MEDICAL OXYGEN GENERATORS

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A Trusted name Since 1977

MAKE IN INDIA

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Since its inception in 1977, MVS Engineering has been at the forefront of technology and has supplied over 7000 air and gas equipment worldwide. We are a turnkey supplier of Air and Gas equipment and have been a market leader in developing and executing on-site systems for continuous uninterrupted supply of high purity gases and dry air.

Our products are offered in Technical collaborations with world leading companies such as CarboTech AC GmbH (Germany) **Stirling Cryogenics (Netherlands), Proton OnSite(USA), Air Liquide (USA),** and many others. Our customers benefit from world leading technology and also very attractive prices due to low cost manufacturing in India.

ADVANTAGES OF MVS MEDICAL OXYGEN GENERATORS

a) COST OF OXYGEN

Electric Power is the only requirement in these gas generators. Cost of Oxygen production is Rs. 10 to Rs. 12 per cubic meter whereas oxygen in cylinders or in bulk may cost around Rs. 25 per cubic meter. So you get great savings.

b) OXYGEN AVAILABILITY ROUND THE CLOCK

From Oxygen generator, you get Oxygen all 365-days. Whereas there may be interruptions in delivered Oxygen supply due to non-availability of cylinders in time or tanker shortages.

c) CONVENIENCE

No more problems of logistics or maintaining cylinders stock. You are never short of Oxygen from your own Oxygen generator.

OXYGEN PURITY

Our medical oxygen generators are manufactured in accordance with ASME Code & it meets Indian Pharmacopeia Oxygen 93% requirement.
It is Oxygen from Air by Molecular Sieve process. "Oxygen 93% " contains not less than 90% Oxygen & not more than 96%, remainder consisting mostly of Argon and Nitrogen and thousands of such installations have proven these are safe for medical use.

OXYGEN PRESSURE

These fully automatic units produce pure oxygen at 4.8 bar pressure and is collected in a storage tank and then used through a pressure regulator at 4 bar pressure and delivered through the hospital pipeline.

Pressure in Oxygen storage tank is continuously monitored and when the pressure falls below 3.5 bar, an alarm is sounded.

Drop in pressure also activates the reserve supply system to be activated through the switchover panel.


CERTIFICATE

TÜV NORD

Management system as per
ISO 9001 : 2008

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WORKS : B-232, Okhla Industrial Area,
Phase 1, New Delhi – 110 020,
India

Design, Development, Manufacturing and Supply of Nitrogen, Oxygen, Hydrogen and Other Industrial Gas Plants

Oxygen is produced Onsite, instantaneously from ambient air freely available

Onsite production means, no cylinder deliveries and no risk of Oxygen shortage

No manpower needed for handling cylinders, a major safety advantage

PHARMACOPEIA	OXYGEN PURITY REQUIREMENT
India – IP 2010	**Oxygen 93 per cent contains not less than 90.0 per cent and not more than 96.0 per cent** of oxygen, the remainder consisting mostly of argon and nitrogen. It is produced from air by the molecular sieve process.
USA –United States Pharmacopeia (USP) XXII oxygen 93% Monograph	USP requirements: **Oxygen 93 per cent USP –** Preserve in cylinders or in a low pressure collecting tank. Containers used for Oxygen 93 Percent must not be treated with any toxic, sleep-inducing, or narcosis-producing compounds, and must not be treated with any compound that will be irritating to the respiratory tract when the Oxygen 93 Percent is used. It is Oxygen produced from air by the molecular sieve process. Where it is piped directly from the collecting tank to the point of use, label each outlet "Oxygen 93 Percent.**" Contains not less than 90.0% and not more than 96.0%, by volume, of oxygen,** the remainder consisting mostly of argon and nitrogen. Meets the requirements for Identification, Odor, Carbon dioxide (not more than 0.03%), and Carbon monoxide (not more than 0.001%).
UK –HTM #02-01 Medical Gas Pipeline Systems	• Oxygen can also be supplied from an oxygen concentrator (pressure-swing adsorber). Such systems are usually installed where liquid or cylinders are expensive, unavailable or impracticable. • The PSA process has reached a high level of technical sophistication and is **capable of producing oxygen with a concentration of about 95%.** (For the UK the minimum level, below which the emergency/**reserve manifold will come into operation, is 94%.)**
ISO 10083 : 2006	• ISO 10083:2006 specifies requirements for the design and installation of an oxygen concentrator supply system for use with a medical gas pipeline distribution system that complies with ISO 7396-1. • The standard applies only to oxygen concentrator supply systems that produce oxygen-enriched air with an oxygen concentration not less than 90%.
Europe	• European Pharmacopoeia Supplement 7.1 • **Oxygen (93 per cent) 7.1-3445**
Sweden –Svensk läkemedelsstandard 2012.2	• **90.0 per cent to 96.0 per cent of oxygen,** the remainder mainly consisting of argon and nitrogen. • Oxygen (93 per cent) is produced in single-stage concentrators by adsorption purification of ambient air using zeolites.

