ENGINEERING SERVICES DEPARTMENT

necsa We're in your world
South African Nuclear Energy Corporation SOC Limited

PRESSURE RELIEF VALVE SPECIFICATION SHEET

Project	PTFE Filter Destruction Project	**Unit Tag Number**	PG833-104
Datasheet Document No.	ENS-FDP-SPE-24023	**Revision**	R3
Description	Pressure relief valve servicing the LPG supply line 15-833-PGVP-065 to the Plasma Reactor R82018 in 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	Liquefied Petroleum Gas (LPG)		
Fluid state	Gas		
Set pressure	110 kPa(g) [1]		
Over pressure	11 kPa(g) [2]		

FLUID PROPERTIES	**UNITS**	**MINIMUM**	**NORMAL**	**MAXIMUM**
Operating temperature	**°C**	-2.6 [3]	25	40 [3]
Operating pressure	**kPa (g)**	-	100 [1]	509 [5]
Back pressure	**kPa (g)**	-	Note 1	-
Mass flow rate Note 2	**kg/h**	-	10,03 [5]	-
Volume flow rate	**m^3/h**	-	6,51 [5]	-
Inlet density Note 3	**kg/m^3**	-	4,37 [5]	-
Viscosity	**cP**	-	0,0085 [6]	-
Compressibility factor	**z**	-	0,956 [5]	-
Specific heat capacity (C_p)	**kJ/kg.K**	-	1,6942 [5]	-
Specific heat capacity (C_v)	**kJ/kg.K**	-	1,5239 [5]	-

VALVE PROPERTIES

Material of Construction

Body	**Bellows**	**Packing**	**Seat**	**Plug/Ball/Disk**	**Bonnet/Cap**
SS	Supplier to advise	SS	PTFE	SS	SS

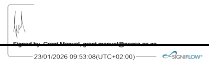
Valve Type	Supplier to advise.
Orifice area (mm^2)	4,743 [5] (Note 4)

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 Standard 520; 9th Edition: Sizing, Selection, and Installation of Pressure-relieving Devices, 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

NOTES
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 the valve outlet near ground level to the building ventilation stack on top of the building. The tie-in point for the arrangement mentioned above is just before the stack directly discharges 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. Supplier to provide value for the PRV backpressure, after confirming sizing and routing of the vent line.
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.

	Name	Signature	Date
Compiled by	Mr W Ludwick		
Process	Mr MK Nkadimeng		
Process	Mr BM Khumalo		
Mechanical	Mr M Msane		
Mechanical	Mr S Mngoma		
Instrumentation	Dr G Manuel		
Electrical	Mr WJ van den Berg		
Approved by	Dr K Moodley