CONTROL VALVE SPECIFICATION	
PROJECT	**1 X 660 MW FGD BLOWER**
OWNER	**MAHAGENCO BHUSAWAL**
UNIT	**OXIDATION BLOWER**
ITEM / ITEM NO.	**CONTROL VALVE**
BHEL MATL. CODE	**REFER SPECIFICATION SHEET**

Rev. No.	Revision	Prepared	Approved	Date
02	Revised	I.S	RAM	08.08.2020
01	Blow off Valve Outlet Pressure updated	I.S	RAM	26.05.2020
00	Issue	I.S	RAM	14.03.2020

EQC: Equipment Qualification Criterion

1) Bidders are advised to contact BHEL for essential technical queries in writing within one week of issue of Enquiry. Offers with incomplete information will not be considered for evaluation, and are likely to be rejected without any further correspondence with the Bidder.
2) Unsolicited requests from bidders for alterations to their already submitted offer will not be permitted. These would not be taken cognizance, and offers will be evaluated without taking into account such requests/correspondence.
3) Any technical features over & above BHEL enquiry specification requirements proposed by Bidder will not be given preference for the purpose of evaluation.
4) Bidders shall comply BHEL specifications in total. Incomplete offers will be rejected. In case feasible deviations are proposed by the bidder and subsequently withdrawn, no commercial implications can be claimed by the bidder.
5) The make and model no of Bidder bought out items shall be as per attached specification. Alternate make / model of bought out item (like AFR, Positioner, Proximity Limit Switch) is NOT acceptable.
6) In the event of any conflict between these specifications, data sheets, related standards, codes etc. the bidder shall refer the matter to the purchaser for clarifications and only after obtaining the same shall proceed with the manufacture / procurement of the items in question.
7) Bidder to note this is ZERO deviation bid. Any deviation due to "Optimisation, Spares reduction etc." is NOT acceptable. Any deviation which can be removed with "Commercial / Price Implication" is NOT acceptable. Bidders are advised to NOT indicate any such deviation.
8) If unavoidable, vendor shall list the deviations to BHEL specification requirements explicitly and indicate applicable price for removal of deviations. Incase a deviation is not accepted by BHEL, the price indicated against that deviation shall be considered. Incase a price against a deviation is not indicated, vendor shall not be allowed any price implication. The deviations without any accompanying price for its removal shall be considered as an alternative solution and is not binding on BHEL.
9) Changes if any made by BHEL during technical evaluation on the specification requirements or Bill of material, bidder is requested by the purchase to submit impact price (amount to be reduced or increased to the original offered price) for those changed items only, other items for which there are no technical changes, unit rates shall be maintained as it is.
10) **Bidder shall submit filled in CHECK LIST (Clause 2), Filled in General Points (Clause 3) & Price Schedule (Clause 5) along with the technical offer.**
11) **In case of any technical query, bidders may contact the following BHEL engineer:**

Name: Sandhya Iuskapalli
Designation: Dy Manager
Deptt: TC Engineering
Phone: 91 40 2318 2961
Email: sandhya@bhel.in

PROJECT SPECIFICATION FOR CONTROL VALVES

1. **GENERAL:**

   This detailed operating parameters, metallurgy, testing requirements etc. are indicated in the TAG specific control valve specifications. **Sample valve GAD is attached for Reference.**

2. **CHECKLIST:** (vendor to submit filled in checklist along with technical offer)

2.1 01-XV-0101 : SUCTION THROTTLE VALVE

Sl.no.	Requirement	Vendor Confirmation YES / NO
a	Valve type: Butterfly (Wafer Type)	
b	Valve size : 16", modulating	
c	Trim Size : Maximum available in 16"	
d	Vendor to specify the valve controllable range. Also vendor to ensure that Valve Opening @ max Flow Condition & @ Min Flow condition is within Controllable range.	
e	Actuator: Pneumatic Diaphragm / piston (Single / double Acting)	
f	Air Tank (designed for minimum 3 full strokes) & other accessories shall be considered by vendor, if, double acting piston actuator offered.	
g	Electro Pneumatic 4-20Ma Positioner included	
h	Open / close Limit Switches included	
i	Cv Type Test Certificate.	
j	Leakage class IV	
k	Mechanical stopper (0-50% adjustable) required.	
l	Valve Cv @60% opening	
m	Valve Cv @90% opening	

2.2 01-XV-0201A: BLOW OFF VALVE

Sl.no.	Requirement	Vendor Confirmation YES / NO
a	Valve type: Butterfly (Wafer Type)_	
b	Valve size : 8"	
c	Trim Size : 8", modulating	
d	Vendor to specify the valve controllable range. Also vendor to ensure that Valve Opening @ max Flow Condition & @ Min Flow condition is within Controllable range.	
e	Actuator: Pneumatic Diaphragm / piston (Single / double Acting)	
f	Air Tank (designed for minimum 3 full strokes) & other accessories shall be considered by vendor, if, double acting piston actuator offered.	
g	Electro Pneumatic 4-20Ma Positioner included	
h	Open / close Limit Switches included	
i	Solenoid valve included	
j	Cv Type Test Certificate.	
k	Leakage class IV	
l	Stroke time for valve Open/ close shall be as specified in Specification sheet	
m	Valve Cv @60% opening	
n	Valve Cv @90% opening	

