







OWNER:  شرکت سست و سستی آبرسانی (سهامی خاص)	BUSHEHR PETROCHEMICAL COMPANY MEG PLANT						EPC CONTRACTOR:  Chagalesh-Enerchimi-Steam Joint Venture BUPC-MEG PLANT PROJECT		
MC :  شرکت سست و سستی آبرسانی تهران	CALCULATION & DATA SHEET OF CONTROL VALVES / ON-OFF VALVES FOR EMERGENCY INSTRUMENT AIR COMPRESSOR						 Netherlands		
Owner Document Number: 17811-45B							Project	Area	Phase
	BU	20	VD	303	IN	DSH	0091	Rev.: 05	Page 1 of 17

## CALCULATION & DATA SHEET OF CONTROL VALVES / ON-OFF VALVES FOR EMERGENCY INSTRUMENT AIR COMPRESSOR






 		BUSHEHR PETROCHEMICAL COMPANY MEG PLANT	
<b>Document Review</b>			
Issue Purpose:		AFC	
Result Code: AP,AN,CM,RE,NC		AN	
Next Status : IFC,IFA,IFI,AFC,AB		AFC	
Responsible Department		MECHANICAL	
Commented Date		7/25/2022	
<b>Approval or review hereunder shall not be construed to relieve Vendor / Subcontractor of his responsibilities and liability under the contract.</b>			

05	13/07/2022	Approved for Construction	TvT	KP	JR	
04	01/06/2022	Approved for Construction	TvT	KP	LdM	
03	07/02/2022	Approved for Construction	TvT	KP	LdM	
02	07/01/2022	Approved for Construction	TvT	KP	LdM	
01	25/10/2021	Approved for Construction	TvT	KP	LdM	
01	20/09/2021	For approval	TvT	KP	LdM	
00	25/02/2021	For approval	TvT	KP	LdM	
<b>Rev</b>	<b>Date</b>	<b>Purpose of Issue</b>	<b>Prepared</b>	<b>Checked</b>	<b>Approved</b>	<b>AC Code</b>
					<b>Class: 1</b>	<b>Phase: P</b>





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**Notes:**

05	TT	13/07/2022	For Construction	<b>CALCULATION &amp; DATA SHEET OF          CONTROL VALVES / ON-OFF VALVES FOR          EMERGENCY INSTRUMENT AIR          COMPRESSOR</b>  	   	
04	TT	01/06/2022	For Construction			
03	TT	07/02/2022	For Construction			
02	TT	07/01/2022	For Construction			
01	TT	25/10/2021	For Construction			
00	TT	20/09/2021	For Approval			
Rev	By	Date	Description	Sheet	3 of 17	
					Based on P&ID	rev. 05



GENERAL	1	Tag Number		No Tag.no.: Qty 1 pc	
	2	Service		Hand Ball valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Inlet	
	5	Line/equip. No.		2"-INA-7001-511C(N)	
	6				
	7				
PROCESS CONDITIONS	8	Fluid	State	Air	Dry Gas
	9	Pressure	Norm. Max.	8 Bar(a)	8,5 Bar(a)
	10	Temperature	Norm. Max.	AMB	65°C
	11	Design	Press. Temp.	13.5 Bar(a)	85°C
	12	Ambient Temp.	Min. Max.	5 °C	52 °C
	13	Oper. Flow		55 Kg/hr / 43 Nm3/hr	
	14				
BODY	16	Body Type		Ball valve, 2-piece, split-body	
	17	Body Size	Bore	2"	Full bore
	18	Guiding	No. Of Ports	-	2
	19	Conn. Type	End Conn. Rat.	RF, ASME B16.5	150#
	20	Body Material		Carbon steel ASTM A 216 Gr. WCB / A105	
	21	Packing/ gasket Material		RPTFE / 304/graphite	
	22	Bonnet Type		bolted	
	23	Form		Floating ball	
	24	Trim	Seat Mat.	RPTFE	
	25		Ball Mat.	SS 316	SS316
	26	Actuation	Material	Lever handle	CS
	27	Bolts & Nuts		B7/2H	
	28	Shaft		Anti blow-out	
	29	Device		Anti static	
	30	Fire safe		Included	
	31				
	32				
	33				
	34				
	35	Leakage rate		API 598 TSO	
	36				
	37				
	38				
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43					
OPTIONS	44				
	45				
	46				
CERTIFICATES	47	3.1 Material certificate		ALFA	
	48	Hydrotest certificate		64sb	
	49				
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	51				
PURCHASE	52	Manufacturer		According to aproved vendor list	
	53	Model		Supplier to advise	
	54				
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**NOTES :**

