


Form No:	  PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PY 52053
		TECHNICAL SPECIFICATION FOR	Rev. No. 03
		VALVES PACKAGE & VALVE SPARES PACKAGE	Page 1 of 3

<p style="text-align: center;">COPYRIGHT AND CONFIDENTIAL</p> <p>The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.</p>	<p>TECHNICAL SPECIFICATION FOR VALVES PACKAGE & VALVE SPARES PACKAGE</p> <p>1.0 SCOPE: Supply of valves, spares for valves shall be as per the Annexure as mentioned in the Variant Table</p> <p>2.0 COMPLIANCE WITH STANDARDS:</p> <p>2.1 Dimensions, Tolerances and other requirements as per individual standards listed in Annexure mentioned at Variant Table</p> <p>(Copies of BHEL standards referred in concerned Annexure to be enclosed by Purchase Dept.)</p> <p>3.0 MATERIAL:</p> <p>As indicated in individual item description / as per individual standards listed in Annexure mentioned at Variant Table</p> <p>4.0 SIZES:</p> <p>As indicated in individual item description listed in concerned Annexure mentioned at Variant Table</p> <p>5.0 TECHNICAL DELIVERY CONDITIONS:</p> <p>As per corporate standard No. AA0851403 (A copy to be enclosed by Purchase Dept.)</p> <p>6.0 IBR ATTESTATION:</p> <p>As indicated against individual item in Annexure mentioned at Variant Table</p>
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Form No:	PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		RAGHAVENDRA SVN	SRIKANTH G	SUNDAR VVSS	10.11.14

Form No:	 BHEL PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PEMC-07577
		PURCHASE SPECIFICATION	Rev. No. 00
		RAIPUR DEVELOPMENT AUTHORITY 6 NO. STP'S CHECK VALVES PACKAGE	Page 1 of 9

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CHECK VALVES PACKAGE

for

RAIPUR DEVELOPMENT AUTHORITY 6 NO. STP'S

Refer Doc	PROJECT ENGINEERING & SYSTEMS DIVISION	PREPARED	CHECKED	APPROVED	DATE
		U Pradeep	Kalyana Chakravarthi G	Srikanth G	11.11.21



Form No:

PE&SD

**BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING & SYSTEMS DIVISION**

PEMC-07577

PURCHASE SPECIFICATION

Rev. No. 00

**RAIPUR DEVELOPMENT AUTHORITY 6 NO. STP'S
CHECK VALVES PACKAGE**

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1.0 SCOPE OF SUPPLY

This document indicates the requirements to be considered for supply of Check Valves, for 6 units of STP, Raipur Development Authority (RDA) Project.

Following are the 6 units of STP:

- 1) 7.40 MLD STP KAMAL VIHAR, RAIPUR
- 2) 7.05 MLD STP SEC-12, KAMAL VIHAR, RAIPUR
- 3) 4.33 MLD STP SEC-6, KAMAL VIHAR, RAIPUR
- 4) 3.98 MLD STP INDRAPRASTHA, RAIPUR
- 5) 1.79 MLD STP SEC-11a, KAMAL VIHAR, RAIPUR
- 6) 0.872 MLD STP SEC-11b, KAMAL VIHAR, RAIPUR

The supplies shall meet the requirements of the following technical datasheet and unit-wise valve schedule, without any deviations:

- Technical Datasheet for Check valves _ Pg 3 of 9
- Check Valve Schedule for 7.40 MLD STP KAMAL VIHAR, RAIPUR_ Pg 4 of 9
- Check Valve Schedule for 7.05 MLD STP SEC-12, KAMAL VIHAR, RAIPUR_ Pg 5 of 9
- Check Valve Schedule for 4.33 MLD STP SEC-6, KAMAL VIHAR, RAIPUR_ Pg 6 of 9
- Check Valve Schedule for 3.98 MLD STP INDRAPRASTHA, RAIPUR_ Pg 7 of 9
- Check Valve Schedule for 1.79 MLD STP SEC-11a, KAMAL VIHAR, RAIPUR_ Pg 8 of 9
- Check Valve Schedule for 0.872 MLD STP SEC-11b, KAMAL VIHAR, RAIPUR_ Pg 9 of 9

2.0 NOTES:

- 2.1 Bidder shall obtain necessary clarifications (if any) from BHEL, before bid submission. This is a no deviation tender and no deviation or price implication is acceptable after bid submission.
- 2.2 Bidder shall submit the following along with their bid:
 - No Technical Deviation Certificate.
 - Unpriced price bid format (Pg no. 4 to 9)

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RECORD OF REVISIONS:

Rev No	Date	Revision Detail	Revised by	Approved by
00	11.11.2021	FIRST ISSUE	U Pradeep	Srikanth G