3 GENERAL POINTS:

Sl. No.	Requirement	Vendor Confirmation YES / NO
a.	Compliance to BHEL specification and its annexures. Signed and stamped copy attached with technical offer.	
b.	Deviation (if any) included in offer with reason.	
c.	Price implication for deviation removal is indicated in Priced offer in case of any deviation **(BHEL will NOT consider/ allow any price implication if it is not indicated in the Price Schedule)**	
d.	Valve Datasheet, GA & BOM (with make/model) attached with technical offer.	
e.	Price schedule attached with technical offer with 'QUOTED' marked against each item.	
f.	Offered Actuator shall be able to withstand Max Shutoff Pressure (design Pressure) with min instrument air pressure.	
g.	Its vendor's responsibility to size and select actuator suitable to process parameters and specification requirement.	
h.	Offered Valve, actuator and accessories models should have been operating satisfactorily for at least 4000 hrs.	

4 DOCUMENT SUBMISSION:

4.1 Along with the Offer

a. Valve Datasheet (Along with Offer)

b. Filled in Checklist as per clause 2, General Points as per clause 3 & Price Schedule as per clause 5 (Along with Offer)

c. Valve GA Drawing (Along with Offer)

d. Installation Diagram with dimensional details

e. Detailed BOM

f. Technical Catalogues

g. Recommended spares for 2 years operation as an option along with unit price and with validity of 12 months.

4.2 After Order Placement

a. Documents referred in Clause 4.1

b. Flow Vs Opening Characteristics.

c. Write up on Operation

d. ITP / QAP

5 PRICE SCHEDULE:

Enquiry ref no. Date:
Offer ref no. Date:

Sl no.	DESCRIPTION	Qty	UNIT PRICE	TOTAL PRICE
A	**Main Items**			
1	SUCTION THROTTLE VALVE : **TC9765576013**	2 No		
2	BLOW OFF VALVE : **TC9765576021**	2 No		
B	Additional price to withdraw the deviations to following clause no and Item / Item Qty with Unit Prices (Vendor may attach annexure for unit prices for each deviation item)			
	Total Price (A1+A2+B)			

Notes:

a) Any additional requirements which are essential for proper functioning of the valves, however not indicated in this specification shall be explicitly listed and included in the offer by vendor.

VENDOR SEAL & SIGNATURE.

HYDERABAD

SPECIFICATION SHEET FOR CONTROL VALVE

SPEC.NO: TC65576-01,02
PAGE 1 OF 1
REV NO. 02

Project: MAHAGENCO BHUSAWAL 1 X 660 MW FGD BLOWER

GENERAL	1	Item		001		
	2	Specification		SUCTION THROTTLE VALVE		
	3	Quantity	Tag No.	As per enquiry	XV-0101A	
	4	Service		AIR		
	5	Line Size / Shed No.		16", STD (9.52 mm)		
	6	Ambient Temp °C ■ °F ☐		Min 7.2 Max 46		
SERVICE CONDITIONS	7	Fluid		AIR		
	8	Mol. Wt	Cp/Cv	Refer Annexure-2	Refer Annexure-2	
	9	Sp. Gravity at Oper. Cond.				
	10	Oper. Viscosity	Compressibility factor	Refer Annexure-2	Refer Annexure-2	
	11	% Flashing		---		
	12	Solid Partices		-----		
	13	Vapour Pressure		-----		
	14	Critical Pressure		-----		
	15	Flow	Unit	**Kg/hr**		
			Quantity	**Case-1 Case-2 Case-3**		
				Refer Annexure-2		
	16	Temperature °C ■ °F ☐		Refer Annexure-2		
	17	Pressure at Kg/cm2 (g)	Case-1	In : Refer Annexure-2 Out : Refer Annexure-2		
			Case-2	In : Refer Annexure-2 Out : Refer Annexure-2		
			Case-3	In : Refer Annexure-2 Out : Refer Annexure-2		
	18	Pressure drop for valve size Kg/cm2		0.005		
	19	Pressure drop for actuator size Kg/cm2		2		
	20	Calc Cv	Valve Cv	Vendor to indicate valve MAXIMUM Cv Value		
	21	SPL db(A)	Prod SPL db(A)	<=85	*	
	22	Required Seat Tightness		CLASS IV		
BODY	23	Type	Model No.	BUTTERFLY (Wafer type)	*	
	24	Size	Rating & end conn.	**16"**	Flanges by BHEL (16"150RF)	
	25	Guiding		*Blow out proof shaft guiding design		
	26	Material	**ASTM A216GR. WCB**	carbon steel ■ Stainless steel Alloy steel ☐		
	27	Bonnet type	**ASTM A216GR. WCB**	Std ■ CoolFins Extended ☐	☐	
	28	Packing Material		Teflon ■ graph asb ☐		
	29	Lubricator	Steam jack	------	-----	
	30	Bellows	Material	------	-----	
TRIM	31	Size	No. of ports	*	*	
	32	Flow charactersitics		Equiperc ■ Linear ON-off ☐ Quickopen ☐		
	33	Form		Cont. ■ VP Cage ☐* ☐		
	34	Disc		SS 316 *		
	35	Seat	Cage	Stellite sheathing*		
	36	Bearing Matl.	Shaft Matl.	SS316	SS316*	
ACTUATOR	37	Type		Diaph ■ ☐		
	38	Flow action		Open ■ Close ☐ *		
	39	On Air Supply failure, Valve		Open ■ Close ☐ Stayput		
	40	Spring Range		*		
	41	Spring set pressure KG/CM²		*		
	42	Connection type	Material		316SS	
	43	Yoke Material		Cast Iron ☐ Carbon steel ■		
	44	Hand wheel		Side ■ Top ☐		
ACCESSORIES	45	Positioner	**Make:** *	Smart POSITIONER (4-20 mA Input), Weatherproof to IP65. Pressure Gauges at Inlet and Outlet required. Position Feedback Signal (4-20 Ma HART) is also required.		
		Available Air Supply	Min/ Nor/ Max/ Design	4/5/7/10.5	Kg/cm^2(g)	
	46	Filter regulator	**Make: ***	MOC: Anodized Aluminium, 5 Micron, Sintered Bronze filter Element, Manual Drain, 2" Nominal Size Pressure gauge required.		
	47	Limit Switch	Type & Code	YES		
			Position	Open ■ Close ■		
			Construction	Ex-proof ☐ Weather proof to IP65 ■		
	48	Radiography, MP/LP TEST, CV Type Test		YES		
	49	NACE MR 103 (for all wetted parts)		NA		
	50	Painting		Std ☐ Epoxy ■ Tropicalised ☐		
	51	Inspection		BHEL/EIL/CUSTOMER/BHEL APPOINTED AGENCY		
Manufacturer			Weight	*	*	
BHEL Material code				**TC9765576013**		

