



SAFETY VALVE SIZING SHEET

GENERAL INFO										
1	TECHNICAL Ref. / Item	24-2385 / 1			4	Project	PO DELTA-TECHNICAL-2024-PO-200		DELTA GMBH	
2	Valve Code	3A0-E23-BW			5	Quantity	2			
3	Tag Number	PSV-RU0001A-03, PSV-RU0001B-03,								
DESIGN DATA										
6	Operating Pressure	3,7	bar g		10	Operating Temperature	-0,07	°C		
7	Ambient Pressure	1,013	bar a		11	Sizing Code	API Std 520			
8	Basis	FIRE WETTED			12	Fire Case	Yes			
9	Governing Case	Yes			13	Rupture Disc	No			
INSTALLATION DATA										
14	Inlet	1" 300# RF			22	Outlet	2" 150# RF			
15	Valve Model	30000			23	Valve Type	CONVENTIONAL			
16	Superimposed Bkp				24	Seat Type	METAL-TO-METAL			
17	Constant	Pbcs	0	bar g	25	Set Pressure	Ps	22,000	bar g	
18	Variable	Pbvs	0	bar g	26	CDTP		22,000	bar g	
19	Total	Pbs	0	bar g	27	Overpressure	Overp	21	%	
20	Built-up Backpressure	Pbb	0	bar g	28	Relieving Temperature	T ₀	70,1	°C	
21	Total BackPressure	Pb	0	bar g	29	Required Flow Rate	W	3197,00	kg/h	
FLUID PROPERTIES										
30	Phase	GAS			35	Density	ρ	-	kg/m3	
31	Medium	PROPANE			36	Specific Volume	v	-	m3/kg	
32	Ratio of Specific Heats	k	1,11	-	37	Specific Gravity	G	-	-	
33	Molecular Weight	M	44,10	kg/kmol	38	Dynamic Viscosity	μ	-	cP	
34	Compressibility Factor	Z	0,8	-	39	Dryness Steam Factor	x0	-	-	
SIZING CRITICAL FLOW - GAS&VAPOURS - API 520										
40	Critical / Subcritical Flow	CRITICAL			$A = \frac{W}{0,9 C P_0 K_D K_{BP} K_C} \sqrt{\frac{Z T_0}{M}}$ $C = 3,948 \sqrt{k \left(\frac{2}{k+1} \right)^{\frac{(k+1)}{(k-1)}}$ $W_T = \frac{W A_s}{A}$ <p><i>Units of measure</i> A [mm²]; W [kg/h]; P [kPa]; T [K]; M [kg/kg mole]</p>					
41	Relieving Pressure	P ₀	27,633	bar a						
42	C Factor	C	2,4890	-						
43	Discharge Coefficient	K _D	0,951	-						
44	Backpressure Corr. Factor	K _{BP}	1	-						
45	Subcritical Corr. Factor	K _b	-	-						
46	Rupture Disk Corr. Factor	K _C	1	-						
47	Steam Correction Factor EN	k _s	-	-						
48	Superheat Corr. Factor	k _{sh}	-	-						
49	Supercritical Corr. Factor	k _{sc}	-	-						
50	Napier Factor	k _n	-	-						
51	Viscosity Corr. Factor	K _v	-	-						
52	Reynolds Number	Re	-	-						
53	Calculated Area	A	1,3552	cm ²						
54	Orifice Designation	-	E	-						
55	Selected Area	A _s	1,389	cm ²						
56	Area Gain	-	2	%						
57	Maximum Flow Rate	W _T	3276,79	kg/h						
58										
REACTION FORCE API 520 PART II OPEN DISCHARGE TO ATMOSPHERE										
59	Reaction force (Flow)	FF	264	N	$F_F = \frac{129 W_{MAX}}{0,9 * 3600} \sqrt{\frac{k T_0}{(k+1) M}} ; F_B = \frac{A_2 P_B}{10} ; F_T = F_F + F_B$					
60	Reaction force (Static Bkp)	FB	0	N						
61	Total Reaction Force	FT	264	N						
NOISE EVALUATION API 521 Not Applicable for Liquid										
62	Noise Level @ 30m	L30	103,8	dB	$L_{30} = L + 10 \log_{10} \left(\frac{W_{M-MAX} c^2}{3600 * 0,9 * 2} \right) ; c = 91,2 \left(\frac{k T_0}{M} \right)^{0,5}$ $L_p = L_{30} - 20 \log_{10} \left(\frac{d}{30} \right)$					
63	Distance d	d	1	m						
64	Outlet Tube Diameter	d _a	0,05	m						
65	Noise Level @ distance d	L _d	133,8	dB						
REMARKS: Process data are under customer responsibility.										
0	30/09/2024	FIRST ISSUE				R. BIANCHI	P.L.DELPONTE	R. BIANCHI		
REV	DATE	DESCRIPTION				PREP.	CHECK.	APPROV.		