

FRAMEWORK AGREEMENT

TECHNICAL SPECIFICATION FOR AIR RELEASE VALVES

SPECIFICATION NO. PE-TS-020-100-M019



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

	TECHNICAL SPECIFICATION AIR RELEASE VALVE		SPECIFICATION NO. PE-TS-020-100-M019
			SECTION: -
	REV. NO.: 00		DATE: 22-03-2017
	SHEET 1 OF 1		

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SECTION-I

SPECIFIC TECHNICAL REQUIREMENTS

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1. GENERAL

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

2. SCOPE OF SUPPLY

- 2.1. The valves complete with all accessories shall be supplied as per Data Sheet A of Section-II. For detail refer the same. Each valve (quantity and other details specified in Data Sheet-A) shall be complete with the following accessories.
 - 2.1.1. Lifting arrangement provision for handling i.e., lifting lugs, eye bolts etc.
- 2.2. Commissioning spares, as per Datasheet-A.
- 2.3. Set of special tools and tackles if required for the maintenance, erection etc. of the equipment supplied.
- 2.4. Mandatory spares shall be informed as per project specific requirement.
- 2.5. Finish paints for touch-up painting of equipment after erection at site in sealed containers.
- 2.6. Various drawings, datasheets, operation and maintenance manuals etc. (Nos./ sets of hard copies shall be informed as per project specific requirement).

3. CODES AND STANDARDS

- 3.1. The design, materials, construction features, manufacture, inspection and testing of valves shall conform to the latest applicable codes and standards.
- 3.2. The valves covered under this specification shall be designed and tested as per IS 14845.
- 3.3. In case of any conflict between the above codes/ standards and this specification, the latter shall prevail and in case of any further conflict in the matter, the interpretation of the specification by the Engineer shall be final and binding.

4. DESIGN REQUIREMENTS

- 4.1. Valves shall be flanged, double orifice, double float & kinetic type.
- 4.2. All valves shall be suitable for the service conditions i.e. flow, temperature and pressure under which they are required to operate and those performing similar duties shall be interchangeable with each other unless otherwise specified.

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5. MATERIALS

- 5.1. The materials of construction of main parts of Air release valves shall be as specified in Data Sheet-A.
- 5.2. The materials of construction of the remaining parts shall be as per the relevant standard governing the valves and to suit water quality. These materials shall be subjected to approval.
- 5.3. Material used in manufacture of valve shall be of tested quality.

6. CONSTRUCTION FEATURES

- 6.1. The float shall not close the valve at higher air velocities. The orifice contact joint with the float shall be leak tight. The valves shall efficiently discharge the displaced air automatically from pipes/ducts while filling them & admit air automatically into them while they are being emptied.
- 6.2. The valve shall also be able to release any trapped air while at normal working conditions from pipes /ducts.
- 6.3. The body of valve shall be of one-piece construction.
- 6.4. All valves shall be fitted with a stainless steel nameplate (2 mm thick) with valve tag nos. & service description, engraved 1 mm deep and filled with black enamel paint. This nameplate is in addition to the rating plate being provided by vendor indicating the valve body material, rating, size etc.

7. MANUFACTURE OF VALVES

- 7.1. Valve castings shall be procured from foundries observing strict quality control and approved by reputed customers.
- 7.2. Particular care shall be taken to ensure that all foundry sand and loose material is properly removed from castings by fettling before the valve's manufacture is started.

8. TESTING, INSPECTION & QUALITY ASSURANCE

- 8.1. The items covered under this contract shall be subjected to inspection, testing and quality surveillance. The Inspection Agency shall, at all reasonable times have access to Vendor's works, Quality Control records and all facilities as reasonably required for carrying out the inspection and testing efficiently, and these shall be provided by the vendor free of cost.
- 8.2. The Quality Plan enclosed with this specification specify minimum quality control requirement. During contract stage vendor shall furnish this Quality Plan duly signed & stamped for BHEL approval. Quality plans shall be approved by BHEL and customer, as per project requirement. All inspection and testing shall be carried out by BHEL/ BHEL representative and customer (as applicable). In case inspection is by both BHEL and their customer, then the inspection can be carried out jointly or separately, which will be

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informed later. In case of the foreign bidder, inspection shall be carried out by reputed third party.

