

ENGINEERING SERVICES DEPARTMENT



PRESSURE RELIEF VALVE SPECIFICATION SHEET

Project	PTFE Filter Destruction Project			Unit Tag Number	NH833-87
Datasheet Document No.	ENS-FDP-SPE-24027			Revision	R3
Description	Pressure relief valve servicing the nitrogen gas supply line 15-833-NHVP-058 to the Plasma Power Supply Y82016 of the PTFE Filter Destruction Facility ^[1] .				
Plant location	Necsa, Pelindaba, North-West Province				
Equipment Location	PTFE Filter Destruction Facility - Outside laboratory 131, north side of Building V-H2				
Safety Classification	Non-classified (N) and SC-2 (C)				
Quality Classification	Non-classified (N) and QC-2 (C)				
Fluid	Nitrogen				
Fluid state	Gas				
Set pressure	440 kPa ^[1]				
Over pressure	40 kPa ^[2]				
FLUID PROPERTIES	UNITS	MINIMUM	NORMAL	MAXIMUM	
Operating temperature	°C	-2.6 ^[3]	25	40 ^[3]	
Working pressure	kPa (g)	-	400	600 ^[7]	
Back pressure	kPa (g)	-	Note 1	-	
Mass flow rate ^{Note 2}	kg/h	-	7,50 ^[5]	-	
Volume flow rate	m ³ /h	-	1,15 ^[5]	-	
Inlet density ^{Note 3}	kg/m ³	-	651 ^[5]	-	
Viscosity	cP	-	0,018 ^[6]	-	
Compressibility factor	(z)	-	0,992 ^[5]	-	
Specific heat capacity (C _p)	kJ/kg.K	-	1,039 ^[5]	-	
Specific heat capacity (C _v)	kJ/kg.K	-	0,743 ^[5]	-	

VALVE PROPERTIES

Material of Construction					
Body	Bellows	Packing	Seat	Plug/Ball/Disk	Bonnet/Cap
SS	Supplier to advise	SS	PTFE	SS	SS
Valve Type	Supplier to advise.				
Orifice area (mm²)	1,617 ^[5] (Note 4)				
Process connections					
		Flange Specification	Flange Rating	Pipe Size (NB)	
Inlet Nozzle		ASTM A182-F316/316L, RF, ASME B16.5	API526 (Or supplier to advise)	Supplier to Advise	
Outlet Nozzle		ASTM A182-F316/316L, RF, ASME B16.5	API526 (Or supplier to advise)	Supplier to Advise	
Valve rating		API526 (Or supplier to advise)			

REFERENCE DRAWINGS AND DOCUMENTS			
[1] ENS-FDP-PID-24005, PTFE Filter Destruction Project P&ID Diagram - Gas Supply System 833			
[2] API 520: Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries, Part I-Sizing and Selection			
[3] SHEQ-2011-REP-01017,2011 : Pelindaba Site, Site Description Rev 2, Necsa			
[4] ENS-FDP-REP-24023: PTFE Gas Supply System Pressure Protection Calculations: Pressure Relief Valves Sizing			
[5] ENS-FDP-CLC-24018: PTFE Gas Supply System Pressure Protection Calculations Pressure Relief Valves Sizing.			
[6] Daniel Gaddis, 2019: Tubular Exchangers Manufacturer's Association, 10th Edition			
[7] ENS-OWPVR-PID-24003: Uranium Contaminated Waste Oil Plasma Gasification, Basic Engineering Design P&ID - , Gas Supply System (O ₂ and Ar)			
[8] ENS-FDP-SPE-24026: PTFE Filter Destruction Project Pressure Relief Valve GA833-91 Specification Sheet			
[9] ENS-FDP-SPE-24024: PTFE Filter Destruction Project Pressure Relief Valve GS833-99 Specification Sheet			
NOTES			
<p>Note 1: The backpressure is not specified here since it is reliant on the sizing (diameter) of the relief valve vent line, which is currently not known. Suitable line sizing is to be recommended by the valve supplier, taking note that the proposed routing of the vent line is from valve outlet near ground level to the top of the building, where the line discharges directly to the atmosphere. The building height is 13,5 m, total length of the vent line is estimated to be 22 m, and atmospheric pressure is 88 kPa.</p> <p>As an alternative, the supplier may consider a configuration in which the current nitrogen relief valve vents into a common header near ground level, together with two other relief valves for argon^[8] and oxygen^[9], respectively. The common header is then routed to the top of the building for venting of all three gases to atmosphere.</p> <p>Supplier to advise on the best configuration for venting purposes and to provide value for the current backpressure, thereafter.</p>			
Note 2: The normal flow rate was calculated based on the scenario that an upstream pressure regulator (PCV83346B) with a C _v value = 0,08 fails open.			
Note 3: The inlet density was calculated at the absolute upstream relieving pressure of the PRV.			
Note 4: Orifice sizing is based on the procedure according to API Standard 520 Part I with the assumption that a conventional spring-loaded pressure relief valve is used with gas venting at the normal flow rate specified. Valve supplier to advise further.			
Note 5: Inspection and testing shall be done in supplier facility.			
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