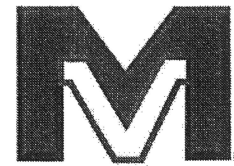


Customer Name TIM
 Company TULSA GAS
 Location
 Quote #
 Reference
 Valve PSV/Tag Number

Quote Revision
 Rev.:
 Quote Contact
 LINDA VALADEZ
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Ivaladez
 ENG-1047000
 6.06
 18-May-2026

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

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

Fluid Data	GAS/VAPOR	REQUIRED CAPACITY	Natural Gas	
	MOLECULAR WEIGHT	SPECIFIC GRAVITY	17.40	0.601
	GAS COEFFICIENT	k-RATIO OF SPECIFIC HEATS	344.1	1.27
	COMPRESSIBILITY FACTOR		1.000	
	REQUIRED AREA	FLOW COEFFICIENT	0.12 in ²	0.818
	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		
Process Conditions	REQUIRED AREA	FLOW COEFFICIENT		
	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		14.696 psia
	SET PRESSURE	CDTP	150 psig	
	OVER PRESSURE	INLET PRESSURE LOSSES	15 psig / 10 %	0 psig / 0 %
		FLOWING PRESSURE		179.696 psia
Sizing Results	DISCHARGE COEFFICIENT AND AREAS	VALVE CERTIFICATION / DESIGN CODE	ASME Certified	ASME BPVC, SECTION XIII UV STAMPED
	SYSTEM TYPE		Set on Air	Blocked Flow
	TOTAL REQUIRED AREA	Rupture Disk Correction	0.12 in ²	1.0
	SELECTED ORIFICE AREA	SELECTED ORIFICE	0.122 in ²	D ORIFICE
	MAXIMUM CAPACITY OF GAS AT OVER PRESS.		410.2 scfm	
	MAXIMUM CAPACITY OF LIQUID 1 AT OVER PRESS.			
	MAXIMUM CAPACITY OF LIQUID 2 AT OVER PRESS.			
Materials	TAG CAPACITY		329 SCFM AIR	
	DECIBEL LEVEL	SINGLE OUTLET REACTION FORCE	96.87 dB @ 100 ft	12.61 lbf
	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	NO	(E) - 17-4 DISK & NOZZLE
	ADJ SCREW	ADJ BUSHING	STNLS STL	STNLS STL
	SPRING	DISK	17-7 PH STNLS STL	17-4 PH STNLS STL
	NOZZLE MATERIAL	NOZZLE TYPE	17-4 PH STNLS STL	SEMI NOZZLE
Valve Information	CAP TYPE	INLET PIPE TAP	(1) - CLOSED CAP	NOT AVAILABLE
	VALVE SERIES		9100 SERIES CONVENTIONAL SPRING OPERATED VALVE	
	FLANGED OR THREADED		Threaded	
	VALVE P/N:	REPAIR KIT P/N:	91-16D51V07E1	1D1V1E1
	TEST GAG		NO	
	INLET AND OUTLET		(16) - 1" FNPT x 1" FNPT	
	CENTER TO FACE DIMENSIONS		A = 3.202 ± 0.062 in. (81.3 ± 1.6 mm.)	B = 2.312 ± 0.062 in. (58.7 ± 1.6 mm.)
Pricing Information	VALVE TEMP RANGE	VALVE PRESS RANGE	-20°F to 400°F (-29°C to 204°C)	120psig to 230psig (827.4kPag to 1585.8kPag)
	Quantity	Lead Time (ARO)	1	
	Price Per Valve (US\$)	Total Valve Price (US\$)	\$243.66	\$243.66
Comments	2-3 days			

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Fluid Properties	Variable Name	Symbol	Input Value	Equation Value
Gas	Molecular Weight	M	17.4	17.4
	Ratio of Specific Heats	k	1.27	1.27
	Compressibility	Z	1	1
Process Conditions	Gas Required Area	AGAS	0.12 in²	0.12 in²
	Set Pressure	Pset	150 psig	150 psig
	Over Pressure	Pover	10 %	15 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		0.818
	Outlet Diameter	Do		0.957 in
	Actual Valve Orifice Area	ATAG		0.122 in²
	ASME Certified Flow Coefficient KdTag			0.818
Calculations	Symbol	Equation	Equation Result	
Flowing Pressure	P1	P1 = Pset + Pover - Ploss + Patm	179.7 psia	
Total Back Pressure	P2	P2 = Pvs + Pcs + Pbu + Patm	14.696 psia	
Pressure Ratio	PR	PR = P1 / P2	12.2	
Critical Flow Nozzle Pressure	Pcf	Pcf = P1 * [2 / (k + 1)] ^ [k / (k - 1)]	99.05 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	

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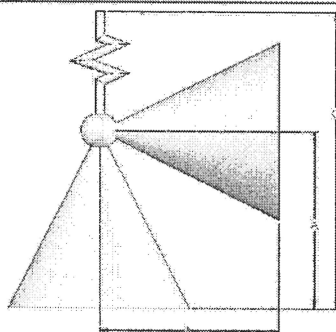
Calculations	Symbol	Equation	Equation Result
Total Required Area	A	$A = AGAS$	0.12 in ²
Selected Orifice	D	ORIFICE	0.122 in ²
Tag Flowing Pressure	P1TAG	$P1TAG = Pset + 10\% \text{ OverPress} + Patm \text{ Std}$	179.7 psia
Tag Capacity	VTAG	$VTAG = 18.331 * A * P1TAG * KdTAG$	329 SCFM AIR
Maximum Gas Flow Rate	Vmax	$Vmax = 6.32 * C * KdGAS * P1 * Kc * A / (T1 * Z * M)^{0.5}$	410.12 scfm
Mass Flow	W	$W = Vmax * M / 6.32$	1129.13 lb/hr

Noise Level Calculations

Sound Pressure Level	L	Calculated from Figure 18 in API 521	57.2 dB
Noise Level at 100 ft (30 m)	L100	$L100 = L + 10 * \log (0.214967 * W * k * T1 / M)$	96.87 dB
Noise Level at distance d	Ld	$Ld = L100 - 20 * \log (d / 100)$	96.87 dB

Reaction Forces

Outlet Static Pressure	Po	Po = Max Allowable Over Pressure	14.696 psia
Outlet Area	Ao	$Ao = (\pi * Do^2) / 4$	0.719 in ²
Gas Reaction Force for Open Discharge	FrGas	$FrGas = W / 366 * \{ (k * T1) / [(k + 1) * M] \}^{0.5} + [(Po - Patm) * Ao]$	12.61 lbf



Picture may not be representative of actual valve

A = 3.202 ± 0.062 in. (81.3 ± 1.6 mm.)

B = 2.312 ± 0.062 in. (58.7 ± 1.6 mm.)