABLE GLANDS	@ POWER CABLE GLAND	SIZE: suitable for 3Cx2.5sq mm for motor rating 3.7 kW, 3Cx10 sq mm fr motor from 3.7 kW to 5.5 kW.	
	@ SPACE HEATER CABLE GLAND	SIZE:-Space heater cable gland to be derived internally.	
	OTHER CONTROL CABLE GLANDS-2	QUANTITY & SIZE :-------- (8Px0.5 sq mm)	
WEIGHT	TOTAL WEIGHT (ACTUATOR + ACCESSORIES)	BIDDER TO SPECIFY	_____ Kg.

NOTES:

1. **SCOPE**: DESIGN, MANUFACTURE, INSPECTION, TESTING AND DELIVERY TO SITE OF ELECTRIC ACTUATOR FOR INCHING OR OPEN / CLOSE DUTY.
2. **CODES & STANDARDS**: DESIGN AND MATERIALS USED SHALL COMPLY WITH THE RELEVANT LATEST NATIONAL AND INTERNATION 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
3. TEMPERATURE RISE SHALL BE RESTRICTED TO 70 DEG. C FOR AMBIENT TEMPERATURE OF 50 DEG C.
4. CABLE GLANDS OF DOUBLE COMPRESSION TYPE, BRASS MATERIAL SHALL BE PROVIDED.
5. 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.
6. 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%.
7. THE MOTOR SHALL BE SUITABLE FOR DIRECT ON LINE STARTING.
8. 2 No. OF EARTHING TERMINALS SHALL BE PROVIDED FOR THE MOTOR BODY EARTHING. 1
9. IN ADDITION TO ABOVE, 2 No. OF CABLE GLANDS (NPT) SHALL BE PROVIDED.
10. LOCAL DIGITAL POSITION INDICATOR SHALL BE PROVIDED FOR INCHING DUTY DRIVES.

$$ 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