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
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02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Hand Ball Valve Sheet 4 of 17 Based on P&ID rev. 05	



GENERAL	1	Tag Number		No Tag.no.: Qty 1 pcs	
	2	Service		Hand Ball valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Outlet	
	5	Line/equip. No.		2"-INA-7002-539D(N)	
	6				
	7				
PROCESS CONDITIONS	8	Fluid	State	Air	Dry Gas
	9	Pressure	Norm. Max.	21 Bar(a)	-
	10	Temperature	Norm. Max.	40°C	55°C
	11	Design	Press. Temp.	26 Barg	85°C
	12	Ambient Temp.	Min. Max.	5 °C	52 °C
	13	Oper. Flow		55 Kg/hr / 43 Nm3/hr	
	14				
BODY	16	Body Type		Ball valve, 2-piece, split-body	
	17	Body Size	Bore	2"	Full bore
	18	Guiding	No. Of Ports	-	2
	19	Conn. Type	End Conn. Rat.	RF, ASME B16.5	300#
	20	Body Material		Carbon steel ASTM A 216 Gr. WCB / A105	
	21	Packing/ gasket Material		RPTFE / 304/graphite	
	22	Bonnet Type		bolted	
	23	Form		Floating ball	
	24	Trim	Seat Mat.	RPTFE	
	25		Ball Mat.	SS 316	SS316
	26	Actuation	Material	Lever handle	CS
	27	Bolts & Nuts		B7/2H	
	28	Shaft		Anti blow-out	
	29	Device		Anti static	
	30	Fire safe		Included	
	31				
	32				
	33				
	34				
	35	Leakage rate		API 598 TSO	
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OPTIONS	44				
	45				
	46				
CERTIFICATES	47	3.1 Material certificate		ALFA	
	48	Hydrotest certificate		64sb	
	49				
	50				
	51				
PURCHASE	52	Manufacturer		According to aproved vendor list	
	53	Model		Supplier to advise	
	54				
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**NOTES :**

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
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02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet 5 of 17 Based on P&ID rev. 05	



GENERAL	1	Tag Number		No Tag.no.: Qty 2 pcs	
	2	Service		Hand Ball valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Cooling water	
	5	Line/equip. No.		1 1/2"-CWS-7003-500C(N)/ 1 1/2"-CWR-7008-500C(N)	
	6				
	7				
PROCESS CONDITIONS	8	Fluid	State	Water	Liquid
	9	Pressure	Norm. Max.	4,5 Bar(g)	5 Bar(g)
	10	Temperature	Norm. Max.	35°C	45°C
	11	Design	Press. Temp.	7 Bar(g)	100°C
	12	Ambient Temp.	Min. Max.	5 °C	52 °C
	13	Oper. Flow		1,4 m3/hr	
	14				
BODY	16	Body Type		Ball valve, 2-piece, split-body	
	17	Body Size	Bore	1 1/2"	Full bore
	18	Guiding	No. Of Ports	-	2
	19	Conn. Type	End Conn. Rat.	RF, ASME B16.5	150#
	20	Body Material		Carbon steel ASTM A 216 Gr. WCB / A105	
	21	Packing/ gasket Material		RPTFE / 304/graphite	
	22	Bonnet Type		bolted	
	23	Form		Floating ball	
	24	Trim	Seat Mat.	RPTFE	
	25		Ball Mat.	SS 316	SS316
	26	Actuation	Material	Lever handle	CS
	27	Bolts & Nuts		B7/2H	
	28	Shaft		Anti blow-out	
	29	Device		Anti static	
	30	Fire safe		Included	
	31				
	32				
	33				
	34				
	35	Leakage rate		API 598 TSO	
	36				
37					
38					
39					
40					
41					
42					
43					
OPTIONS	44				
	45				
	46				
CERTIFICATES	47	3.1 Material certificate		ALFA	
	48	Hydrotest certificate		64sb	
	49				
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	51				
PURCHASE	52	Manufacturer		According to aproved vendor list	
	53	Model		Supplier to advise	
	54				
	55				
	56				
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**NOTES :**

