STYRENE PARK OFFSITE

Document Title:

Safety / Relief Valve Data Sheet

R0	21-07-2024	IFA	F.sh	M.O	A.M
Rev.	**Issued Date**	**DESCRIPTION**	**PREPARED**	**CHECKED**	**APPROVED**

REVISION RECORD SHEET

Page	Revisions								Page	Revisions						
Page	R0	R1	R2	R3	R4	R5	R6			R0	R1	R2	R3	R4	R5	R6
1	X								41							
2	X								42							
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GENERAL	1	Tag Number		PSV-RU0001A-04,PSV-RU0001B-04	
	2	Service		EVAPORATOR	
	3	Line No.	Equipment No.	3"-PR-RU0001-ML3R1-C	RU0001(A/B)-E-02
	4	P&ID	Vessel Dimension mm	EI027-HSE-VD-PR-PID-002 (5/7)	
	5	Design		Safety-Relief	
	6	Type : Conventional, Bellow, Pilot		Conventional	
	7	Bonnet Type	Nozzle (Full, Semi)	Closed	Full
	8	Pipe Rating Inlet	Pipe Rating Outlet	300#	150#
PROCESS CONDITIONS	9	Fluid State	Corrosive	VAPOR	PROPANE
	10	Required Capacity		3197 kg/h	
	11	Molecular Weight	Sp. Gravity Liq /	44.1	0.437
	12	Pressure Nor / Max	Set Pressure	4.7 bara	22 barg
	13	Temperature Nor /	Relieving	-0.07	70.1°C
	14	Back Pressure	Superimposed+built	0	
	15		built up back	0	
	16		Total	0	
	17	% Allowable Overpressure		21%	
	18	% Blow Down		7.5	
	19	Compressibility Factor		0.8	
	20	Latent Heat of Vaporization		211 kJ/kg	
	21	Ratio of Specific Heats @ Relief		1.11	
	22	Relief Density	Relief Viscosity	53.3 kg/m3	0.0078 cP
	23	Reactive Force	Noise Level	VTA	VTA
	24	Barometric Pressure		1.0132	
	25	Design Pressure Max		22	
	26	Design Temperature Min / Max		-45	120
BASIS AND SELECTION	27	Design Code	Vessel Design Code	API RP 526	ASME SEC. VIII Div 1. without U
	28	Manufacturer Code		API 520	
	29	Sizing Basis		Fire Wetted	
	30	Sizing Case		Fire Wetted	
	31	Calculated Area		*0.184 in2 (VTA)*	
	32	Selected Area		*0.196 in2 (VTA)*	
	33	Orifice Designation		*E (VTA)*	
	34	Rated Capacity		*3396 kg/h (VTA)*	
	35	Seat Leakage	Cold Diff. Test	As per API RP 527	*22*
	36				
CONNECTIONS	37	Size: Inlet	Outlet	*1" (VTA)*	*2" (VTA)*
	38	Rating & Facing:	Outlet	300#	150#
MATERIALS	39	Body and Bonnet		*A352 LCB*	
	40	Nozzle / Disc		*A351 CF3M ST. / A479 316L ST.*	
	41	Blowdown Ring / Locking Screw		*SS 316L*	
	42	Guide		*A351 CF3M*	
	43	Spring		*CHROME ALLOY STEEL*	
	44	Bellows		*SS 316L*	
	45	Body Stud Bolts / Nut		*A193 B7 / A194 Gr.2H*	
	46	NACE MR-01-75 / ISO 15156		NA	
OPTIONS	47	Cap: Screwed or Bolted		Bolted	
	48	Lever: Plain or Packed		Not Required	
	49	Test Gag		Yes	
	50	Color		*Cycle Deltaberg-1 + RAL 7038*	
PURCHASE	51	Manufacturer			
	52	Model			

Notes:
1) DOCUMENTATIONS:

