

Standard Installation, Operation & Maintenance Manual For PSA Medical Oxygen Generation System (NAMO™ SERIES)



Document submitted by:

**Neometrix Engineering (P) Limited
E-148, Sector-63, NOIDA, UP-201301**

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Introduction

Neometrix is proud to support our Nation for managing Medical Oxygen requirements during the Covid 19 pandemic.

We are pleased to announce that we are supplying PSA Medical Oxygen Generation plants to hospitals all over India through a running contract with ministry of health and family welfare, Government of India.

These NAMO™ series plants are for different hospitals of India with different capacities as per requirement of hospitals like 100 LPM, 200 LPM, 500 LPM, 1000 LPM, 1500 LPM, 2000 LPM, 2500LPM & 3000LPM.

Neometrix has enhanced its manufacturing capabilities to supply any of these plants within 4-6 weeks.

Neometrix is providing plants with purity as per Indian Medical standard i.e. 93±3.

Pressure swing adsorption processes utilize the fact that under high pressure, gases tend to be attracted to solid surfaces, or "adsorbed". The higher the pressure, the more gas is adsorbed. When the pressure is reduced, the gas is released, or desorbed.

PSA processes are used to separate gases in a mixture because different gases tend to be attracted to different solid surfaces more or less strongly.

Neometrix is working to supply a quality product to ensure the best services to the medical units:

We use reputed make components in our NAMO™ series oxygen generator-

- ❖ Screw type Air Compressor
- ❖ Refrigeration Dryer
- ❖ Multistage Coalescing type Oil filters to purify Air.
- ❖ Air Receiver medical grade
- ❖ Oxygen Generator with PLC Control based automated control system
- ❖ Medical grade Oxygen Buffer Tank
- ❖ Micro & Bacterial filtration unit
- ❖ Power backup and Power fluctuation free system
- ❖ 30 minute backup to control system for emergency support
- ❖ Valves, Gauges etc.

GENERAL GUIDELINES

In order to ensure the safe installation, assembly and the operation of this onsite oxygen plant, the following instructions must be followed strictly.

Instruction for Safe Operation-

- ❖ This oxygen generation plant must be placed in a well-ventilated area. Avoid inhalation of gases.
- ❖ All pipes, tubes and hoses must be compatible with oxygen which is used in oxygen plant.
- ❖ For Medical Oxygen Plant, you must follow the procedure for service and maintenance instructions
- ❖ Exhaust gas must be led by piping out of the room to outdoor atmospheric air.
- ❖ Oxygen is a powerful oxidizing agent. It can cause fire or explosion. Observe strict cleanliness procedures when fabricating and connecting the oxygen piping.
- ❖ The Panel contains electrical parts that may produce electrical hazard if not handled properly. To prevent electrical shock when servicing the plant, care must be taken. In general electrical installation and servicing is to be performed by trained or authorized personnel only.
- ❖ Oxygen and Air reservoir must be de-pressurized and purged thorough with air to remove all oxygen before service or inspection. Always vent oxygen to outdoor atmospheric air. Make sure there is no smoking or open flame.
- ❖ Smoking should not be permitted in the area where the plant is located.
- ❖ Do not try to modify or enhance the performance of an oxygen plant in any condition without proper knowledge

Warranty will not be covered -

- 1) If inlet air temperature below 5-degree C or above 40-degree C.
- 2) Water, oil, rust, scale and/or other foreign objects carry over in the inlet air due to damaged filter
- 3) If the Inlet air quality not comply with ISO 8573 class 4.



Warning

Do not use this plant without completely reading the instructions and any additional instructional material such as user manuals, service manuals or instruction sheets supplied with this product or optional equipment. If you are unable to understand the warnings, cautions or instructions, contact a healthcare professional, dealer or technical professional before attempting to use this equipment.

"NO SMOKING" sign should be displayed at the place where this medical oxygen plant is located.



Danger

- ❖ Do not install this oxygen equipment near any heat sources or open flames.
- ❖ Check that all electrical equipment in the area near the oxygen plant is properly grounded.
- ❖ No one should smoke or use any flammable material in the oxygen generation plant room.

Unpacking

- ❖ Before unpacking the equipment, check the possible damage in shipment, if any damage, notify carrier.
- ❖ The equipment should be carefully unpacked.

Product Description

NAMO™ Series onsite PSA Based Oxygen Generation Plant are for different hospitals of India. This oxygen generation plant works on the Pressure Swing Adsorption technique in which oxygen enriched gases from the ambient air.

These plants are available in different models like NAMO™ 100, NAMO™ 200, NAMO™500, NAMO™ 1000, NAMO™1500, NAMO™2000, NAMO™2500, and NAMO™ 3000 as per requirement of different hospitals.

This onsite oxygen generation plant comes Generally with 2 compressors, filtration system, dryer ,Air Receiver tank , Oxygen tank , PSA Towers ,valves, gauges , control panel, UPS and along with Servo Voltage stabilizer to avoid any fluctuation in voltage.

This onsite oxygen generation plant produces oxygen with purity as per Indian Medical standard i.e. 93±3.

In this oxygen generation plant imported zeolite, based molecular sieve is used for adsorption of Nitrogen from the ambient Air and oxygen is produced.

NAMO™ Series Features

Robust and Reliable System -

All components used in the system are of best quality in order to enhance the life and

Easy Customization-

More of the components of the system are selected and positioned in such a way that this system can be customized at later stage as per end user requirement.

Safe -

Air Storage tank, O2 tank & PSA tower is tested for unlimited no. of cycle, so it can sustain operating pressure without any fail.

Easy integration and Installation-

Complete system is designed for easy integration and installation.

PSA Process

When a gas mixture such as air is passed under pressure through a vessel containing an adsorbent bed of Zeolite Molecular Sieve that attracts Nitrogen more strongly than Oxygen, part or all of the nitrogen will stay in the bed, and the gas exiting the vessel will be richer in oxygen than the mixture entering. When the bed reaches the end of its capacity to adsorb nitrogen, it can be regenerated by reducing the pressure, thus releasing the adsorbed nitrogen. It is then ready for another cycle of producing oxygen-enriched air.

Stage 1

Compressed air is fed into the first molecular sieve bed. Nitrogen is trapped, while oxygen is allowed to flow through.



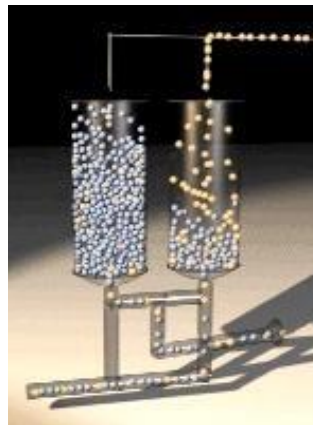
Stage 2

When the sieve in the first bed becomes full of nitrogen, the airflow is then directed into the second bed.



Stage 3

As the second bed separates the oxygen from the nitrogen, the first bed vents its nitrogen into the atmosphere.