Notes as per Annexure-1

Design Pressure: 2 Kg/cm^2(g)
Design Temperature: 170 Deg C

* : To be confirmed by vendor.

Mechanical Stopper (0-50%) adjustable shall be provided.

T & C ENGINEERING	REV no.	02	PREP	IS	CHKD	RAM	APPR	RAM	DATE	08.08.2020

HYDERABAD

SPECIFICATION SHEET FOR CONTROL VALVE

SPEC.NO: TC65576-01,02
PAGE 1 OF 1
REV NO. 02

Project: MAHAGENCO BHUSAWAL 1 X 660 MW FGD BLOWER

GENERAL	1	Item		002	
	2	Specification		BLOW OFF VALVE	
	3	Quantity	Tag No.	As per enquiry	XV-0201A
	4	Service		AIR	
	5	Line Size / Shed No.		12" S40 (10.31 MM)	
	6	Ambient Temp °C ■ °F □		Min 7.2 Max 46	
SERVICE CONDITIONS	7	Fluid		AIR	
	8	Mol. Wt	Cp/Cv	Refer Annexure-3	Refer Annexure-3
	9	Sp. Gravity at Oper. Cond.			
	10	Oper. Viscosity	Compressibility factor	Refer Annexure-3	Refer Annexure-3
	11	% Flashing		---	
	12	Solid Partices		-----	
	13	Vapour Pressure		-----	
	14	Critical Pressure		-----	
	15	Flow	Unit	**Kg/hr**	
			Quantity	**Case-1 Case-2 Case-3**	
				Refer Annexure-3	
	16	Temperature °C ■ °F □		Refer Annexure-3	
	17	Pressure at Kg/cm2 (g)	Case-1	In : Refer Annexure-3	Out : Refer Annexure-3
			Case-2	In : Refer Annexure-3	Out : Refer Annexure-3
			Case-3	In : Refer Annexure-3	Out : Refer Annexure-3
	18	Pressure drop for valve size Kg/cm2		Refer Annexure-3	
	19	Pressure drop for actuator size Kg/cm2		2	
	20	Calc Cv	Valve Cv	Vendor to indicate valve MAXIMUM Cv Value	
	21	SPL db(A)	Prod SPL db(A)	<=85	*
	22	Required Seat Tightness		CLASS IV	
BODY	23	Type	Model No.	BUTTERFLY (Wafer type)	*
	24	Size	Rating & end conn.	**8"**	Flanges by BHEL (8"150RF)
	25	Guiding		*Blow out proof shaft guiding design	
	26	Material	**ASTM A216GR. WCB**	carbon steel ■ Stainless steel	Alloy steel □
	27	Bonnet type	**ASTM A216GR. WCB**	Std ■ CoolFins	Extended □ □
	28	Packing Material		Teflon ■ graph asb	□
	29	Lubricator	Steam jack	------	-----
	30	Bellows	Material	------	-----
TRIM	31	Size	No. of ports	*	*
	32	Flow charactersitics		Equiperc ■ Linear	ON-off □ Quickopen □
	33	Form		Cont. ■ VP	Cage □* □
	34	Disc		SS 316*	
	35	Seat	Cage	Stellite sheathing*	
	36	Bearing Matl.	Shaft Matl.	SS316	SS316*
ACTUATOR	37	Type		Diaph ■	□
	38	Flow action		Open ■ Close □	*
	39	On Air Supply failure, Valve		Open ■ Close □	Stayput
	40	Spring Range		*	
	41	Spring set pressure KG/CM²		*	
	42	Connection type	Material		316SS
	43	Yoke Material		Cast Iron □	Carbon steel ■
	44	Hand wheel		Side ■	Top □
ACCESSORIES	45	Positioner	**Make:** *	Smart POSITIONER (4-20 mA Input), Weatherproof to IP65. Pressure Gauges at Inlet and Outlet required. Position Feedback Signal (4-20 Ma HART) is also required.	
		Available Air Supply	Min/ Nor/ Max/ Design	4/5/7/10.5	Kg/cm^2(g)
	46	Filter regulator	**Make: ***	MOC: Anodized Aluminium, 5 Micron, Sintered Bronze filter Element, Manual Drain, 2" Nominal Size Pressure gauge required.	
	47	Limit Switch	Type & Code	YES	
			Position	Open ■ Close	■
			Construction	Ex-proof □	Weather proof to IP65 ■
	48	Solenoid valve	**Make: ***	Universal, Class H Insulation, Body Enclosure/ valve assembly shall be SS316, 24 V DC Power Supply, Weatherproof TO IP65. Surge Supression diodes shall be integral part of solenoid valve.	
	49	Radiography, MP/LP TEST, CV Type Test		YES	
	50	NACE MR 103 (for all wetted parts)		NA	
	51	Painting		Std □	Epoxy ■ Tropicalised □
	52	Inspection		BHEL/EIL/CUSTOMER/BHEL APPOINTED AGENCY	
Manufacturer			Weight	*	*
BHEL Material code				**TC9765576021**	