DATA SHEET:		CHECK (NON RETURN) VALVE	PEMC-07577, Page 3 of 9
PROJECT:		RDA STPs, RAIPUR	
Sr No	Description	Particulars	Vendor's Confirmation
A	GENERAL		
	Make	*	
	Description	Single Plate Wafer Check valve long pattern	
	Design standard	API 6D/API 594	
	Test standard	API 598	
B	OPERATING CONDITIONS		
	Operating pressure	As per attached Valve Schedule	
	Test pressure (Body)	1.5 times of the valve pressure rating (PN 10)	
	Test pressure (Seat)	1.1 times of the valve pressure rating (PN 10)	
	Fluid handled	Air / Treated Sewage / Plant drain / Raw Sewage	
	pH of fluid handled	6 - 8	
	Design Temperature	120 deg C for Air / 45 deg C for sewage, centrate, plant drain (as per valve schedule)	
	Type of sealing	*	
	Pressure drop in valve	Less than 0.4 mWC	
C	CONSTRUCTION FEATURES		
	Ends connections	As per attached Valve Schedule	
D	MATERIAL OF CONSTRUCTION		
	Body	CI IS 210 FG 260	
	Door	SS AISI 304	
	Seat Rings	*	
	Spring	SS 304 (if applicable)	
	Hing Link	*	
	Hing Pin	SS 304	
	Fasteners	High tensile steel hot dip galvanised	
	Packing material	Non - Asbestos *	
E	QUANTITY		
	Size	As per attached Valve Schedule	
	Quantity		
	Fluid handled		
	Flange drilling Standard		
F	PAINTING		
	Surface Finish	SA 2.5	
	Painting	Epoxy Painting, minimum 200 micron DFT	
	Note:		
	1. Valve Tag, size, PN rating & Brand name shall be provided on valve body.		
	2. Dual-plate Wafer Check Valves are not acceptable		
	3. Check valve should have high speed non slam closing characteristics		
	4. Check valve should be of PN 10 rating.		

7.40 MLD STP KAMAL VIHAR, RAIPUR_ Valve Schedule

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SR. NO.	TAG NO.	QTY	LINE M OC	SIZE (NB)	TYPE	LOCATION	SERVICE	SUITABLE	OPERATION	VALVE M OC	UNIT RATE	TOTAL PRICE
1	4.2	2	DI	100	CHECK VALVE	SAS PUM P DISCHARGE SBR BASIN 1 & 2	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
2	9.2	3	DI	250	CHECK VALVE	RAW SEWAGE TRANSFER PUM P DISCHARGE	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
3	10.4	2	HDPE	250	CHECK VALVE	BIO FILTER BLOWER DISCHARGE	AIR	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
4	18.3	3	GI	200	CHECK VALVE	TREATED WATER TRANSFER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
5	27.3	2	GI	50	CHECK VALVE	SERVICE WATER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		

7.05 MLD STP SEC-12, KAMAL VIHAR, RAIPUR_ Valve Schedule

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SR. NO.	TAG NO.	QTY	LINE M OC	SIZE (NB)	TYPE	LOCATION	SERVICE	SUITABLE	OPERATION	VALVE M OC	UNIT RATE	TOTAL PRICE
1	4.2	2	DI	100	CHECK VALVE	SAS PUM P DISCHARGE SBR BASIN 1 & 2	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
2	9.2	3	DI	250	CHECK VALVE	RAW SEWAGE TRANSFER PUM P DISCHARGE	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
3	10.4	2	HDPE	300	CHECK VALVE	BIO FILTER BLOWER DISCHARGE	AIR	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
4	18.3	3	GI	150	CHECK VALVE	TREATED WATER TRANSFER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
5	27.3	2	GI	40	CHECK VALVE	SERVICE WATER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		

4.33 MLD STP SEC-6, KAMAL VIHAR, RAIPUR_ Valve Schedule

SR. NO.	TAG NO.	QTY	LINE M OC	SIZE (NB)	TYPE	LOCATION	SERVICE	SUITABLE	OPERATION	VALVE M OC	UNIT RATE	TOTAL PRICE
1	4.2	2	DI	100	CHECK VALVE	SAS PUM P DISCHARGE SBR BASIN 1 & 2	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
2	9.2	3	DI	200	CHECK VALVE	RAW SEWAGE TRANSFER PUM P DISCHARGE	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
3	10.4	2	HDPE	300	CHECK VALVE	BIO FILTER BLOWER DISCHARGE	AIR	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
4	18.3	3	GI	150	CHECK VALVE	TREATED WATER TRANSFER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
5	27.3	2	GI	40	CHECK VALVE	SERVICE WATER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		

3.98 MLD STP INDRAPRASTHA_ Valve Schedule

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SR. NO.	TAG NO.	QTY	LINE MOC	SIZE (NB)	TYPE	LOCATION	SERVICE	SUITABLE	OPERATION	VALVE MOC	UNIT RATE	TOTAL PRICE
1	4.2	2	DI	80	CHECK VALVE	SAS PUM P DISCHARGE SBR BASIN 1 & 2	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
2	9.2	3	DI	200	CHECK VALVE	RAW SEWAGE TRANSFER PUM P DISCHARGE	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
3	10.4	2	HDPE	200	CHECK VALVE	BIO FILTER BLOWER DISCHARGE	AIR	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
4	18.3	3	GI	150	CHECK VALVE	TREATED WATER TRANSFER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
5	27.3	2	GI	40	CHECK VALVE	SERVICE WATER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		