Traditionally Oxygen in Medical field has been used from cylinders or from liquid tank. However, since 1970, PSA Oxygen generators have come in use for Medical Oxygen gas. These greatly reduce capital cost and offer mobility for requirement of hospitals & health care sector.

Because Oxygen has traditionally been delivered from Cryogenic sources, the medical Oxygen specified that purity had to be greater than 99%. However, extensive clinical trials led to conclusion that 93 ± 3% Oxygen from PSA Oxygen generator presented no physiological effect on patients and therefore, now Oxygen generated by PSA generators is acceptable for use and is recognized and permitted by USA, European and Indian Pharmacopeia.

Over the years, the intent of Hospitals worldwide for onsite oxygen generation has been growing and hospitals have already implemented the change to produce their own medical Oxygen Onsite. The Medical Oxygen generator comes with Oxygen purity monitoring device which ensures Oxygen produced is within the acceptable purity limits. With such device, if gas purity goes below 90%, the Gas generator stops and system automatically switches to backup oxygen supply.

PSA PRINCIPLE

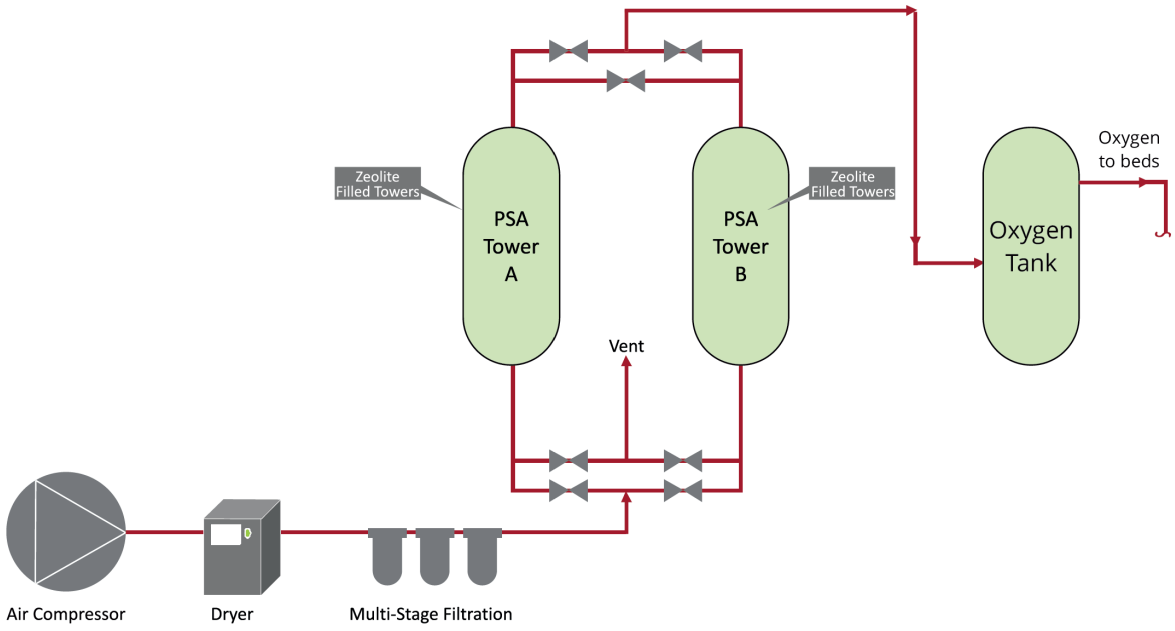
PSA (Pressure Swing Adsorption) is an economical alternative for Onsite production of Oxygen for Medical use and is in use for over 30 years in the medical industry.