Notes as per Annexure-1

Design Pressure: 2 Kg/cm^2(g)
Design Temperature: 170 Deg C

* : To be confirmed by vendor.

1) **Stroke time shall be as follows:**

a) Full opening by automatic control in response to control signal step from 20 to 4 mA <=2 sec

b) Full closing by automatic control in response to control signal step from 4 to 20 mA < 8 sec max

c) Full opening by deenergizing solenoid vlave shall be <= 1.5 sec preferred or < 2 sec max.

2) Exact Cv confirmation shall be provided to vendor after P.O Placement.

T & C ENGINEERING	REV no.	02	PREP	IS	CHKD	RAM	APPR	RAM	DATE	08.08.2020

Annexure-1

1 **The valve shall be designed in line with the following documents**

a. BHEL specification

b. Gas composition indicated in Annexure-2 & Annexure-3 attached.

2 Electroneumatic Positioner shall be provided with 4-20mA signal for controlling the valve oipening. Positioner enclosure shall be metallic.

3 Offered pneumatic actuator shall be suitable for working with a minimum instrument air pressure of 4 Kg/cm^2(g). Actuator shall be able to withstand maximum shut- off pressure (design pressure) with the minimum instrument air pressure specified.

All instrument air tubing and fittings shall be SS316.Tube shall be Min 8 mm. Higher O.D tube shall be provided when required.

Vendors for Tube Fittings:

• ARYA CRAFTS & ENGINEERING PVT LTD. INDIA
• ASTEC VALVES & FITTINGS PVT. LTD. INDIA
• AUTOCLAVE ENGINERS FLUID COMPONENTS USA
• CIRCOR INSTR. TECHNOLOGIES INC-FORM. H608 USA
• COMFIT & VALVES PVT. LTD. INDIA
• EXCEL HYDRO PNEUMATICS PVT LTD. INDIA
• EXCELSIOR ENGG. WORKS INDIA
• FLUID CONTROLS PVT. LTD. INDIA
• HAM-LET (ISRAEL-CANADA) LTD. ISRAEL
• MULTIMETAL INDUSTRIES INDIA
• PANAM ENGINEERS INDIA
• PARKER HANNIFIN CORPORATION USA
• PRECISION ENGINEERING INDUSTRIES INDIA
• PRIME ENGINEERS INDIA
• RELIANCE ENGINEERING & ELECTRICALS CORPN INDIA
• SEALEXCEL (INDIA) PVT. LTD. (Added in EIL MVL) INDIA
• SSP FITTINGS CORPORATION U.S.A.
• SWAGELOK CO. USA
• SWASTIK ENGINEERING WORKS INDIA

5 • TK FUJIKIN CORPORATION (Added in EIL MVL) SOUTH KOREA

6 Test certificates of Material, Hydro Leakage and calibration to be produced.

7 All accessories shall be fully piped/ wired as part of valve assembly and shall be suitably terminated. Terminal Point connection shall be 1/2" for further connection at site.

8 Vendor shall be responsible for selecting proper material for the internal parts of control valve. All such materials shall have the same or better specification than specified in the datasheet.

9 No Copper or Its alloys are allowed. Silver, Zinc, Mercury and their alloys have to be excluded from components in contact with any process fluid.