1.79 MLD STP SEC-11a, KAMAL VIHAR, RAIPUR_ Valve Schedule

SR. NO.	TAG NO.	QTY	LINE MOC	SIZE (NB)	TYPE	LOCATION	SERVICE	SUITABLE	OPERATION	VALVE MOC	UNIT RATE	TOTAL PRICE
1	4.2	2	DI	80	CHECK VALVE	SAS PUMP DISCHARGE SBR BASIN 1 & 2	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
2	9.2	3	DI	150	CHECK VALVE	RAW SEWAGE TRANSFER PUMP DISCHARGE	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
3	10.4	2	HDPE	150	CHECK VALVE	BIO FILTER BLOWER DISCHARGE	AIR	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
4	18.3	3	GI	80	CHECK VALVE	TREATED WATER TRANSFER PUMP DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
5	27.3	2	GI	40	CHECK VALVE	SERVICE WATER PUMP DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		

0.872 MLD STP SEC-11b, KAMAL VIHAR, RAIPUR_ Valve Schedule

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SR. NO.	TAG NO.	QTY	LINE M OC	SIZE (NB)	TYPE	LOCATION	SERVICE	SUITABLE	OPERATION	VALVE M OC	UNIT RATE	TOTAL PRICE
1	4.2	2	DI	80	CHECK VALVE	SAS PUMP DISCHARGE SBR BASIN 1 & 2	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
2	9.2	3	DI	100	CHECK VALVE	RAW SEWAGE TRANSFER PUM P DISCHARGE	SLUDGE	WAFER, SUITABLE TO IS:9523, PN 10	MANUAL	Body - CI FG 260 Internal - SS		
3	10.4	2	HDPE	100	CHECK VALVE	BIO FILTER BLOWER DISCHARGE	AIR	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
4	18.3	3	GI	80	CHECK VALVE	TREATED WATER TRANSFER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		
5	27.3	2	GI	40	CHECK VALVE	SERVICE WATER PUM P DISCHARGE	WATER	WAFER, SUITABLE TO ANSI B16.5, 150#	MANUAL	Body - CI FG 260 Internal - SS		



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TECHNICAL DELIVERY CONDITIONS FOR VALVES

1.0 SCOPE

- 1.1 This Standard stipulates the Technical Delivery Conditions for Industrial Valves to DIN/ANSI/IS/BS Standards, covering the requirements of constructional features, Accessories, Inspection, Tests, Test Certificates, Documentation, Preservation, Packing and Marking.
- 1.2 This Standard supplements the individual BHEL Valve Standards and forms a part of the Purchasing Conditions.
- 1.3 In addition to the general requirements stipulated in this Standard, any special requirements specified on the Enquiry /Purchase Order/Quality plan shall also be complied with.
- 1.4 The suppliers shall strictly comply with this standard in all respects. No deviations shall be allowed, unless written permission of BHEL is obtained before finalization of the Order.

2.0 CONSTRUCTIONAL FEATURES

Provision of the constructional features given in Table-1 shall be ensured for different types of Valves.

3.0 ACCESSORIES

The accessories mentioned in Table - 2 shall be provided for different types of Valves.

4.0 INSPECTION

4.1 INSPECTION AGENCY

Inspection agency for different categories of valves shall be as follows:

4.1.1 ATTESTED VALVES

For carbon and alloy steel attested valves coming under the purview of IBR (Indian Boiler Regulations), the inspection agency shall be as follows

a) Indigenous Valves: Authorized Inspector of CIB (Chief Inspector of Boilers).

In addition, BHEL representative shall witness the Inspection/Testing at supplier's works (other than BHEL, Tiruchy) for the following categories of valves,

- i) All Valves of Class 600 and above
- ii) All Valves of size 350 NB and above of all pressure ratings.
- iii) All Motor / Gear operated valves,
- iv) All valves with BW ends.
- v) All valves with any special features like sealed gland, regulating disc etc.

Revisions:

Cl. 19.07 of MOM of WG - VALVES

APPROVED :
INTERPLANT STANDARDIZATION COMMITTEE
WG - VALVES

Rev. No. 02

Amd . No.

Reaffirmed

Prepared
Corp. R&D

Issued
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Dt. of 1st Issue
OCTOBER, 1985

Dt: 31.07.2012

Dt :

Year:



b) Imported Valves: M/s Lloyds/TUV or any other inspection agency approved by IBR.

4.1.2 NON-ATTESTED (CERTIFIED) VALVES

- a) For Cast Iron, Gun Metal and other general purpose Valves (other than Stainless Steel Valves), not coming under the preview of IBR, the supplier's Inspection. Department shall undertake testing/inspection in presence of BHEL representative. However, witnessing of testing/inspection by BHEL representative may be waived off for Cast Iron and gun metal Valves on case to case basis.
- b) In case of all Stainless Steel Valves, the inspection agency shall be M/s Lloyds/BHEL Inspectors, unless otherwise specified in the Enquiry / Purchase Order.

4.2 SCOPE OF INSPECTION

The scope of inspection shall be as follows:

- (a) All tests listed in Cl.5
- (b) Any other tests specified in the Enquiry / Purchase Order / Quality Plan
- (c) Stamping of all accepted Valves and issue of Inspection reports and certificates.

