JOKWANG I.L.I

Pressure Safety & Relief Valve Specification and Calculation Sheet

Sheet No.	1 of 11	Rev . No	1
Project Name	Yeosu No.2 Complex Project(R2) 2nd PO		
Project No.			
Date	2021-01-22	By	S.W.PARK
Checked	M.J.LEE	Approved	J.H.LEEM

		No.		
GENERAL	P&ID No.	1	H530-R2-PID-1011	
	Tag No.	2	R2-PSV-1029/1030	
	Service Line	3	E-1 08A/B 2ND STAGE FEED/EFFULENT EXCHANGER #2-1 TUBE SIDE E-1 09A/B 2ND STAGE FEED/EFFULENT EXCHANGER #2-2 TUBE SIDE	
	Model No.	4	JSV-FF100	
	Quantity	5	2	
TYPE	Nozzle Type	6	Full Nozzle	
	Design Type	7	Conventional	
	Bonnet Type	8	Close	
	Lever Type	9	None	
	Cap Type	10	Screwed	
CONN.	Size. Inlet / Outlet	11	3"X4"	
	Inlet. Rating / Facing	12	ASME CL.600 RF	
	Outlet. Rating / Facing	13	ASME CL.150 RF	
MATERIALS	Body (Base)	14	SA217 C5	
	Bonnet	15	SA217 C5	
	Seat	16	316 SS-st.	
	Disc	17	316 SS-st.	
	Guide	18	316 SS	
	Gasket (Bonnet)	19	Graphite	
	Spring	20	Inconel X-750	
	Bellows	21	None	
BASIS	Approved by	22	KGS UV STAMP	
	Comply with NACE	23	No	
	EN 10204	24	No	
	Code	25	API RP 520	
	Fire	26	No	
	Sizing Basis	27	Thermal Expansion	
	Rupture Disk	28	No	

Calculation

Calculation of Area

$$A_1 = 13160 \cdot W_1 \cdot (\sqrt{ZT/M})/(C \cdot K_d \cdot (P \cdot 1.1+101.325) \cdot K_b \cdot K_c)$$

$$= 13160 \cdot 19856 \cdot (\sqrt{0.952 \cdot 465.4/26.10})/(331.04 \cdot 0.831 \cdot (4844 \cdot 1.1+101.325) \cdot 1 \cdot 1)$$

$$= \underline{720.775029} \text{ mm}^2$$

Calculation of Capacity

$$W = A \cdot C \cdot K_d \cdot (P \cdot 1.1+101.325) \cdot K_b \cdot K_c/(13160 \cdot \sqrt{ZT/M})$$

$$= 834.19 \cdot 331.04 \cdot 0.831 \cdot (4844 \cdot 1.1+101.325) \cdot 1 \cdot 1/(13160 \cdot \sqrt{0.952 \cdot 465.4/26.10})$$

$$= \underline{22980} \text{ kg/h}$$

W	Valve Capacity		22980 kg/h

	SERVICE CONDITION	No.	value				
SERVICE CONDITION	Fluid / State	29	HC / GAS	W1	Required Capacity		19856 kg/h
	Mol. Weight / Specific Gravity	30	26.10	P	Set Pressure		4844 KPag
	Compressibility Factor	31	0.952	A1	Calculated Area		720.775029 mm²
	Ratio of Specific Heat	32	1.140	A	Selected Area		834.19 mm²
	Viscosity	33	0.017 cP	Kd	Coefficient of Discharge		0.831
	Operating / Relieving Temp.	34	192.36 / 192.4 ℃	C	Coefficient base on Ratio of Specific Heat		331.04
	Design Min. / Design Max. Temp.	35	-18/319 ℃	T	Kelvin Temperature		465.4 K
	Operating / Set Pressure	36	3.677 / 4.844 MPag	M	Molecular Weight		26.10
	Design Pressure / C.D.T.P	37	4.844 / 4.815 MPag	Z	Compressibility Factor		0.952
	Back Pressure — Superimposed - Constant	38	0.029 MPag	Kb	Correction Factor Due to Back Pressure		1
	Back Pressure — Superimposed - Variable	39	- MPag	Kc	Correction Factor for a rupture disk		1
	Back Pressure — Built-up	40	0.081 MPag				
	Back Pressure — Total	41	0.11 MPag				
	Allowable Overpressure	42	10 %				
	Closing Pressure / Blowdown(%)	43	Min. 4.50492 MPag / 7%				

Remarks

*Remark
Service Requirement : NACE MR0103
Painting : P-5
- Operating Pressure : 37.5 kg/㎠g
- Setting Pressure : 49.4 kg/㎠g
- Design Pressure : 49.4 kg/㎠g
- Constant Back Pressure : 0.3 kg/㎠g
- Variable Back Pressure : kg/㎠g
- Built-up Back Pressure : 0.83 kg/㎠g
- Required Capacity : 19856 kg/hr
- Valve Capacity : 22980 kg/hr

SIZING & SELECTION	Required Capacity	44	19856 kg/h
	Valve Actual Capacity	45	22980 kg/h
	Calculated Orifice Area	46	720.775029 mm²
	Selected Orifice Area	47	834.19 mm²
	Orifice Dia.(mm)	48	J(32.6)
			-
			-
ETC	Paint System & Color	49	See Remark
	Test Gag	50	Yes
	Bug screen	51	No

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