8.3. The charges for third party inspection (Lloyds, TUV or equivalent) for foreign bidders shall be included in the base price of the item by the bidder. This third party agency shall be approved by BHEL. Bidder to inform the same in the offer and mention the same in Quality Plan.

8.4. There may be minor changes in quality plan depending on customer/consultant comments which will have to be accommodated by vendor at no extra cost.

9. PAINTING REQUIREMENT:

9.1. Duplex Stainless Steel Valves - No painting needs to be done for Duplex SS body valves.

9.2. Cast Iron Valves –

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

OR

Valves shall be painted externally after the necessary testing has been carried out. Just before the painting, valve bodies and other items shall be thoroughly cleaned with wire brush/hand tool (Sa1/St2/St3 as applicable). The primer shall be two coats of a two pack air drying epoxy polyamide resin based red oxide – zinc phosphate with DFT of 30 microns (min)/coat. This shall be followed by 1 coat of Intermediate coat of a two pack air drying high build epoxy resin based paint with MIO with DFT of 80 microns (min). 2 finished coats of a two pack air drying epoxy polyamide enamel suitably pigmented with DFT of 30 microns (min)/coat shall be applied over intermediate painted surface. Finished Paint colour shade shall be Grey as per RAL 9002. Total DFT of Primer + Intermediate + Finish paint shall not be less than 200 microns.

10. PACKING INSTRUCTIONS:

10.1. Each valve shall be drained, cleaned, prepared and suitably protected in such a way so as to minimize the possibility of damage and deterioration during transit and storage.

10.2. The valve shall be dispatched in total assembled form.

10.3. Discs of all valves shall be properly secured while dispatching so that there is no risk of damage to the disc & seat.

10.4. Body ends shall be suitably sealed to protect them against damage during transit and storage.

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10.5. A thin sheet steel circular blanking plate of a diameter 6mm less than the bolt holes inner P.C.D. shall be firmly fixed to the flange faces by the application of adhesive after first ensuring that the flange faces have been thoroughly degreased. A thin coat of adhesive shall be applied to the flange face and the blanking plate and then allowed to dry for 15-20 minutes. The coated face of the blanking plate should then be offered up to the face of the flange taking care that the plate is concentric with the flange. Firm pressure shall be applied to ensure intimate contact between plate and flange. A wooden blank should then be bolted to the flange using a minimum of 4 bolts.

10.6. Valve Tag Nos. shall be incorporated in all the dispatch documents.

10.7. Proper care shall be taken to avoid damage to the painted surface during transit.

10.8. All the valves shall be packed suitably in wooden cases in order to avoid damage during transit and also during storage at site in tropical climate conditions for a period of 15-18 months.

10.9. Vendor to provide soft copy of photos/snaps of duly packed valve. The soft copies to be provided by vendor after final inspection of valves. Clearance for dispatch of valves will be given only after satisfactory packing conditions of valves from vendors work.

11. SPARES

11.1. Mandatory Spares: These shall be informed as per project specific requirement.

11.2. Order for the spares may be placed simultaneously or otherwise at the option of purchaser.

12. EXCLUSIONS:

12.1 The following are excluded from the bidder's scope:

12.1.1. Counter flanges and their nuts and bolts.

12.1.2. Erection & Commissioning of equipment at site.

13. DOCUMENTS TO BE SUBMITTED ALONG WITH OFFER

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

13.1.1. Compliance sheet.

13.1.2. Characteristic curve of ARV while filling and emptying.

13.1.3. Documents as per the list indicated in the NIT.

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

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14. DOCUMENTS TO BE SUBMITTED AFTER AWARD OF RATE CONTRACT:

- 14.1 Complete cross sectional arrangement of the valve.
- 14.2 Binding dimensions, dismantling clearances & weights.
- 14.3 Bill of material incorporating all the materials of construction of various parts and also specifying the IS/BS/ASTM standards to which the materials conform to.
- 14.4 Standard Quality Plan duly signed with bidder's company seal as a token of acceptance by the bidder.

The above drawings/ documents will be considered as reference documents for different projects PO which will be placed later.