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Hand Ball Valve Sheet 6 of 17 Based on P&ID rev. 05	



GENERAL	1	Tag Number		No Tag.no.: Qty 2 pcs	
	2	Service		Hand Ball valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Oil sump drain & block valve	
	5	Line/equip. No.		N/A	
	6				
	7				
PROCESS CONDITIONS	8	Fluid	State	Oil	Liquid
	9	Pressure	Norm. Max.	3 Bar(a)	3,5 Bar(a)
	10	Temperature	Norm. Max.	45°C	65°C
	11	Design	Press. Temp.	5 Bar(a)	80°C
	12	Ambient Temp.	Min. Max.	5 °C	52 °C
	13	Oper. Flow			
	14				
BODY	16	Body Type		Ball valve, screwed type	
	17	Body Size	Bore	1/2"	Full bore
	18	Guiding	No. Of Ports	-	2
	19	Conn. Type	End Conn. Rat.	NPT-F	800#
	20	Body Material		SS316	
	21	Packing Material		PTFE / Graphite	
	22	Bonnet Type		Screwed	
	23	Form		Floating ball	
	24	Trim	Seat Mat.	PTFE / Graphite	
	25		Ball Mat.	Shaft Mat.	SS 316 SS316
	26	Actuation	Material	Lever handle	SS
	27				
	28				
	29				
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	32				
	33				
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43					
OPTIONS	44				
	45				
	46				
CERTIFICATES	47	3.1 Material certificate		No	
	48	Hydrotest certificate		No	
	49				
	50				
	51				
PURCHASE	52	Manufacturer		ALFA	
	53	Model		20r/t	
	54				
	55				
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**NOTES :**

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
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00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet 7 of 17 Based on P&ID rev. 05	



GENERAL	1	Tag Number		No Tag.no.: Qty 9 pcs	
	2	Service		Hand Ball valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor block valve & pulsation drain	
	5	Line/equip. No.		N/A	
	6				
	7				
PROCESS CONDITIONS	8	Fluid	State	Air/ water	Dry Gas
	9	Pressure	Norm. Max.	21 Bar(a)	-
	10	Temperature	Norm. Max.	40°C	55°C
	11	Design	Press. Temp.	26 Barg	70°C
	12	Ambient Temp.	Min. Max.	5 °C	52 °C
	13	Oper. Flow			
	14				
BODY	16	Body Type		Ball valve, screwed type	
	17	Body Size	Bore	1/2"	Full bore
	18	Guiding	No. Of Ports	-	2
	19	Conn. Type	End Conn. Rat.	NPT-F	800#
	20	Body Material		SS316	
	21	Packing Material		PTFE / Graphite	
	22	Bonnet Type		Screwed	
	23	Trim Form		Floating ball	
	24	Trim	Seat Mat.	PTFE / Graphite	
	25		Ball Mat.	Shaft Mat.	SS 316 SS316
	26	Actuation	Material	Lever handle	CS
	27				
	28				
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OPTIONS	44				
	45				
	46				
CERTIFICATES	47	3.1 Material certificate		No	
	48	Hydrotest certificate		No	
	49				
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	51				
PURCHASE	52	Manufacturer		ALFA	
	53	Model		20r/t	
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**NOTES :**

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet 8 of 17 Based on P&ID rev. 05	