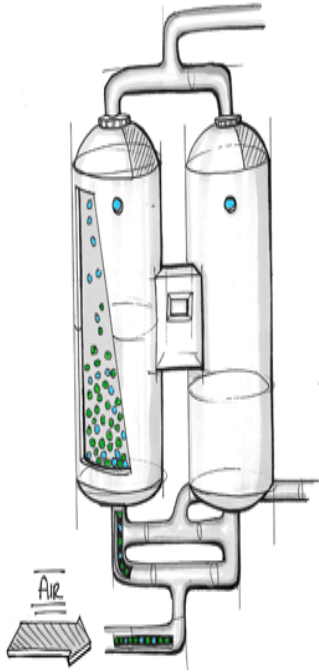


Stage 4

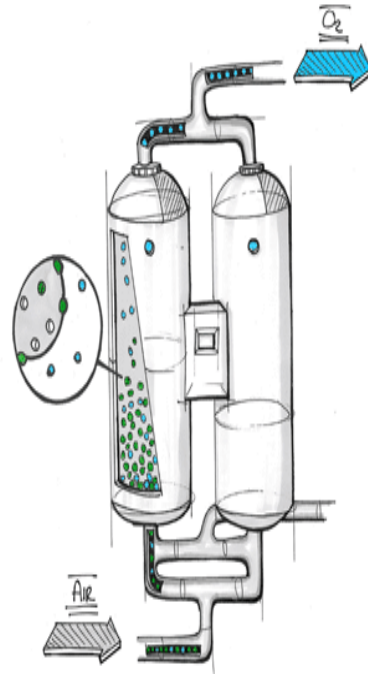
Compressed air is once again fed into the first bed and the process is repeated continuously. A constant flow of oxygen is produced.



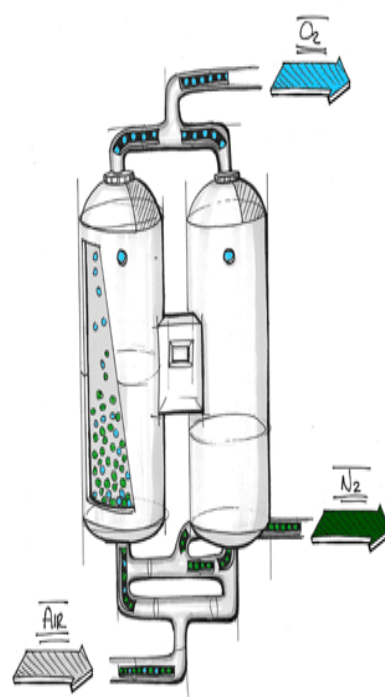
Pressurization



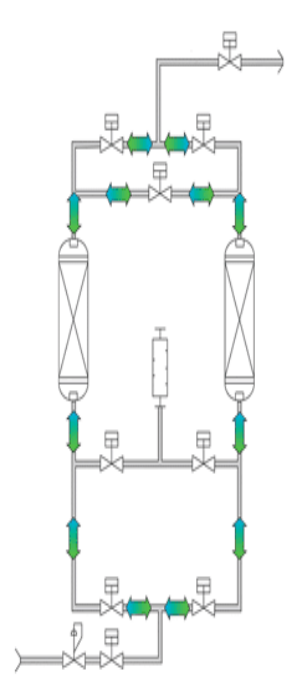
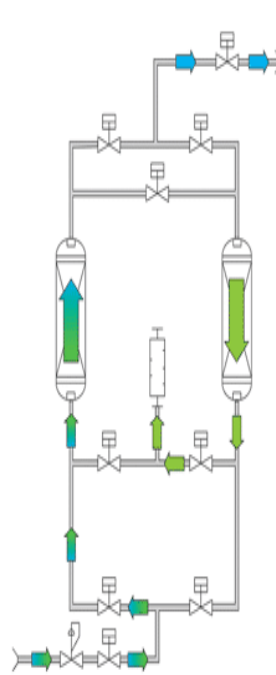
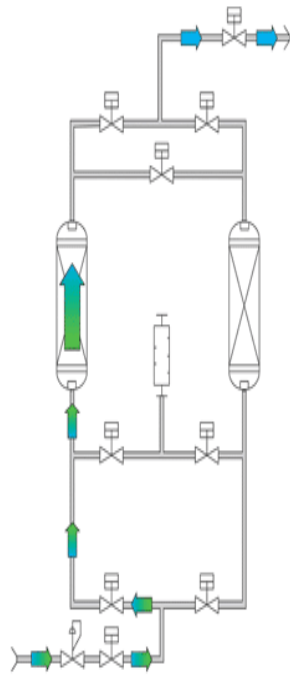
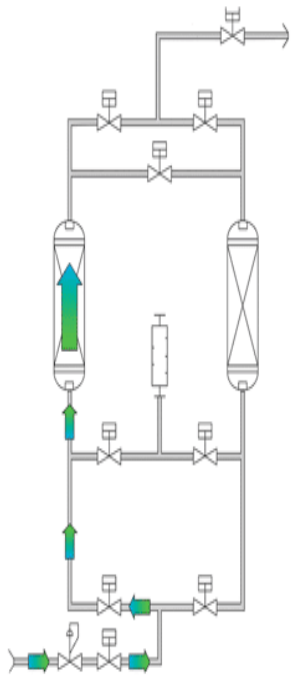
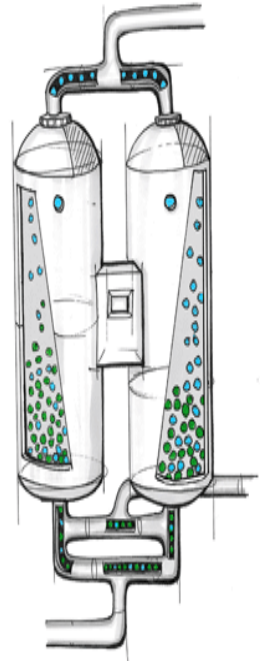
Delivery



