

02



AIR



PSA OXYGEN  
GENERATING  
SYSTEMS



## About Us

- Founded 25 years ago • Introduced central medical gas systems & emergency equipment solutions to the worldwide market • Manufacturer & distributor of medical equipment • R&D capability and OEM contractor • focussed on hospitals

MED Birlesim is a manufacturer of on site oxygen, nitrogen and breathable medical air generation systems.

MED Birlesim is a company with dynamic, innovative, reliable, technological and high quality service understanding and operating in sub-groups according to the commercial laws of the countries.

Our team of highly skilled professionals with the appropriate nitrogen or oxygen generators to our clients develop, design and produce a solution by taking into account all the special needs that are required to we're here.

Completed more than 50,000 beds, in 96 Turkish and 37 intl. hospital references. O2 Generator products sold through well known partners. There are many projects completed with products.

MED Birlesim's team has been working with domestic and international companies having the internaonal quality standards.



### - Ankara-TURKEY Manufacturing

- 2.200 m<sup>2</sup> total area
- 1500 m<sup>2</sup> Closed Area for Manufacturing
- 400 m<sup>2</sup> Closed Area for Manufacturing
- 300 m<sup>2</sup> Open Areas for Storage & Delivery & Loading
- More than 20 workers

### Istanbul -TURKEY Office

- 150 m<sup>2</sup> total area
- 50 m<sup>2</sup> Closed Area for
- More than 12 Officers

## How It Works ?

MED Oxygen Generator, prepared with the experience of Med Birlesim engineers, works on the principle of Pressure Swing Adsorption, commonly called PSA. This conventional gas separation technology is used to separate oxygen from compressed air. Main components include adsorbent containers, balancing tank, switching valves, PLC, oxygen analyzer. The adsorbent container filled with zeolite preferably adsorbs Nitrogen and CO<sub>2</sub>; here oxygen is not adsorbed by the Zeolite due to its larger molecular size and passes through the absorber into the feed containers. Based on the prescribed time interval, the online adsorber goes into regeneration mode and the adsorbed gas from the Zeolite is expelled into the atmosphere. During this process, the oxygen analyzer monitors the oxygen concentration and allows the oxygen gas to be stored. If the oxygen concentration is lower than the preset value, the PLC changes the aeration value and clears the gas until it reaches the required purity level.

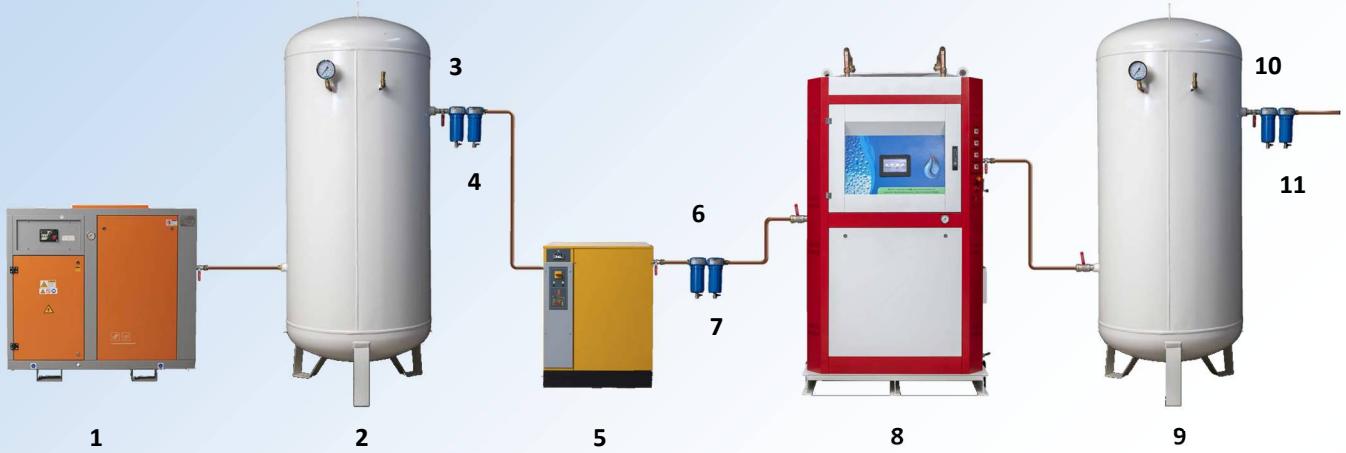


## Working Technology

Med Birlesim has a specialized technology in adsorption container design. Specially produced sieve adsorbents are crystalline Aumino Silicates known as Zeolite. PSA is highly resistant to long-term use. The excellent automatic regeneration properties of the screens ensure high quality oxygen production.

