

Customer Name Robby Martinez
 Company ICS
 Location Ventura, CA
 Quote #
 Reference
 Valve PSV/Tag Number


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

Quote Contact
 Linsey Allen
 SIZED ON
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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	0.47 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	70 °F	70 °F
	OPERATING PRESSURE	ATMOSPHERIC PRESSURE		14.696 psia
	SET PRESSURE	CDTP	1000 psig	
	OVER PRESSURE	INLET PRESSURE LOSSES	100 psig / 10 %	0 psig / 0 %
		FLOWING PRESSURE		1114.696 psia
	DISCHARGE COEFFICIENT AND AREAS	VALVE CERTIFICATION / DESIGN CODE	ASME Certified	ASME BPVC, SECTION VIII, DIVISION 1
	SYSTEM TYPE		Set on Air	Blocked Flow
Sizing Results	TOTAL REQUIRED AREA	Rupture Disk Correction	0.47 in ²	1.0
	SELECTED ORIFICE AREA	SELECTED ORIFICE	0.472 in ²	G ORIFICE
	MAXIMUM CAPACITY OF GAS AT OVER PRESS.		9749.4 scfm	
	MAXIMUM CAPACITY OF LIQUID 1 AT OVER PRESS.			
	MAXIMUM CAPACITY OF LIQUID 2 AT OVER PRESS.			
	TAG CAPACITY		7889 SCFM AIR	
	DECIBEL LEVEL	SINGLE OUTLET REACTION FORCE	148.58 dB @ 100 ft	597.95 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	NO	(U) - 316 SS DISK & NOZZLE
	ADJ SCREW	ADJ BUSHING	STNLS STL	STNLS STL
	SPRING	DISK	17-7 PH STNLS STL	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		9100 SERIES SPRING OPERATED VALVE	
	FLANGED OR THREADED		Threaded	
	Valve P/N:		91-34G51T32U1	
	Repair Kit P/N:		2GX1T1U4	
	Inlet and Outlet		(34) - 1½" MNPT x 2" FNPT	
	Center to Face Dimensions		A = 4.423 ± 0.062 in. (112.3442 ± 1.6 mm.)	B = 2.312 ± 0.062 in. (58.7248 ± 1.6 mm.)
	Valve Design Temp	Valve Design Pressure	-20°F to 400°F (-29°C to 204°C)	900psig to 1200psig (6205.3kPag to 8273.7kPag)
Pricing Information	Quantity	Lead Time (ARO)	1	
	Price Per Valve (US\$)	Total Valve Price (US\$)		
Comments				

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Customer Name	Robby Martinez		 MERCER VALVE CO., INC.® "AUTO SEAT TECHNOLOGY"®		allen
Company	ICS				ENG-1047000
Location	Ventura, CA				2.19
Quote #					15-Aug-19
Reference					
Valve PSV/Tag Number			SIZED ON 8/15/2019 10:58 Page 2 of 3		

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	0.47 in ²	0.47 in ²	
	Set Pressure	Pset	1000 psig	1000 psig	
	Over Pressure	Pover	10 %	100 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	70 °F	529.67 °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		1.939 in
Actual Valve Orifice Area		ATAG		0.472 in ²	
ASME Certified Flow Coefficient KdTag				0.818	

Calculations	Symbol	Equation	Equation Result
Flowing Pressure	P1	$P1 = Pset + Pover - Ploss + Patm$	1114.7 psia
Total Back Pressure	P2	$P2 = Pvs + Pcs + Pbu + Patm$	14.696 psia
Pressure Ratio	PR	$PR = P1 / P2$	75.9
Critical Flow Nozzle Pressure	Pcf	$Pcf = P1 * [2 / (k + 1)]^{k / (k - 1)}$	614.43 psia
Sonic Flow Verification		$Pcf < Pback \Rightarrow \text{SONIC FLOW}$	
Gas Constant	C	$C = 520 * \{k * [2 / (k + 1)]^{k / (k - 1)}\}^{0.5}$	344.1

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Calculations	Symbol	Equation	Equation Result
Total Required Area	A	A = AGAS	0.47 in ²
Selected Orifice		G ORIFICE	0.472 in²
Tag Flowing Pressure	P1TAG	P1TAG = Pset + Povertag + Patm	1114.696 psia
Tag Capacity	VTAG	VTAG = 18.331 * A * P1TAG * KdTAG	7889 SCFM AIR
Maximum Gas Flow Rate	Vmax	Vmax = 6.32 * C * KdGAS * P1 * Kc * A / (T1 * Z * M) ^ 0.5	9749.36 scfm
Mass Flow	W	W = Vmax * M / 6.32	26841.59 lb/hr
Noise Level Calculations			
SoundPressureLevel	L	Calculated from Figure 18 in API 521	95.1 dB
Noise Level at 100 ft (30 m)	L100	L100 = L + 10 * log (0.214967 * W * k * T1 / M)	148.58 dB
Noise Level at distance d	Ld	Ld = L100 - 20 * log (d / 100)	148.58 dB
Reaction Forces			
Outlet Static Pressure	Po	Po = Max Allowable Over Pressure	114.696 psia
Outlet Area	Ao	Ao = (π * Do ^ 2) / 4	2.953 in ²
Gas Reaction Force for Open Discharge	FrGas	FrGas = W / 366 * { (k * T1) / [(k + 1) * M] } ^ 0.5 + [(Po - Patm) * Ao]	597.95 lbf
<div style="text-align: center;">  </div> <p>Picture may not be representative of actual valve</p> <p>A = 4.423 ± 0.062 in. (112.3442 ± 1.6 mm.)</p> <p>B = 2.312 ± 0.062 in. (58.7248 ± 1.6 mm.)</p>			

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