10 Basic Specification: BS EN 593 / API 609. Cv calculations shall be submitted with the offer. Selected CV shall be approximately 125% of calculated CV. Performance of the control valve for the specified parameters are vendor's responsibility.

11 **Test certificates:**

a. Calibration/ operating test.
b. Seat leakage test
c. Leakage test for actuator
d. Radiographic test
e. Material certificates
f. Hydrostatic test
g. Conformity

12 Vendor shall furnish the valve-tubing diagram along with the offer.

13 Offer shall include detailed catalogues for valve, actuator, smart positioner, Air Filter Regulator and all other accessories(as required). Air consumption, dimensions and weight shall also be indicated, for the control valve assembly.

14 Actuator sizing calculation and Noise calculations shall also accompany the offer.

15 The supplier shall offer the best possible rangeability for the control valve and specify the same in the offer.

16 Vendor shall return this data sheet after filling in information wherever required, duly signed and stamped. Deviation, if any to this specification, shall be brought out clearly with out which the offer will not be considered.

17 2 Nos. of O & M manuals shall be supplied within 2 months after placement of order.

	Expander with weld in type cartridge provided internal or external to the valve is not preferred. In case external expander is offered, vendor shall supply flanged expander with counter flanges (stud / bolts, gasket and other accessories included) for the end way from
18	valve.
19	Bonnets & bottom flanges shall be of integral type or bolted type construction with fully retained gasketting.
	Bonnets, extension bonnets, cooling fins & bottom flanges shall be of the same genetic material as that of body and made of casting,
20	forging or plates where applicable.
21	Asbestos material shall not be used in the valve assembly.
22	Face to Face Dimensions shall be as per ANSI
23	Control valve shall be suitable for installation in horizontal as well as in vertical lines.
24	Wherever piston or cylinder actuator is considered, single acting spring return type shall be used.
	Wheneevre double acting springless type of actuator is unavoidable, all accessories like pilot valves, booster relays, non- return valve, pressure gaige, volume tank etc shall be provided to ensure desired action on air failure. The volume tank shall be sized considering full stroking of the valve for two complete cycles. The volume tank shall be of carbon steel construction and sized as per ASME Section VIII
	with design Pressure of 10 Kg/cm^@(g) as a minimum. Accessories like relief valves and tubing shall be of 316 ss Construction. Other
25	accessories can be of cast aluminium.

ANNEXURE- 2

OPERATING CONDITION	Average Mol Wt	Inlet Pressure Kg/cm^2(a)	Outlet Pressure Kg/cm^2(a)	Temp °C	Flow Kg/HR	Kv	Z	Viscosity @ 0°C (N-s/m^2)	Correction Factor
DESIGN	28.226	0.990	0.985	45.00	12153.6000	1.395	0.999	1.65E-05	0.713
GP	28.615	0.760	0.755	27.00	8107.2000	1.398	1.000	1.70E-05	0.694
OP-1	28.226	0.960	0.955	45.00	11660.4000	1.395	0.999	1.65E-05	0.713
OP-2	28.615	0.750	0.745	27.00	8082.0000	1.398	1.000	1.70E-05	0.694