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TECHNICAL SPECIFICATION AIR RELEASE VALVE

SECTION-II

- DATA SHEET – A
- QUALITY PLAN
- COMPLIANCE SHEET

		DATA SHEET - A AIR RELEASE VALVES										SPECIFICATION NO.: PE-TS-020-100-M019			
		SECTION II										REV. NO.: 00 DATE: 22/03/2017			
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		1	2	3	4	5	6	7	8	9	10	11	12	13	
S. NO.	TYPE OF VALVE	SIZE (NB)	OPERATION	DESIGN PRESSURE KG/CM ² (G) TEMP (DEG C)	SERVICE	RATING, DESIGN & TESTING CODE	BODY, HP & LP COVERS MATERIAL	TRIM MATERIAL	END CONNECTION	SPECIAL FEATURES	VALVES QTY. WITHOUT COMMISSIONING SPARES (NOS.)	COVER GASKET (SETS)	COMMISSIONING SPARES		
1	ARV WITHOUT ISOLATING GATE VALVE	150	AUTO	5 60	WATER	PN1.0 AS PER IS:14845	CAST IRON AS PER IS 210 Gr. FG 260	13% Cr SS as per ASTM A182 Gr F6a	ASME B16.1 CL.125 F/F	-	15	14			
2	ARV WITHOUT ISOLATING GATE VALVE	150	AUTO	5 60	SEA WATER	PN1.0 AS PER IS:14845	DUPLEX SS AS PER UNS 32205	DUPLEX SS AS PER UNS 32205	ASME B16.5 CL 150 R/F	-	5	4			
3	ARV WITHOUT ISOLATING GATE VALVE	200	AUTO	5/ 5.5/ 8 60	SEA WATER	PN1.0 AS PER IS:14845	DUPLEX SS AS PER UNS 32205	DUPLEX SS AS PER UNS 32205	ASME B16.5 CL 150 R/F	-	80	80			
4	ARV WITHOUT ISOLATING GATE VALVE	200	AUTO	5 60	WATER	PN1.0 AS PER IS:14845	CAST IRON AS PER IS 210 Gr. FG 260	13% Cr SS as per ASTM A182 Gr F6a	ASME B16.1 CL.125 F/F	-	152	150			
5	ARV WITHOUT ISOLATING GATE VALVE	150	AUTO	5 60	SEA WATER	PN1.0 AS PER IS:14845	DUPLEX SS	DUPLEX SS	ASME B16.5 CL 150 R/F	-	32	30			
											284	278			

NOTES

1. LEGENDS: AUTO=AUTOMATIC, ARV=AIR RELEASE VALVE
2. COMMISSIONING SPARES -> 1 SET OF COVER GASKET FOR EACH ARV
3. PRICES OF COMMISSIONING SPARES TO BE QUOTED SEPARATELY BY BIDDER. IT SHALL NOT BE CLUBBED WITH THE UNIT PRICE OF MAIN VALVES
4. FOR DETAILED MATERIAL OF CONSTRUCTION, REFER SHEETS 2 TO 4 OF DATASHEET-A.

Signature of the bidder with name, designation, date and company's seal

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SERVICE: NON-COASTAL

S. No.	PARTICULAR	MATERIAL
1	BODY, HP& LP COVERS, COWL, JOINT SUPPORTING RING	CAST IRON AS PER IS 210 Gr. FG 260
2	LP SEAT RING	Natural rubber
3	H.P. ORIFICE, ORIFICE PLUG & FLOAT GUIDE	ASTM A182 Gr F6a
4	H.P. & L.P. FLOATS	Wooden(ebonite coated)
5	GASKET	Rubber
6	BOLTS & NUTS	ASTM A193 Gr B7 & ASTM A194 Gr 2H
7	NAME PLATE FOR PURCHASER'S VALVE TAG NOS.	AISI 316 (2 MM THICK)

- THIS DATASHEET IS APPLICABLE FOR VALVES GIVEN AT S. NO. 1 & 4 OF DATASHEET-A (SHEET-1).

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SERVICE: SEA WATER

S. No.	PARTICULAR	MATERIAL
1	BODY, HP& LP COVERS, COWL, JOINT SUPPORTING RING	Duplex SS (UNS 32205)
2	LP SEAT RING	Natural rubber
3	H.P. ORIFICE, ORIFICE PLUG & FLOAT GUIDE	Duplex SS (UNS 32205)
4	H.P. & L.P. FLOATS	Wooden (ebonite coated)
5	GASKET	Rubber
6	BOLTS & NUTS	AISI 316L
7	NAME PLATE FOR PURCHASER'S VALVE TAG NOS.	AISI 316 (2 MM THICK)

- THIS DATASHEET IS APPLICABLE FOR VALVES GIVEN AT S. NO. 2 & 3 OF DATASHEET-A (SHEET-1).
- MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER SERVICE.

