

PSA technology  
**Oxygen Generators**



**CistrOx**  
series

**Medical Oxygen Generators for modern hospitals**

(Produce Oxygen On Demand)



High Pressure Cylinders

"Existing Source"



Liquid Oxygen Tank

# Pressure Swing Adsorption (PSA) technology

PSA technology is the most reliable source of producing medical oxygen for modern hospitals. The oxygen produced is 93% ( $\pm 3\%$ ) according to all pharmacopeia standards. The average cost of production is comparatively lower than buying of oxygen from 3<sup>rd</sup> party sources. Hence it is preferred and recommended also. Drugs & Cosmetics Act has also granted exemption from manufacturing license for oxygen generators, if the same is for own consumption. They are safe, reliable and used by hospitals in the world for more than 20 years.

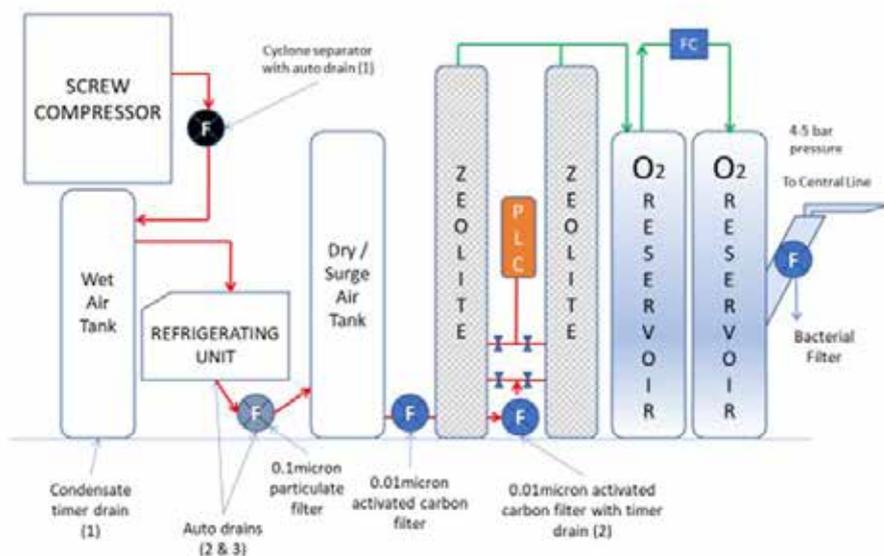
The latest World Health Organisation in their "Interim Guidance" released as on 4th April 2020 states "PSA oxygen plant as one of the oxygen sources and distribution for COVID 19 treatment centres". Hence, this technology reduces cost of production of oxygen and also is independent of outside sources, becoming an added advantage of "Oxygen Therapy" for pandemic & disaster management.

For hospitals following the guidelines of "Central Oxygen Pipeline Systems", the "The Health Technical Memorandum 02-01, also mentions about PSA oxygen generators, as another source for medical oxygen for hospitals.

ISO 7396-1:2016 Previews Medical gas pipeline systems:

- mentions oxygen 93 as one of the sources of medical gas pipeline systems
- It also mentions "supply systems in which all sources of supply deliver oxygen 93; In this case the concentration of the oxygen may vary between 90% and 96%
- A mixture of oxygen 93 and oxygen may be delivered by a medical supply system. In this case the concentration of the gas can vary between 90% and >99%

Schematic diagram of a typical Cistron installed "Oxygen Generator"



The PSA oxygen generator comprises of the following:

1. Twin tower PSA oxygen generator filled with molecular sieves (Zeolites)
2. Screw air compressor and Refrigerating Dryer
3. Wet & Dry air tanks
4. Dual oxygen surge tanks
5. Various stages filters
6. Fully automatic change over system
7. Optional high pressure oxygen compressor to fill cylinders

## HOW MUCH ECONOMICAL ?

"PSA oxygen generators are economical than oxygen transported in cylinders. The simple calculation is as below"

### OXYGEN IN CYLINDERS

e.g. 40 patients need medical oxygen in a relief camp. Average recommended dose is 5 litres per minute. Therefore they require 200 litres per minute, which works to 288000 litres a day. Each high pressure cylinder has a volume of 7100 litres of oxygen, which works out 41 cylinders a day, requirement. At Rs.200/- refilling cost per cylinder, the cost incurred is Rs. 8200/- a day (41x200). In other words, it is approx. Rs. 200/- per bed/patient.

(all calculations above are subject to cost of refilling cylinders as Rs.200/- per cylinder)

### OXYGEN FROM GENERATORS

If the same 40 patients require medical oxygen, from oxygen generators, what would be the comparison ?

Consider cost of electricity to be Rs.7/- per unit. The power required by CistrOx 200 oxygen generator, which produces 200 litres per minute of medical oxygen, is 15KW per hour. This amounts to (15 x 24) 360 units of electricity and will cost (360 x 7) Rs. 2520/-. The approximate maintenance cost (averaged to each day) works out to Rs. 1500/- Hence the total cost of oxygen will be (2520+1500) Rs. 4020/- a day. This works out to an average of Rs.100/- per bed/patient.

