**JOKWANG I.L.I**

## Pressure Safety & Relief Valve Specification and Calculation Sheet

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|---|---|---|---|
| Sheet No. | 6 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 |

| | | | | |
|---|---|---|---|---|
| GENERAL | P&ID No. | 1 | H530-R2-PID-3037 | |
| | Tag No. | 2 | R2-PSV-3373A/B | |
| | Service Line | 3 | W-302-D6 (Cold Drains Vaporizer) | |
| | 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 | 1"X2" | |
| | Inlet. Rating / Facing | 12 | ASME CL.150 RF | |
| | Outlet. Rating / Facing | 13 | ASME CL.150 RF | |
| MATERIALS | Body (Base) | 14 | SA351 CF8M | |
| | Bonnet | 15 | SA351 CF8M | |
| | Seat | 16 | 316 SS-st. | |
| | Disc | 17 | 316 SS-st. | |
| | Guide | 18 | 316 SS | |
| | Gasket (Bonnet) | 19 | PcTFE | |
| | Spring | 20 | 316 SS | |
| | 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 | Yes | |
| | Sizing Basis | 27 | Fire Case | |
| | Rupture Disk | 28 | No | |
| SERVICE CONDITION | Fluid / State | 29 | Hydrocarbon(HC) / GAS | |
| | Mol. Weight / Specific Gravity | 30 | 91.55 | |
| | Compressibility Factor | 31 | 0.849 | |
| | Ratio of Specific Heat | 32 | 0.449 | |
| | Viscosity | 33 | 0.017 cP | |
| | Operating / Relieving Temp. | 34 | 40 / 202.7 ℃ | |
| | Design Min. / Design Max. Temp. | 35 | -166/200 ℃ | |
| | Operating / Set Pressure | 36 | 0.101 / 0.588 MPag | |
| | Design Pressure / C.D.T.P | 37 | 0.588 / 0.559 MPag | |
| | Back Pressure: Superimposed - Constant | 38 | 0.029 MPag | |
| | Back Pressure: Superimposed - Variable | 39 | - MPag | |
| | Back Pressure: Built-up | 40 | 0.024 MPag | |
| | Back Pressure: Total | 41 | 0.053 MPag | |
| | Allowable Overpressure | 42 | 21 % | |
| | Closing Pressure / Blowdown(%) | 43 | Min. 0.54684 MPag / 7% | |
| SIZING & SELECTION | Required Capacity | 44 | 387 kg/h | |
| | Valve Actual Capacity | 45 | 741 kg/h | |
| | Calculated Orifice Area | 46 | 69.43581 ㎟ | |
| | Selected Orifice Area | 47 | 132.9 ㎟ | |
| | Orifice Dia.(mm) | 48 | D1(13) | |
| | | | - | |
| | | | - | |
| ETC | Paint System & Color | 49 | None | |
| | Test Gag | 50 | Yes | |
| | Bug screen | 51 | No | |

## Calculation

Calculation of Area

A1 = 13160*W1*(√ZT/M)/(C*Kd*(P*1.21+101.325)*Kb*Kc)

= 13160*387*(√0.849*475.7/91.55)/(228.08*0.831*(588*1.21+101.325)*1*1)

= **69.43581** ㎟

Calculation of Capacity

W = A*C*Kd*(P*1.21+101.325)*Kb*Kc/(13160*√(ZT/M))

= 132.9*228.08*0.831*(588*1.21+101.325)*1*1/(13160*√(0.849*475.7/91.55))

= **741** kg/h

| | | |
|---|---|---|
| W | Valve Capacity | 741 kg/h |
| W1 | Required Capacity | 387 kg/h |
| P | Set Pressure | 588 KPag |
| A1 | Calculated Area | 69.43581 ㎟ |
| A | Selected Area | 132.9 ㎟ |
| Kd | Coefficient of Discharge | 0.831 |
| C | Coefficient base on Ratio of Specific Heat | 228.08 |
| T | Kelvin Temperature | 475.7 K |
| M | Molecular Weight | 91.55 |
| Z | Compressibility Factor | 0.849 |
| Kb | Correction Factor Due to Back Pressure | 1 |
| Kc | Correction Factor for a rupture disk | 1 |

## Remarks

*Remark
?
- Required Capacity : 387 kg/h
- Valve Capacity : 682 kg/h