GENERAL	1	Tag Number		XV-71102	
	2	Service		Ball valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Cooling water Inlet	
	5	Line/equip. No.		1 1/2"-CWS-7003-500C(N)	
	6				
	7				
PROCESS CONDITIONS	8	Fluid	State	Water	Liquid
	9	Pressure	Norm. Max.	4,5 Bar(g)	5 Bar(g)
	10	Temperature	Norm. Max.	35°C	45°C
	11	Design	Press. Temp.	7 Bar(g)	100°C
	12	Ambient Temp.	Min. Max.	5 °C	52 °C
	13	Oper. Flow		1,4 m3/hr	
	14				
BODY	15	Body Type		Ball valve, 2-piece, split-body	
	16	Body Size	Bore	1 1/2"	Full bore
	17	Guiding	No. Of Ports	-	2
	18	Conn. Type	End Conn. Rat.	RF, ASME B16.5	150#
	19	Body Material		Carbon steel ASTM A 216 Gr. WCB/ A105	
	20	Packing/ gasket Material		RPTFE / 304/graphite	
	21	Bonnet Type		bolted	
	22	Form		Floating ball	
	23	Trim	Seat Mat.	RPTFE	
	24		Ball Mat.	SS 316	SS316
	25	Bolts & Nuts		B7/2H	
	26	Shaft		Anti blow-out	
	27	Device		Anti static	
	28	Fire safe		Included	
ACTUATOR	29	Type		Rack & Pinion, single acting	
	30	Close At	Open At	Spring return	Air supply
	31	Flow Action To		FTC	
	32	Fail Position		FC	
	33	Pneumatic connection		2 x 1/4" NPT-F	
	34	Instrument Supply Fluid		Instrument Air / Nitrogen	
	35	Instrument Supply Fluid pressure		6.0 bar(g)	
	36	Brackets	Coupling	SS316	SS316
	37	Housing material		Aluminium, epoxy coated	
	38				
POSITION MONITOR	39	Type		N/A	
	40	Power supply		N/A	
	41	Type of switch/transmitter		N/A	
	42	Area Classification		N/A	
	43	Cable Gland		N/A	
OPTIONS	44	Solenoid valves		see instrument datasheet Tag. XY-71102	
	45	Leakage rate		API 598 TSO	
	46				
CERTIFICATES	47	3.1 Material certificate		Yes	
	48	Hydrotest certificate		Yes	
	49	ATEX		No	
	50	SIL certificate	Level	No	
	51	IP certificate		No	
PURCHASE	52	Valve Manufacturer		ALFA	
	53	Valve Model		64sb	
	54	Actuator Manufacturer		Air Torque	
	55	Actuator Model		AT251	
	56				
	57				

**NOTES :**

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet 9 of 17 Based on P&ID rev. 05	




GENERAL	1	Tag Number	XV-71102	
	2	Service	Ball valve	
	3	P&ID No.	BU-20-VD-303-PR-WG-0066	
	4	Location	Compressor Cooling water Inlet	
	5	Line/equip. No.	1 1/2"-CWS-7003-501C(N)	
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
Calculation	15	1 1/2" Ball valve, 2-piece, split-body	k.k. F03 SW8	
	16	Break to open (Nm)   End to close (Nm)	45 Nm	36 Nm
	17			
	18	Actuator Rack & Pinion single acting	251U S12 A F05/F07 17DS 6 bar	
	19	Break to open (Nm)   End to close (Nm)	65,8 Nm	44 Nm
	20		Including Safety factor 1,5	
	21			
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**NOTES :**

05	TT	13/07/2022	For Construction	  
04	TT	01/06/2022	For Construction	
03	TT	07/02/2022	For Construction	
02	TT	07/01/2022	For Construction	
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Rev	By	Date	Description	Sheet 10 of 17 Based on P&ID rev. 05



GENERAL	1	Tag Number		No Tag.no: Qty 1 pcs		
	2	Service		Globe valve		
	3	P&ID No.		BU-20-VD-303-PR-WG-0066		
	4	Location		Compressor Cooling water		
	5	Line/equip. No.		1 1/2"-CWS-7005-501C(N)		
	6					
	7					
PROCESS CONDITIONS	8	Fluid	State	Water	Liquid	
	9	Pressure	Norm. Max.	4,5 Bar(g)	5 Bar(g)	
	10	Temperature	Norm. Max.	35°C	45°C	
	11	Design	Press. Temp.	7 Bar(g)	100°C	
	12	Ambient Temp.	Min. Max.	5°C	52°C	
	13	Oper. Flow		1,4 m3/hr		
BODY	15	Body Type		Globe valve, OS&Y, BB		
	16	Body Size		1 1/2"		
	17	Guiding	No. Of Ports	-	2	
	18	Conn. Type	End Conn. Rat.	RF	150#	
	19	Body Material		Carbon steel ASTM A 216 Gr. WCB/WCC / A105		
	20	Packing Material		PTFE / Graphite		
	21	Bonnet Type		Bolted		
	22	Form		Disc		
	23	Trim	Seat Mat.		PTFE / Graphite	
	24		Disc Mat.	Shaft Mat.	SS 316	SS316
	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
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43						
OPTIONS	44					
	45					
	46					
CERTIFICATES	47	3.1 Material certificate		Yes		
	48	Hydrotest certificate		Yes		
	49					
	50					
	51					
PURCHASE	52	Manufacturer		LVF		
	53	Model		1BR207		
	54					
	55					
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**NOTES :**