5.0 TEST & TEST CERTIFICATES

The tests specified in Table-3 shall be conducted and 5 copies of the relevant test certificates shall be furnished to BHEL along with each consignment. The following abbreviations are used in the table. AI - Authorized Inspector; CS - Carbon Steel; AS - Alloy Steel; SS - Stainless Steel.

6.0 GUARANTEE CERTIFICATE

2 copies of the guarantee certificate shall be submitted before dispatch of valves. All the valves shall be guaranteed for trouble free operation for a period of 12 months from the date of commissioning or 24 months from the date of dispatch. The valves found defective due to design deficiency, Manufacturing defects etc., during the guarantee period shall be replaced by the supplier at no extra charge to BHEL.

7.0 DOCUMENTS

7.1 ALONG WITH THE OFFER

4 copies each of the following documents shall be submitted along with the quotation.

- i) Drawing/leaflet/catalogue for the offered item indicating complete cross sectional arrangement, standards governing the valves and valve rating, indicating direction of flow by an arrow marked on the body, binding dimensions, bill of materials with material specification details, hydraulic/air test pressure for body/seat/ back seat, overall height, dismantling clearances, weight and special features, if any, as specified in the main specification of the valves.



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- ii) Quality plan adopted by the supplier during manufacture and inspection / testing of valves.
- iii) List of recommended spares for 3 years trouble free operation of valves.
- iv) Any deviations to this standard / individual specification proposed by the supplier.
- v) Actuator technical data sheet, wiring diagram, limit Switch development diagram.
- vi) Regulation characteristics for Regulating globe valve.

The offer submitted without the above mentioned documents shall be considered as incomplete and therefore the offer shall be ignored for the purpose of technical/commercial evaluation.

7.2 AFTER PLACEMENT OF ORDER

7.2.1 Immediately after placement of order as per purchase order the following documents shall be furnished,

- i) Certified contract drawings for approval. After approval of the same RTF shall be furnished
- ii) Standard Quality plan duly countersigned by the supplier.
- iii) Operation and maintenance instructions.
- iv) Lubricant recommendation covering the following details:
 - a) Item to be lubricated.
 - b) Method of lubrication.
 - c) Type of lubricant and source of supply.
 - d) Frequency of lubrication.
- v) Storage instructions.

8.0 CLEANING

Particular care shall be taken to ensure that all foundry sand and loose material is properly removed by fettling/shot blasting.

9.0 PAINTING

Valves shall be painted externally after the hydraulic testing has been carried out. Just before the painting, valve bodies and other items shall be thoroughly cleaned. The valves shall be first painted with red oxide primer followed by 2 coats of spray painting with enamel paint. The colour of the paint shall be Blue for Carbon Steel Valves and Aluminum heat resisting for alloy steel valves. In case of forged steel valves up to 2" phosphating may be done instead of painting. For alloy steel forged valves a yellow band may be painted on the body after phosphating.

**10.0 MARKING ON VALVES****10.1 BODY**

The body of the valve shall have the following markings:

- a) Nominal size.
- b) Pressure rating.
- c) Material grade of body.
- d) Supplier's Trade Mark.
- e) Arrow showing direction of flow (for globe and check valves).
- f) Inspector's' identification mark.

10.2 NAME PLATE

10.2.1 The nameplate shall be fitted below the hand wheel nut for globe/gate valve and on the body/cover for Non-return valves covering the following details.

- a) Manufacturer's name.
- b) Nominal size,
- c) Pressure rating.
- d) Material grades of body, bonnet and trim.
- e) Manufacturer's identification/serial No.,
- f) Year of manufacture.
- g) BHEL material code number/Tag No. From Purchase Order.

10.2.2 ACTUATOR

A name plate covering the following details shall be fitted to the actuator.

- a) Make.
- b) Model No.
- c) Output shaft r.p.m.
- d) K.W. rating

10.3 HAND WHEEL

Hand wheel shall have the working "open" and "shut" - duly cast alongwith the arrow to show direction of closing the valve.

11.0 PRESERVATION

Suitable temporary rust preventive with minimum life of one year shall be applied inside the valve body in order to prevent corrosion.

12.0 END PROTECTION**12.1 FLANGED VALVES**

A circular blanking plate made of thin steel sheet, with diameter 6mm less than the bolt holes inner PCD, shall be firmly fixed to the flange faces by the application of adhesive, after 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 to 20 minutes. The coated face of the blanking plate should then be joined 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 the plate and flange.

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



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12.2 SCREWED, SOCKET & BUTT WELDED VALVES

Valve ends shall be protected from external damage and sealed against the ingress of dirt by means of plastic/ Steel end covers firmly secured.

12.3 Any improved method of end protection can however be considered and the suppliers shall furnish complete details at offer stage.

13.0 PACKING

13.1 All the valves shall be packed suitably in closed wooden cases in order to avoid damage during transit and storage at BHEL. Suitable supports shall be provided inside the cases in order to avoid internal movement. In case of imported consignments the packing shall be seaworthy.

13.2 Each valve after end protection should be wrapped in polythene sheet before packing in the cases.

13.3 Valves of sizes upto Nb 50mm (2") could be packed in one packing case taking care that they do not strike with each other. Enough packing material shall be kept inside the case to avoid damage.