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SERVICE: SEA WATER

S. No.	PARTICULAR	MATERIAL
1	BODY, HP& LP COVERS, COWL, JOINT SUPPORTING RING	Duplex SS
2	LP SEAT RING	Natural rubber
3	H.P. ORIFICE, ORIFICE PLUG & FLOAT GUIDE	Duplex SS
4	H.P. & L.P. FLOATS	Wooden (ebonite coated)
5	GASKET	Rubber
6	BOLTS & NUTS	AISI 316L
7	NAME PLATE FOR PURCHASER'S VALVE TAG NOS.	AISI 316 (2 MM THICK)

- THIS DATASHEET IS APPLICABLE FOR VALVES GIVEN AT S. NO. 5 OF DATASHEET-A (SHEET-1).
- MATERIALS FOR ITEMS NOT SPECIFIED ABOVE SHALL ALSO BE SUITABLE FOR SEA WATER SERVICE.
- **THE BIDDER SHALL CLEARLY SPECIFY THE GRADE OF DUPLEX SS MATERIAL CONSIDERED IN THE OFFER FOR THIS ITEM. THE BIDDER SHALL PROVIDE VALVE WITH THE SAME OR SUPERIOR GRADE DURING CONTRACT STAGE.**
- IF MATERIAL GRADE OFFERED FOR THIS ITEM IS SAME AS SPECIFIED FOR ITEMS AT S. NO. 2 OF DATASHHET-A & THE BIDDER QUOTES DIFFERENT PRICE FOR THESE ITEMS, THEN LOWER OF THE TWO SHALL BE CONSIDERED FOR BOTH THE ITEMS.

QUALITY PLAN				CUSTOMER : -		PROJECT: FRAMEWORK AGREEMENT		SPEC. NO:- PE-TS-020-100-M019			
SHEET 1 OF 2				BIDDER/VENDOR :-		QP NUMBER: PE-QP-020-100-M009 REV. 00		SPEC. TITLE:- TECH SPEC. FOR ARV			
				SYSTEM: LP PIPING VALVES (WATER SYSTEMS)		ITEM: AIR RELEASE VALVE		SECTION:- II			
S.NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CATE- GORY	TYPE/METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY P W V	REMARKS	
1.	MATERIALS										
1.1	BODY, HP & LP COVER, COWL, HP ORIFICE & PLUG	1. PHYSICAL & CHEMI- CAL PROPERTIES	MA	PHYSICAL, CHEMICAL TEST	1/HEAT/ HEAT TREAT- MENT	APPD.DRG./ TECH. SPEC.	APPD. DRG. / TECH. SPEC.	TEST CERT	3/2	2	1
		2. SURFACE DEFECTS	MA	VISUAL	100%	FREE FROM DEFECTS	FREE FROM DEFECTS	LOG BOOK	3/2	2	2
		3. SUB SURFACE DEFECTS FOR BODY ONLY	CR	RT	100%	ASMEB16.34/ SKETCH	FREE FROM DEFECTS	TC	3/2	2	1
		4. DIMENSIONS	MA	MEASUREMENT	100%	APPRD. DRG.	APPRD. DRG.	LOG BOOK	3/2	2	2
1.2	WOODEN FLOATS, GASKET	1. DIMENSIONS	MA	MEASUREMENT	100%	-DO-	-DO-	-DO-	3/2	2	2
		2. SURFACE DEFECTS	MA	VISUAL	100%	FREE FROM DEFECTS	FREE FROM DEFECTS	-DO-	3/2	2	2
2.0	INPROCESS CONTROL										
2.1	MACHINING OF BODY, COVER, ORIFICE	1. DIMENSIONS	MA	MEASUREMENT	100%	PROD. DRG.	PROD. DRG.	-DO-	3/2	2	2
		2. SURFACE DEFECTS	MA	VISUAL	100%	FREE FROM DEFECTS	FREE FROM DEFECTS	-DO-	3/2	2	2
		3. SUB SURFACE DEFECTS	MA	PT	100%	ASTM E 165	NO SURFACE DEFECT	TEST CERT	3/2	2	1
2.2	FLOATS WITH EBONITE COATING, LP SEAT RING	1. SURFACE DEFECTS	MA	VISUAL	100%	IS: 14845	COMPLETE COVERING OF WOODEN FLOAT WITH EBONITE	-DO-	3/2	2	2
		2. HARDNESS	MA	MEASUREMENT	100%	APPD DRG./ IS:14845	APPD DRG./ IS:14845	INSP. REPORT.	3/2	2	1
		3. DIMENSIONS	MA	-DO-	100%	APPD DRG/ IS:14845	APPD DRG/ IS:14845	-DO-	3/2	2	1
BHEIL											
SAURABH DUGGAL				PARTICULARS		BIDDER/VENDOR					
Signature				NAME							
25/03/17				SIGNATURE							
				DATE		BIDDER'S/ VENDOR'S COMPANY SEAL					

