ENGINEERING SERVICES DEPARTMENT

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South African Nuclear Energy Corporation SOC Limited

PRESSURE RELIEF VALVE SPECIFICATION SHEET

Project	PTFE Filter Destruction Project	**Unit Tag Number**	GS833-99
Datasheet Document No.	ENS-FDP-SPE-24024	**Revision**	R3

Description	Pressure relief valve servicing the oxygen gas supply line 15-833-GSVP-064 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	Oxygen
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]
Operating pressure	**kPa (g)**	-	400	600 [7]
Back pressure	**kPa (g)**	-	Note 1	-
Mass flow rate Note 2	**kg/h**	-	8,01 [5]	-
Volume flow rate	**m^3/h**	-	1,08 [5]	-
Inlet density Note 3	**kg/m^3**	-	7,45 [5]	-
Viscosity	**cP**	-	0,0205 [6]	-
Compressibility factor	**z**	-	0,991 [5]	-
Specific heat capacity (C_p)	**kJ/kg.K**	-	0,918 [5]	-
Specific heat capacity (C_v)	**kJ/kg.K**	-	0,658 [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)	1,618 [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-24027: PTFE Filter Destruction Project Pressure Relief Valve NH833-87 Specification Sheet
[9] ENS-FDP-SPE-24026: PTFE Filter Destruction Project Pressure Relief Valve GA833-91 Specification Sheet

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 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.
As an alternative, the supplier may consider a configuration in which the current oxygen relief valve vents into a common header near ground level, together with two other relief valves for nitrogen[8] and argon[9], respectively. The common header is then routed to the top of the building for venting of all three gases to atmosphere.
Supplier to advise on the best configuration for venting purposes and to provide value for the current backpressure, thereafter.

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
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