
Section 7

Process Valves

Toll Free Number

1-866-747-9720

Webpage

www.mercervalue.net



1136444 BC LTD A Subsidiary Of
MERCER VALVE CO., INC.®
"AUTO SEAT TECHNOLOGY"®

Direct Number

403-225-3219

Email

canada@mercervalue.net

Sour Service

Customer Name: Optimized Oilfield Inc.

Customer PO Number: 112-22-01

Item Description: Qty (2) 85-17151V07N11

1" MNPT X 1" FNPT 1/2" (E) ORIFICE FKM SEAT
FKM/BUNA SEALS SOUR GAS SERVICE

Series 8500

Serial Number(s) RVC00018337 -
RVC00018338

Set @ 66 PSI

Temperature: 60 F

Capacity 294 SCFM

Tag:PSV-110

CDTP

Repair Kit No: 11V1N11

CRN.0G8841.5CLADD3

Mercer Valve Sales Order Number: 7728

Mercer Valve Job Order Number: 87781

Valve Setting Instructions:

Set Pressure Tolerance: 2 PSI

Test Medium: Air

This certifies that the valves purchased on the above sales order number were built per section VIII, Division 1 of ASME boiler and pressure vessel code.

Note: _____

DBB

6/1/2022

Certified Individual
Quality Control

Customer Name Nathan Broda
 Company Marathon Compression
 Location
 Quote # 9008629
 Reference 109
 Valve PSV/Tag Number PSV-110

Quote Revision
 Rev.:
 Quote Contact



jalvarez

ENG-1047000
 3.01
 4-Mar-2022

Please reference Quote Number on all corresponding Purchase Orders.
 Quote is only valid for 30 days from the sized on date.

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MERCER VALVE CO., INC.
 "AUTO SEAT TECHNOLOGY"®

Fluid Data	GAS/VAPOR	REQUIRED CAPACITY	Natural Gas	
	MOLECULAR WEIGHT	SPECIFIC GRAVITY	21.44	0.74
	GAS COEFFICIENT	K-RATIO OF SPECIFIC HEATS	344.1	1.27
	COMPRESSIBILITY FACTOR		1.000	
	REQUIRED AREA	FLOW COEFFICIENT	0.212 in ²	0.867
	LIQUID 1	REQUIRED CAPACITY		
	SPECIFIC GRAVITY	DENSITY		
	VISCOSITY	VISCOSITY CORRECTION FACTOR		
	REQUIRED AREA	FLOW COEFFICIENT		
	LIQUID 2	REQUIRED CAPACITY		
	SPECIFIC GRAVITY	DENSITY		
	VISCOSITY	VISCOSITY CORRECTION FACTOR		
REQUIRED AREA	FLOW COEFFICIENT			
Process Conditions	SUPERIMPOSED CONST BP	SUPERIMPOSED VARIABLE BP	0 psig	0 psig
	BUILT-UP BP	TOTAL BACK PRESSURE	0 psig	0 psig
	OPERATING TEMP	RELIEVING TEMPERATURE	60 °F	60 °F
	OPERATING PRESSURE	ATMOSPHERIC PRESSURE	17 psig	14.696 psia
	SET PRESSURE	CDTP	66 psig	
	OVER PRESSURE	INLET PRESSURE LOSSES	6.6 psig / 10 %	0 psig / 0 %
		FLOWING PRESSURE		87.296 psia
	DISCHARGE COEFFICIENT AND AREAS	VALVE CERTIFICATION / DESIGN CODE	ASME Certified	ASME BPVC, SECTION VIII, DIVISION 1
	SYSTEM TYPE		Set on Air	Blocked Flow
				1.0
Sizing Results	TOTAL REQUIRED AREA	Rupture Disk Correction	0.212 in ²	
	SELECTED ORIFICE AREA	SELECTED ORIFICE	0.212 in ²	1/2" Diam ORIFICE
	MAXIMUM CAPACITY OF GAS AT OVER PRESS.		330.7 scfm	
	MAXIMUM CAPACITY OF LIQUID 1 AT OVER PRESS.			
	MAXIMUM CAPACITY OF LIQUID 2 AT OVER PRESS.			
	TAG CAPACITY		294 SCFM AIR	
	DECIBEL LEVEL	SINGLE OUTLET REACTION FORCE	94.64 dB @ 100 ft	11.29 lbf
Materials	INLET BASE / BODY MATERIAL		(5) - Carbon Steel / WCB Carbon Steel	
	SEAT	O-RINGS	(V) - Fluorocarbon 90 DUROMETER	(1) - Fluorocarbon & BUNA N
	SOUR SERVICE	TRIM MATERIALS	YES	(N1) - 316 SS DISK & NOZLE
	ADJ SCREW	ADJ BUSHING	STNLS STL	STNLS STL
	SPRING	DISK	MP35N	316 STNLS STL
	NOZZLE MATERIAL	NOZZLE TYPE	316 STNLS STL	Semi Nozzle
	CAP TYPE	INLET PIPE TAP	(1) - CLOSED CAP	NO
Valve Information	Valve Type		8500 SERIES SPRING OPERATED VALVE	
	Valve P/N:		85-17151V07N11	
	Repair Kit P/N:		11V1N11	
	Inlet and Outlet		(17) - 1" MNPT x 1" FNPT	
	Center to Face Dimensions		A = 3.202 ± 0.062 in. (81.3 ± 1.6 mm.)	B = 1.906 ± 0.062 in. (48.4 ± 1.6 mm.)
	Valve Design Temp	Valve Design Pressure	-20°F to 400°F (-29°C to 204°C)	
		60psig to 90psig (413.7kPag to 620.5kPag)		
Pricing Information	Quantity	Lead Time (ARO)	1	
	Price Per Valve (US\$)	Total Valve Price (US\$)		
Comments				

