

Annexure I- Item wise Details-SS BALL VALVES for HINDALCO-ADITYA R&M, WBPDCS Sagardighi 2X500 MW Denox system & SAGARDIGHI U-5 TPP 1X660 Projects.

PR NO	Package	Project	Material code	Description	QTY	UOM	Delivery location	Delivery period	Specification	Quality Plan
131713184	Package A	WBPDCS Sagardighi 2X500 MW Denox system	L750118090101001	SS BALL VALVE NB15 CL800 SW	90	NO	BHEL Trichy stores	30 days from PO	PC:TSP:SAGARDIGHI:BV	QPG -38 Rev 02
131713184	Package A	WBPDCS Sagardighi 2X500 MW Denox system	L750118090101002	SS BALL VALVE NB25 CL800 SW	50	NO	BHEL Trichy stores	30 days from PO	PC:TSP:SAGARDIGHI:BV	QPG -38 Rev 02
135127652	Package B	HINDALCO-ADITYA R&M	L441118090101001	SS BALL VALVE NB15 CL800 SW	45	NO	HINDALCO-ADITYA R&M Project site	15 days from PO	PC:TSP:HINDALCO:BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105001	SS BALL VALVE NB15 CL800 SW	964	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105002	SS BALL VALVE NB25 CL800 SW	145	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105003	SS BALL VALVE NB40 CL800 SW	2	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105004	SS BALL VALVE NB50 CL800 SW	25	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105005	SS BALL VALVE NB65 CL150 BW	4	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105006	SS BALL VALVE NB80 CL150 BW	1	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105007	SS BALL VALVE NB100 CL150 FL	2	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363631	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090105008	SS BALL VALVE NB150 CL150 BW	2	NO	SAGARDIGHI U-5 TPP 1X660 MW Project site	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103001	SS BALL VALVE NB15 CL800 SW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103002	SS BALL VALVE NB25 CL800 SW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103003	SS BALL VALVE NB40 CL800 SW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103004	SS BALL VALVE NB50 CL800 SW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103005	SS BALL VALVE NB65 CL150 BW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103006	SS BALL VALVE NB80 CL150 BW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103007	SS BALL VALVE NB100 CL150 FL	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
135363630	Package C	SAGARDIGHI U-5 TPP 1X660 MW	L741118090103008	SS BALL VALVE NB150 CL150 BW	1	NO	BHEL Trichy stores	45 days from PO	PE:TSP:SAGARDIGHI:SS-BV	QPG -38 Rev 02
					1338					



TECHNICAL PRE QUALIFICATION REQUIREMENTS (PQR) FOR SS BALL VALVES

REFERENCE: TECHNICAL SPECIFICATION OF SS BALL VALVES

1. The vendor shall be an established **SS Ball Valve** supplier and having adequate Engineering, Manufacturing, Testing, Inspection and Servicing facilities and shall furnish technical backup documents in proof for above requirements.
2. The vendor shall have experience of having supplied **SS Ball Valve** as per the technical specification and datasheet for power plants or application of similar severity. Supply reference list with details of PO, PO date, customer name, application, size and class shall be submitted.
3. The **SS Ball Valve** offered shall be from the existing regular supply range of the vendor. Vendor shall provide the product catalogue.
4. Proven track record is required. Minimum One end user certificate for the satisfactory operational performance of their product supplied meeting requirements specified in enquiry specification or higher.

(or)

successfully executed two POs for same or superior item meeting requirements specified in enquiry specification. Vendor to submit the corresponding datasheets / drawings / technical documents of supplied item as per POs / end user certificate.

5. In case of ordering, the Vendor shall have the responsibility for the following and same to be confirmed point wise.
 - i) Vendor should have the component replacement responsibility in case of defect / failure.
 - ii) Vendor shall have capability to provide assistance in commissioning activities at site, if required.
 - iii) Vendor should ensure the product performance during erection & commissioning and ensure performance guarantee.
6. Backup document checklist to meet PQR to the fullest satisfaction of BHEL:

S. No	Document description	Check list	Name of the document furnished by vendor (Document Description / Number)
1	Documents to meet clause(1)	<input type="checkbox"/>	
2	Supply reference document (General reference list) to meet clause (2)	<input type="checkbox"/>	
3	Product Catalogues to meet clause (3)	<input type="checkbox"/>	
4	Min. one end user certificate (or) Two POs to meet clause (4)	<input type="checkbox"/>	
5	Confirmation to clause meet clause (5)	<input type="checkbox"/>	

Vendor Signature and Seal



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:HINDALCO:BV	00	1 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

HINDALCO Cust no: 4411

CONTENTS

1.0 SCOPE OF SUPPLY & CODES AND STANDARDS

2.0 DESIGN REQUIREMENTS

3.0 CONSTRUCTION FEATURES

4.0 SHOP INSPECTION AND TESTS

5.0 CLEANING AND PROTECTION FOR DESPATCH

6.0 DATA / DOCUMENTS / DRAWINGS TO BE FURNISHED WITH THE BID

7.0 POST CONTRACT DATA AND DRAWINGS

DATA SHEET – A - DOCUMENT TO BE FURNISHED AFTER AWARD OF CONTRACT.

DATA SHEET – B - BALL VALVE DATA SHEET.

00	31.07.2022	Fresh Issue	S ARUN SHARMA	P SURESH	C.SARAVANAN
Rev	Date	Purpose	Prepared	Checked	Approved



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:HINDALCO:BV	00	2 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

1.0 SCOPE OF SUPPLY & CODES AND STANDARDS

- 1.1 The Ball valves are to be supplied as details in Data Sheet – B of this specification.
- 1.2 The design, material, construction features, manufacture, inspection and testing of valves shall conform to the latest applicable codes and standards (BS 5351/IS 17292 or equivalent).

2.0 DESIGN REQUIREMENTS

- 2.1 Valves shall be of 3-piece construction and full bore type and shall be designed according to the guidelines mentioned in the applicable standard. Valves above Nb 50 two-piece construction can also be offered.

2.2 MATERIAL SELECTION

- 2.2.1 Unless otherwise specified in valve data sheet, the ball valves shall be offered with the following materials.