13.4 Valves of size above 50mm (2") shall be packed separately in each case. In case, the handwheel, extension spindle or any other accessory of a valve is removed at the time of packing, the same must be kept in the same case and not separately.

13.5 Each packing case must contain 2 copies of the shipping list giving details of all the contents of the case.

14.0 MARKING

The following marking shall be done on each packing case minimum on two sides and also at the top.

- a) Complete address of the consignee and destination as per BHEL Purchase Order.
- b) BHEL Purchase Order Number.
- c) BHEL Valve Standard Number(s).
- d) Number of pieces in each packing case.
- e) Net weight.
- f) Gross weight.
- g) Packing case numbers and total number of packings.
- h) Arrow indicating top of the packing case.



TABLE I – CONSTRUCTIONAL FEATURES

CL NO	FEATURE	VALVE TYPE	PRESSURE CLASS ANSI/DIN					
			CL 150 NP 10&16	CL 300 NP 25&40	CL 600 NP 64&100	CL 900 NP 160	CL 1500 NP 250	CL 2500 NP 320&400
2.1	SPINDLE	GLOBE GATE	Outside screw & Yoke type with rising Spindle					
2.2	BONNET/ COVER	GLOBE GATE CHECK	Bolted to the Body for all sizes			Seal welded for NB50 and below. Pressure sealed for NB65 and above.		
2.3	BORE	GLOBE GATE CHECK	Full bore ANSI rating. For DIN rating			Shall not be less than 80% of the Full Venture Bore area.		
2.4	DISC	GLOBE	Radii used/ Spherical Seating Disc. For NB65 and above, the Disc shall be free to Revolve on the spindle for valves upto C1.900.					
		REGU LATING GLOBE	Taper Plug type Disc/Parabolic type Disc. For NB65 and above the disc shall be free to revolve on the spindle					
		SWING CHECK N.R.V	The Body Seat shall be inclined at such an angle from the vertical, to facilitate positive closing and to prevent valve clatter. The friction between hinge pin and bush shall be as minimum as possibilities so as to ensure that The check valve closes when the return of flow is even at a pressure of 1 ata.					
		PISTON LIFT N.R.V	Shall be provided with guided Disc, which enables the back pressure to be utilized fully for positive disc closing. The fluid collected in the space between disc, body and Cover should act as a damper.					
2.5	WEDGE	GATE	Solid Wedge for upto NB80, Flexible Wedge for NB 100 & above.					
2.6	TRI M	GLOBE GATE N.R.V	Minimum Hardness Values for various trim materials shall be as follows and the seating surface of stainless steel shall have a minimum differential Hardness of 50 BHN					



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TABLE I – CONSTRUCTIONAL FEATURES

CL NO	FEATURE	VALVE TYPE	PRESSURE CLASS ANSI/DIN					
			CL 150 NP 10&16	CL 300 NP 25&40	CL 600 NP 64&100	CL 900 NP 160	CL 1500 NP 250	CL 2500 NP 320&400
2.6	TRIM (Contd.)		Part			Hardness, BHN		
			Stem/Hingepin			200-220		
			Body Seat			250-270		
			Wedge/Disc Seating			300-320		
			Back Seat bush			250-270		
			Thrust Plate (for gate Valves)/			350-370		
2.7	BACK SEAT	GLOBE GATE	Shall be provided for all sizes. For NB65 and above back seat bush will be Provided.					
2.8	DIRECTION OF FLOW	GLOBE	The direction of Flow shall be preferably from bottom to top and the Arrow showing the direction shall be cast on the body.					
2.9	OPENING/ CLOSING	GLOBE GATE	The valves shall close by rotating the Hand Wheel in clockwise Arrow showing the direction shall be cast on the body.					

TABLE – 2 ACCESSORIES

CL NO	FEATURE	VALVE TYPE	PRESSURE CLASS ANSI/DIN					
			CL 150 NP 10&16	CL 300 NP 25&40	CL 600 NP 64&100	CL 900 NP 160	CL 1500 NP 250	CL 2500 NP 320&400
3.1	Position Indicator	GLOBE GATE REGULATING GLOBE	Shall be provided for all regulating globe valve and other valves of non-rising spindle type.					
3.2	Impact Hand Wheel	GLOBE	Shall be provided wherever necessary.					
3.3	Ball Bearing	GLOBE GATE	Shall be provided wherever necessary for smooth operation.					
3.4	Gear Operation	GATE	Shall be provided for the following sizes for different pressure classes.					
			NB 350& above	NB 300& above	NB 250& above	NB 200& above	NB 150& above	NB 150 above



TABLE – 2 ACCESSORIES (Contd.)

CL NO	REQUIREMENT	VALVE TYPE	PRESSURE CLASS ANSI/DIN					
			CL150 NP10&16	CL300 NP25&40	CL600 NP64&100	CL900 NP160	CL1 500 NP 250	CL2 2500 NP320&400
3.5	Integral Bypass	GATE	NB 250 & above			NB 200 & above		
*NOTE: Integral Bypass shall be provided as per MSS:SP-45. The Bypass Pipe shall be seamless, Schedule 80 minimum and of the same material As that of Valve body.								
3.6	EyeBolts	All valves	Suitable eyebolts shall be provided for heavy valves.					