Delivery + Purge

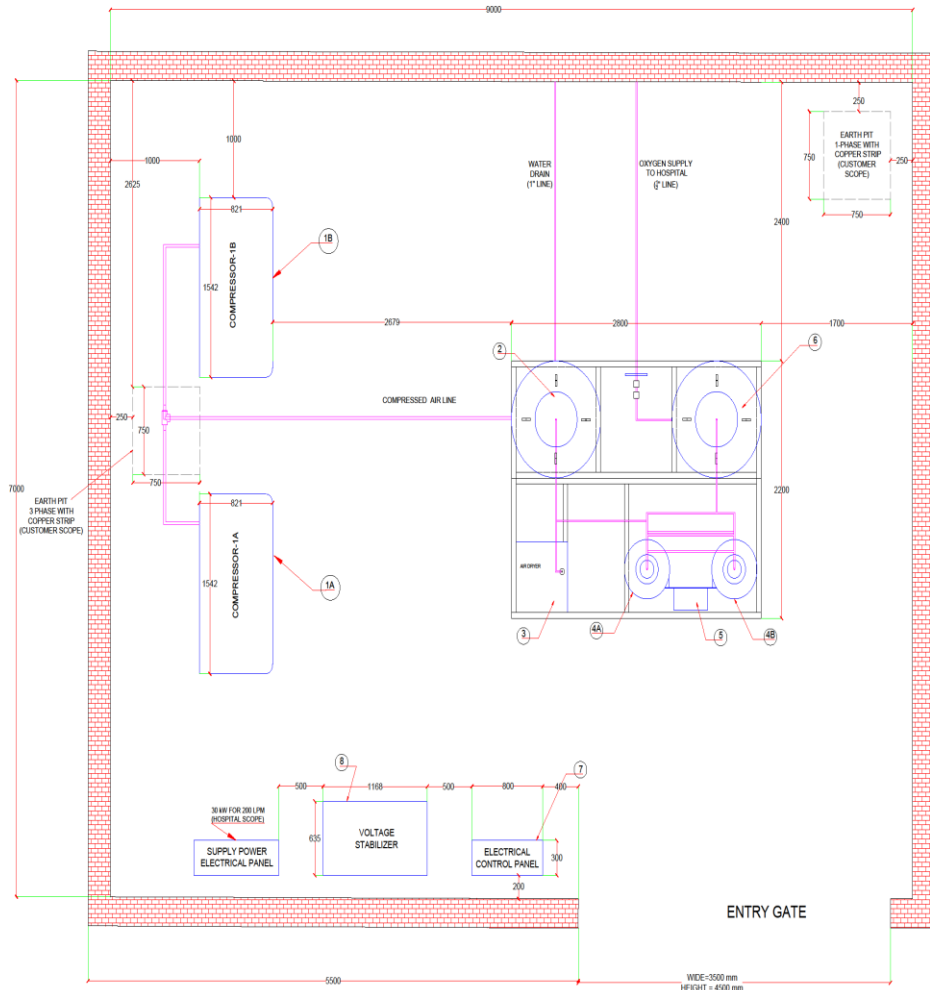


Pressure Equalization



Plant Layout

THIS DWG. IS SOLE PROPERTY OF NEOMETRIX ENGINEERING PVT. LTD.
UNAUTHORISED USE OF THIS DWG. OR MAKING PRODUCT AS PER THIS DWG.
WITHOUT OUR PERMISSION OR ANY OTHER MISUSE IS NOT PERMITTED.



BILL OF MATERIALS		
S.No.	ITEM	QTY.
1	AIR COMPRESSORS	2
2	AIR RECEIVER	1
3	REFRIGERATED DRYER	1
4	MEDICAL OXYGEN PSA TOWERS	2
5	PLC CONTROL PANEL	1
6	OXYGEN STORAGE TANK	1
7	ELECTRICAL CONTROL PANEL	1
8	VOLTAGE STABILIZER	1

ROOM SIZE REQUIREMENT (INTERNAL)				
S.NO.	PLANT CAPACITY	LENGTH	WIDTH	HEIGHT
1	160 LPM	9000 mm	7000 mm	5000 mm

POWER REQUIREMENT			
S.NO.	PLANT CAPACITY	TYPE OF POWER SUPPLY	REQUIRED POWER
1	160 LPM	3-PHASE	30 KW

MAJOR LAYOUT COMPONENTS SIZES					
S.NO.	ITEM	LENGTH	WIDTH	WEIGHT	QTY.
1	PSA PLANT SKID	2800 mm	2200 mm	3500 kg	1
2	COMPRESSORS	1542mm	821 mm	700 kg	2
3	ELECTRICAL CONTROL PANEL	800 mm	300 mm	70 kg	1
4	VOLTAGE STABILIZER	1168 mm	635 mm	700 kg	1

- NOTE:
- All dimensions are in mm.
 - No Anchor bolts required for fixing Compressors or skid.
 - 9m x 7m Concrete Floor required.
 - Plant Room should be properly ventilated.
 - Internal Roof Height should be Minimum 4.5m from floor.
 - Entry Gate should be of Width = 3.5 m and Height = 4.5 m.
 - Civil, Electrical, and Plumbing work in Customer's scope.
 - Separate Earthing required for 3-Phase and Single-Phase.
 - Supply Power Electrical panel to be placed as shown in this drawing.
 - Minimum 200 Lux Capacity lighting required in Plant Room.

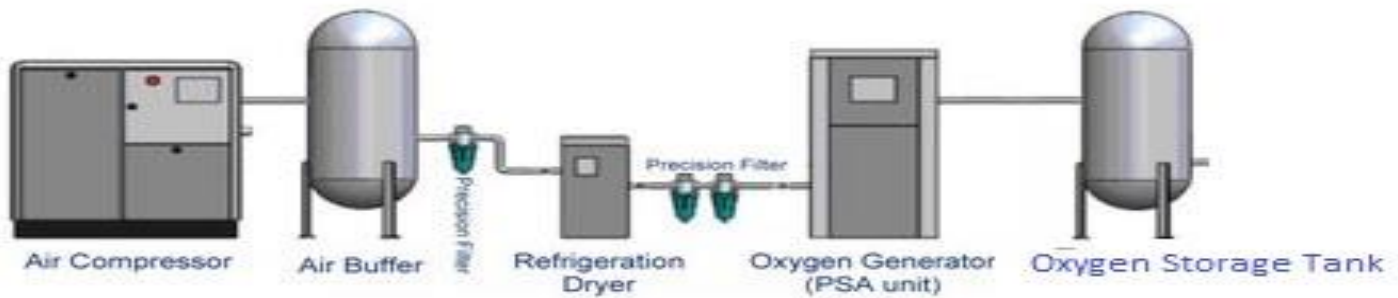
www.neometrixgroup.com

NEOMETRIX ENGINEERING PVT. LTD.
E-148, Sector-63, Noida, UP-201304
Tel. No. :- 0120-4300800
Fax No. :- 0120-4300808
Email :- contact@neometrixgroup.com

MAIN TITLE: PSA MEDICAL OXYGEN GENERATION PLANT		CUSTOMER REF. NO.:	
SUB-TITLE: MOX-PSA-160LPM-D		CUSTOMER DWG. / REF. No.:	
SRS NO.:	A2764	NAMO™ SERIES	
CUSTOMER:	--		
END-USER:	--		
PO NO.:	--		
PREPARED BY & DATE:	CHKD BY & DATE:	APPROVED BY & DATE:	SCALE:
DESIGNED BY:	DATE:	DATE:	DATE:
NO. OF SHEETS:	NO. OF SHEETS:	NO. OF SHEETS:	NO. OF SHEETS:
1	1	1	1

NEOMETRIX ADSORPTION MEDICAL OXYGEN (NAMO™)
GENERATION PLANT (PSA)
LAYOUT DRAWING (160 LPM)

Process Flow Diagram



Parts description & Functioning of Major Parts

NAMO™ Series Medical Oxygen generation plant consists of following major parts-

- ❖ Compressor
- ❖ Air Storage Tank
- ❖ Pre filter
- ❖ Refrigerated Air Dryer
- ❖ Micron filter
- ❖ Activated carbon filter
- ❖ Submicron Filter
- ❖ Oxygen Generator
- ❖ Solenoid Valves
- ❖ Angle seated valves
- ❖ Ball Valves
- ❖ Pressure regulator
- ❖ Pressure Gauge
- ❖ PLC Control Panel
- ❖ Oxygen Sensor
- ❖ Silencer
- ❖ Bacteria filter
- ❖ Auto Drain Valve
- ❖ Servo Stabilizer

Compressor-

After switch on the compressor, Compressed air from the compressor is produced; maximum pressure can be developed up to 8.3 Bar in the compressor. Now this compressed air is fed to the Air storage tank above 8 Bar.

Air Storage tank-

Compressed air is accumulated inside air storage tank; it is connected between the Compressor and the dryer. The air coming from the compressor in it should be dry.

Pre filter-

This filter (5 micron) avoids dust, dirt, foreign materials and moisture before entering into the molecular sieves bed and damaging the working.

Refrigerated Air Dryer-

This Dryer is used for cooling of compressed air coming from the air receiver tank then delivers this cooled air to fine filter for further processing.

Micron filter-

This filter (1 micron) avoids dust, dirt, foreign materials and moisture before entering into the molecular sieves bed and damaging the working.