- 2.2.1.1 Body and end pieces : SA182F304 (uptp 50NB) / CF8 (above 50NB)
(Forged body upto NB50, Cast body above 50NB)
- 2.2.1.2 Ball, stem and gland : Stainless steel as per AISI-316 or equivalent
- 2.2.1.3 Body seats and gland seal : PTFE or equivalent (Asbestos not acceptable)

- 2.2.2 The materials of construction of remaining parts shall be as per the relevant standard governing the valve.

3.0 CONSTRUCTION FEATURES

3.1 End Connections

- 3.1.1 For NB50 and below - All valves with Socket Weld ends.
- 3.1.2 For above NB 50 - All valves with Flange ends. SS - Counter flange on both sides (ASME B16.5 CL 150 SS304), Non-asbestos gasket and SS –fasteners is in vendor scope of supply.
- 3.2 All the valves shall be provided with integral stop on body limiting quarter turn operation.
- 3.3 All the ball valves shall be of tight shut off type and the lever shall be so designed that it is parallel to the flow passage of the ball.
- 3.4 All the ball valves shall be fitted with steel lever and shall be closed by turning the lever in the clockwise direction. The direction of closing the valve and shut position shall be marked on the valves.



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:HINDALCO:BV	00	3 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

- 3.5 Unless otherwise specified elsewhere, each lever shall be fitted with a nameplate indicating the valve tag number. The valve tag number shall also be stamped on a metal tag and shall be securely wired to lever of the valves.

4.0 SHOP INSPECTION AND TESTS

As per Standard manufacturing quality plan

5.0 CLEANING AND PROTECTION FOR DESPATCH

- 5.1 Valve ends shall be protected from external damage and sealed against the ingress of dirt. Valves shall be protected by means of polythene caps / rubber end protectors.
- 5.2 All the valves shall be packed suitably in wooden cases in order to avoid damage during Transit and also during storage at Site.

6.0 DATA/DOCUMENTS/DRAWINGS TO BE FURNISHED WITH THE BID

The offer must be submitted in 5 number of copies along with Data Sheet 'A' and the following documents for each size.

- 6.1 Relevant drawings / leaflets for the offered valves showing following information.
- 6.1.1 Complete cross sectional arrangement of the valve.
- 6.1.2 Binding dimensions, dismantling clearances and weight.
- 6.1.3 Bill of material incorporating all the materials of construction of various parts along with IS/BS/ASTM/AISI standards to which the materials conform to.
- 6.1.4 Special features, if any.
- 6.2 Operation and maintenance manual for valves.
- 6.3 Catalogue for the various ranges of production.
- 6.4 Quality Plan.
- 6.5 Detailed surface preparation and painting procedures.
- 6.6 Deviations
Deviations, if any, to the technical specifications shall be clearly mentioned in the offer.



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:HINDALCO:BV	00	4 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

7.0 POST CONTRACT DATA AND DRAWINGS

Data, documents and drawings to be furnished by the vendor after award of the contract are indicated in the Data Sheet-B.

DATA SHEET-A

The following final data / documents shall be furnished by the vendor after the award of the contract.

Sl. No	Description	No of copies
1	Certified final drgs. Showing the sectional arrgt. of valves, bill of material, dimensional details, test pressure and weight	1CD + 20
2	Operation and Maintenance Instructions for valves	20
3	Catalogue for the equipment supplied	5 sets
4	Storage Instructions	20
5	List of recommended lubricants to be used on valves	15
6	Hydraulic/air test certificate for body/seat/back seat	1 reproducible + 3 copies
7	Material test certificate/test report for materials	-do-
8	Quality plan(QP)	-do-
9	All other test reports as per Quality plan	-do-
10	Detailed surface preparation and painting procedure	5 copies
11	Detailed packing procedure	5 copies

Note: The above list is only indicative. However the successful bidder shall prepare a detailed schedule of drawings/documents, which shall be mutually agreed upon, and the same shall be indicated in the contract document/ordering specification.



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:HINDALCO:BV	00	5 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION


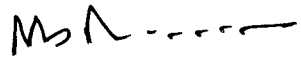

DATA SHEET - B


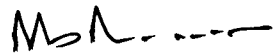

DATA SHEET FOR STAINLESS STEEL BALL VALVES


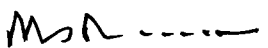

Sl. no	Valve Size	Class Rating	End Connection	Design Pr. Kg/cm ² (g)	Design Temp. Deg C	Body material (SS)	Operation	Connecting Pipe size. OD x T	Qty
01	NB 15	800	SW	10.0	50	SA182F304	HW	21.3 X 2.77	45


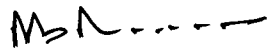

Assembly procedure of the valves with matching Stainless steel pipes. (Bidder to specify the necessary sealant material for leak proof assembly with the SS pipes)

SS - Counter flange on both sides (ASME B16.5 SS304), Non-asbestos gasket and SS –fasteners is in vendor scope of supply.