TABLE – 3 TESTS

CL. NO.	TEST	APPLICABLE STANDARD	APPLICABLE COMPONENTS	EXTENT OF TESTING	CERTIFICATES REQUIRED
5.1	Visual Inspection	MSS-SP55 IS:210 IS:318	Steel Castings CI Castings Gunmetal Castings	100 %	Inspection by 'AI' and then attestation of Manufacturer's certificate by 'AI'
		Manufac-turer's Standard	Forgings and other components	100 %	Verification of Manufac-turer's certificate by 'AI'
5.2	Dimensional Check	Relevant BHEL Standards	Overall dimensions and end connections	100%	IBR, Form IIIc Inspection report by 'AI'
5.3	Material Tests:				
5.3.1	Chemical Analysis	Relevant material Standard	Body, bonnet, Yoke	Each heat/melt	Material test certificate attested by 'AI'; Body bonnet & yoke shall have identification
5.3.2	Mechanical Tests	-do-	-do-	-do-	-do-



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TABLE -3 TESTS

CL.NO	TEST APPLICABLE STANDARD	APPLICABLE COMPONENTS	EXTENT OF TESTING	CERTIFICATES REQUIRED
5.3.3	Heat Treatment -do-	Body, Bonnet, Yoke	100%	Inspection Report Test Certificate
5.3.4	Hardness Tests -do-	Trim	100%	
5.4	Non-destructive tests:			
5.4.1	Radio-graphy ASTM:E94&E142 CL90050 %	Body& Bonnet Castings	AS:100% CS&SS upto CL 300-10% CL600 to CL 1500 & above -100% 100%	Manufacturer's Certificates with the stamp of 'AI' -do-
5.4.2	Ultrasonic Test ASTM : 388	Body/Cover Forging	100%	-do-
5.4.3	Magnetic Particle Inspection (MPT) ASTM: E138/ E709	Trim	100%	-do-
5.4.4	Liquid Penetrant Inspection ASTM:E165 Dye Penetrant Inspection (LPI/DPI)	Seating Surfaces, Spindle Butt Welding ends of valves	100%	-do-
*5.5	Hydraulic Test API:598	a) Body & Seat b)Back Seat	100% 100%	IBR-Forth IIIC-b/AI Authorised inspector's certificate
*5.6	Air Leak Test API:598	Seat	100%	-do-



TABLE – 3 TESTS

CL. NO	TEST	APPLICABLE STANDARD	APPLICABLE COMPONENTS	EXTENT OF TESTING	CERTIFICATES REQUIRED
5.7	Functional test on Assembled valves with actuators / gears (with hand wheel on actuator and with electrical actuator)	--	Motor / Gear operated Valves	100%	Authorised Inspector certificates

***Note: Test pressure shall be as given in individual BHEL standards and no leakage shall be allowed during hydraulic/air test. The test duration shall be as follows:**

	Nominal Size 'mm'	Minimum Test Duration in seconds		
		Body	Seat	Back Seat
Test Duration	Upto and including 50	15	15	15
	65 upto and including 150	60	60	15
	200 upto and including 300	120	120	15
	350 and above	300	120	15

TABLE 4 – Duration of Required Test Pressure

Valve Size (NPS)	Minimum Test Duration (Seconds) ^a				
	Shall		Back Seat	Closure	
	Check Valves (API Std 594)	Other Valves	All Valves with Backseat Feature	Check Valves (API Std 594)	Other Valves
=2	60	15	15	60	15
2½ -6	60	60	60	60	60
8-12	60	120	60	60	120
=14	120	300	60	120	120

Note: ^aThe test duration is the period of inspection after the valves is fully prepared and is under full pressure.



QAP GUIDELINES & FORMAT

(ANNEXURE)


The QAP format and guidelines for filling up the format shall be used by vendor for preparation and submission of QAP after order placement.


Note:

1. Typical /Indicative /Standard QAP(s) for equipment /package attached is reference document and to use by successful bidder in future for preparation and submission of QAP for BHEL /CUSTOMER approval.
2. No deviation to reference document is acceptable.

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Form No.	 HYDERABAD	PRODUCT STANDARD PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD	ANNEXURE Rev No. 00 Page 2 of 3
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company.	<u>GUIDELINES TO VENDORS FOR PREPARATION OF QUALITY ASSURANCE PLAN</u>		
Ref. Doc	<ol style="list-style-type: none"> 1. QAP shall be made in landscape mode on A4 size paper as per the format enclosed. Font size shall be minimum 10. 2. Each page of QAP shall contain the following information. <ol style="list-style-type: none"> a) Vendor's name & address. b) Customer: BHEL, Hyderabad. c) Project. d) BHEL Product Standard Number/revision number as referred in P.O. e) BHEL Purchase Order Number & Date. f) Product as per P.O. description. g) QAP Number (unique and shall not repeat)/revision number/date. h) Page number and number of pages 3. QAP shall contain four parts / stages as follows. <ol style="list-style-type: none"> a) Raw materials and bought out items. b) In process Control / Inspection. c) Final assembly, Inspection & Testing. d) Painting, preservation & packing. 4. Under 'Component', indicate name of the component (say casing, rotor, pressure gauge, etc). 5. Under 'Characteristics', indicate appropriately (say chemical analysis, mechanical properties, NDT (UT, DP etc.), hydrostatic test, calibration check etc.) 6. Under 'Class', indicate minor, major or critical depending on the importance of characteristic. 7. Under 'Type of check', indicate appropriately (say chemical, mechanical, UT, DP etc.) 8. Under 'Quantum of check', indicate appropriately (say 100%, 10%, sample, per melt, per heat, all pieces etc.) 9. Under 'Reference document' and 'Acceptance norms', appropriate National & International standards, BHEL standards, approved drawing references etc. should be indicated. It is not correct to mention as "Vendor's internal standards or Vendor's standard practice etc.". If vendors' internal standards are referred, same shall be in line with BHEL Spec. indicated in the P.O. These may require review & approval by our Engineering dept. 10. Under 'Format of record', indicate appropriately supplier's test certificate, calibration certificate, lab report, inspection report etc. 11. Please refer 'Agency' in QAP format. Under P: Perform, W: Witness, V: Verify Indicate against each characteristic 1: (BHEL CQS/Nominated inspection agency), OR 2: (Vendor / Sub vendor) 		