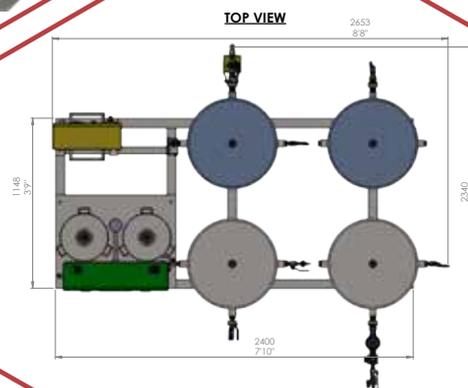
(all calculations above are subject to cost of electricity as Rs.7/- per unit)



NE ISOMETRIC VIEW



TOP VIEW





## CistrOx Plus

CistrOx Plus is a small capacity oxygen producing unit for very small hospitals. The oxygen produced is 22 litres per minute at 65 psi pressure, thereby enabling the oxygen to be connected to central oxygen pipeline system. The oxygen produced is 93% ( $\pm 3\%$ ) according to pharmacopeia standards.

CistrOx Plus also uses the principals of PSA technology. Raw material is atmospheric air. It has two molecular sieves tank for continuous production. Dual oil free air compressors are also used to 24x7 operation. There is online oxygen purity and pressure monitoring available. The refrigerating dryer ensures long life for the molecular sieves. The air tank and oxygen surge tank ensures constant pressure and purity of oxygen produced.

The fully automatic change over system ensures seamless connection to back up cylinders, in case of emergency. This is the unique feature of CistrOx Plus. Hospitals do not have to worry about any breakdown in the system.

CistrOx Plus occupies a small area for installation. The unit can be installed anywhere in the hospital, even on the terrace. Power requirement is 230V – 50/60Hz, 2.5KW.

# CistrOx series

## CistrOx 50

Flow rate – 50 litres per minute  
Air requirement 18 CFM  
Power 5KW air compressor  
Space required – 15ft x 15ft

## CistrOx 100

Flow rate – 100 litres per minute  
Air requirement 45 CFM  
Power 9KW air compressor  
Space required – 20ft x 20ft

## CistrOx 200

Flow rate – 200 litres per minute  
Air requirement 90 CFM  
Power 15KW air compressor  
Space required – 20ft x 20ft

## Unique Features

- Make in India
- High quality molecular sieves for oxygen separation
- Best air to oxygen production ratio
- Ergonomically designed for medical grade oxygen generation
- Complete digital system having 8 inch colour touch screen
- Dual PLC system for valve operations and digital monitoring respectively
- High durable solenoid valves for continuous operation
- Built with stainless steel fittings and fasteners
- Inbuilt ultrasonic purity analyser
- Inbuilt digital flow monitoring system
- Can be installed on the terrace also



## Technical Specifications

- Oxygen output pressure: 60 psi to 67 psi / 4 bar to 4.5 bar
- Output oxygen dew point: -50°C
- Ambient operational temperature: 5°C to 50°C
- Inbuilt 0.01 micron filtration system
- Dual 500 litres air tanks as wet and dry tank
- Moisture/water separator with drain
- Tropical and equatorial compatible refrigeration dryer with drain
- Low pressure, high flow prevention system
- Dual 0.01 micron oil separation filter with drains
- All fittings and joints are made of stainless steel
- High dew point cutoff to prevent entry of moisture

## AUTO CHANGE OVER SYSTEM

- "PP Admin" ensures constant pressure and purity in the hospital pipe line
- Three input and one output multistage controlled valve bench system, to ensure smooth change over between sources
- Dedicated electronic control panel for changing over between sources
- Dual oxygen tank for controlled flow and purity

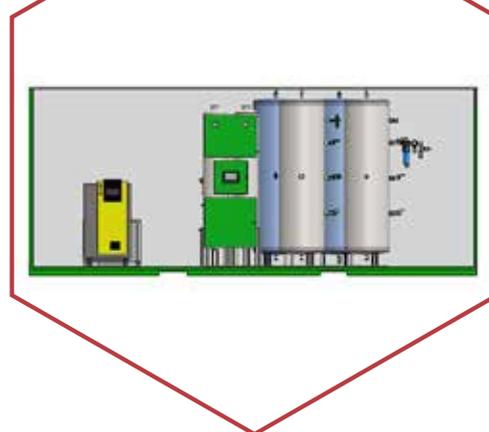


# Mobile Oxygen Generators

During pandemic or disaster management, medical oxygen is required at various locations in a very short notice. Oxygen generators are mounted on a container and deployed to different medical & relief camps. Continuous supply of oxygen can be provided to every bed. Logistics of refilling cylinders & liquid oxygen tanks can be avoided.

Alternatively with the help of "High Pressure Oxygen compressors" cylinders also can be refilled at 150 bar pressure. High pressure cylinders must be available at site, as standby, when the oxygen generators are shut down for servicing.

The investment on the "PSA Oxygen Generators" do not get wasted, once the pandemic is over. They are installed in any hospital, for their regular supply of medical oxygen, instead of cylinders or liquid oxygen.



Manufactured by

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