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE						QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1.0	RAWMATERIAL & BOUGHT-OUT ITEMS (BOI)													MTC - Mill Test Certificate(refer Note 1 & 2)		
1.1	Body, Adaptor, End Piece, Tail Piece, Ball (Forgings / Castings)	Identification Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Inward Receipt Report	--	3	--	2	--				
1.2		Chemical Composition & Mechanical properties	Major	Verification of MTC	One per Heat	As per BHEL approved Drg. / Technical Specification.	MTC	✓	3	--	2	--				
1.3		Surface Defects/Finish	Major	Visual	100%	MSS SP - 55	Inspection Report	✓	3	--	2	--				
1.4		Heat Treatment (applicable for Castings)	Critical	Verification of TC / HT Chart	100%	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	--	2	--				
1.5		Hardness (applicable for Forgings)	Major	Hardness Test	One per Size per Batch	As per BHEL approved Drg. & Relevant Material Specification	Inspection Report	✓	3	--	2	--				
1.6	Bars for Stem, Trim parts, Gland (Rolled Sec. / Forgings) & Fasteners	Identification Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Inward Receipt Report	--	3	--	2	--				
1.7		Chemical Composition & Mechanical properties	Major	Verification of MTC	One per Size	As per BHEL approved Drg. / Technical Specification.	MTC	✓	3	--	2	--	Refer Note 1 & 2			
1.8		Surface Defects/Finish	Major	Visual	100%	MSS SP - 55	Inspection Report	✓	3	--	2	--				
1.9		Internal defects in Bars (applicable if Dia. > 50mm).	Critical	Ultrasonic Test (UT)	100%	ASTM A 388	ANSI B 16.34	UT Report	✓	3	--	2	--			
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required .																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGO VAN 		PAGE : 1 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE					QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011					
REF: 1) BHEL TECH. SPECIFICATION														
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS
									D	P	W	V	H	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.0	INPROCESS CONTROL													
2.1	Machining of Body End connection, Ball, Stem & Gland	Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Internal QC Report		--	3	--	2	--	
2.2		Surface Finish	Major	Visual	100%	As per BHEL approved Drg. / Internal Procedure			--	3	--	2	--	
2.3	Ball & Stem	Surface Defects	Critical	Dye Penetrant Test (PT)	100%	ASTM E 165 & ANSI B 16.34	No Defects	Inspection Report	✓	3	--	2	--	
2.4	Ball & Seat	Surface conformity by Blue Matching	Critical	Visual	100%	As per BHEL approved Drg. / Internal Procedure	Uniform Contact	Inspection Report	✓	3	--	2	--	
2.5	Galvanising of Valve body and other accessories	Surface Preparation	Major	Visual	100%	IS 2629, BHEL approved Drg. & Technical Specification.		Internal QC Report	--	3	--	2	--	
2.6		Mass & Uniformity of Zinc Coating	Major	Sample / Strip Test	on Sample Piece			Inspection Report	✓	3	--	2	--	
2.7		Adhesion of Zinc Coating	Major	Adhesion Test	on Sample Piece			Inspection Report	✓	3	--	2	--	
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; D - "✓" mark in this column indicates that Document is required .														
PREPARED : M.S.MURALIDHARAN 														APPROVED BY: P. ELANGO VAN 
														PAGE : 2 of 4

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE						QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
3.0	TESTS															
3.1	Body Shell Hydro static Pressure test	Body Shell Structural Integrity & Strength	Critical	Hydro Test (HT)	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--	£ -100% by mfr & 10% by BHEL at random or min 1 no. Test Pressure & Pressure holding time as per Technical Specification.		
3.2	Valve Seat Hydro static Pressure test	Valve Seat Leak Tightness	Critical	Hydro Test (HT)	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--			
3.3	Valve Seat Pneumatic test	Valve Seat Leak Tightness	Critical	Pneumatic Test	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--			
3.4	Fire Safe test	Valve Performance in Fire Environment	Critical	Fire Safe test (Type Test)	100% £	BHEL approved Drg. & Technical Specification.		Test Report	✓	3	2	--	--	Applicable for Fuel Oil Applications		
4.0	ASSEMBLED VALVE															
4.1	Valve final assembly	Completeness	Major	Visual	100% £	As per BHEL approved Drg. / Technical Specification. / Internal Procedure	Internal QC Report	--	3	2	--	--				
4.2		Opening & Closing of Valve	Major	Valve Operation	100% £		Test Report	✓	3	2	--	--				
4.3	Antistatic Test (if applicable)	Electrical Continuity	Major	Continuity Test	One / Size / Lot	BS 5351 Amd. 2	Test Report	✓	3	2	--	--				
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required.																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGO VAN 		PAGE : 3 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE					QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
Sl. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5.0	FINAL INSPECTION															
5.1	Ball Valve	Surface condition Correctness of Assembly	Major	Visual	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.2		Over all Dimension	Major	Measurement	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.3		End Connection Details	Major	Visual & Measurement	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.2	Marking & Identification	Name Plate Details	Major	Visual & Verification	100%	As per BHEL approved Drg. / Technical Specification./ PO	Inspection Report	--	3	--	2	--				
5.3	Valve End Protection	Damage Control	Major	Visual & Verification	100%	As per BHEL approved Drg. / Technical Specification./ PO	Inspection Report	--	3	--	2	--				
5.4	Packing	Transit Worthy	Major	Visual	100%	As per BHEL approved Drg. / Technical Specification./ Internal Procedure	Inspection Report	--	3	--	2	--				
5.5	Inspection Clearance	Documentation & Certification	Major	Verification	100%	All relevant Documents as per this QAP are required	Inspection Report	✓	3	--	2	2	CHP - Customer Hold Point			
Notes: 1 There shall be correlation with raw material test certificates. 2 Chemical analysis & Mechanical tests shall be performed in approved laboratories. Calibrated instruments shall be used during testing.																
LEGEND: 1 - Coustomer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required .																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGOVAN 		PAGE : 4 of 4	



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	1 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

SAGARDIGHI TPEP Unit# 3&4, 2X500MW
Cust no: 7501

CONTENTS

1.0 SCOPE OF SUPPLY & CODES AND STANDARDS

2.0 DESIGN REQUIREMENTS

3.0 CONSTRUCTION FEATURES

4.0 SHOP INSPECTION AND TESTS

5.0 CLEANING AND PROTECTION FOR DESPATCH

6.0 DATA / DOCUMENTS / DRAWINGS TO BE FURNISHED WITH THE BID

7.0 POST CONTRACT DATA AND DRAWINGS

DATA SHEET – A - DOCUMENT TO BE FURNISHED AFTER AWARD OF CONTRACT.

DATA SHEET – B - BALL VALVE DATA SHEET.

00	23.03.2022	Fresh Issue	S ARUN SHARMA	P SURESH	P SURESH
Rev	Date	Purpose	Prepared	Checked	Approved (Mech)



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	2 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

1.0 SCOPE OF SUPPLY & CODES AND STANDARDS

- 1.1 The Ball valves are to be supplied as details in Data Sheet – B of this specification.
- 1.2 The design, material, construction features, manufacture, inspection and testing of valves shall conform to the latest applicable codes and standards (BS 5351/IS 17292 or equivalent).

2.0 DESIGN REQUIREMENTS

- 2.1 Valves shall be of 3-piece construction and full bore type and shall be designed according to the guidelines mentioned in the applicable standard. Valves above Nb 50 two-piece construction can also be offered.