	Form No.	 HYDERABAD	<p style="text-align: center;">PRODUCT STANDARD</p> <p style="text-align: center;">PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD</p>	ANNEXURE Rev No. 00 Page 3 of 3
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"> COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED . It must not be used directly or indirectly in any way detrimental to the interest of the company. </p>		<p>Note: Performing agency is normally vendor or his sub vendor (Legend 2). Where witness points are indicated in specification, P.O., Drawing etc., for such operations, Under Witness (W) column use 1. Under 'Verify' column, use code1.</p> <p>12. Under 'D' please put (<input type="checkbox"/> Tick) against each characteristic where vendor proposes to submit test certificate/report etc. OR as required as per BHEL Specification.</p> <p>13. Vendor's signature & stamp should be available on each page of QAP.</p> <p>14. Vendor should read the BHEL Product Standard thoroughly and QAP should be made only inline and relevant to the Specification & Approved Drawings.</p> <p>15. The following operations/characteristics/check points may be included (AS APPROPRIATE)</p> <ol style="list-style-type: none"> a) Visual check b) Dimensional check c) Mechanical and Chemical properties. d) Surface preparation before painting (by chemical cleaning, sand blasting, shot blasting etc. as the case may be.) e) Painting check for shade, Dry Film Thickness (DFT), Adhesion/ peel off test etc. f) Check for correctness for all components mounted as per General Arrangement Drawing, Bill of Materials (BOM), etc. for range, rating, make, color, size, location as per GA, quantity, label description including tag nos., annunciator facia, loose components, accessories, spares etc. g) Verification of test certificate for protection class for the enclosures. h) Mechanical functioning of switches. i) Continuity of earthing and provision of earth points. j) Colour coding of wiring, size, tightness & dressing of wiring. k) Review of test certificates of assembled items, raw materials, internal test reports etc. l) Witness of functional checks, which may include mechanical run & electrical run, H.V.test, IR measurement, Electrical and Mechanical tests etc. m) PQR, WPS, Welder Qualification Record, welding records (fit up, DP) etc. n) Material identification (for punch marks of serial numbers, Heat No, Melt No, Inspector's stamp etc.) o) Hydraulic Pressure Test, Pneumatic Pressure Test, Liquid Penetration Examination and other Non-Destructive Tests. p) Tests on Galvanised items (Visual, Hammer Test, Knife Test, Thickness, Pierce Test (Copper sulphate test), Hydrogen evaluation test, Stripping test (for Mass of Zinc coating) q) All tests as per BHEL Product Standard & approved drawings including Type tests and Routine tests on individual items and on System as a whole. r) Packing and Preservation. <p>16. QAP Format enclosed.</p>		
	Ref. Doc			

VENDOR'S NAME & ADDRESS:		TYPICAL MANUFACTURING QUALITY PLAN							QP. NO.:				
		CUSTOMER: BHEL, HYDERABAD – 32. PROJECT:				BHEL P.O.NO.:			REV NO:		DATE:		
		PRODUCT: SWING CHECK VALVE - CI				P.O. DATE:			PAGE1 OF3				
		BHEL SPEC:			REV:								
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	AGENCY			REMARKS
										P	W	V	

1.0 RAW MATERIALS & BOUGHT OUT ITEMS																				
1.1	(Body/Cover)	Casting defects	Major	Visual inspection	100%	MSS-SP55	VI reports	--	2	2	1&3									
1.1 A		Chemical & Mech. properties	Major	Chemical analysis & mech. testing	100%			MTC	✓	2	2	1&3								
1.2	Trim	Chemical & Mech. properties	Major	Chemical analysis & mech. testing	100%			BHEL Specification / Appd. Drawings / Appd Data Sheet	MTC	✓	2	2	1&3							
1.3		MPI*	Major	NDT	100%										NDE Report	✓	2	2	1&3	*Other than SS material
1.4		Hardness value	Major	Hardness test	As per BHEL spec										MTC	✓	2	2	1&3	
1.5	Fasteners	Chemical, Physical & Heat treatment	Major	Verify & Hardness test	One per heat										MTC	✓	2	2	1&3	
2.0 INPROCESS INSPECTION																				
2.1	Body, Cover, Flap	Surface finish of Machining	Major	Visual	100%	BHEL Specification / Appd. Drawings / Appd Data Sheet	IR	✓	2	2	1&3									
2.2		LPI For Seating Surfaces, Spindle and Butt Welding Ends of Valves*	Major	NDT	As per BHEL Spec								NDE Report	✓	2	2	1&3	*as applicable		
2.3		Dimensions	Major	Measurements	100%								IR	✓	2	2	1&3			
3.0 FINAL INSPECTION & TESTING																				
3.1	Valve Assembly	Visual Inspection, Dimensional check	Major	Visual & measurement	100%	BHEL Specification / Appd. Drawings / Appd Data Sheet	IR	✓	2	1&3	-									