05	TT	13/07/2022	For Construction	  
04	TT	01/06/2022	For Construction	
03	TT	07/02/2022	For Construction	
02	TT	07/01/2022	For Construction	
01	TT	25/10/2021	For Construction	
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Rev	By	Date	Description	Sheet 11 of 17 Based on P&ID rev. 05

GENERAL	1	Tag Number		No Tag.no: Qty 1 pcs		
	2	Service		Pressure Control Valve		
	3	P&ID No.		BU-20-VD-303-PR-WG-0066		
	4	Location		Compressor Inlet & actuator cooling inlet		
	5	Line/equip. No.		N/A		
	6					
	7					
PROCESS CONDITIONS	8	Fluid	State	Air	Dry Gas	
	9	Pressure	Norm. Max.	8 Bar(a)	9 Bar(a)	
	10	Temperature	Norm. Max.	55°C	65°C	
	11	Design	Press. Temp.	13.5 Bar(a)	80°C	
	12	Ambient Temp.	Min. Max.	5 °C	52 °C	
BODY	13	Valve Type		Pressure reducing valve		
	14	Body Material		Aluminium		
	15	Diaphragm Material		Nitrile		
	16	Trim	Form		Plug	
	17		Seat Mat.		SS316	
	18		Spring Mat.	Disc Mat.	SS316	SS316
	19					
	20					
	21					
22						
23						
24						
ACTUATOR	25	Type		Mechanical, spring type		
	26	Fail Position		FC		
	27					
	28					
	29					
	30					
CONNECTIONS	31	Inlet Size	Outlet Size	1/4"	1/4"	
	32	Inlet Connection	Outlet Conn.	Threaded NPT-F	Threaded NPT-F	
	33	Inlet Rating	Outlet Rating	800#	800#	
	34					
SIZING CONDITIONS	35	Flow Rate		10 Nm <sup>3</sup> /hr		
	36	Pressure drop		0,1 bar		
	37	Pressure setpoint		6,0 bar(g)		
	38					
	39					
OPTIONS	41	Pressure Gauge		Yes		
	42	Material		Aluminium		
	43	Range		0...11 bar(g)		
	44	Filter Regulator and drip well		Yes(Mesh 40)		
CERTIFICATES	45	3.1 Material certificate for body		No		
	46	3.1 Material certificate for stem		No		
	47					
CALCULATIONS	48					
	49	Sizing calculation		No		
	50					
	51					
	52					
PURCHASE	53					
	54	Manufacturer		Fisher		
	55	Model		67CFR		
	56					
57						



