

ENGINEERING SERVICES DEPARTMENT



BLOWER P1510 SPECIFICATION SHEET

Project	NW PlasGas and CWOPG Projects	Unit Tag Number	P1510
Datasheet Document No.	ENS-NWPVR-SPE-25007	Revision	2
Description	Blower P1510 provides the driving force to extract the off-gas from the wet scrubber S1501 in the Low-level Waste Plasma Gasification (NW PlasGas) and Uranium Contaminated Waste Oil Plasma Gasification (CWOPG) Demonstration Facilities, and discharges the gas into the process ventilation system.		
Plant Location	Necsa, Pelindaba, North-West Province		
Equipment Location	Integrated NW PlasGas and CWOPG Demonstration Facilities Process area inside Laboratory 150, Building V-H2		
Safety Classification	SC-2(C) and SC-3(N)		
Quality Classification	QC-2(C) and QC-3(N)		

FLUID PROPERTIES

Fluid	Off-gas mixture containing CO ₂ , HCl, HF, O ₂ and N ₂ ^{Note 4*}		
Solids content	Trace (<0,001 w/w) ^{[3], Note 5*}		
Moisture Content	Trace (<0,001 w/w) ^{[1], Note 6*}		
Installation	Outdoor <input type="checkbox"/>	Indoor <input checked="" type="checkbox"/>	
Corrosive due to	HCl(g) - entering blower at a maximum rate of 10 g/h ^[1] HF(g) - entering filter at a maximum of 0.2 g/h only in the CWOPG Facility ^[9]		

PARAMETERS	UNITS	MINIMUM	MAXIMUM
Operating temperature	°C	35 ^[1]	65 ^[1]
Suction	kPa(g)	-	-12.5 ^[8]
Discharge	Pa(g)	-25 ^{Note 8*}	Atmospheric ^{Note 9*}
Fluid density	kg/m ³	0,84 ^{[5], Note 1}	2,1 ^{[5], Note 1*}
Viscosity ^[7]	Pa.s	1,57E-05	0,0413
Mass flow rate	kg/h	12,5 ^{[6], Notes 4 & 10*}	50,5 ^{[1], Note 4}
Volume flow rate	m ³ /hr	14,88 ^{Note 2*}	24,05 ^{Note 2*}
Pressure differential	kPa	12.5	-

MECHANICAL, ELECTRICAL & GENERAL PROPERTIES

Type of fan recommended	Regenerative	Insulation	TBD Vendor ^{Note 3*}	Application	Off-gas extraction
Electrical (Y/N)	Y	Volts	TBD Vendor	Phase	TBD
Wheel diameter	TBD Vendor		Blade Type	TBD Vendor	
Fan length	TBD Vendor		Fan width	TBD Vendor	
Shaft dimensions	TBD Vendor				
Vibration Sensor (Y/N)	TBD Vendor				
Instruments on equipment	Run (Status) Indicator ^[2] - to communicate with centralized plant monitoring system in control room				
Motor specifications	Variable speed adjustment required. Supplier to advise further.				
Noise criteria	Maximum allowable sound level is 85 dB(A) at a distance of 1 m from blower				

PROCESS CONNECTION

Pipe Suction Nozzle	Size	100NB	Rating	150#	Flange Spec.	SS, ASTM A182-F304/304L, ASME B16.5, RF
Pipe Discharge Nozzle	Size	100NB	Rating	150#	Flange Spec.	SS, ASTM A182-F304/304L, ASME B16.5, RF

MATERIAL OF CONSTRUCTION

Casing	TBD Vendor	Shaft	TBD Vendor	Shaft sleeves	TBD Vendor
Fan Impellor	TBD Vendor	Base Plate	TBD Vendor	Seal type	TBD Vendor
Hub	TBD Vendor	Belt	TBD Vendor	Helical Time gear	TBD Vendor

VENDOR DATA REQUIRED WITH TENDER

1 Fan performance curve		4 Fan dimensions	
2 Fan duty		5 Fan sound pressure level	
3 Fan efficiency		6 Fan rotational speed	

ACCESSORIES

Inlet & Outlet Silencer	To Be Included
Common Base Plate	To Be Included

REFERENCE DRAWINGS AND DOCUMENTS

[1] ENS-OWPVR-CLC-24002: Mass Balance & Energy Balance Calculations for the Basic Engineering Design of the Uranium Contaminated Waste Oil Plasma Gasification.
[2] ENS-NWPVR-PID-24002: NW PlasGas Demonstration Plant P&ID Diagram - KOH Scrubber Sub-system 15
[3] ENS-NWPVR-DES-24002: Process description for the NW PlasGas system
[4] ENS-NWPVR-CLC-24018: Pressure Balance across the NW PlasGas Facility
[5] Howard F. Rase, 1963: Piping Design for Process Plants, John Wiley & Sons, New York
[6] ENS-NWPVR-CLC-24011: Mass Balance across the NW PlasGas Demonstration Facility
[7] Robert Reid, 1987: The Properties of Gases and Liquids Fourth Edition
[8] ENS-OWPVR-CLC-25010: Pressure Balance for the Uranium Contaminated Waste Oil Plasma Gasification Demonstration Facility
[9] ENS-OWPVR-CLC-25006: Scrubber Design for the Uranium Contaminated Waste Oil Plasma Gasification Demonstration Facility

NOTES

Note 1. The minimum and maximum densities correspond to lower and upper extremities of the off-gas compositions obtained at any scrubbing phase from both the NW PlasGas and CWOPG Facilities, respectively.

Note 2. These volumetric flowrates are obtained by taking the quotient of the mass flows obtained in [6] with the fluid densities estimated for the different scrubbing phases in this document.

Note 3. "TBD Vendor" refers to information that will be specified by the vendor responsible for supplying the equipment.

Note 4. In both the NW PlasGas and CWOPG Facilities, the composition of the scrubber off-gas changes over time due to chemical reactions which take place in the scrubber. The gas compositions are as follows for the two facilities:

[a] NW Plas Gas Facility: Gas composition (% w/w) is 1.3% CO₂, 0.1% HCl, 51.9% O₂ and 46.7% N₂ at the start of the process (phases 1 and 2 of scrubbing), and 74% CO₂, 0.02% HCl, 13.7% O₂ and 12.3% N₂ at the end of the process (phase 3 of scrubbing).

[b] CWOPG Facility: Gas composition (% w/w) is 10.3% CO₂, 0.01% HCl, <0.01% HF, 56.7% O₂ and 33.0% N₂ at the start of the process (phases 1 and 2 of scrubbing), and 69.6% CO₂, Traces of HCl, Traces of HF, 19.2% O₂ and 11.2% N₂ at the end of the process (phase 3 of scrubbing).

Note 5. Two HEPA filters F1508A&B and F1509 are installed in series upstream of the blower

Note 6. A moisture trap Y1511 is installed in the suction line upstream of the blower.

Note 7. Inspection and testing shall be done in supplier facility.

Note 8. This represents the suction pressure of the process ventilation system into which the blower P1510 discharges.

Note 9. Atmospheric pressure on the Necsa site is typically 88 kPa(a).

Note 10. The minimum flow rate is achieved at the start of the process (phases 1 and 2 of scrubbing) in the NW PlasGas facility, while the maximum flow rate is achieved at the end of the process (phase 3 of scrubbing), also in the NW PlasGas facility.

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