Ambient air entering the compressors is 78% nitrogen, 21% oxygen, less than 1% argon and other gases. As nitrogen is separated, the resulting product gas is up to 95.5% oxygen purity.

PSA process comprises of Zeolite filled towers and is based on the fact that different gases have the property to be attracted to different solid surfaces more or less strongly. This happens with nitrogen, which is attracted to the zeolites. As the air is compressed, the nitrogen is forced into the crystalline cages of the zeolite, and the oxygen is less adsorbed and conveyed to the end of the zeolite bed and ultimately recovered in the oxygen buffer tank.

Two zeolite beds are used together: One filters air under pressure until it gets saturated with nitrogen while oxygen passes through. The second filter begins to do the same while the first one is regenerated as nitrogen is expulsed (desorbed) by releasing the pressure. The process repeats again, storing the oxygen in a tank.

PSA PROCESS FLOW DIAGRAM



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MODELS

MVS OXYGEN GENERATOR MODEL	Oxygen Generator Production Capacity			Number of BEDS Oxygen plant can cater to when consuming at the rate in LPM below			
	Nm3/hr	Liter/min	Equivalent cylinders per day	3 LPM	5 LPM	10 LPM	15 LPM
OXYMED - 5	5	83	17	28	17	8	6
OXYMED - 7.5	7.5	125	25	42	25	13	8
OXYMED - 10	10	167	34	56	33	17	11
OXYMED - 15	15	250	51	83	50	25	17
OXYMED - 20	20	333	69	111	67	33	22
OXYMED - 30	30	500	103	167	100	50	33
OXYMED - 40	40	667	137	222	133	67	44
OXYMED - 50	50	833	171	278	167	83	56
OXYMED - 60	60	1000	206	333	200	100	67
OXYMED - 75	75	1250	257	417	250	125	83
OXYMED - 80	80	1333	274	444	267	133	89
OXYMED - 100	100	1667	343	556	333	167	111

OXYGEN PLANT-ESSENTIAL BLOCKS

The Oxygen system consists of the following:

- Screw type Air Compressor with Refrigeration Dryer
- Multistage Coalescing type Oil filters to purify Air, Oil content below 0.001 ppm
- Air Receiver
- Oxygen Generator with PLC Control & Oxygen Analyzer
- Oxygen Buffer Tank
- Micro & Bacterial filtration unit

PIPELINE SYSTEM

If Oxygen is supplied through a pipeline distribution system, Oxygen generator can be connected directly to the pipeline through Oxygen Buffer tank. The Pipeline system is connected in parallel to reserve Oxygen cylinders to maintain Oxygen supply in the event of Oxygen supply pressure falling below 3.5 Barg or drop in oxygen purity