**NOTES :**



05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Based on P&ID rev. 05	

GENERAL	1	Tag Number			PV-71101	
	2	Service			Recycle valve	
	3	P&ID No.			BU-20-VD-303-PR-WG-0066	
	4	Location			Compressor bypass	
	5					
	6					
	7					
PROCESS CONDITIONS	8	Fluid	State		Air	Dry Gas
	9	Pressure	Norm.	Max.	21 Bar(a)	-
	10	Temperature	Norm.	Max.	40°C	55°C
	11	Design	Press.	Temp.	26 Barg	70°C
	12	Ambient Temp.	Min.	Max.	5 °C	52 °C
BODY	13	Type Of Body			Globe valve	
	14	Body Size			1" ANSI RF	
	15	Conn. Type	End Conn. Rat.		RF	300#
	16	Body Material			Carbon steel ASTM A216 WCB/WCC	
	17	Packing Material			PTFE / Graphite	
	18	Bonnet Type			Integral	
	19	Trim	Form		Disc	
	20		Seat Mat.		PTFE / Graphite	
	21		Disc Mat.	Shaft Mat.	SS 316	SS316
	22	Required Seat Tightness			IV	
	23	Max. Allow. Sound Level (dBA)			85 dBA	
	24	Required CV			0.294	
	25	Travel %			69	
26	Trim Characteristics			Equal percentage		
ACTUATOR	27	Positioner controller			Electro-pneumatic (I/P)	
	28	Interface			4 -20 mA , HART	
	29	Fail Position			AFC	
	30	Pneumatic Conn.			1/4" NPT-F	
	31	Instrument Supply Fluid			Instrument Air	
	32	Instrument Supply Fluid pressure			6.0 bar(g)	
	33	Position Monitor			Yes 4-20 mA HART	
	34	Area Classification			Zone 2, Eex'ia	
	35	Electric Connection			ISO M20 x 1,5	
	36	Cable Gland			Yes, Eex 'de' certified (Airpack scope)	
ACCESSORIES	37	Ingress Protection			IP 65	
	38	Filter Regulator			Yes	
	39	Gauges			Yes	
SERVICE	40					
	41	Flow Rate			55 Kg/hr / 43 Nm3/hr	
	42	Pressure	Inlet	outlet	21 bar(a)	8 bar(a)
	43	Pressure drop			0,55	
	44	CV selected			0,188	
	45					
	46					
	47					
CERTIFICATES	48					
	49	3.1 Material certificate			Yes	
	50	ATEX			No	
	51	SIL certificate	Level		No	
PURCHASE	52					
	53	Valve Manufacturer			Emerson/Fisher	
	54	Valve Model			NPS1GX	
	55	Actuator Manufacturer			Emerson/Fisher	
	56	Actuator Model			DVC6200	
57						

05	TT	13/07/2022	For Construction	<b>INSTRUMENT AND VALVE DATASHEET</b> <b>Pressure Control Valve</b> 	
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet	13 of 17
				Based on P&ID rev. 05	

GENERAL	1	Tag Number		No Tag.no.: Qty 2 pcs	
	2	Service		Check Valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Outlet	
	5	Line/equip. No.		2"-INA-7002-539D(N)	
	6				
	7				
	8				
PROCESS CONDITIONS	9	Fluid	State	Air	Dry Gas
	10	Pressure	Norm. Max.	21 Bar(a)	-
	11	Temperature	Norm. Max.	40°C	55°C
	12	Design	Press. Temp.	26 Barg	85°C
	13	Ambient Temp.	Min. Max.	5 °C	52 °C
	14	Oper. Flow		55 Kg/hr / 43 Nm3/hr	
	15				
	16				
	17				
	18				
BODY	20	Type Of Body		Wafer type	
	21	Type Of valve		Disc style, pulsation service	
	21	Body Size		DN 50 ( Process line = 2" ANSI 300# RF)	
	22	Body Material		Carbon steel ASTM A216 WCB	
	23	Cracking Pressure		0,002 bar	
	24	Inlet Connection	Outlet Conn.	RF	RF
	25	Inlet Rating	Outlet Rating	300#	300#
	26	Trim materials		SS316	
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
35					
36					
37					
38					
39					
40					
OPTIONS	41				
	42				
	43				
	44				
	45				
CERTIFICATES	46	3.1 Material certificate		Yes	
	47				
	48				
	49				
	50				
	51				
PURCHASE	52	Manufacturer		Hoerbigger	
	53	Model		49D0	
	54				
	55				
	56				

05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet 16 of 17 Based on P&ID rev. 05	