Activated carbon filter-

This carbon filter is used to remove the left impurities coming from micron filter and remaining hydrocarbon particles.

Sub-Micron filter-

This filter (0.01 micron) avoids dust, dirt, foreign materials and moisture before entering into the molecular sieves bed and damaging the working.

Oxygen Generator-

NAMO™ Series oxygen plant has 2 Adsorber towers which contains the Zeolite Molecular Sieves along with Activated alumina. This mixed desiccant bed adsorbs nitrogen, and concentrates oxygen from the air during drying cycle. Pressure gauges are fitted on these towers to indicate the tower pressure and there is provision for refilling the desiccant.

Solenoid Valves-

This valve allows the inlet feed air between the two adsorbent towers during drying phase. Controls signals for valve operation are taken from the control panel and the pilot air required for this valve is taken from the air receiver.

Angle seated valves-

These valves are used for controlling the air and oxygen flow as per cycle time requirement to get the desired output.

Ball Valves-

These valves are used to open and shut off the inlet and product outlet from the receivers based on the requirement.

Pressure regulator-

The air pressure regulator controls the inlet air pressure before entering into the adsorber tower in the inlet side and control the delivery oxygen pressure at delivery side.

Pressure Gauge-

These gauges indicate the air pressure inside the adsorbent towers, air storage tank & oxygen storage tank.

PLC Control Panel-

The PLC (Programmable Logic Controller) process the inputs and outputs) to and from the system components and communicates with the touch screen.

Oxygen Sensor-

This sensor is used to indicate the product purity in terms of % of oxygen from the oxygen generator.

Silencer-

Silencer/Mufflers are used for reducing the amount of noise emitted by the exhaust of the waste gases coming out from the adsorbent towers during regeneration phase.

Bacteria filter-

Bacterial filters provide effective protection against various types of particles including bacteria, viruses, and moisture droplets in the oxygen out from the plant. This filters help to protect the patient, and the breathing circuit from contamination.

Auto Drain Valve-

This Auto drain valve automatically removes condensate from the filters mechanically.

Servo Stabilizer-

To stabilize the voltage for the complete system so that system can run smoothly.

Description of operation

The oxygen generator works on the PSA principle. The mixed bed desiccant adsorbs moisture and Nitrogen from the compressed air for generating the oxygen. For proper removal of moisture and Nitrogen from the wet air regeneration of the desiccant is required. Regeneration is achieved by means of allowing a part of the oxygen from the supply outlet.

Cycle of Operations The oxygen generator works based on the following phases-

- ❖ Drying
- ❖ Pressure Equalization
- ❖ Depressurization
- ❖ Regeneration
- ❖ Re-pressurization

Drying cycle –

The compressed wet air flows through the pre filter. The water particles get filtered by the filter. The filtered air flows in to the adsorber tower filled with activated alumina where it loses all the moisture to the alumina. Purified (Moisture and oil free) air further passing through the Molecular Sieves (Zeolite type). The sieves selectively adsorb nitrogen, allowing oxygen to pass through at the desired purity level.

Pressure Equalization cycle-

At the end of drying cycle the second adsorber tower is ready for the next drying cycle so in order to re-pressurize the tower to drying pressure by means of inlet air it take so much time to save that energy the air in the tower 1 is fed in to the second tower and the pressures are equalized

Depressurization-

After drying for the preset cycle time, the desiccant bed will be saturated with moisture and nitrogen. For successful removal of moisture and nitrogen in the next cycle, this moisture and nitrogen is to be removed from the desiccant. This removal of moisture cycle starts with depressurization. In this cycle air inside the tower is vent out by the depressurization valve. The pressure is expanded to atmospheric pressure. The sudden depressurization brings out nitrogen molecules trapped in the sieves pores to the surface of the beads

Regeneration-

Cycle In order to remove the moisture and nitrogen during regeneration cycle. Small portion of oxygen from the drying tower is passes over the sieves through the regeneration orifice. This results in complete regeneration of Molecular Sieves and ready for the next cycle.

Re-pressurization cycle-

At the end of drying cycle the second adsorber tower is ready for the next drying cycle so re-pressurization of the tower2 to drying pressure is necessary this is achieved by allowing the inlet feed air to the adsorbent tower.

Working

- ❖ Wet dirt atmospheric air is compressed in the compressor.
 - ❖ The air coming from the compressor is first fed into the inlet Pre-Filter, here the impurities present itself and water particles are removed.
 - ❖ After that in order to remove the water vapor present in the air it is allowed to flow through the refrigerant air dryer, where 2 to 10 deg C pressure dew point is achieved.
 - ❖ This dry air is stored in the air receiver under pressure.
 - ❖ On the first cycle drying phase dry air is allowed to adsorbent tower by means of inlet valve through the fine filter and carbon filter where the foreign materials and carbon particles are removed from the air.
 - ❖ The compressed dry air flowing through mixed bed tower 1 is selectively adsorbs the nitrogen and delivers the oxygen enriched air to the oxygen receiver.
 - ❖ Where the oxygen is stored under pressure.
 - ❖ At this time the tower 2 is in regeneration phase.
 - ❖ A small portion of the oxygen enriched air is expanded to near atmospheric pressure by passing through the purge orifice. Expansion of this oxygen gas to near atmospheric pressure increases the ability of the purge air to strip the previously adsorbed nitrogen from desiccant bed in tower 2. The absorbed gases exhausts through the opened two-way purge valve.
 - ❖ From the oxygen receiver the oxygen is taken to the user end through the after filter and bacterial filter.
-
- ❖ The automatic cycling of the adsorption and desorption between the two beds enables the continuous production of oxygen.

Warning –

Failure to follow these instructions can lead to serious injury or death. This dryer should be only be used for drying filtered, compressed air. Ensure inlet air to this air dryer is filtered.

Only experienced and licensed electricians that are properly trained in compressed air and separation systems should service or repair PSA Plant products.

Before start-up or performing any maintenance on any NAMO™ gas separation product like oxygen and nitrogen generator air dryer, filter, drain system, or other equipment, you must first turn off and disconnect all electrical power and service to the equipment at the main disconnect switch. Also, be sure to bypass and depressurize the dryer to 0 PSIG.

Do not start or operate the dryer if there is a leak. Make sure the dryer's protection rating is applicable to the installation conditions.

Do not operate the generator at pressures and/or temperatures above the maximum allowable. Verify that incoming voltage matches the voltage marked on the data label. Do not lift the generator by its piping or control box or drop the generator. Doing so may damage the equipment.

Installation

Oxygen Generator is intended for the separation of compressed air from nitrogen to oxygen. Under no circumstance should they be used to dry other gases.

The adsorbents used are non-toxic. However, they may cause respiratory problems if they are inhaled in dust form. The use of a dust mask is sufficient to protect personnel.

NAMO™ series Oxygen generators are pre - Assembled one. In the case of inbuilt air compressor there is no need for any connections. As in case of without air compressor in the unit proper pipe connection should be given, for the pipe sizes refer the models.