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Customer Name Nathan Broda
 Company Marathon Compression
 Location
 Quote # 9008629
 Reference 109
 Valve PSV/Tag Number PSV-110



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 4-Mar-2022

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MERCER VALVE CO., INC.®
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Fluid Properties	Variable Name	Symbol	Input Value	Equation Value
Gas	Molecular Weight	M	21.44	21.44
	Ratio of Specific Heats	k	1.27	1.27
	Compressibility	Z	1	1
Process Conditions	Gas Required Area	AGAS	0.212 in ²	0.212 in ²
	Set Pressure	Pset	66 psig	66 psig
	Over Pressure	Pover	10 %	6.6 psig
	Inlet Line Loss	Ploss	0 %	0 psig
	Variable Superimposed Back Pressure	Pvs	0 psig	0 psig
	Constant Superimposed Back Pressure	Pcs	0 psig	0 psig
	Built-up Back Pressure	Pbu	0 psig	0 psig
	Atmospheric Pressure	Patm	14.696 psia	14.696 psia
	Relieving Temperature	T1	60 °F	519.67 °R
	Rupture Disk Correction	Kc	1	1
	Noise Level Distance	d	100 ft	100 ft
Valve Data	Gas Discharge Coefficient	KdGAS		0.867
	Outlet Diameter	Do		0.957 in
	Actual Valve Orifice Area	ATAG		0.212 in ²
	ASME Certified Slope	Slope		3.370
Calculations	Symbol	Equation	Equation Result	
Flowing Pressure	P1	$P1 = Pset + Pover - Ploss + Patm$	87.3 psia	
Total Back Pressure	P2	$P2 = Pvs + Pcs + Pbu + Patm$	14.696 psia	
Pressure Ratio	PR	$PR = P1 / P2$	5.94	
Critical Flow Nozzle Pressure	Pcf	$Pcf = P1 * [2 / (k + 1)] ^ { k / (k - 1) }$	48.118 psia	
Sonic Flow Verification		$Pcf < Pback ==> SONIC FLOW$		
Gas Constant	C	$C = 520 * \{ k * [2 / (k + 1)] ^ { [(k + 1) / (k - 1)] } \} ^ { 0.5}$	344.1	