GENERAL	1	Tag Number		No Tag.no.: Qty 1 pcs	
	2	Service		Check Valve	
	3	P&ID No.		BU-20-VD-303-PR-WG-0066	
	4	Location		Compressor Cooling water inlet	
	5	Line/equip. No.		1 1/2"-CWS-7003-500C(N)	
	6				
	7				
	8				
PROCESS CONDITIONS	9	Fluid	State	Water	Liquid
	10	Pressure	Norm. Max.	4,5 Bar(g)	5 Bar(g)
	11	Temperature	Norm. Max.	35°C	45°C
	12	Design	Press. Temp.	7 Bar(g)	100°C
	13	Ambient Temp.	Min. Max.	5 °C	52 °C
	14	Oper. Flow		1,4 m3/hr	
	15				
	16				
	17				
	18				
BODY	20	Type Of Body		Flanged bolted type	
	21	Type Of valve		Swing disc	
	21	Body Size		1 1/2" ANSI	
	22	Body Material		Carbon steel ASTM A216 WCB	
	23	Cracking Pressure		0,05 bar	
	24	Inlet Connection	Outlet Conn.	RF	RF
	25	Inlet Rating	Outlet Rating	150#	150#
	26	Trim materials		SS316	
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				
	36				
37					
38					
39					
40					
OPTIONS	41				
	42				
	43				
	44				
	45				
CERTIFICATES	46	3.1 Material certificate		Yes	
	47				
	48				
	49				
	50				
	51				
PURCHASE	52	Manufacturer		Fluval	
	53	Model		SWCV-150	
	54				
	55				
	56				
05	TT	13/07/2022	For Construction		
04	TT	01/06/2022	For Construction		
03	TT	07/02/2022	For Construction		
02	TT	07/01/2022	For Construction		
01	TT	25/10/2021	For Construction		
00	TT	20/09/2021	For Approval		
Rev	By	Date	Description	Sheet 17 of 17 Based on P&ID rev. 05	

# Valve/Regulator Sizing Calculation

Customer: **AIRPACK NEDERLAND BV**

Contact:

Customer Reference: **Inquiry 17811 VV-0801 (CV)**

Item: **200**

Rev:

Qty: **1**

Selected valve series or model no. shall be specified

Tags: **PV-71101**

Description:

Service Description: **Recycle valve**

Sizing Type: Gas      Flow is Turbulent      Solving for: Cv      Noise is None      Flow is Volumetric

Variable Name      Units      Normal

**SERVICE & SIZING**

Gas		<b>~NITROGEN</b>
Inlet Pressure (P1)	<b>bar(a)</b>	<b>21.000</b>
Outlet Pressure (P2)	<b>bar(a)</b>	<b>8.000</b>
Inlet Temperature (T1)	<b>deg C</b>	<b>55.000</b>
Volumetric Flow Rate Gas (Qg)	<b>Nm3/h</b>	<b>43.000</b>
Pressure drop ratio factor (Xt)		<b>0.550</b>
Pressure Recovery Factor (FI)		<b>0.930</b>
Valve style modifier (Fd)		<b>0.217</b>
Atmospheric Pressure	<b>bar</b>	<b>1.013</b>
Dynamic Viscosity (Mu)	<b>cP</b>	<b>0.017</b>
Specific heats ratio (gamma)		<b>1.400</b>
Molecular Weight/Specific Gravity	<b>M</b>	<b>28.130</b>
Inlet Compressibility Factor (Z1)		<b>1.000</b>

Pipe Size Up	<b>in</b>	<b>1</b>
Pipe Schedule Up		<b>STD</b>
Pipe Size Down	<b>in</b>	<b>1</b>
Pipe Schedule Down		<b>STD</b>
Nominal Valve Diameter (dv)	<b>in</b>	<b>1.000</b>

Sizing Coefficient (Cv)		<b>0.188</b>
% Open		<b>69</b>
dP Choked	<b>bar</b>	<b>11.550</b>
dP/P1 Valve		<b>0.619</b>
Fp		<b>1.000</b>

**VELOCITY OUTPUTS**

M1 Pipe	<b>Mach</b>	<b>0.003</b>
Mo Valve	<b>Mach</b>	<b>0.010</b>
M2 Pipe	<b>Mach</b>	<b>0.009</b>
V1 Pipe	<b>m/s</b>	<b>1.242</b>
Vo Valve	<b>m/s</b>	<b>3.704</b>
V2 Pipe	<b>m/s</b>	<b>3.261</b>
C1 Pipe	<b>m/s</b>	<b>368.603</b>
Co Valve	<b>m/s</b>	<b>368.603</b>
C2 Pipe	<b>m/s</b>	<b>368.603</b>