Installation Site and Connections-

- ❖ Install the generator in a closed clean, dry room protected from freezing.
- ❖ Access to the room should be restricted to personnel qualified in maintenance and operation.
- ❖ The room must be adequately ventilated.
- ❖ The generator must not be directly exposed to sources of heat.
- ❖ The temperature of the room must not exceed 43°C/109°F
- ❖ Make sure that the generator is not near any equipment which does not comply with the electromagnetic compatibility directives and which may degrade generator operation.
- ❖ There must be a minimum distance of 3 feet between the dryer and any other equipment which uses electricity. Ensure that the generator is installed in the vertical position.
- ❖ Generator should be secured by bolting it down.
- ❖ Install a system of by-pass valves between the Generator inlet and outlet so the dryer can be serviced without having to interrupt the compressed air supply from the circuit (see diagram above). The upstream and downstream valves must be closed during installation.
- ❖ Connect a drain line to the Pre-filter auto drain outlet.
- ❖ Check for leaks after all connections have been made.
- ❖ Always pressurize generator before power up.

Electrical Connections-

- ❖ Provide 4 wire (3 phase 415 VAC with neutral) power supply along with main on/off Panel to connect it with servo stabilizer supply.

Maintenance

This oxygen plant is specifically designed to minimize routine preventive maintenance. Only professionals of the healthcare field or persons fully conversant with this process such as factory trained personnel should perform preventive maintenance or performance adjustments on the oxygen generator.

Note: PSA oxygen generator is robust, reliable machines. To ensure uninterrupted, problem-free operation, perform the inspections below.

A Detailed check list is added in this manual you can also refer it for the maintenance.

Monthly Inspections-

During the monthly routine inspection, check that-

- ❖ The drying and regeneration cycles function normally
- ❖ The silencers are not clogged.

Semi Annual Inspections-

During the semi-annual routine inspection, check that-

- ❖ That the drying and regeneration cycles function normally
- ❖ The silencers are not clogged
- ❖ Replace filter elements

Annual Inspections-

During the annual routine inspection, check that –

- ❖ The drying and regeneration cycles function normally
- ❖ The silencers are not clogged
- ❖ Replace filter elements.
- ❖ The state all valve seals.

Note: During the entire operation, the compressor and the generator must be shut down. It is recommended all personnel who are in the presence of the desiccant to wear dust masks.

Changing the Desiccant-

- ❖ Bypass the oxygen supply into the secondary line.
- ❖ Disconnect the power supply to the generator.
- ❖ Make sure the inlet air supply to the generator is closed.
- ❖ Depressurize the pressure in both towers
- ❖ Loosen the dummy present in the tower bottom desiccant port
- ❖ Remove the old desiccant and replace new desiccant one.

Filter Element Replacement Instructions

- ❖ Place the oxygen generator in the **CONTINUOUS** mode.
- ❖ Close the valve that supplies air to the oxygen generator.
- ❖ Press the manual filter drain button until the regulated air pressure gauge reads **0 psi**.
- ❖ Place the oxygen generator in the „**OFF**“ mode.
- ❖ Open the cabinet door.
- ❖ Remove the filter bowl by pressing the release tab and turning the bowl clockwise.
- ❖ Carefully remove the bowl from the cabinet.
- ❖ Clean out the inside of the bowl with some soap and water, and dry thoroughly.
- ❖ Remove the existing filter element by unscrewing the element.
- ❖ Insert the new filter element.
- ❖ Replace the filter bowl.
- ❖ Reconnect the drain tube.
- ❖ Check to see that the tube has been replaced securely by opening the valve that supplies air to the oxygen generator
- ❖ Close the cabinet door and begin operating, if desired.

OPERATING MODES & WORKING OF SYSTEM

- ❖ STEP-1: Switch on the Main MCCB.
- ❖ STEP-2: Switch on the Servo Voltage Stabilizer MCB and wait for 10 second.
- ❖ STEP-3: Switch on the Power supply of Compressor using changeover switch of main power panel.
- ❖ Switch on the Power supply of Dryer using “DRYER MCB” of power panel.
- ❖ Run the Dryer using on/off Switch of dryer
- ❖ Make sure before run the compressor Dryer Should be running.
- ❖ Run the compressor using Compressor control panel, if not any fault will present the display will indicate “READY” Now press the “START” (green) button on the controller machine.
- ❖ Open the Manual ball valve which is installed after Main Reservoir.
- ❖ Switch on PLC control panel Power supply using MCB of Power panel.
- ❖ Switch on the UPS
- ❖ Switch on the PLC & HMI Supply using on/off switch of PLC control panel

Below screen will appear after switch on PLC Control panel

20/09/2021

12:35:53

NEOMETRIX

The Complete Engineering Solutions Company

www.neometrixgroup.com

PSA OXYGEN GENERATION PLANT

MODEL : NAMO™ - 160

PURITY : 93 % (± 3 %)

FLOW : 160 LPM

MANUFACTURED BY : NEOMETRIX ENGINEERING PVT LTD

E-148, SEC-63, NOIDA, UP-201301 24X7 SERVICE & SUPPORT :

7777-876-876, WWW.NEOMETRIXGROUP.COM,

EMAIL : CONTACT@NEOMETRIXGROUP.COM

Touch on **anywhere on the screen** to close the event popup screen.

Below screen will appear when User will close the popup screen.

OPERATION SCREEN

20/09/2021 12:37:29

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NAMO™-160 RUN HOURS

PRESSUERE SWITCH

OXYGEN PURITY 0.0 %

OXYGEN PRESSURE 0.00 bar

OXYGEN FLOW 0.0 LPM

COMPRESSOR - I

COMPRESSOR - II

STOPED

START

HOME OPERTION SETTING ALARM TREND MIMIC

BUTTONS:

- ❖ **START** - Used to start the process.
- ❖ **Emergency button** - Used to stop the process.
- ❖ **OPERATION**- Navigation to **OPERATION** page. In this screen operator can see oxygen purity, oxygen pressure, oxygen flow, and compressor status.
- ❖ **HOME** - Touch the home operator can see the welcome screen.

When the operator touch **the setting** the given below screen will be show

SETTING SCREEN

The screenshot shows the following data:

Section	Parameter	Value
OXYGEN PURITY	SET VALUE	0.0 %
	ACTUAL VALUE	0.0 %
OXYGEN PRESSURE	HIGH LIMIT	0.0 bar
	LOWER LIMIT	0.0 bar
	ACTUAL VALUE	0.0 bar

Navigation Bar:

- HOME (House icon)
- OPERATION (Gears icon)
- SETTING (Gears icon)
- ALARM (Bell icon)
- TREND (Line graph icon)
- MIMIC (MiMiC logo)

BUTTONS:

- ❖ **SETTING** – Operator can see in this screen Timer setting & calibration. Operator can set the oxygen purity limit and oxygen pressure limit and also set the operation time from here.
- ❖ **TIMER SETTING** – For time setting operator touch the timer setting then the next page will be appear below.

(Note- Oxygen pressure in bar g and oxygen purity in % will be displayed.)

