PSV-2019

Fire Scenario

wetted Surface

**PSV SIZING PROCEDURE FOR UNWETTED FIRE SCENARIO**

1.Determine the scenario, using API-521

2.Calculate the relief load, using API-520 Part1

3.Calculate the orifice area, using API-520 Part1

4.Select proper PSV type by checking backpressure

5.Use API-526 to determine the designation and the inlet and outlet sizing

6.Use API-520 Part2 to detail its construction

**1.Determine the scenario, using API-521**

Since it is exposed to fire then a fire scenario is defined.

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameters** | **Value** | **Parameters** | **Value** |
| **Diameter** | **0.7 m** | **M** | **18.02** |
| **Height** | **3.275 m** | **Set Pressure** | **52 barg** |
| **Fluid** | **Steam Condensat** | **Relieving Pressure** | **63.9 bara** |
| **Z** | **0.78** | **Accumulation** | **0.21** |
| **Cp/Cv** | **1.09** | **Material** | **CS** |



**2.Calculate the relief load, using API-520 Part1**

Where adequate drainage and firefighting equipment do not exist, Equation (8) should be used





**Calculation**

|  |  |
| --- | --- |
| **Parameters** | **Value** |
| **Aw** | **7.73 m2** |
| **C2** | **70900** |
| **F** | **1** |
| **λ** | **2880** |
| **Relief load** | **474 kg/h** |

**3.Calculate orifice area**

Determine if it is in critical flow:



If so, then:





**5.Use API-526 to determine the designation and the inlet and outlet sizing**

Since it is less than 0.11 inch then D is selected. Also, by checking its rating and temperature

limitation, 1D2 is selected. But Topsoe has selected 1E2 in site.





**Select proper PSV type by checking backpressure**

According to licensor data, superimposed and build-up backpressure are max 21barg. Even

though selecting Conventional type is not fully recommended, Conventional type has been

selected by LESER.

|  |  |  |
| --- | --- | --- |
| **superimposed** | **Build-up** | **Total** |
| **0 barg** | **21 barg** | **21 barg** |
| **2.5%** | **30%** | **40%** |



**Material Selection**

Since it is steam condensate then A-216 WCB is selected for its body

**Discussion**

1.The relief load calculated by TCC greatly differs by that of TOPSOE and that of mine which

stems from λ value in calculation. The λ value for TCC is 1600 kj/kg while it is 2880 kj/kg.

2. Another matter is orifice designation dedicated. TOPSOE has selected 1E2 but it appears

that 1D2 is also suitable.

3. According to total backpressure calculation, it seems that if balanced type had been

selected, it would have more promising performance