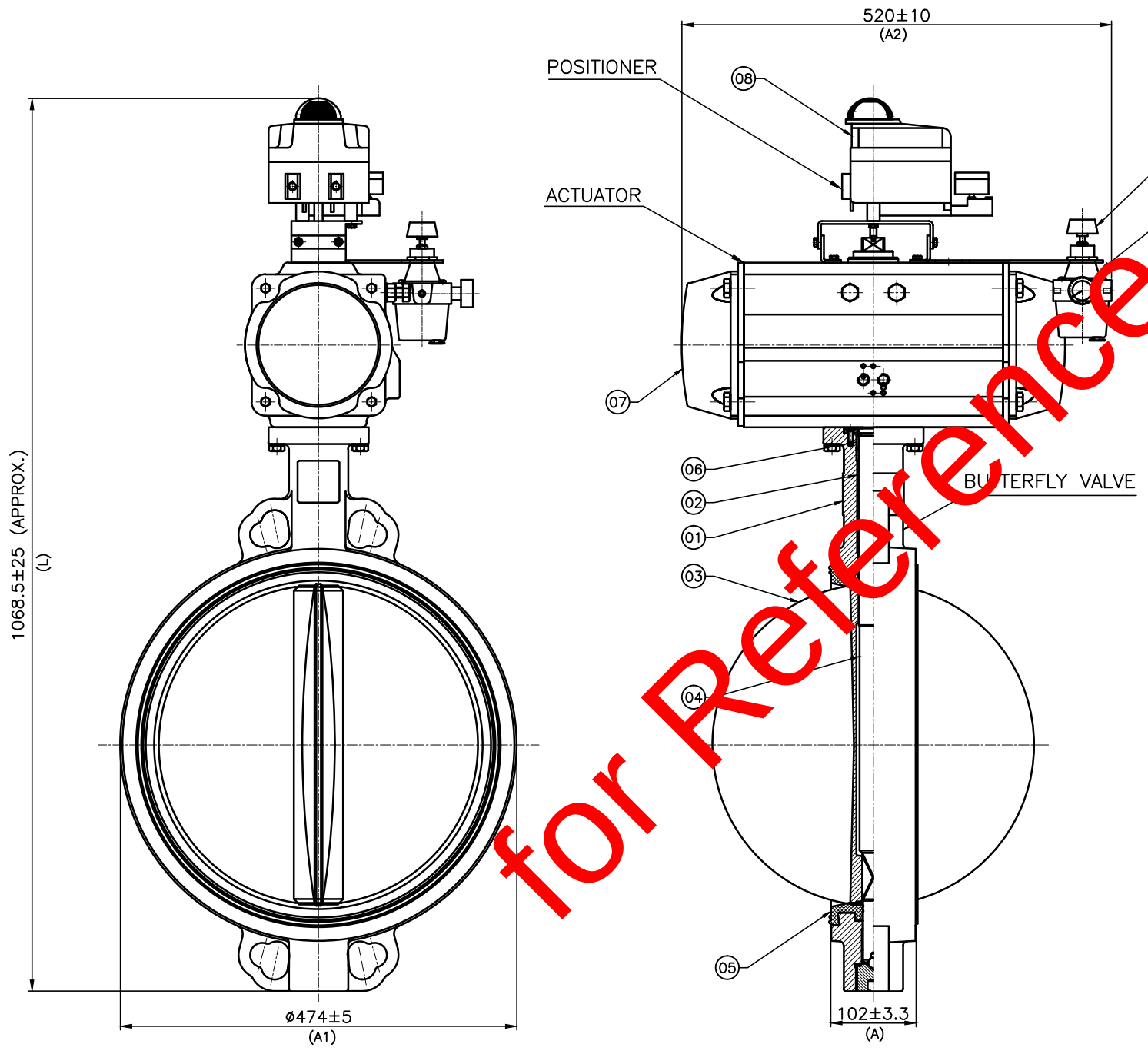
ANNEXURE-3

OPERATING CONDITION	Average Mol Wt	Inlet Pressure kg/cm2(a)	Outlet Pressure kg/cm2(a)	Temp °C	Flow Kg/hr	Kv	Z	Viscosity @ 0°C ($N\text{-}s/m^2$)	Correction Factor
DESIGN	28.226	1.960	1.420	139.79	12153.60	1.389	1.000	0.0000165	0.713
GP	28.615	1.770	1.420	137.98	8107.20	1.392	1.000	0.000017	0.694
OP-1	28.226	1.940	1.420	141.11	11660.40	1.389	1.000	0.0000165	0.713
OP-2	28.615	1.770	1.420	138.03	8082.00	1.392	1.000	0.000017	0.694

LET	WAS	DATE	DRN	APPD	LET	WAS	DATE	DRN	APPD	LET	WAS	DATE	DRN	APPD	MATERIAL	SERIES	ITEM CODE	MATERIAL	SERIES	ITEM CODE
1	DRG CHANGE AS PER CUSTOMER COMMENT MAIL DT 15.01.19	15/01/19	RDM	VSS														--		-

ACCESSORIES

ACTUATOR (115)	POSITIONER (P0006)	FRG (Z0001)	SPECIAL POINT (S08)
MODEL :– ACT–160D ACTUATOR TYPE :– PNEUMATIC, RACK & PINION DOUBLE ACTING ACTUATOR SUPPLY MINIMUM:– 4 BAR PNEUMATIC CONNECTIONS :– ¼" BSP HOUSING MATERIAL :– ALUMINIUM ALLOY ACTUATOR ORIENTATION :– PARALLEL TO PIPE LINE AXIS	MODEL NO :– EPR–W–N2S04DTR MAKE :– POWER – GENEX ACTION TYPE :– ROTARY TYPE :– ELECTRO PNEUMATIC + PTR POWER SUPPLY :– 24 V DC PNEUMATIC – ELECTRIC CONNECTION :– ½" NPT ENCLOSURE :– WEATHERPROOF TO IP66 ADDITIONAL FEATURE :– WITH MOUNTING BRACKET	OTHER ACCESSORIES NAME :–FILTER REGULATOR MATERIAL :–ALUMINIUM CONNECTIONS :–1/4" BSP SPECIFICATIONS 1 :–15 bar (g)MAX INLET PRESSURE OUTLE PRESS. RANGE : 0 TO 10 bar(g) SPECIFICATION 2 :–30 MICRON FILTER ELEMENT (BRONZE) SPECIFICATION 3 :–0 TO 10 bar(g) PRESSURE GAUGE	FAIL SAFE CONDITION :– STAYPUT SPECIFICATION 1 :– CONNECTOR AT INLET OF FRG TO SUIT 1/4" NPT MALE (CONNECTOR SIZE 1/4" BSP MALE X 1/4" NPT FEMALE) Open/close limit switch: YES, required.