RUNNING HOURS SCREEN

20/09/2021

12:38:51

NEOMETRIX
The Complete Engineering Solutions Company
www.neometrixgroup.com

TOTAL CYCLE TIME			0 S	0 S
VALVE NAME	OFF TIME	ON TIME		
SV-1	0 S	0 S		
SV-2	0 S	0 S		
SV-3	0 S	0 S		
SV-4	0 S	0 S		
SV-5&6	0 S	0 S		
SV-5&6	0 S	0 S		

SV-7

OFF TIME	ON TIME
0 S	0 S

SV-8

OFF TIME	ON TIME
0 S	0 S
BYPASS CYCLE	0

HOME

OPERTION

SETTING

ALARM

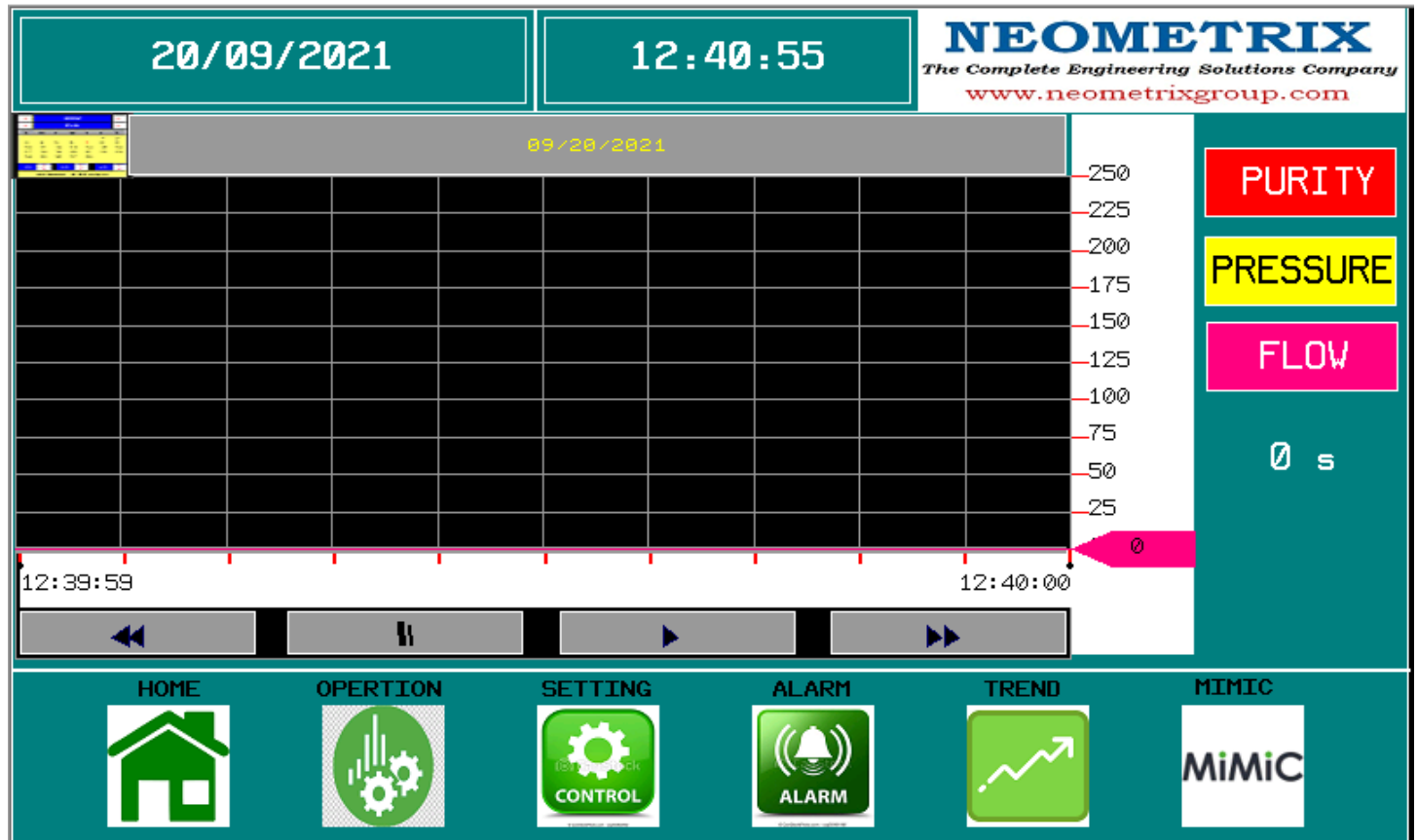
TREND

MIMIC

- ❖ **TIMER SETTING** – Operator can see the all valve timer setting and also monitor the opening and closing the valve.
- ❖ **ALARM**- Touch the alarm operator can see the next screen.

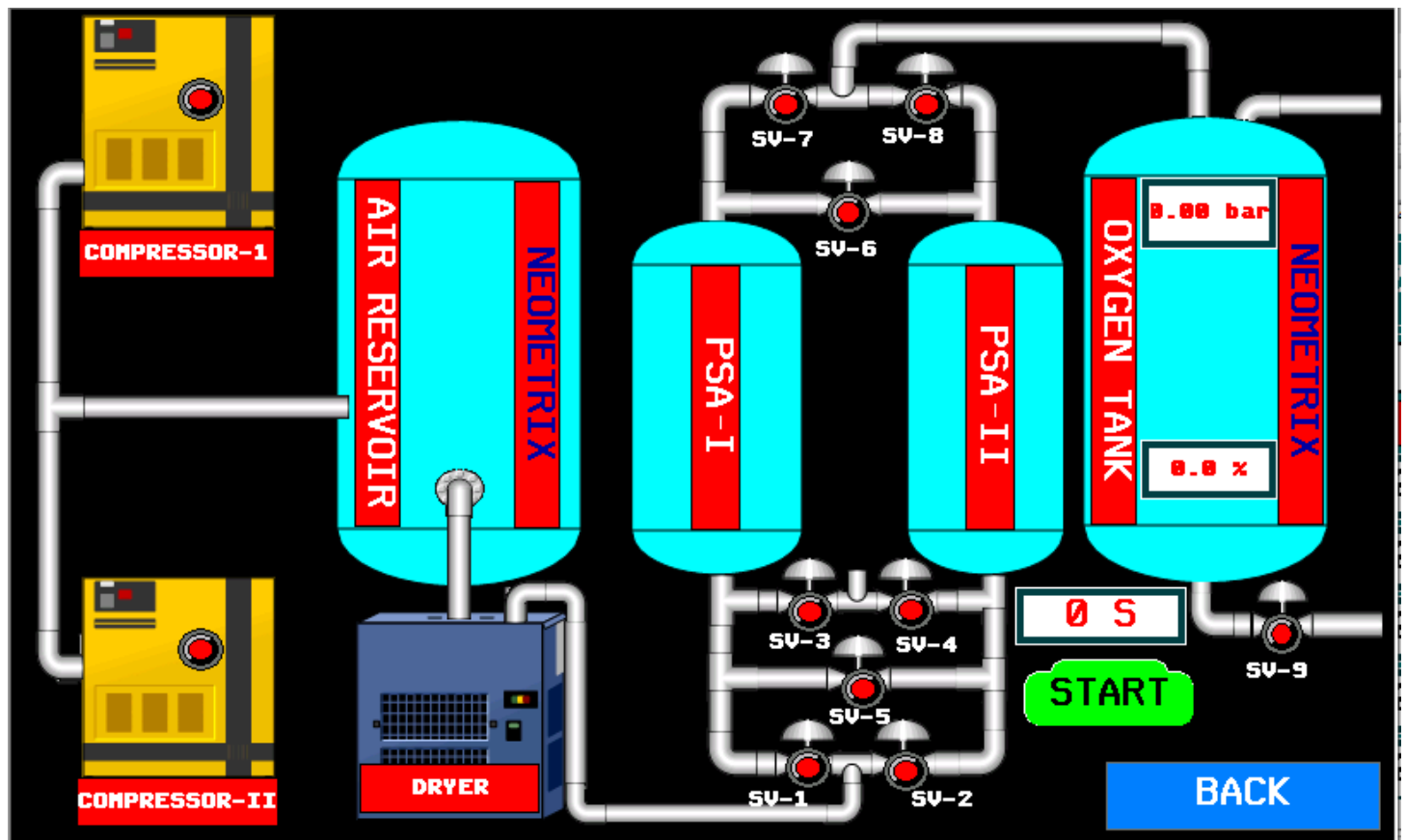
23

TREND SCREEN



- ❖ **TREND** –This screen shows the graph of purity, pressure and flow.
- ❖ **MIMIC**-Touch the mimic button, operator can see the next screen given below .