Item Notes:

# Flow Coefficient Graph

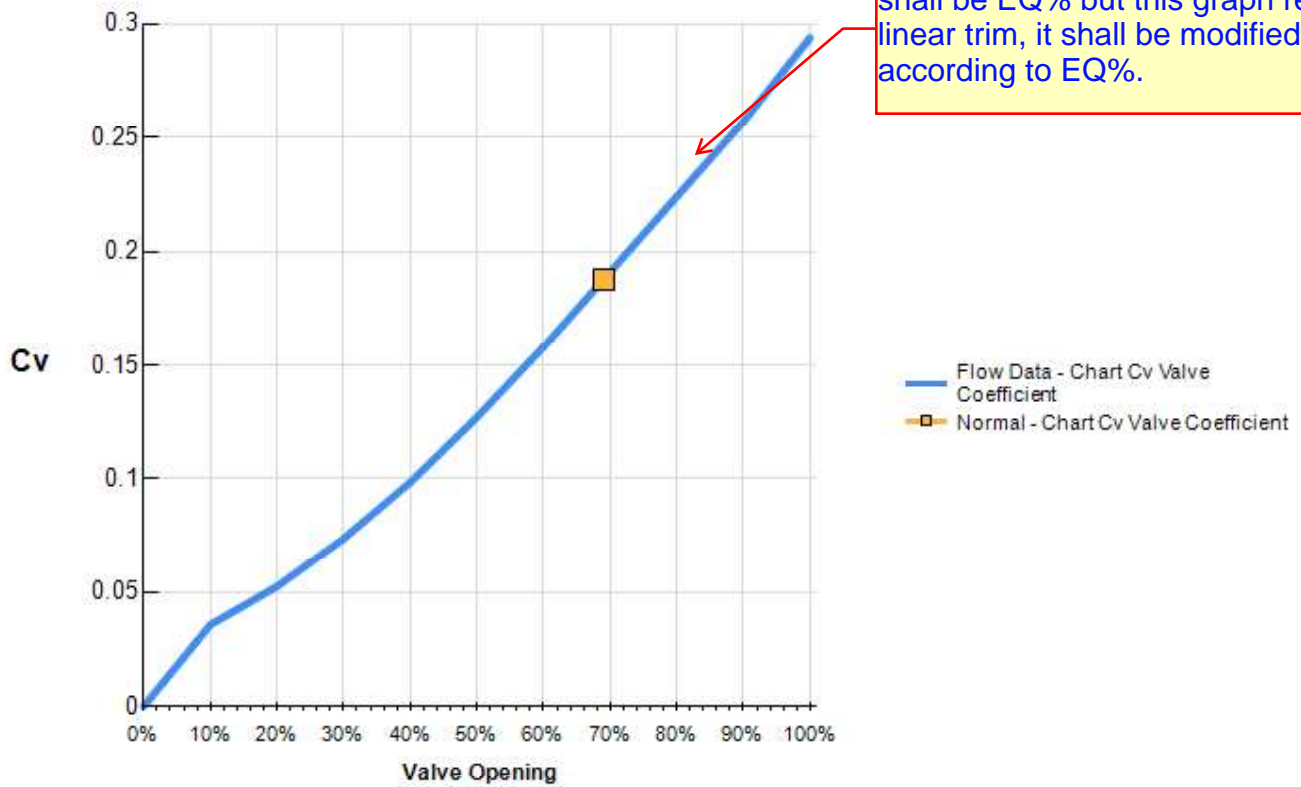
Customer: AIRPACK NEDERLAND BV  
 Contact:  
 Customer Reference: Inquiry 17811 VV-0801 (CV)

Item: 200 Rev: Qty: 1  
 Tags: PV-71101  
 Description:  
 Service Description: Recycle valve

Selected valve series or model no. shall be specified

Flow Coefficient vs. Valve Opening

As per data sheet, trim characteristic shall be EQ% but this graph related to linear trim, it shall be modified according to EQ%.



Product: GX Valve Size=NPS 1 Trim Style/Characteristic=Micro Flow 4 Deg 39 Min Port Diameter=4.8 mm Trim  
 Capacity=Full Capacity Travel=20 mm Balance=Unbalanced