GENERAL	1	Tag Number		PSV-RU0001A-05,PSV-RU0001B-05	
	2	Service		Receiver	
	3	Line No.	Equipment No.	2"-PR-RU0001(A/B)10-ML3R1-N	
	4	P&ID	Vessel Dimension mm	EI027-HSE-VD-PR-PID-002 (5/7)	
	5	Design		Safety-Relief	
	6	Type : Conventional, Bellow, Pilot		Conventional	
	7	Bonnet Type	Nozzle (Full, Semi)	Closed	Full
	8	Pipe Rating Inlet	Pipe Rating Outlet	300#	150#
PROCESS CONDITIONS	9	Fluid State	Corrosive	VAPOR	PROPANE
	10	Required Capacity		3479 kg/h	
	11	Molecular Weight	Sp. Gravity Liq /	44.1	0.437
	12	Pressure Nor / Max	Set Pressure	19.7 bara	22 barg
	13	Temperature Nor /	Relieving	56.32	70.1°C
	14	Back Pressure	Superimposed+built	0	
	15		built up back	0	
	16		Total	0	
	17	% Allowable Overpressure		21%	
	18	% Blow Down		7.5	
	19	Compressibility Factor		0.8	
	20	Latent Heat of Vaporization		211 kJ/kg	
	21	Ratio of Specific Heats @ Relief		1.11	
	22	Relief Density	Relief Viscosity	53.3 kg/m3	0.0078 cP
	23	Reactive Force	Noise Level	VTA	VTA
	24	Barometric Pressure		1.0132	
	25	Design Pressure Max		22	
	26	Design Temperature Min / Max		-45	120
BASIS AND SELECTION	27	Design Code	Vessel Design Code	API RP 526	ASME SEC. VIII Div 1. without U
	28	Manufacturer Code		API 520	
	29	Sizing Basis		Fire Wetted	
	30	Sizing Case		Fire Wetted	
	31	Calculated Area		*0.201 in2 (VTA)*	
	32	Selected Area		*0.307 in2 (VTA)*	
	33	Orifice Designation		*F (VTA)*	
	34	Rated Capacity		*5320 kg/h (VTA)*	
	35	Seat Leakage	Cold Diff. Test	As per API RP 527	*22*
	36				
CONNECTIONS	37	Size: Inlet	Outlet	*1.5" (VTA)*	*2" (VTA)*
	38	Rating & Facing:	Outlet	300#	150#
MATERIALS	39	Body and Bonnet		*A352 LCB*	
	40	Nozzle / Disc		*A351 CF3M ST. / A479 316L ST.*	
	41	Blowdown Ring / Locking Screw		*SS 316L*	
	42	Guide		*A351 CF3M*	
	43	Spring		*CHROME ALLOY STEEL*	
	44	Bellows		*SS 316L*	
	45	Body Stud Bolts / Nut		*A193 B7 / A194 Gr.2H*	
	46	NACE MR-01-75 / ISO 15156		NA	
OPTIONS	47	Cap: Screwed or Bolted		Bolted	
	48	Lever: Plain or Packed		Not Required	
	49	Test Gag		Yes	
	50	Color		*Cycle Deltaberg-1 + RAL 7038*	
PURCHASE	51	Manufacturer			
	52	Model			

Notes:
1) DOCUMENTATIONS:

GEA AWP ValveCalc (8.0.15.9416)

MAYEKAWA MYCOM

Notes

PSV-RU0001AB-01

System Data

System Type	Safety / Overflow Valves				
Line / Component Type	Supply Line: Protection against external heat sources (overflow design)				
Refrigerant	R290		Isentropic Exponent	1.136	
Enthalpy of Vapour	630.2	kJ/kg	Enthalpy of Liquid	397.2	kJ/kg
Density P0	61.76	kg/m³	Density Section	61.76	kg/m³
Required Mass Flow	4339.0	kg/h	Required Volume Flow	70.3	m³/h

Valve Sizing According to:	DIN EN 13136:2020				
Density of Heat Flow Rate	10.00	kW/m²	Insulation Thickness	0.000	m

Pressures

Set Pressure Pset	22.00	bar (g)	Back Pressure Pb	6.150	bar (a)
Pressure Fully Open Valve	25.21	bar (a)	Pressure Diff. dp	22.01	bar
			Back Pressure P2	1.00	bar (a)

Component Properties

Type	Safety Overflow Valve	DN-inlet	DN40
Articlecode	**SVUA P FL DN40/40 PN40 22-23,9**	DN-outlet	DN40
Articlenr.	**45822D12A5A1S000**		
Component Characteristics	Angle, Set Pressure [bar (g)]: 22.00 bar (g), Connection Type: Flanged End, Back pressure independent		
Comments	Refrigerant: R290 PSet: 22.00		

Calculation Results

ṁ-Valve	6425.6	kg/h
ṁ-Standard	5140.5	kg/h

Results