MIMIC SCREEN



- ❖ **MIMIC**- Operator can see all plant operation on the screen as per time setting of valve.
- ❖ **START** – Operator can start the process.
- ❖ **BACK**- Touch the back button and go to the home page.

Shut-down

Following these few simple steps will allow you to avoid having to run the generator while emptying the storage tank every day or every time you want to use it.

Close the valve that allows oxygen to flow to your manifold or application - This will keep the storage tank from being depressurized while oxygen is not being used.

Allow the oxygen storage tank to pressurize to **40 psi (2.8 bars)** or more and then turn the control switch to **“OFF”**. This should really only be done if the storage tank is already pressurized to at least **40 psi (2.8 bar)**.

OR

Leave the control switch in the „AUTO“ position and allow the generator to cycle until it refills the storage tank to 60 psi (4.1 bar).

You will now have oxygen available for use for the next day.

Check List

Activities	Frequency						
	Hourly	Daily	Weekly	Mon hly	Half Ye r y	Yearly	As per requirement
Check Compressor Pressure	✓						
Check Compressor oil level		✓					
Service compressor according to supplier instructions					✓		
Check Oxygen Pressure	✓						
Check rated oxygen flow	✓						
Check Oxygen Purity	✓						
Check Dew point at dryer outlet	✓						
Service Air dryer according to supplier instructions					✓		
Check Air Dryer condensate drain	✓						
Check Tower pressure	✓						
Check drain on all Filter		✓					
Replace all filter element					✓		
Check pressure in Air tank	✓						
Check pressure in Oxygen tank	✓						
Check Pressure safety valve					✓		
Calibrate all Pressure gauge					✓		
Calibrate Oxygen sensor						✓	
Check solenoid valves for corrosion			✓				
Check pipes / hoses				✓			
Replace desiccant							✓

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Whenever Required
Filters	Pre filter											
	Fine filter											
	Activated Carbon Filter											
	After filter											
	Bacterial filter											
PSA Oxygen Generator	Angle Valve Type 1											
	Angle Valve Type 2											
	Solenoid valve											
	Desiccant											
	Pressure Gauge											
	Oxygen Sensor											
	Pressure Transmitter											
	Pressure Regulator											
	Filter Regulator											

CERTIFICATE

ISO 13485 : 2016



Registration Certificate

This is to Certify That The Management Systems Of

NEOMETRIX ENGINEERING PRIVATE LIMITED

E-148 SECTOR-63 NOIDA UP-201301 (INDIA)

for their

QUALITY MANAGEMENT SYSTEMS - MEDICAL DEVICES

ISO 13485:2016

For the following scope

Design, Development, Manufacturing, Installation, Commissioning & Long Term On Site Support of PSA Technology Oxygen Generation Plants for Hospitals/ Medical Use [1 NM3/Hr to 500 NM3/Hr], Oxygen Gas Panels, Pipelines & Distribution Circuits for Hospitals, High Pressure Oxygen Boosting Systems (Up to 350 Bar), Design Development Manufacturing Maintenance Repair & Support of Onboard Oxygen Generation Systems (OBOGS), Oxygen Boosting Systems, Oxygen Charging Storage & Distribution Systems (UGSSO2), Oxygen Charging Hoses (up to 350 Bar WP), Oxygen Breathing Systems (Oxygen Pressure Regulators, Masks and Diving Equipments).

Certificate no.	:	EUAC/MD/10024-2021
Issued on	:	02/03/2021
Validity Date	:	01/03/2024
1 st Surveillance Due On	:	02/02/2022
2 nd Surveillance Due On	:	02/02/2023

THE VALIDITY OF CERTIFICATE IS SUBJECT TO REGULAR SURVEILLANCE AUDIT ON OR ABOVE MENTIONED DATES AND IT'S ONLY VALID AFTER SUCCESSFUL SURVEILLANCE WITH CONTINUATION LETTER ISSUED BY PCMS.

TO VERIFY THIS CERTIFICATE STATUS PLEASE VISIT ACCREDITATION BOARD WEBSITE www.europeanaccreditation.com



AUTHORISED BY
CHAIRMAN/DIRECTOR
P.C. MANAGEMENT SYSTEM PVT. LTD.





Ass No.: EUAC110





Address : Kemp House, 160 City Road,
London, EC1V2NX, United Kingdom
www.pcmsworld.com

The Certificate Remains The Property Of PCMS As Per Certificate Audit Contract

CERTIFICATE

Page 1 of 3

Company Certificate
एन एस आई सी
NSIC
ISO 9001 : 2015

Sr. No. **83573**

राष्ट्रीय लघु उद्योग निगम लिमिटेड
THE NATIONAL SMALL INDUSTRIES CORPORATION LIMITED
(A Government of India Enterprise)

S.No. NOI-000244

Branch Office : III-B/118, Sector-18, Noida-201301(UP)
Ph : 0120-4595000-45 Fax : 0120-4556453
Email : bonoida@nsic.co.in Website : www.nsic.co.in

GOVERNMENT PURCHASE ENLISTMENT CERTIFICATE

Renewal Certificate (Valid From 14/08/2019 to 13/08/2021)

Ref.No NSIC/NOIDA/GP/1076/09

Date: 08/08/2019

M/s. NEOMETRIX ENGINEERING PVT. LTD.
104, FF Plot No. 4, LSC, National Arcade, Ghaziipur
Main Road,
DELHI,
DELHI- 110096

Factory Address:
1 E-148, SECTOR-63
NOIDA, UTTAR PRADESH -201301

Name of the Directors
1. SH. SHAILENDRA PRATAP SINGH
2. SMT. PRIYANKA SINGH
Constitution of the firm- Private Limited

UAM up28b0007547 Enterprise Social Class:
GENERAL

GOVERNMENT PURCHASE REGISTRATION NO: NSIC/GP/NOI/2015/0015031
GOVERNMENT PURCHASE OLD REGISTRATION NO: NSIC/NOIDA.GP/RS/07/NN-049
Monetary Limit: ₹ 604 lakhs (₹ Six Hundred Four Lakh Only)
TURNOVER (Rupees in Lakhs)

Financial Year	Annual Turnover
2015-16	979.31
2016-17	1123.97
2017-18	1206.89
Monetary Limit	604

MSEs registered with NSIC are exempted from deposit of Earnest Money irrespective of value of Monetary Limit.

Your name has been registered as a MSE Unit eligible for participation in the Central Government Store Purchase Programme as per the Single Point Registration Scheme for the following Item(s)/Store (s)/Service(s).

Name of the Store(s)/ Service(s)	Specification(s)	Qualitative Capacity	Quantitative Capacity P.M.
"As per List Attached" (66 item only)			

M/s. NEOMETRIX ENGINEERING PVT. LTD.

"Authenticity of the certificate can be checked through the web portal: www.nsicsonline.com"

संजय यादव Sr. Branch Manager
 राष्ट्रीय लघु उद्योग निगम लिमिटेड
 The National Small Industries Corporation Limited
 III-B/118, Sector-18, Shree Complex, Noida

<http://www.nsicsonline.com/app/Administrator/RegistrationCertificatePageView.aspx?sd=...> 8/8/2019

CIN : U74140DL1955GOI002481

Conditions overleaf.