2.2 MATERIAL SELECTION

- 2.2.1 Unless otherwise specified in valve data sheet, the ball valves shall be offered with the following materials.
- 2.2.1.1 Body and end pieces : SA182F304 (uptp 50NB) / CF8 (above 50NB)
(Forged body upto NB50, Cast body above 50NB)
- 2.2.1.2 Ball, stem and gland : Stainless steel as per AISI-316 or equivalent
- 2.2.1.3 Body seats and gland seal : PTFE or equivalent (Asbestos not acceptable)
- 2.2.2 The materials of construction of remaining parts shall be as per the relevant standard governing the valve.

3.0 CONSTRUCTION FEATURES

3.1 End Connections

- 3.1.1 For NB50 and below - All valves with Socket Weld ends.
- 3.1.2 For above NB 50 - All valves with Flange ends. SS - Counter flange on both sides (ASME B16.5 CL 150 SS304), Non-asbestos gasket and SS –fasteners is in vendor scope of supply.
- 3.2 All the valves shall be provided with integral stop on body limiting quarter turn operation.
- 3.3 All the ball valves shall be of tight shut off type and the lever shall be so designed that it is parallel to the flow passage of the ball.
- 3.4 All the ball valves shall be fitted with steel lever and shall be closed by turning the lever in the clockwise direction. The direction of closing the valve and shut position shall be marked on the valves.



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	3 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

- 3.5 Unless otherwise specified elsewhere, each lever shall be fitted with a nameplate indicating the valve tag number. The valve tag number shall also be stamped on a metal tag and shall be securely wired to lever of the valves.

4.0 SHOP INSPECTION AND TESTS

As per Standard manufacturing quality plan

5.0 CLEANING AND PROTECTION FOR DESPATCH

- 5.1 Valve ends shall be protected from external damage and sealed against the ingress of dirt. Valves shall be protected by means of polythene caps / rubber end protectors.
- 5.2 All the valves shall be packed suitably in wooden cases in order to avoid damage during Transit and also during storage at Site.

6.0 DATA/DOCUMENTS/DRAWINGS TO BE FURNISHED WITH THE BID

The offer must be submitted in 5 number of copies along with Data Sheet 'A' and the following documents for each size.

- 6.1 Relevant drawings / leaflets for the offered valves showing following information.
- 6.1.1 Complete cross sectional arrangement of the valve.
- 6.1.2 Binding dimensions, dismantling clearances and weight.
- 6.1.3 Bill of material incorporating all the materials of construction of various parts along with IS/BS/ASTM/AISI standards to which the materials conform to.
- 6.1.4 Special features, if any.
- 6.2 Operation and maintenance manual for valves.
- 6.3 Catalogue for the various ranges of production.
- 6.4 Quality Plan.
- 6.5 Detailed surface preparation and painting procedures.
- 6.6 Deviations
Deviations, if any, to the technical specifications shall be clearly mentioned in the offer.



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	4 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

7.0 POST CONTRACT DATA AND DRAWINGS

Data, documents and drawings to be furnished by the vendor after award of the contract are indicated in the Data Sheet-B.

DATA SHEET-A

The following final data / documents shall be furnished by the vendor after the award of the contract.

Sl. No	Description	No of copies
1	Certified final drgs. Showing the sectional arrgt. of valves, bill of material, dimensional details, test pressure and weight	1CD + 20
2	Operation and Maintenance Instructions for valves	20
3	Catalogue for the equipment supplied	5 sets
4	Storage Instructions	20
5	List of recommended lubricants to be used on valves	15
6	Hydraulic/air test certificate for body/seal/back seat	1 reproducible + 3 copies
7	Material test certificate/test report for materials	-do-
8	Quality plan(QP)	-do-
9	All other test reports as per Quality plan	-do-
10	Detailed surface preparation and painting procedure	5 copies
11	Detailed packing procedure	5 copies

Note: The above list is only indicative. However the successful bidder shall prepare a detailed schedule of drawings/documents, which shall be mutually agreed upon, and the same shall be indicated in the contract document/ordering specification.



Bharat Heavy Electricals Limited
Piping Centre Chennai-17

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	5 OF 5

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION


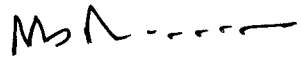

DATA SHEET - B


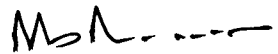

DATA SHEET FOR STAINLESS STEEL BALL VALVES


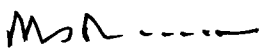

Sl. no	Valve Size	Class Rating	End Connection	Design Pr. Kg/cm ² (g)	Design Temp. Deg C	Body material (SS)	Operation	Connecting Pipe size. OD x T	Unit-3&4 qty
01	NB 15	800	SW	10.0	50	SA182F304	HW	21.3 X 2.77	90
02	NB 25	800	SW	10.0	50	SA182F304	HW	33.4 X 3.38	50


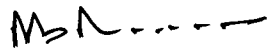

Assembly procedure of the valves with matching Stainless steel pipes. (Bidder to specify the necessary sealant material for leak proof assembly with the SS pipes)

SS - Counter flange on both sides (ASME B16.5 SS304), Non-asbestos gasket and SS –fasteners is in vendor scope of supply.