	QUALITY PLAN		CUSTOMER : -		PROJECT: FRAMEWORK AGREEMENT		SPEC. NO.: PE-TS-020-100-M019	
			BIDDER/VENDOR : -		QP NUMBER: PE-QP-020-100-M009 REV. 00		SPEC. TITLE:- TECH SPEC. FOR ARV	
	SHEET 2 OF 2	CHARACTERISTICS CHECKED	SYSTEM: LP PIPING VALVES (WATER SYSTEMS)	CATE-GORY	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD
S.NO.	COMPONENT/ OPERATION	CHARACTERISTICS CHECKED	CATE-GORY	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	REMARKS

3.0	ASSEMBLY TESTING	1. DIMENSIONS	MA	MEASUREMENT	100%	APPD.DRG.	APPD. DRG.	-DO-	3/2	2,1	-	
4.0												
4.1	BODY	1. LEAKAGE	CR	HYDRAULIC	100%	APPD. DRG. / IS 14845	NO LEAKAGE	TEST CERT	3/2	2,1	-	
4.2	ORIFICES (FOR ARV)	FUNCTIONAL TEST	CR	AIR/WATER	100%	APPD.DRG/ IS 14845	-DO-	-DO-	3/2	2,1	-	
5.0	COMPLETE VALVE	OVERALL DIMENSIONS	MA	MEASUREMENT	SAMPLE	APPD. DRG.	APPD. DRG.		3/2	2,1	-	
6.0	END CONNECTION	1. DIMENSIONS	CR	MEASUREMENT	100%	APPD. DRG./ TECH.SPEC.	APPD. DRG./ TECH.SPEC.	INSPN. REPORT	3/2	2,1	-	
7.0	FINAL INSPECTION	1. CLEANLINESS	MA	VISUAL	100%	-DO-	-DO-	-DO-	3/2	2,1	-	
		2. COMPLETENESS AND CORRECTNESS										
8.0	PAINTING	1. QUALITY AND THICKNESS OF PAINT	MA	VISUAL AND MEASUREMENT WITH PAINT THICKNESS GAUGE	100%	TECH. SPEC.	TECH. SPEC.	-DO-	3/2	2	1	FOR CI BODY VALVES
9.0	PACKING	AS PER BHEL TECHNICAL SPEC.	MA	VISUAL	100%	-DO-	-DO-	-DO-	3/2	2	1	PHOTOGRAPHS OF WOODEN CASES HAVING DULY PACKED VALVES TO BE FURNISHED TO BHEL-PEM FOR VERIFICATION TO OBTAIN MDCC

ABBREVIATIONS

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

BHEL	PARTICULARS	BIDDER/VENDOR
SAURABH DUGGAL	NAME	
<i>Saurabh</i>	SIGNATURE	
23/03/17	DATE	BIDDER'S/ VENDOR'S COMPANY SEAL

	COMPLIANCE SHEET AIR RELEASE VALVE		SPECIFICATION NO. PE-TS-020-100-M019	
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A. I hereby comply/not comply (*) to all the requirements of this technical specification in totality.

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

B. Specify Duplex SS grade for items at S. No. 5 _____ of Datasheet-A.

(* - THE BIDDER SHALL PROVIDE VALVE WITH THE SAME OR SUPERIOR GRADE DURING CONTRACT STAGE).

Name of Bidder / Authorized Representative: - _____

Designation: - _____

Signature: - _____

Company Seal: - _____

Date: - _____