All pipes of our oxygen generators are made of selective materials such as oil-free me-

rical device copper tubing to ASTM B819 / BSEN 13348. All components and parts that come into contact with oxygen are highly clean in accordance with NFPA99 / HTM02-01. Oxygen generators should be operated in a completely clean and heated environment. MED series generators can operate between 5 and 45 ° C (41 to 113 ° F) but provide the best performance between 20 and 35 ° C (68-95 ° F). The installation is very easy for the user according to the “Plug and Play” principle. The most important factor affecting the performance of O<sub>2</sub> generators is clean and dry air.



1. Compressor
2. Air Tank
3. Water Separator
4. Compressed Air Filter (Pre-Filtering)
5. Air Dryer
6. Compressed Air Filter (General Purpose Protection)
7. Compressed Air Filter (Oil Retaining Filter)
8. Oxygen Generator
9. Oxygen Tank
10. Compressed Air Filter (Solid Particle Filtering)
11. Active Carbon Filter



**Stage 1:** The compressor absorbs and compresses the ambient air. Compressed air from 5 to 7.5 bar is required to produce oxygen. Compressed air from 6 to 10 bar is required to produce nitrogen. The air occupying 8 m<sup>3</sup> volume at 1 atm pressure occupies 1 m<sup>3</sup> volume at 8 atm pressure.

**Stage 2:** An Air Storage Tank is used immediately after the compressor. In this tank, pressurized air in enough volume capacity is stored. This stored air is called Generator Supply Air. Also, an Automatic drain valve is installed at the bottom side of this tank for evacuation the water occurred by condensate air.

**Stage 3:** The air leaving the air storage tank is filtered by a water separator and a Compressed Air Filter.

**Stage 4:** The air passing through the filter enters the Air Dryer to be dehumidified. The dew point of the air leaving the dryer reaches +3 C or -40 C / -70 C according to the characteristics of the air dryer used. To put it more simply, the moisture in the compressed air is removed by the air dryer.

**Stage 5:** The air leaving the dryer is filtered again by General Purpose and Oil Retaining Filters. Before entering the Oxygen Generator, particles in the supply air are removed.

**Stage 6:** Oxygen / Nitrogen Generator is used after the filters. Compressed air is separated by passing through the generator at this stage.

**Stage 7:** Gas decomposed at the Oxygen / Nitrogen Generator output; O<sub>2</sub> gas is sent from line to the Gas Storage Tank

**Stage 8:** The O<sub>2</sub> gas leaving the O<sub>2</sub> storage tank is filtered again. Before entering the Hospital Regulator Feeding Line, particles in output line cleaned by a Solid Particle Filter and Active Carbon Filter.



Compressor

The compressor is the component that collects the air needed by the Medical Oxygen Production, Storage and Control System into the system.

Air Dryer

Air dryers are used in the system to separate the water vapor in the air. The related DEW points are 3°C for Refrigerant Dryer or -40°C for Desiccant Dryer.



Filter sets

They are components used to filter particles and oil vapor in the air. They are effective in holding dust and oil. Active Carbon Filter used to filter odor and oil. Water Separators are used to separate condensed liquid water and residues in compressed air and gases.

Air Tank

It is a pressurized vessel in which the air that has passed through the dryer and filters is accumulated (at 10 bar pressure) before being sent to the oxygen generator. These tanks are resistant up to 16 bar pressure.



PLC Screen

It is the section that allows the user to communicate with the device.

Electrical Connections

Oxygen Analyzer: It is the component that is used to measure the oxygen concentration in the medical gas and transfers this measurement value to the PLC system.