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE						QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1.0	RAWMATERIAL & BOUGHT-OUT ITEMS (BOI)													MTC - Mill Test Certificate(refer Note 1 & 2)		
1.1	Body, Adaptor, End Piece, Tail Piece, Ball (Forgings / Castings)	Identification Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Inward Receipt Report	--	3	--	2	--				
1.2		Chemical Composition & Mechanical properties	Major	Verification of MTC	One per Heat	As per BHEL approved Drg. / Technical Specification.	MTC	✓	3	--	2	--				
1.3		Surface Defects/Finish	Major	Visual	100%	MSS SP - 55	Inspection Report	✓	3	--	2	--				
1.4		Heat Treatment (applicable for Castings)	Critical	Verification of TC / HT Chart	100%	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	--	2	--				
1.5		Hardness (applicable for Forgings)	Major	Hardness Test	One per Size per Batch	As per BHEL approved Drg. & Relevant Material Specification	Inspection Report	✓	3	--	2	--				
1.6	Bars for Stem, Trim parts, Gland (Rolled Sec. / Forgings) & Fasteners	Identification Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Inward Receipt Report	--	3	--	2	--				
1.7		Chemical Composition & Mechanical properties	Major	Verification of MTC	One per Size	As per BHEL approved Drg. / Technical Specification.	MTC	✓	3	--	2	--	Refer Note 1 & 2			
1.8		Surface Defects/Finish	Major	Visual	100%	MSS SP - 55	Inspection Report	✓	3	--	2	--				
1.9		Internal defects in Bars (applicable if Dia. > 50mm).	Critical	Ultrasonic Test (UT)	100%	ASTM A 388	ANSI B 16.34	UT Report	✓	3	--	2	--			
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required.																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGO VAN 		PAGE : 1 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE					QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011						
REF: 1) BHEL TECH. SPECIFICATION															
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS	
									D	P	W	V	H		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
2.0	INPROCESS CONTROL														
2.1	Machining of Body End connection, Ball, Stem & Gland	Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Internal QC Report	--	3	--	2	--			
2.2		Surface Finish	Major	Visual	100%	As per BHEL approved Drg. / Internal Procedure		--	3	--	2	--			
2.3	Ball & Stem	Surface Defects	Critical	Dye Penetrant Test (PT)	100%	ASTM E 165 & ANSI B 16.34	No Defects	Inspection Report	✓	3	--	2	--		
2.4	Ball & Seat	Surface conformity by Blue Matching	Critical	Visual	100%	As per BHEL approved Drg. / Internal Procedure	Uniform Contact	Inspection Report	✓	3	--	2	--		
2.5	Galvanising of Valve body and other accessories	Surface Preparation	Major	Visual	100%	IS 2629, BHEL approved Drg. & Technical Specification.	Internal QC Report	--	3	--	2	--			
2.6		Mass & Uniformity of Zinc Coating	Major	Sample / Strip Test	on Sample Piece			Inspection Report	✓	3	--	2	--		
2.7		Adhesion of Zinc Coating	Major	Adhesion Test	on Sample Piece			Inspection Report	✓	3	--	2	--		
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; D - "✓" mark in this column indicates that Document is required .															
PREPARED : M.S.MURALIDHARAN 														APPROVED BY: P. ELANGO VAN 	
														PAGE : 2 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.		STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE							QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011						
REF: 1) BHEL TECH. SPECIFICATION															
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS	
									D	P	W	V	H		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
3.0	TESTS														
3.1	Body Shell Hydro static Pressure test	Body Shell Structural Integrity & Strength	Critical	Hydro Test (HT)	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--	£ -100% by mfr & 10% by BHEL at random or min 1 no. Test Pressure & Pressure holding time as per Technical Specification.	
3.2	Valve Seat Hydro static Pressure test	Valve Seat Leak Tightness	Critical	Hydro Test (HT)	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--		
3.3	Valve Seat Pneumatic test	Valve Seat Leak Tightness	Critical	Pneumatic Test	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--		
3.4	Fire Safe test	Valve Performance in Fire Environment	Critical	Fire Safe test (Type Test)	100% £	BHEL approved Drg. & Technical Specification.		Test Report	✓	3	2	--	--	Applicable for Fuel Oil Applications	
4.0	ASSEMBLED VALVE														
4.1	Valve final assembly	Completeness	Major	Visual	100% £	As per BHEL approved Drg. / Technical Specification. / Internal Procedure	Internal QC Report	--	3	2	--	--			
4.2		Opening & Closing of Valve	Major	Valve Operation	100% £		Test Report	✓	3	2	--	--			
4.3	Antistatic Test (if applicable)	Electrical Continuity	Major	Continuity Test	One / Size / Lot	BS 5351 Amd. 2	Test Report	✓	3	2	--	--			
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required.															
PREPARED : M.S.MURALIDHARAN 														APPROVED BY: P. ELANGOVAN 	PAGE : 3 of 4

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE					QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
Sl. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5.0	FINAL INSPECTION															
5.1	Ball Valve	Surface condition Correctness of Assembly	Major	Visual	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.2		Over all Dimension	Major	Measurement	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.3		End Connection Details	Major	Visual & Measurement	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.2	Marking & Identification	Name Plate Details	Major	Visual & Verification	100%	As per BHEL approved Drg. / Technical Specification./ PO	Inspection Report	--	3	--	2	--				
5.3	Valve End Protection	Damage Control	Major	Visual & Verification	100%	As per BHEL approved Drg. / Technical Specification./ PO	Inspection Report	--	3	--	2	--				
5.4	Packing	Transit Worthy	Major	Visual	100%	As per BHEL approved Drg. / Technical Specification./ Internal Procedure	Inspection Report	--	3	--	2	--				
5.5	Inspection Clearance	Documentation & Certification	Major	Verification	100%	All relevant Documents as per this QAP are required	Inspection Report	✓	3	--	2	2	CHP - Customer Hold Point			
Notes:																
1	There shall be correlation with raw material test certificates.															
2	Chemical analysis & Mechanical tests shall be performed in approved laboratories. Calibrated instruments shall be used during testing.															
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required .																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGOVAN 		PAGE : 4 of 4	



TECHNICAL PRE QUALIFICATION REQUIREMENTS (PQR) FOR SS BALL VALVES

REFERENCE: TECHNICAL SPECIFICATION OF SS BALL VALVES

1. The vendor shall be an established **SS Ball Valve** supplier and having adequate Engineering, Manufacturing, Testing, Inspection and Servicing facilities and shall furnish technical backup documents in proof for above requirements.
2. The vendor shall have experience of having supplied **SS Ball Valve** as per the technical specification and datasheet for power plants or application of similar severity. Supply reference list with details of PO, PO date, customer name, application, size and class shall be submitted.
3. The **SS Ball Valve** offered shall be from the existing regular supply range of the vendor. Vendor shall provide the product catalogue.
4. Proven track record is required. Minimum One end user certificate for the satisfactory operational performance of their product supplied meeting requirements specified in enquiry specification or higher.