Customer Name Nathan Broda
 Company Marathon Compression
 Location
 Quote # 9008629
 Reference 109
 Valve PSV/Tag Number PSV-110

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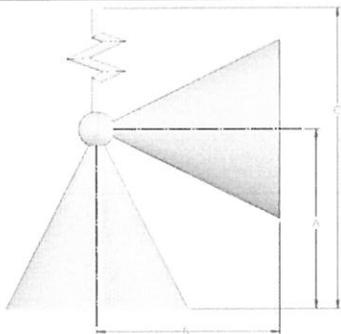
Calculations	Symbol	Equation	Equation Result
Total Required Area	A	A = AGAS	0.212 in ²
Selected Orifice		1/2" Diam ORIFICE	0.212 in ²
Tag Flowing Pressure	P1TAG	P1TAG = Pset + Povertag + Patm	87.3 psia
Tag Capacity	VTAG	VTAG = slope * P1TAG	294 SCFM AIR
Maximum Gas Flow Rate	Vmax	$V_{max} = 6.32 * C * K_dGAS * P_1 * K_c * A / (T_1 * Z * M)^{0.5}$	330.65 scfm
Mass Flow	W	$W = V_{max} * M / 6.32$	1121.7 lb/hr

Noise Level Calculations

SoundPressureLevel	L	Calculated from Figure 18 in API 521	55.9 dB
Noise Level at 100 ft (30 m)	L100	$L_{100} = L + 10 * \log (0.214967 * W * k * T_1 / M)$	94.64 dB
Noise Level at distance d	Ld	$L_d = L_{100} - 20 * \log (d / 100)$	94.64 dB

Reaction Forces

Outlet Static Pressure	Po	Po = Max Allowable Over Pressure	14.696 psia
Outlet Area	Ao	$A_o = (\pi * D_o^2) / 4$	0.719 in ²
Gas Reaction Force for Open Discharge	FrGas	$Fr_{Gas} = W / 366 * \{ (k * T_1) / [(k + 1) * M] \}^{0.5} + [(Po - Patm) * A_o]$	11.29 lbf



Picture may not be representative of actual valve
 A = 3.202 ± 0.062 in. (81.3 ± 1.6 mm.)
 B = 1.906 ± 0.062 in. (48.4 ± 1.6 mm.)

Toll Free Number

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"AUTO SEAT TECHNOLOGY"™

Direct Number

403-225-3219

Email

canada@mercervalve.net

Sour Service

Customer Name: Optimized Oilfield Inc.

Customer PO Number: 112-22-01

Item Description: Qty (2) 85-17151T11N11

1" MNPT X 1" FNPT 1/2" (E) ORIFICE PTFE SEAT
FKM/BUNA SEALS SOUR GAS SERVICE

Series 8500

Serial Number(s) RVC00018339 -
RVC00018340

Set @ 360 PSI

Temperature: 280 F

Capacity 1384 SCFM

Tag:PSV-310

CDTP

Repair Kit No: 11T1N11

CRN.0G8841.5CLADD3

Mercer Valve Sales Order Number: 7728

Mercer Valve Job Order Number: 87782

Valve Setting Instructions:

Set Pressure Tolerance: 3%

Test Medium: Air

This certifies that the valves purchased on the above sales order number were built per section VIII, Division 1 of ASME boiler and pressure vessel code.

Note: _____

DBB

6/1/2022

Certified Individual
Quality Control

Customer Name Nathan Broda
 Company Marathon Compression
 Location
 Quote # 9008629
 Reference 109
 Valve PSV/Tag Number PSV-310

