ENGINEERING SERVICES DEPARTMENT

OXYGEN FLAME ARRESTER Y1308 SPECIFICATION SHEET

Project	Nuclear Waste Plasma Gasification Project	**Unit Tag Number**	Y1308
Datasheet Doc. No.	ENS-NWPVR-SPE-24003	**Revision**	2
Description	Flame arrester Y1308 is installed on the oxygen gas supply line 25-13-GSVP-12 to the Plasma Reactor R1403 in the NW PlasGas Facility [1], downstream of the pressure regulator PCV1303B. Its function is to allow flow of oxygen but prevent the transmission of flame from a downstream source, in the event of ignition taking place.		
Plant Location	Necsa, Pelindaba, North-West Province		
Equipment Location	NW PlasGas Demonstration Facility - Outside Laboratory-150, Building V-H2		
Safety Classification	SC-3(C) and Non-classified (N)		
Quality Classification	SC-3(C) and Non-classified (N)		

Storage tank (T1602) [2], Note 1

Tank oxygen inventory/capacity	2496	kg liquid O_2					
☑ Above ground	Diameter	1,3	m	Design pressure	Note 1	kPa(g)	
☐ Buried	Height	2,5	m	Design vacuum	Note 1	kPa(g)	
☐ Insulated	Wall thickness	Note 1	m	Pumping-in rate	Note 1	m^3/h	
☐ ☐ Ins. Thickness	Note 1		mm	Pumping-out rate at 25 °C & 600 kPa(g) Note 3	5,85	m^3/h	
Blanketed	Blanketing gas	N/A		Design standard	Note 1		

Stored product

Component Name	Formula	Vol%	Mass%	Flashpoint °C	Haz. Group	MESG (mm)	Ex-Gr
Oxygen	O_2	>99	>99	N/A	2.2 (Non-Flammable Gas)	N/A	N/A

Process information

Design temperature	38 [6]	°C	Design pressure	24820 [6]	kPa(g)
Operating temperature	Ambient		Operating pressure	600 [5]	kPa(g)
			Back pressure	N/A	kPa(g)

Installation

☑ In-line		☑ Horizontal	Distance to source of ignition	4	m
☐ End-of line		☐ Vertical	☐ Top of Tank/vessel		

Function

☐ Pressure		☐ Endurance burning proof	☐ Temperature monitored
☐ Vacuum		☐ Short term burning proof	
☐ Pressure & Vacuum		☑ Deflagration proof	☐ Pressure monitored
☑ Flame arrester		☑ Detonation proof	☐ Bi-directional

Flame arrester data

Size nominal	25 [3] Note 2	mm	Flow	32,8 [5]	kg/h	Density	5,16 [4]	kg/m^3
Pressure nominal	400	kPa(g)	Inlet flange type		Screwed female BSPT			
Adjusted set pressure	Supplier to advise	kPa(g)	Outlet flange type		Screwed female BSPT			
Adjusted set vacuum	Supplier to advise	kPa(g)	Pressure drop		Supplier to advise			kPa(g)

Material Construction for body / flanges

Pressure carrying parts SS, 304/304L Class 1500	**Internals** SS, 304/304L Class 1500	**Lining** Carbon Steel
End connection / Facing Threaded	**Special drilling of flange connections** Supplier to advise	
Paint finish Supplier to advise	**Weather hood** Supplier to advise	**O-ring Seal** Supplier to advise

Inspection / Documentation (to be provided by supplier)

☑ Material certificate	☑ Work certificate	☑ Performance certificate

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REFERENCE DRAWINGS AND DOCUMENTS

[1] ENS-NWPVR-PID-24004, NW PlasGas Demonstration Plant Subsystem 13 P&ID Diagram - Gas Supply System

[2] ENS-OWPVR-PID-24003, Uranium Contaminated Waste Oil Plasma Gasification: P&ID Diagram - Gas Supply System (O2 & Ar)

[3] ENS-NWPVR-CLC-24002, Process Gases Line Sizing for the NW PlasGas Demonstration Facility

[4] The Engineering ToolBox (2003). Gases - Densities and Specific Weight. [online] Available at https://www.engineeringtoolbox.com/oxygen-O2-density-specific-weight-temperature-pressure-d_2082.html [27/09/2024]

[5] ENS-NWPVR-REP-24013, Mass & Energy Balance (Zutari Report) for the Low-level Waste Plasma Gasification (NW Plas Gas) Demonstration Facility

[6] MES-PIPE-SPE-0014, Piping Material Specification Line Class GSVP, May 2024

NOTES

Note 1: The oxygen storage tank T1602 will be incorporated into a centralized gas supply system, outside the scope of the Nuclear Waste Plasma Gasification Facility. The tank will be procured as a vendor package, i.e. a bulk liquid storage tank coming with the evaporator, necessary shutoff valves, regulator(s) and safety relief valve(s) to regulate the gas supply pressure at 600 kPa(g). The tank will be equipped with instrumentation indicating the pressure and liquid inventory in the tank. The specifications of this tank are still to be confirmed by the vendor. Therefore, the tank capacity/dimensions provided in this Sheet are only an estimate at this point.

Note 2: This is the size of the schedule 40 pipeline in which the flame arrester will be installed.

Note 3: This is the maximum flowrate coming out of the bulk storage tank. In the context of the NW PlasGas facility, the maximum pump-out rate will be experienced when both the PTFE and NW PlasGas facilities are operated simultaneously.

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