(or)

successfully executed two POs for same or superior item meeting requirements specified in enquiry specification. Vendor to submit the corresponding datasheets / drawings / technical documents of supplied item as per POs / end user certificate.

5. In case of ordering, the Vendor shall have the responsibility for the following and same to be confirmed point wise.
 - i) Vendor should have the component replacement responsibility in case of defect / failure.
 - ii) Vendor shall have capability to provide assistance in commissioning activities at site, if required.
 - iii) Vendor should ensure the product performance during erection & commissioning and ensure performance guarantee.
6. Backup document checklist to meet PQR to the fullest satisfaction of BHEL:

S. No	Document description	Check list	Name of the document furnished by vendor (Document Description / Number)
1	Documents to meet clause(1)	<input type="checkbox"/>	
2	Supply reference document (General reference list) to meet clause (2)	<input type="checkbox"/>	
3	Product Catalogues to meet clause (3)	<input type="checkbox"/>	
4	Min. one end user certificate (or) Two POs to meet clause (4)	<input type="checkbox"/>	
5	Confirmation to clause meet clause (5)	<input type="checkbox"/>	

Vendor Signature and Seal



Bharat Heavy Electricals Limited
Piping Engineering, PE/FB,
HPBP, TRICHY

Specification Number	Rev.no.	Sheet No.
PE:TSP:SAGARDIGHI:SS-BV	00	1 OF 6

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

SAGARDIGHI 1X660MW
Cust no: 7411

CONTENTS

1.0 SCOPE OF SUPPLY & CODES AND STANDARDS

2.0 DESIGN REQUIREMENTS

3.0 CONSTRUCTION FEATURES

4.0 SHOP INSPECTION AND TESTS

5.0 CLEANING AND PROTECTION FOR DESPATCH

6.0 DATA / DOCUMENTS / DRAWINGS TO BE FURNISHED WITH THE BID

7.0 POST CONTRACT DATA AND DRAWINGS

DATA SHEET – A - DOCUMENT TO BE FURNISHED AFTER AWARD OF CONTRACT.

DATA SHEET – B - BALL VALVE DATA SHEET.

DATA SHEET-C - MANDATORY SPARES

00	16.02.24	Fresh Issue	S.ARUN SHARMA	P.SURESH	C.SARAVANAN
Rev	Date	Purpose	Prepared	Checked	Approved (Mech)



Bharat Heavy Electricals Limited
Piping Engineering, PE/FB,
HPBP, TRICHY

Specification Number	Rev.no.	Sheet No.
PE:TSP:SAGARDIGHI:SS-BV	00	2 OF 6

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

1.0 SCOPE OF SUPPLY & CODES AND STANDARDS

- 1.1 The Ball valves are to be supplied as detailed in Data Sheet – B of this specification.
- 1.2 Recommended Spares:
Spares recommended for three years of normal operation of the Ball valves, to be quoted separately and unit price is to be indicated.
- 1.3 The design, material, construction features, manufacture, inspection and testing of valves shall conform to the latest applicable codes and standards (BS 5351/IS 17292 or equivalent).

2.0 DESIGN REQUIREMENTS

- 2.1 Valves shall be of 3-piece construction and full bore type and shall be designed according to the guidelines mentioned in the applicable standard. Valves above Nb 50 two-piece construction can also be offered.

2.2 MATERIAL SELECTION

- 2.2.1 Unless otherwise specified in valve data sheet, the ball valves shall be offered with the following materials.

2.2.1.1 Body and end pieces : SA182F304H (upto 50NB) / CF8 (above 50NB)
(Forged body upto NB50, Cast body above 50NB)

2.2.1.2 Ball, stem and gland : Stainless steel as per AISI-316 or equivalent

2.2.1.3 Body seats and gland seal : PTFE or equivalent (Asbestos not acceptable)

- 2.2.2 The materials of construction of remaining parts shall be as per the relevant standard governing the valve.

3.0 CONSTRUCTION FEATURES

3.1 End Connections

- 3.1.1 For NB50 and below - All valves with Socket Weld ends.
- 3.1.2 For above NB 50 - All valves with Butt Weld ends unless specified as flanged.
- 3.2 All the valves shall be provided with integral stop on body limiting quarter turn operation.
- 3.3 All the ball valves shall be of tight shut off type and the lever shall be so designed that it is parallel to the flow passage of the ball.



Bharat Heavy Electricals Limited
Piping Engineering, PE/FB,
HPBP, TRICHY

Specification Number	Rev.no.	Sheet No.
PE:TSP:SAGARDIGHI:SS-BV	00	3 OF 6

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

- 3.4 All the ball valves shall be fitted with steel lever and shall be closed by turning the lever in the clockwise direction. The direction of closing the valve and shut position shall be marked on the valves.
- 3.5 Unless otherwise specified elsewhere, each lever shall be fitted with a nameplate indicating the valve tag number. The valve tag number shall also be stamped on a metal tag and shall be securely wired to lever of the valves.

4.0 SHOP INSPECTION AND TESTS

As per Standard manufacturing quality plan

5.0 CLEANING AND PROTECTION FOR DESPATCH

- 5.1 Valve ends shall be protected from external damage and sealed against the ingress of dirt. Valves shall be protected by means of polythene caps / rubber end protectors.
- 5.2 All the valves shall be packed suitably in wooden cases in order to avoid damage during Transit and also during storage at Site.

6.0 DATA/DOCUMENTS/DRAWINGS TO BE FURNISHED WITH THE BID

The offer must be submitted in 5 number of copies along with Data Sheet 'A' and the following documents for each size.

- 6.1 Relevant drawings / leaflets for the offered valves showing following information.
- 6.1.1 Complete cross sectional arrangement of the valve.
- 6.1.2 Binding dimensions, dismantling clearances and weight.
- 6.1.3 Bill of material incorporating all the materials of construction of various parts along with IS/BS/ASTM/AISI standards to which the materials conform to.
- 6.1.4 Special features, if any.
- 6.2 Operation and maintenance manual for valves.
- 6.3 Catalogue for the various ranges of production.
- 6.4 Quality Plan.
- 6.5 Detailed surface preparation and painting procedures.
- 6.6 Deviations
Deviations, if any, to the technical specifications shall be clearly mentioned in the offer.