SR. NO.	DESCRIPTION	MATERIAL
09	FILTER REGULATOR	ALUMINIUM
08	POSITIONER	EPR–W–N2S04DTR
07	ACTUATOR	ACT–160D
06	PACKING	NYLON
05	SEAT	EPDM
04	STEM	ASTM A 582 TYPE SS 416
03	DISC	ASTM A 351 Gr. CF8 – U3.5
02	BEARING	CS+PTFE
01	BODY	ASTM A 126 Gr. B (CI)

BILL OF MATERIAL

TESTING DETAILS

PRESSURE RATING	HYDROSHELL STRENGTH	HYDROSEAT STRENGTH	PNUEMATIC SEAT
	BAR	BAR	BAR
PN3.5	5.25	4	3–4

VALVE SIZE	CATALOLOUGE NO	ITEM CODE
16" (DN400)	4322B400/CI/CF8–U3.5/S46/E/CTR/A1F ACT–160D/EPR2/FRG	41462–115–C0424–S08

NOTES :–		
1)	ALL DIMENSIONS ARE IN mm.	
2)	VALVE TYPE	BUTTERFLY VALVE, CENTRIC SANDWICH, WAFER, REPLACEABLE SEAT
3)	FLOW DIRECTION	BI–DIRECTIONAL
4)	DESIGN STANDARD	API 609 Cat A / BS EN 593
5)	FACE TO FACE	API 609 Cat A
6)	END CONNECTIONS	HOLDING BETWEEN FLANGES
7)	DRILLING	ANSI B16.5 #150
8)	PRESSURE RATING	PN3.5
9)	CHARACTERISTICS	MODULATING
10)	TESTING STANDARD	API 598
11)	LEAKAGE CLASS	API 598 TABLE – 5
12)	TESTING FLUID	WATER
13)	SHUT OF PRESSURE	3.5 bar (g)

CUSTOMER APPROVED STAMP & SIGN:–

TITLE:–

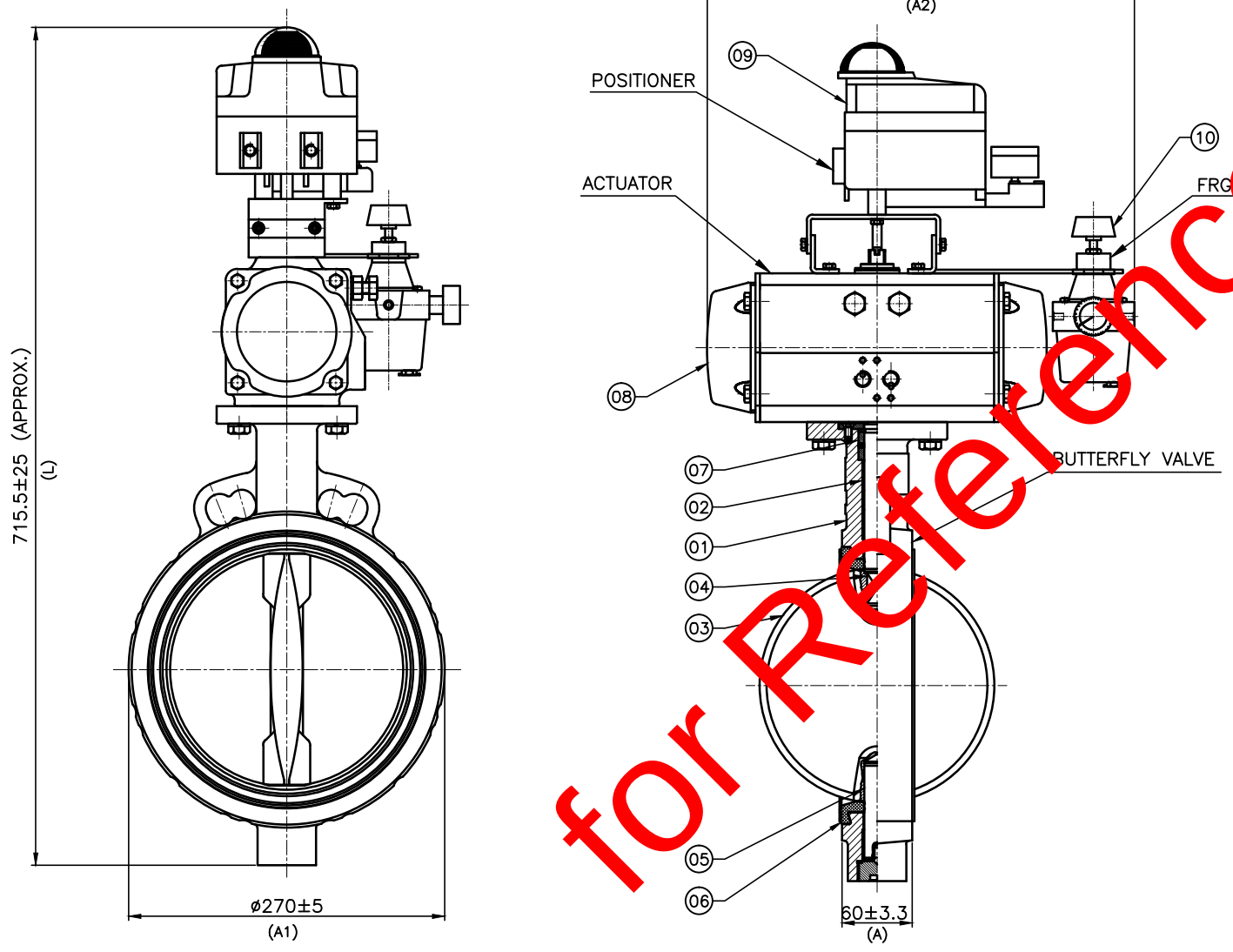
GAD OF 16" (400mm) WAFER TYPE
BFV (SERIES - 4022B)
WITH ACT-160D ACTUATOR / EPR2 / FRG