Quote Revision
 Rev.:
 Quote Contact



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MERCER VALVE CO., INC.®
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Fluid Data	GAS/VAPOR	REQUIRED CAPACITY	Natural Gas	
	MOLECULAR WEIGHT	SPECIFIC GRAVITY	21.44	0.74
	GAS COEFFICIENT	k-RATIO OF SPECIFIC HEATS	344.1	1.27
	COMPRESSIBILITY FACTOR		1.000	
	REQUIRED AREA	FLOW COEFFICIENT	0.212 in ²	0.867
	LIQUID 1	REQUIRED CAPACITY		
	SPECIFIC GRAVITY	DENSITY		
	VISCOSITY	VISCOSITY CORRECTION FACTOR		
	REQUIRED AREA	FLOW COEFFICIENT		
	LIQUID 2	REQUIRED CAPACITY		
SPECIFIC GRAVITY	DENSITY			
VISCOSITY	VISCOSITY CORRECTION FACTOR			
REQUIRED AREA	FLOW COEFFICIENT			
Process Conditions	SUPERIMPOSED CONST BP	SUPERIMPOSED VARIABLE BP	0 psig	0 psig
	BUILT-UP BP	TOTAL BACK PRESSURE	0 psig	0 psig
	OPERATING TEMP	RELIEVING TEMPERATURE	280 °F	350 °F
	OPERATING PRESSURE	ATMOSPHERIC PRESSURE	250 psig	14.696 psia
	SET PRESSURE	CDTP	360 psig	
	OVER PRESSURE	INLET PRESSURE LOSSES	36 psig / 10 %	0 psig / 0 %
		FLOWING PRESSURE		410.696 psia
	DISCHARGE COEFFICIENT AND AREAS	VALVE CERTIFICATION / DESIGN CODE	ASME Certified	ASME BPVC, SECTION VIII, DIVISION 1
SYSTEM TYPE		Set on Air	Compressor Service - Blocked Flow	
Sizing Results	TOTAL REQUIRED AREA	Rupture Disk Correction	0.212 in ²	1.0
	SELECTED ORIFICE AREA	SELECTED ORIFICE	0.212 in ²	1/2" Diam ORIFICE
	MAXIMUM CAPACITY OF GAS AT OVER PRESS.		1246.3 scfm	
	MAXIMUM CAPACITY OF LIQUID 1 AT OVER PRESS.			
	MAXIMUM CAPACITY OF LIQUID 2 AT OVER PRESS.			
	TAG CAPACITY		1384 SCFM AIR	
DECIBEL LEVEL	SINGLE OUTLET REACTION FORCE	105.09 dB @ 100 ft	78.98 lbf	
Materials	INLET BASE / BODY MATERIAL		(5) - Carbon Steel / WCB Carbon Steel	
	SEAT	O-RINGS	(T) - 15% GLASS FILLED PTFE	(1) - Fluorocarbon & BUNA N
	SOUR SERVICE	TRIM MATERIALS	YES	(N1) - 316 SS DISK & NOZLE
	ADJ SCREW	ADJ BUSHING	STNLS STL	STNLS STL
	SPRING	DISK	MP35N	316 STNLS STL
	NOZZLE MATERIAL	NOZZLE TYPE	316 STNLS STL	Semi Nozzle
	CAP TYPE	INLET PIPE TAP	(1) - CLOSED CAP	NO
Valve Information	Valve Type		8500 SERIES SPRING OPERATED VALVE	
	Valve P/N:		85-17151T11N11	
	Repair Kit P/N:		11T1N12	
	Inlet and Outlet		(17) - 1" MNPT x 1" FNPT	
	Center to Face Dimensions		A = 3.202 ± 0.062 in. (81.3 ± 1.6 mm.)	B = 1.906 ± 0.062 in. (48.4 ± 1.6 mm.)
	Valve Design Temp	Valve Design Pressure	-20°F to 400°F (-29°C to 204°C)	350psig to 525psig (2413.2kPag to 3619.7kPag)
Pricing Information	Quantity	Lead Time (ARO)	1	
	Price Per Valve (US\$)	Total Valve Price (US\$)		
Comments				

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Customer Name Nathan Broda
 Company Marathon Compression
 Location
 Quote # 9008629
 Reference 109
 Valve PSV/Tag Number PSV-310