Bharat Heavy Electricals Limited
Piping Engineering, PE/FB,
HPBP, TRICHY

Specification Number	Rev.no.	Sheet No.
PE:TSP:SAGARDIGHI:SS-BV	00	4 OF 6

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

7.0 POST CONTRACT DATA AND DRAWINGS

Data, documents and drawings to be furnished by the vendor after award of the contract are indicated in the Data Sheet-B.

DATA SHEET-A

The following final data / documents shall be furnished by the vendor after the award of the contract.

Sl. No	Description	No of copies
1	Certified final drgs. Showing the sectional arrgt. of valves, bill of material, dimensional details, test pressure and weight	1CD + 20
2	Operation and Maintenance Instructions for valves	20
3	Catalogue for the equipment supplied	5 sets
4	Storage Instructions	20
5	List of recommended lubricants to be used on valves	15
6	Hydraulic/air test certificate for body/seal/back seat	1 reproducible + 3 copies
7	Material test certificate/test report for materials	-do-
8	Quality plan(QP)	-do-
9	All other test reports as per Quality plan	-do-
10	Detailed surface preparation and painting procedure	5 copies
11	Detailed packing procedure	5 copies

Note: The above list is only indicative. However, the successful bidder shall prepare a detailed schedule of drawings/documents, which shall be mutually agreed upon, and the same shall be indicated in the contract document/ordering specification.



Bharat Heavy Electricals Limited
Piping Engineering, PE/FB, HPBP, TRICHY

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	5 OF 6

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION

DATA SHEET - B

DATA SHEET FOR STAINLESS STEEL BALL VALVES

Sl. no	Valve Size	Class Rating	End Connection	Design Pr. Kg/cm ² (g)	Design Temp. Deg C	Body material	Operation	Connecting Pipe size. OD x T	Qty (7411)
01	NB 15	800	SW	10.0	50	SA182F304H	HW	21.3 X 2.77	964
02	NB 25	800	SW	10.0	50	SA182F304H	HW	33.4 X 3.38	145
03	NB 40	800	SW	10.0	50	SA182F304H	HW	48.3 X 3.68	2
04	NB 50	800	SW	10.0	50	SA182F304H	HW	60.3 X 3.91	25
05	NB 65	150	BW	10.0	50	SA182F304H	HW	73 X 3.05 Sty='D' 66.9	4
06	NB 80	150	BW	10.0	50	ASTMA-351CF8M	HW	88.9X 3.05 Sty='D' 82.8	1
07	NB 100	150	FL	10.0	50	ASTMA-351CF8M	HW	-	2
08	NB 150	150	BW	10.0	50	ASTMA-351CF8M	HW	168.3X 3.4 Sty='D' 161.5	2

Assembly procedure of the valves with matching Stainless steel pipes. (Bidder to specify the necessary sealant material for leak proof assembly with the SS pipes)



Bharat Heavy Electricals Limited
Piping Engineering, PE/FB, HPBP, TRICHY

Specification Number	Rev.no.	Sheet No.
PC:TSP:SAGARDIGHI:BV	00	6 OF 6


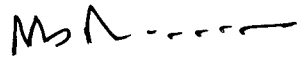

TECHNICAL SPECIFICATION FOR STAINLESS STEEL BALL VALVES
FOR COMPRESSED AIR APPLICATION


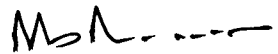

DATA SHEET – C


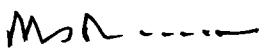

MANDATORY SPARES FOR STAINLESS STEEL BALL VALVES


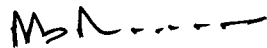

Sl. no	Valve Size	Class Rating	End Connection	Design Pr. Kg/cm ² (g)	Design Temp. Deg C	Body material	Operation	Connecting Pipe size. OD x T	Qty (7411-NS-S)
01	NB 15	800	SW	10.0	50	SA182F304H	HW	21.3 X 2.77	1
02	NB 25	800	SW	10.0	50	SA182F304H	HW	33.4 X 3.38	1
03	NB 40	800	SW	10.0	50	SA182F304H	HW	48.3 X 3.68	1
04	NB 50	800	SW	10.0	50	SA182F304H	HW	60.3 X 3.91	1
05	NB 65	150	BW	10.0	50	SA182F304H	HW	73 X 3.05 Sty='D' 66.9	1
06	NB 80	150	BW	10.0	50	ASTMA-351CF8M	HW	88.9X 3.05 Sty='D' 82.8	1
07	NB 100	150	FL	10.0	50	ASTMA-351CF8M	HW	-	1
08	NB 150	150	BW	10.0	50	ASTMA-351CF8M	HW	168.3X 3.4 Sty='D' 161.5	1

Complete Ball valve (Full assembly) shall be supplied as mandatory spares in line with main supply.