CERTIFICATE



Global
Assessment
"Let's Certify"

Certificate of Compliance

Issued to:

NEOMETRIX ENGINEERING PRIVATE LIMITED

Carried out at following site:

E-148 SECTOR-63 NOIDA UP-201301

for their:



Design, Development, Manufacturing, Installation, Commissioning & Long Term On Site Support of PSA Technology Oxygen Generation Plants for Hospitals/ Medical Use (1 NM³/Hr to 500 NM³/Hr), Oxygen Gas panels, Pipelines & Distribution Circuits for Hospitals, High Pressure Oxygen Boosting Systems (Up to 350 Bar), Design, Development, Manufacturing, Maintenance, Repair & Support of Onboard Oxygen Generation Systems (OBOGS), Oxygen Boosting Systems, Oxygen Charging Storage & Distribution Systems (UGSSO₂), Oxygen Charging Hoses (up to 350 Bar WP), Oxygen Breathing Systems (Oxygen Pressure Regulators, Masks and Diving Equipments).

Based on the voluntary assessment of the product sample and technical file, we confirm that the above mentioned product meets the requirements of EC MACHINERY DIRECTIVE – 2006/42/EC

Certificate no. : GA/CE/F1001
 Issued on : 05/01/2021
 Validity Date : 04/01/2024

1st Surveillance Due On : 05/12/2021
 2nd Surveillance Due On : 05/12/2022

.....

The validity of certificate is subject to regular surveillance audit on or before above mentioned dates and it's only valid after successful surveillance with continuation letter issued by GA.



EAS
All No. - 020AC108



MEMBER
GLOBAL
GCF
CONFORMITY FORUM



Authorized Signatory
Global Assessment



www.theglobalassessment.com

Registered Office - HU 1023 Budapest, Becsi ut 3-5. Hungry

The certificate remains the property of Global Assessment and shall be returned immediately upon request.

This is single site certification.

OXYGEN LAB REPORT



FARE LABS Private Limited
L-173, DLF Phase-II, IFFCO Chowk, M.G. Road,
Gurgaon-122002, Haryana, INDIA
Phone : +91-124-4223207, 4034205
Fax : +91-124-4036008, Cell : +91-95992 21227
E-mail : farelabs@farelabs.com
Website : www.farelabs.com

TEST REPORT

Issued to :
NEOMETRIX ENGINEERING Pvt. Ltd.
E 148, Sector-63, Noida-201301
Uttar Pradesh, India

J.O. No. : ENV20210907-001-002
ULR Code : TC5503 21 3 00005083 F
Report Date : 07-09-2021
Sample Receipt Date : 07-09-2021
Account Manager : Unnati Agrawal
Credit Manager : Gulab Singh

Sample Particulars:

Nature of the Sample : **Oxygen**
Date of Sampling : 05-09-2021
Test Started On : 07-09-2021
Test Completed On : 07-09-2021
Purpose of Monitoring : To Assess the Quality
Method of Sampling : FL/SOP/ENV-10
Place of Sampling : District Combined Hospital Shikohabad , FIROZABAD, Uttar Pradesh

**Observations:**

Description : Colourless, Odourless Gas

Analysis Report

S. No.	Parameters	Unit	Test Results	Specifications as per IP 2018 (Oxygen 93%)	Test Method
Chemical					
1	Assay (Oxygen Purity)	%	93.91	90-96 %	IP- 2018
2	Carbon Dioxide (as CO ₂)	ppm	86.14	NMT 300	IP- 2018
3	Carbon Monoxide	ppm	ND, [DL-1]	NMT 5	IP- 2018

ND= Not Detected; DL= Detection Limit; NMT= Not More Than

Inference: Tested sample of medical oxygen is conforming to IP 2018 Standard Quality and is fit for use for Medical Purposes wrt. to above test results.

Reviewed By
[Signature]

Authorised Signatory
D. Mathur, Director

NOTE: The laboratory accepts the responsibility for content of report. The results contained in this test report are related only to the sample tested. Test report shall not be reproduced except in full, without written approval of the laboratory. This report is intended only for your guidance and not for legal purpose or for advertisement. Samples will be destroyed after 15 days from the date of issue of test certificate unless otherwise specified. Any complaints about this report should be communicated in writing within 7 days of issue of this report. Total liability of FARELABS PVT. LTD. is limited to invoiced amount only.
If you have any complaint/feedback regarding the sample collection/testing/test report, please send an email at feedback@farelabs.com/ndc@l at +91 9599221227

ISO 9001:2015

ISO 14001:2015

OHSA 18001:2007

ISO / IEC 27001:2013

OXYGEN LAB REPORT



FARELABS

FOOD ANALYSIS & RESEARCH LABORATORY

TESTING, CALIBRATION, PROFICIENCY TESTING, R&D & TRAINING SERVICES

FARE LABS Private Limited
 L-173, DLF Phase-II, HFCC Chowk, M.G. Road,
 Gurgaon 122002, Haryana, INDIA
 Phone : +91-124-4223207, 4084205
 Fax : +91-124-4036038, Cell: +91-95992 21227
 E-mail : farelabs@farelabs.com
 Website : www.farelabs.com

TEST REPORT**Issued to :**

NEOMETRIX ENGINEERING Pvt. Ltd.
 E 14B, Sector-63, Noida-201301
 Uttar Pradesh, India

J.O. No. : ENV20210905-001-002
 ULR Code : TC5503 21 3 0006044 F
 Report Date : 06-09-2021
 Sample Receipt Date : 06-09-2021
 Account Manager : Unnati Agrawal
 Credit Manager : Gulab Singh

Sample Particulars:

Nature of the Sample : **Oxygen**
 Date of Sampling : 05-09-2021
 Test Started On : 06-09-2021
 Test Completed On : 06-09-2021
 Purpose of Monitoring : To Assess the Quality
 Method of Sampling : FL/SOP/ENV 10
 Place of Sampling : District: Women's Hospital Bareilly , BAREILLY, Uttar Pradesh

**Observations:**

Description : Colourless, Odourless Gas

Analysis Report

S. No.	Parameters	Unit	Test Results	Specifications as per IP 2018 (Oxygen 93%)	Test Method
Chemical					
1	Assay (Oxygen Purity)	%	95.14	90-96 %	IP- 2018
2	Carbon Dioxide (as CO ₂)	ppm	79.64	RMT 300	IP- 2018
3	Carbon Monoxide	ppm	ND, [DL 1]	NMT 5	IP- 2018

ND= Not Detected; DL= Detection Limit; NMT= Not More Than

Inference: Tested sample of medical oxygen is conforming to IP 2018 Standard Quality and is fit for use for Medical Purposes wrt. to above test results.

Reviewed By

Authorised Signatory
 D. Mittal, Director

NOTE: The laboratory accepts the responsibility for content of report. The results mentioned in this test report related only to the sample tested. Test report should not be reproduced except in full, without written approval of the laboratory. This report is intended only for your guidance and not for legal purpose or for advertisement. Samples will be destroyed within 15 days from the date of issue of test certificate unless otherwise specified. Any complaints about this report should be communicated in writing within 7 days of issue of this report. Total liability of FARELABS Pvt. Ltd. is limited to invoice amount only.
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ISO 9001:2015

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