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MERCER VALVE CO., INC.
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Fluid Properties	Variable Name	Symbol	Input Value	Equation Value
Gas	Molecular Weight	M	21.44	21.44
	Ratio of Specific Heats	k	1.27	1.27
	Compressibility	Z	1	1
Process Conditions	Gas Required Area	AGAS	0.212 in ²	0.212 in ²
	Set Pressure	Pset	360 psig	360 psig
	Over Pressure	Pover	10 %	36 psig
	Inlet Line Loss	Ploss	0 %	0 psig
	Variable Superimposed Back Pressure	Pvs	0 psig	0 psig
	Constant Superimposed Back Pressure	Pcs	0 psig	0 psig
	Built-up Back Pressure	Pbu	0 psig	0 psig
	Atmospheric Pressure	Patm	14.696 psia	14.696 psia
	Relieving Temperature	T1	350 °F	809.67 °R
	Rupture Disk Correction	Kc	1	1
	Noise Level Distance	d	100 ft	100 ft
	Valve Data	Gas Discharge Coefficient	KdGAS	
Outlet Diameter		Do		0.957 in
Actual Valve Orifice Area		ATAG		0.212 in ²
ASME Certified Slope		Slope		3.370

Calculations	Symbol	Equation	Equation Result
Flowing Pressure	P1	$P1 = Pset + Pover - Ploss + Patm$	410.7 psia
Total Back Pressure	P2	$P2 = Pvs + Pcs + Pbu + Patm$	14.696 psia
Pressure Ratio	PR	$PR = P1 / P2$	27.9
Critical Flow Nozzle Pressure	Pcf	$Pcf = P1 * [2 / (k + 1)] ^ { k / (k - 1) }$	226.379 psia
Sonic Flow Verification		$Pcf < Pback ==> SONIC FLOW$	
Gas Constant	C	$C = 520 * \{ k * [2 / (k + 1)] ^ { (k + 1) / (k - 1) } \} ^ { 0.5 }$	344.1

Customer Name Nathan Broda
 Company Marathon Compression
 Location
 Quote # 9008629
 Reference 109
 Valve PSV/Tag Number PSV-310



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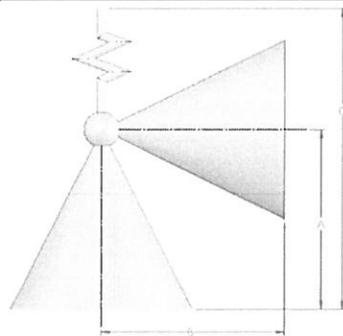
Calculations	Symbol	Equation	Equation Result
Total Required Area	A	A = AGAS	0.212 in ²
Selected Orifice		1/2" Diam ORIFICE	0.212 in ²
Tag Flowing Pressure	P1TAG	P1TAG = Pset + Povertag + Patm	410.7 psia
Tag Capacity	VTAG	VTAG = slope * P1TAG	1384 SCFM AIR
Maximum Gas Flow Rate	Vmax	$V_{max} = 6.32 * C * K_dGAS * P_1 * K_c * A / (T_1 * Z * M)^{0.5}$	1246.27 scfm
Mass Flow	W	$W = V_{max} * M / 6.32$	4227.85 lb/hr

Noise Level Calculations

SoundPressureLevel	L	Calculated from Figure 18 in API 521	58.7 dB
Noise Level at 100 ft (30 m)	L100	$L_{100} = L + 10 * \log (0.214967 * W * k * T_1 / M)$	105.09 dB
Noise Level at distance d	Ld	$L_d = L_{100} - 20 * \log (d / 100)$	105.09 dB

Reaction Forces

Outlet Static Pressure	Po	Po = Max Allowable Over Pressure	50.696 psia
Outlet Area	Ao	$A_o = (\pi * D_o^2) / 4$	0.719 in ²
Gas Reaction Force for Open Discharge	FrGas	$Fr_{Gas} = W / 366 * \{ (k * T_1) / [(k + 1) * M] \}^{0.5} + [(P_o - P_{atm}) * A_o]$	78.98 lbf



Picture may not be representative of actual valve
 A = 3.202 ± 0.062 in. (81.3 ± 1.6 mm.)
 B = 1.906 ± 0.062 in. (48.4 ± 1.6 mm.)