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE						QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
1.0	RAWMATERIAL & BOUGHT-OUT ITEMS (BOI)													MTC - Mill Test Certificate(refer Note 1 & 2)		
1.1	Body, Adaptor, End Piece, Tail Piece, Ball (Forgings / Castings)	Identification Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Inward Receipt Report	--	3	--	2	--				
1.2		Chemical Composition & Mechanical properties	Major	Verification of MTC	One per Heat	As per BHEL approved Drg. / Technical Specification.	MTC	✓	3	--	2	--				
1.3		Surface Defects/Finish	Major	Visual	100%	MSS SP - 55	Inspection Report	✓	3	--	2	--				
1.4		Heat Treatment (applicable for Castings)	Critical	Verification of TC / HT Chart	100%	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	--	2	--				
1.5		Hardness (applicable for Forgings)	Major	Hardness Test	One per Size per Batch	As per BHEL approved Drg. & Relevant Material Specification	Inspection Report	✓	3	--	2	--				
1.6	Bars for Stem, Trim parts, Gland (Rolled Sec. / Forgings) & Fasteners	Identification Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Inward Receipt Report	--	3	--	2	--				
1.7		Chemical Composition & Mechanical properties	Major	Verification of MTC	One per Size	As per BHEL approved Drg. / Technical Specification.	MTC	✓	3	--	2	--	Refer Note 1 & 2			
1.8		Surface Defects/Finish	Major	Visual	100%	MSS SP - 55	Inspection Report	✓	3	--	2	--				
1.9		Internal defects in Bars (applicable if Dia. > 50mm).	Critical	Ultrasonic Test (UT)	100%	ASTM A 388	ANSI B 16.34	UT Report	✓	3	--	2	--			
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required .																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGO VAN 		PAGE : 1 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE					QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011						
REF: 1) BHEL TECH. SPECIFICATION															
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS	
									D	P	W	V	H		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
2.0	INPROCESS CONTROL														
2.1	Machining of Body End connection, Ball, Stem & Gland	Dimension	Major	Visual, Measurement	100%	As per BHEL approved Drg. / Internal Procedure	Internal QC Report	--	3	--	2	--			
2.2		Surface Finish	Major	Visual	100%	As per BHEL approved Drg. / Internal Procedure		--	3	--	2	--			
2.3	Ball & Stem	Surface Defects	Critical	Dye Penetrant Test (PT)	100%	ASTM E 165 & ANSI B 16.34	No Defects	Inspection Report	✓	3	--	2	--		
2.4	Ball & Seat	Surface conformity by Blue Matching	Critical	Visual	100%	As per BHEL approved Drg. / Internal Procedure	Uniform Contact	Inspection Report	✓	3	--	2	--		
2.5	Galvanising of Valve body and other accessories	Surface Preparation	Major	Visual	100%	IS 2629, BHEL approved Drg. & Technical Specification.	Internal QC Report	--	3	--	2	--			
2.6		Mass & Uniformity of Zinc Coating	Major	Sample / Strip Test	on Sample Piece			Inspection Report	✓	3	--	2	--		
2.7		Adhesion of Zinc Coating	Major	Adhesion Test	on Sample Piece			Inspection Report	✓	3	--	2	--		
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; D - "✓" mark in this column indicates that Document is required .															
PREPARED : M.S.MURALIDHARAN 														APPROVED BY: P. ELANGO VAN 	
														PAGE : 2 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.			STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE						QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
SI. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
3.0	TESTS															
3.1	Body Shell Hydro static Pressure test	Body Shell Structural Integrity & Strength	Critical	Hydro Test (HT)	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--	£ -100% by mfr & 10% by BHEL at random or min 1 no. Test Pressure & Pressure holding time as per Technical Specification.		
3.2	Valve Seat Hydro static Pressure test	Valve Seat Leak Tightness	Critical	Hydro Test (HT)	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--	1 no. Test Pressure & Pressure holding time as per Technical Specification.		
3.3	Valve Seat Pneumatic test	Valve Seat Leak Tightness	Critical	Pneumatic Test	100% £	BHEL approved Drg. & Technical Specification.	No Leakage	Test Report	✓	3	2	--	--	Applicable for Fuel Oil Applications		
3.4	Fire Safe test	Valve Performance in Fire Environment	Critical	Fire Safe test (Type Test)	100% £	BHEL approved Drg. & Technical Specification.		Test Report	✓	3	2	--	--			
4.0	ASSEMBLED VALVE															
4.1	Valve final assembly	Completeness	Major	Visual	100% £	As per BHEL approved Drg. / Technical Specification. / Internal Procedure	Internal QC Report	--	3	2	--	--				
4.2		Opening & Closing of Valve	Major	Valve Operation	100% £		Test Report	✓	3	2	--	--				
4.3	Antistatic Test (if applicable)	Electrical Continuity	Major	Continuity Test	One / Size / Lot	BS 5351 Amd. 2	Test Report	✓	3	2	--	--				
LEGEND: 1 - Customer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required.																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGOVA 		PAGE : 3 of 4	

 BHARAT HEAVY ELECTRICALS LIMITED PIPING CENTRE, MADRAS - 17 QUALITY ASSURANCE & CONTROL DEPT.				STANDARD QUALITY ASSURANCE PLAN FOR BALL VALVE					QP NO: QPG - 38 REV.NO: 02 DATE: 17.10.2011							
REF: 1) BHEL TECH. SPECIFICATION																
Sl. NO	COMPONENT / OPERATION	CHARACTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE CRITERIA	TYPE OF RECORD	INSPECTION AGENCY					REMARKS		
									D	P	W	V	H			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
5.0	FINAL INSPECTION															
5.1	Ball Valve	Surface condition Correctness of Assembly	Major	Visual	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.2		Over all Dimension	Major	Measurement	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.3		End Connection Details	Major	Visual & Measurement	100% £	As per BHEL approved Drg. / Technical Specification.	Inspection Report	✓	3	2	--	--				
5.2	Marking & Identification	Name Plate Details	Major	Visual & Verification	100%	As per BHEL approved Drg. / Technical Specification./ PO	Inspection Report	--	3	--	2	--				
5.3	Valve End Protection	Damage Control	Major	Visual & Verification	100%	As per BHEL approved Drg. / Technical Specification./ PO	Inspection Report	--	3	--	2	--				
5.4	Packing	Transit Worthy	Major	Visual	100%	As per BHEL approved Drg. / Technical Specification./ Internal Procedure	Inspection Report	--	3	--	2	--				
5.5	Inspection Clearance	Documentation & Certification	Major	Verification	100%	All relevant Documents as per this QAP are required	Inspection Report	✓	3	--	2	2	CHP - Customer Hold Point			
Notes: 1 There shall be correlation with raw material test certificates. 2 Chemical analysis & Mechanical tests shall be performed in approved laboratories. Calibrated instruments shall be used during testing.																
LEGEND: 1 - Coustomer; 2 - BHEL/ BHEL Nominated Agency; 3 - BHEL Vendor; 4 - Subvendor; P - Perform; V - Verification/Review; W - Witness; H - Hold. D - "✓" mark in this column indicates that Document is required .																
PREPARED : M.S.MURALIDHARAN 													APPROVED BY: P. ELANGOVAN 		PAGE : 4 of 4	

ANNEXURE-C

Financial Soundness:

1. Indigenous suppliers shall submit Audited copies of annual reports (Balance Sheets), Profit & Loss statement for the last three years (or from date of incorporation whichever is less) and GST certificate.

Vendor signature and seal with Date