F/DD/GAD

LET	WAS	DATE	DRN	APPD	LET	WAS	DATE	DRN	APPD	LET	WAS	DATE	DRN	APPD	MATERIAL	SERIES	ITEM CODE	MATERIAL	SERIES	ITEM CODE
1	CHANGE AS PER CUSTOMER COMMENT MAIL DT 150119	15/01/19	RDM	VSS														--		-

ACCESSORIES

ACTUATOR (111)	POSITIONER (P0006)	FRG (Z0001)	SPECIAL POINT (S08)
MODEL :– ACT–100D ACTUATOR TYPE :– PNEUMATIC, RACK & PINION DOUBLE ACTING ACTUATOR SUPPLY MINIMUM:– 4 BAR PNEUMATIC CONNECTIONS :– ¼" BSP HOUSING MATERIAL :– ALUMINIUM ALLOY ACTUATOR ORIENTATION :– PARALLEL TO PIPE LINE AXIS	MODEL NO :– EPR–W–N2S04DTR MAKE :– POWER – GENEX ACTION TYPE :– ROTARY TYPE :– ELECTRO PNEUMATIC + PTR POWER SUPPLY :– 24 V DC PNEUMATIC – ELECTRIC CONNECTION :– ½" NPT ENCLOSURE :– WEATHERPROOF TO IP66 ADDITIONAL FEATURE :– WITH MOUNTING BRACKET	OTHER ACCESSORIES NAME :–FILTER REGULATOR MATERIAL :–ALUMINIUM CONNECTIONS :–1/4" BSP SPECIFICATIONS 1 :–15 bar (g)MAX INLET PRESSURE OUTLE PRESS. RANGE : 0 TO 10 bar(g) SPECIFICATION 2 :–30 MICRON FILTER ELEMENT (BRONZE) SPECIFICATION 3 :–0 TO 10 bar(g) PRESSURE GAUGE	FAIL SAFE CONDITION :– STAYPUT SPECIFICATION 1 :– CONNECTOR AT INLET OF FRG TO SUIT 1/4" NPT MALE (CONNECTOR SIZE 1/4" BSP MALE X 1/4" NPT FEMALE) Solenoid valve: YES, required. Open/close limit switch: YES, required.



SR NO.	DESCRIPTION	MATERIAL
10	FILTER REGULATOR	ALUMINIUM
09	POSITIONER	EPR–W–N2S04DTR
08	ACTUATOR	ACT–100D
07	PACKING	NYLON
06	SEAT	VITON
05	STUB SHAFT	ASTM A 479 TYPE SS 410
04	DRIVE SHAFT	ASTM A 479 TYPE SS 410
03	DISC	ASTM A 351 Gr. CF8 – U3.5
02	BEARING	CS+PTFE
01	BODY	ASTM A 126 Gr. B (CI)

BILL OF MATERIAL

TESTING DETAILS

PRESSURE RATING	HYDROSHELL STRENGTH	HYDROSEAT STRENGTH	PNUEMATIC SEAT
	BAR	BAR	BAR
PN3.5	5.25	4	3–4

VALVE SIZE	CATALOLOUGE NO	ITEM CODE
8" (DN200)	4322B200/CI/CF8–U3.5/S41/V/CTR/A1F ACT–100D/EPR2/FRG	42728–111–C0424–S08

NOTES :–		
1)	ALL DIMENSIONS ARE IN mm.	
2)	VALVE TYPE	BUTTERFLY VALVE, CENTRIC SANDWICH, WAFER, REPLACEABLE SEAT
3)	FLOW DIRECTION	BI–DIRECTIONAL
4)	DESIGN STANDARD	API 609 Cat A / BS EN 593
5)	FACE TO FACE	API 609 Cat A
6)	END CONNECTIONS	HOLDING BETWEEN FLANGES
7)	DRILLING	ANSI B16.5 #150
8)	PRESSURE RATING	PN3.5
9)	CHARACTERISTICS	MODULATING
10)	TESTING STANDARD	API 598
11)	LEAKAGE CLASS	API 598 TABLE – 5
12)	TESTING FLUID	WATER
13)	SHUT OF PRESSURE	3.5 bar (g)

CUSTOMER APPROVED STAMP & SIGN:–

TITLE:–

GAD OF 8" (200mm) WAFER TYPE
BFV (SERIES - 4022B)
WITH ACT-100D ACTUATOR / EPR2 / FRG

F/DD/GAD