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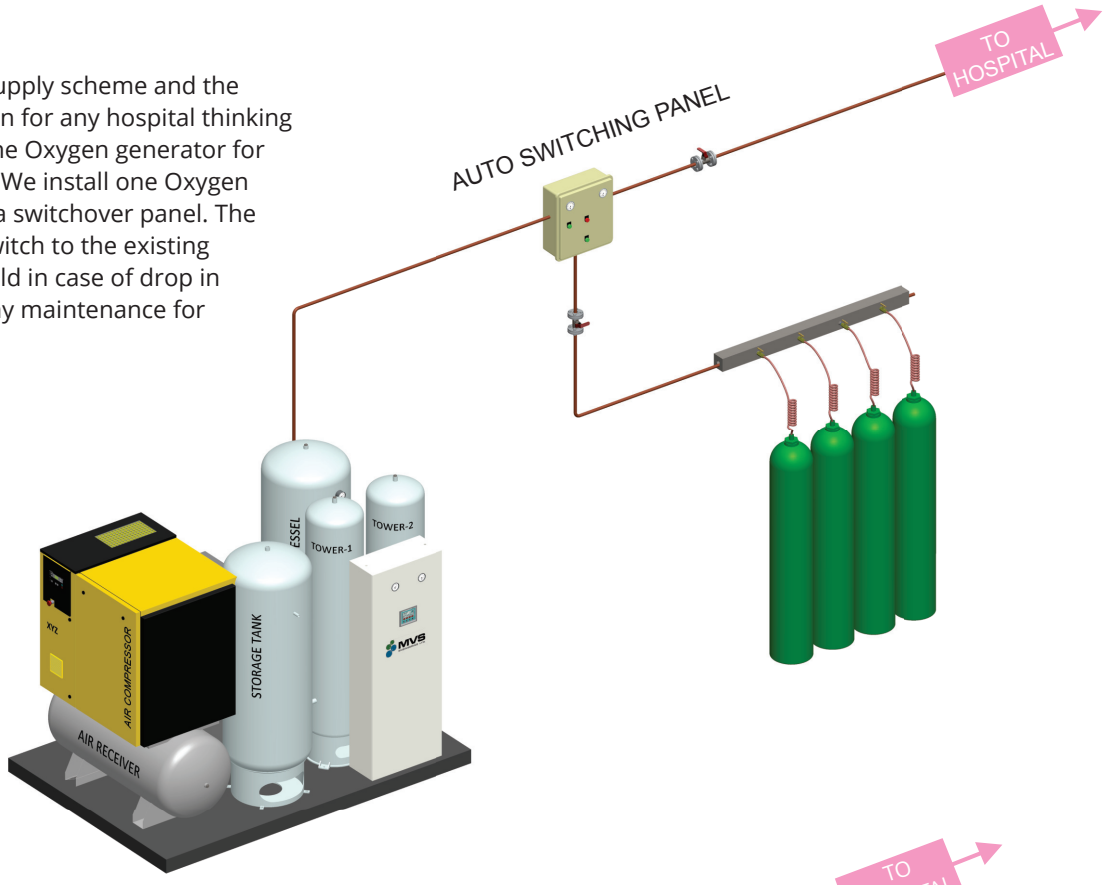
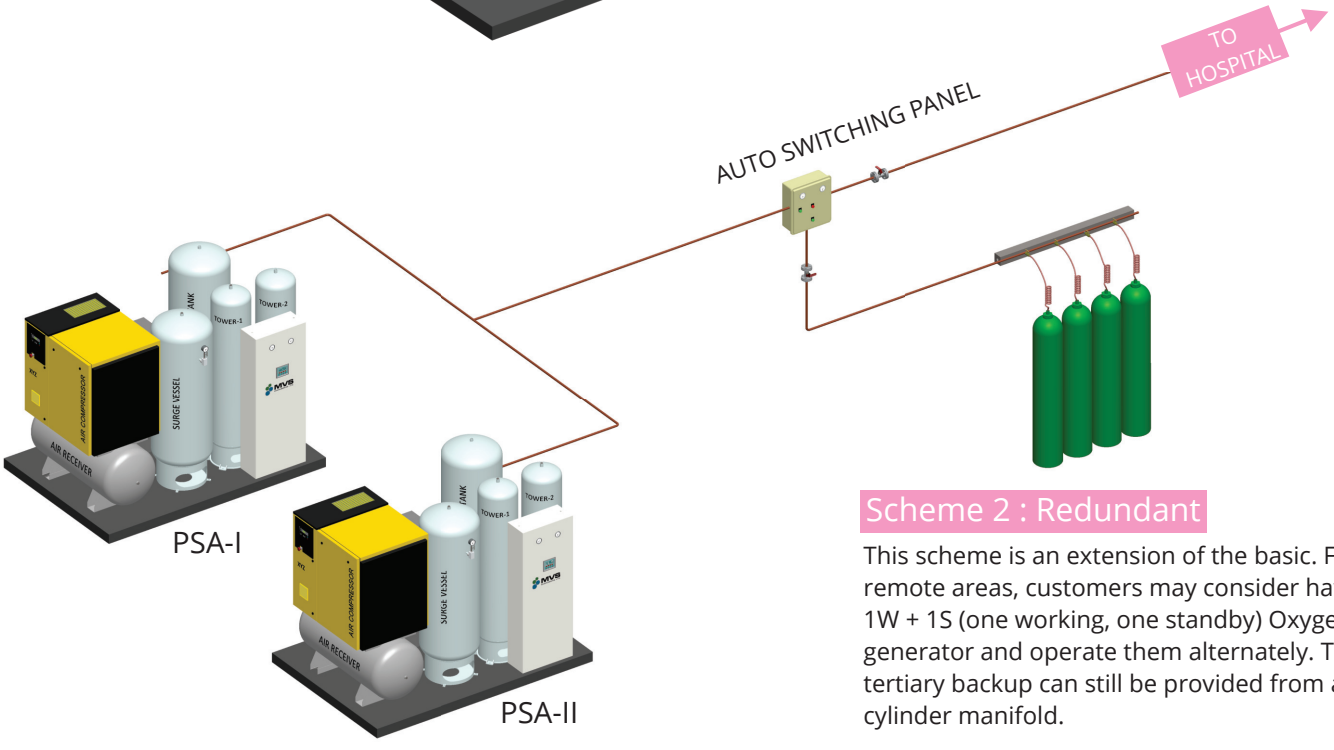
SUPPLY SCHEMES

Scheme 1 : Basic

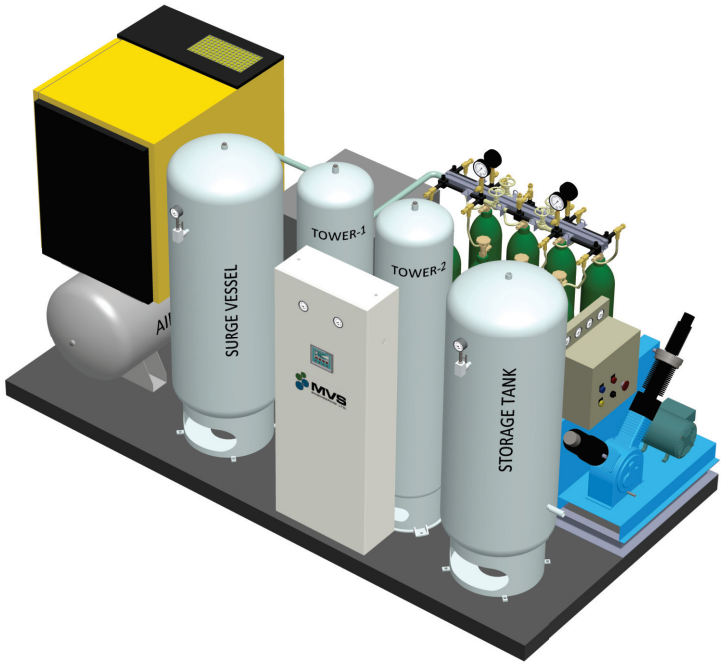
This is the most basic supply scheme and the simplest implementation for any hospital thinking about installing an online Oxygen generator for noninterrupted supply. We install one Oxygen generator and provide a switchover panel. The switchover panel will switch to the existing Oxygen cylinder manifold in case of drop in purity or pressure or any maintenance for the Oxygen generator.





Scheme 2 : Redundant

This scheme is an extension of the basic. For remote areas, customers may consider having a 1W + 1S (one working, one standby) Oxygen generator and operate them alternately. The tertiary backup can still be provided from a cylinder manifold.



Scheme 3 : Cylinder Filling

In this scheme, customer can consider filling their own backup cylinders and thereby eliminating the need to procure cylinders from the market.

Other Schemes

We can prepare any other scheme as suitable for customer needs with our broad range of engineering solutions

SAFETY INTERLOCKS

OXYGEN PURITY

The generator is equipped with Online Digital Analyzer to measure Oxygen purity before it goes to Buffer tank. If purity falls below set points, the Oxygen supply to storage tank stops & alarm signal is displayed to indicate generator malfunction.

Drop in purity also signals for the gas supply to be diverted to the backup Oxygen supply. This is done automatically by the switchover panel. It closes Auto-shut-off valve in Oxygen supply line & actuates reserve cylinder Oxygen supply valve to maintain continuous Oxygen supply.

PRESSURE

Pressure in Oxygen Buffer tank is continuously monitored by Pressure Transmitter. Whenever Oxygen Buffer vessel pressure falls below 3.5 Bar, an alarm is sounded.

Drop in buffer vessel pressure also activates the reserve supply system to be activated automatically through the switchover panel.

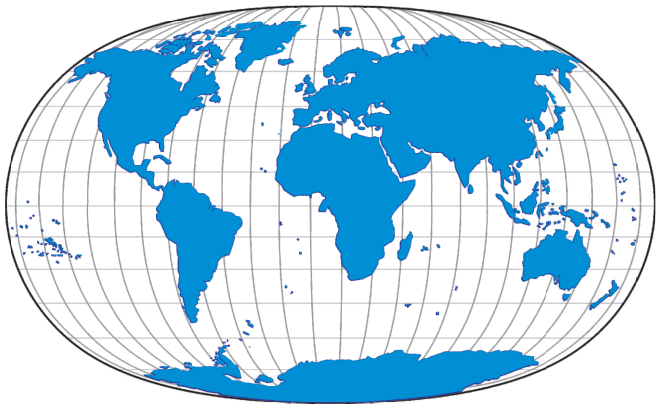
BACKUP MODULE

In most hospital applications, Oxygen is consumed at 4-Barg pressure & this pressure is directly produced from our Onsite Oxygen generators. For back-up of Oxygen, either market Oxygen cylinders can be connected or, alternatively, we supply Cylinders filling system which fills Oxygen cylinders up to 150-Bar pressure & these Oxygen cylinders are used as back-up cylinders. Also, for remote locations use, these filled Oxygen cylinders can be used.

No Handling
of Oxygen Cylinders

Safe Delivery
of Gas.

Economical & Decrease
in Oxygen Cost



Eliminate the expense
of purchasing, receiving and
oxygen supply

WHY CHOOSE
ONSITE GAS GENERATOR ?

Oxygen Available
Round the Clock in-house

Low
Maintenance

Easy
to use

LOWER OPERATING COST

Eliminate expense of purchasing, receiving & monitoring your hospitals Oxygen supply. Oxygen generating system produces oxygen in-house at very low cost. Our equipment is fully automatic, easy to maintain & produces Medical Oxygen round the clock. **It can result up to 50% reduction in your Oxygen cost.** Most Oxygen generators pay back their cost in less than 1-year time.

TECHNICAL SUPPORT

To assist customers in maintaining their medical oxygen plants in excellent operating condition, MVS offers service contracts. Under these contracts MVS technical specialists perform maintenance as well as corrective service if needed. Maintenance requirement is minimal and regular preventive maintenance is only regular change of filters.

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