Closed Metal Box

In order to protect all internal pre-arranged equipment of O2 generator against external environmental conditions and unexpected interventions by unauthorized persons, a locked closed front metal case is used.

## External Factors

- Ambient temperature
- Compressor Pressure
- Purity Value
- Compressed Air Quality
- Filter Pollution Rate
- User Consumption Amount.

- Tank Volume Optimization**

**•Compressed Air Quality:** In cases where the supply air humidity is greater than +3 oC and the amount of oil vapor and particles is high, the zeolite / carbon molecular sieve in the molecular sieve tank of the oxygen / nitrogen generators is damaged. In such cases, the system should be stopped and the source of the problem should be investigated.



**•Filter Pollution Rate:** The internal elements of the filters in the supply air line must be replaced at certain times. If the changeover times of the filter internal elements are delayed, the filter permeability will decrease and the amount of air that must pass through the generator will be reduced. In such a case, purity and production capacity will decrease together.

**•User Consumption Amount:** If the consumption amount is higher than the production capacity of the system, the pressure balance of the system is disrupted and the purity of the produced gas decreases. It is recommended to use the Product Gas Storage Tank in order to prevent the system's high pressure consumption from breaking.

**•Tank Volume:** Optimization The supply air of the oxygen / nitrogen generator needs to be accumulated in a particular air storage tank. In case of insufficient volume of the air storage tank, the pressure of the air tank will decrease to 0 bar as the generator passes to the suction cycle. When it falls below a certain pressure value, the produced gas purity and capacity will decrease together as the pressure balance of the system will be disturbed.

### MED BIRLESIM VS INTERNATIONAL EQUIPMENTS

Parameters		ISO 7396-1	United states USP XXII Oxygen 93%	European Pharmacopeia Oxygen 93%	MED Birlesim
Oxygen	O2	>90 %	90%-96%	90%-96%	90%-96%
CarbonMonoxide	CO	<5 PPM	<0.001 %	<5 ppm	<5 ppm
CarbonDioxide	CO2	<300 PPM	<0.03 %	<300 ppm	<150 ppm
SulfureDioxide	SO2			<1 ppm	<0.2 ppm (1)
NitrogenOxide	NOX			<2 ppm	<1 ppm (2)
Water	H2O	<67 PPM		<67 ppm	<3 ppm
Oil		<0.1 MG/ m3	<0.1 mg/m3	<0.1 mg/m3	<0.003 mg/m3

Feed Air Pressure:	5,0 bar(g)
Ambient Temperature:	20 °C
Purity:	95 %
Capacity:	10,4 Nm <sup>3</sup> /h
Outlet Pressure:	3,4 bar(g)

Feed Air Pressure:	6,0 bar(g)
Ambient Temperature:	20 °C
Purity:	95 %
Capacity:	11,6 Nm <sup>3</sup> /h
Outlet Pressure:	4,4 bar(g)

Feed Air Pressure:	7,5 bar(g)
Ambient Temperature:	20 °C
Purity:	95 %
Capacity:	12,5 Nm <sup>3</sup> /h
Outlet Pressure:	5,9 bar(g)

**Oxygen Generator  
Compressor Pressure - Output Capacity - Output Pressure Graph**





### Special Request:

Upon the Client requests,

The following solutions are provided together with MED O2 Generating systems

**- Cylinder Filling Systems:** An Oil-Free Booster Compressor ( 4 Bar input—150 Bar Output ) and Cylinder Manifolds together with Cylinders Racks, Ramps and Copper Flexible Connections

**- Containerized Systems:** 20'DC or 40'DC Container with Air Conditioning System, Air Ducts for Compressor, Fresh Air Inlets, Electrical Feeding Panel Board, Diesel Power Generator, Trailers etc..

### Safe Packaging

The safe delivery of our products is as much important as our customers' health.





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**MED Birlesim Medikal Sanayi Ticaret Limited Sirketi**

Office: Perpa Is Merkezi B. Blok Kat:5 No:130 Okmeydanı İstanbul Turkey

T: 00 90 212 2202122 / 00 90 532 6569779

[info@medbirlesim.com](mailto:info@medbirlesim.com) [www.medbirlesim.com](http://www.medbirlesim.com)