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED TPIA 2 FOR VENDOR/SUB VENDOR AND 3 FOR END USER/CUSTOMER AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP

VENDOR'S NAME & ADDRESS:		TYPICAL MANUFACTURING QUALITY PLAN							QP. NO.:				
		CUSTOMER: BHEL, HYDERABAD – 32.			BHEL P.O.NO.:			REV NO:		DATE:		PAGE2 OF3	
		PROJECT:			P.O. DATE:								
		PRODUCT: SWING CHECK VALVE - CI			BHEL SPEC:								
SL NO	COMPONENTS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	*D	AGENCY			REMARKS
										P	W	V	
3.2	Valve Assembly	Hydro test for - a) body and bonnet b) seat	Critical	Pr. Testing	100%	BHEL Specification / Appd. Drawings / Appd Data Sheet		TC	✓	2	1&3	-	
3.3		Smooth Operation	Critical	Functional	100%			TC	✓	2	1&3	-	
3.4		BOM and markings	Major	Visual	100%			IR	✓	2	1&3	-	
3.5	SPARES FOR VALVE	BOM & TC	Major	Visual & TC review	100%			TC	✓	2	1&3		
4.0	PRESERVATION & PACKING												
4.1	Valve Assembly	Painting (Shade, DFT), Marking	Major	Visual & Measurement	Random	BHEL Specification / Appd. Dwgs / Appd Datasheet		IR	✓	2	1&3	-	
4.2		Packing	Major	Visual	Random			Packing list	✓	2	2	1&3	

Notes: -

1. This QAP should be read along with specification (latest revision), approved drawings & approved data sheet.
2. Specification/drawing/data sheet shall prevail over quality plan for contradiction if any between Quality plan and drawing/specification.
3. All test certificates/reports reviewed and certified by TPI/BHEL shall be submitted to BHEL as documentation package.
4. Any project/customer specific requirements, which shall be notified, have to be fulfilled by the vendor at the time of execution of order.
5. Material test certificate shall include tensile, impact, hardness, bend, IGC, hot tensile, grain size, chemical analysis etc. as required by applicable material code / approved drawing /data sheet.
6. Hardness values as per the technical delivery conditions for valves spec. AA0851403, Cl. No 2.6 of Table I.
10. Hydro test shall be done in un-painted condition as per approved procedure/relevant code.
11. Marking inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 10.
12. Preservation inspection as per the technical delivery conditions for valves spec AA0851403, Cl. No 11 & 12
13. All lab reports shall be from NABL accredited lab.

Abbreviations: -

LEGEND: P: PERFORM, W: WITNESS, V: VERIFICATION. INDICATE 1 FOR BHEL/BHEL NOMINATED TPIA 2 FOR VENDOR/SUB VENDOR AND 3 FOR END USER/CUSTOMER AS APPROPRIATE AGAINST EACH COMPONENT /CHARACTERISTIC UNDER P, W & V COLUMNS. * FOR ITEMS MARKED ✓ (TICK) IN COLUMN 'D', TEST CERTIFICATES SHALL BE SUBMITTED TO BHEL FOR RECORDS.	PREPARED BY	APPROVED BY	APPROVED BY
	VENDOR'S SIGNATURE & STAMP	BHEL QA SIGNATURE & STAMP	CUSTOMER'S SIGNATURE & STAMP



**PROJECT ENGINEERING & SYSTEMS DIVISION
RC PURAM, HYDERABAD.
QUALITY & BUSINESS EXCELLENCE**

INSPECTION / TC REVIEW FORMAT

1	Vendor's Name:		5	Applicable BHEL Spec No:	
2	Project:		6	Approved Drawing No:	
3	PO No:		7	Approved Data Sheet No:	
4	Item Description:		8	Approved QAP No:	

OFFER LIST

S.No	BBU/ PO Sr. No.	Item Description	Total Qty as per PO/BBU	Qty. already accepted	Qty offered for TC review	Cumulative Qty	Balance Qty
A							
B							
C							
D							

TC REVIEW REQUISITION

BBU / PO Sr. No.	QAP Clause No.	Format of Record	Certificate No. & Date	Page No.	REMARKS
A. Item Description:					
B. Item Description:					
C. Item Description:					
D. Item Description:					
E. Item Description:					

SUPPLIER / VENDOR SIGNATURE WITH SEAL

BHEL/ BHEL's TPIA SIGNATURE WITH SEAL

Dt:

Dt: