



**NITROGEN GENERATORS**

## PSA NITROGEN GENERATORS

ÖZAK PSA type nitrogen generator is the fruit of a 2-year extensive research and development work and operates on the proven PSA (Pressure Swing Adsorption) technique which can produce up to 99,999% pure nitrogen economically. It is designed for maximum performance and reliability and is tested extensively in actual industrial operating conditions for perfection. Consequently its operating cost is very low. It is built with highest quality components available in the market and is virtually maintenance-free.

**ÖZAK PSA type nitrogen generators have several unique features described below which provide great benefit to the users:**

FEATURES	BENEFITS
Proprietary design	High efficiency (high nitrogen to air ratio), which means low nitrogen cost
Simple operator interface	Easy to use
Optimum instrumentation	No unnecessary electronics that complicate to use and maintain
High quality robust components	Years of uninterrupted service with very few service calls

**We have different series for different applications as follows:**

### Standard Series:

Designed for nitrogen demand of 4 Nm<sup>3</sup>/h and more

### Mini Series:

Designed for nitrogen demand of 0,25 - 2 Nm<sup>3</sup>/h. It is small, light weight and portable but has all features of Standard Series.

We also have HP (High Purity) version of these two series for applications which demand higher purities (99,99% - 99,999%).

### LAB Series:

This is basically Mini series complete with all necessary equipment and accessories such as air compressor, air dryer etc. mounted on a skid with wheels. It is small, lightweight, silent and easily transportable. It is very popular series.

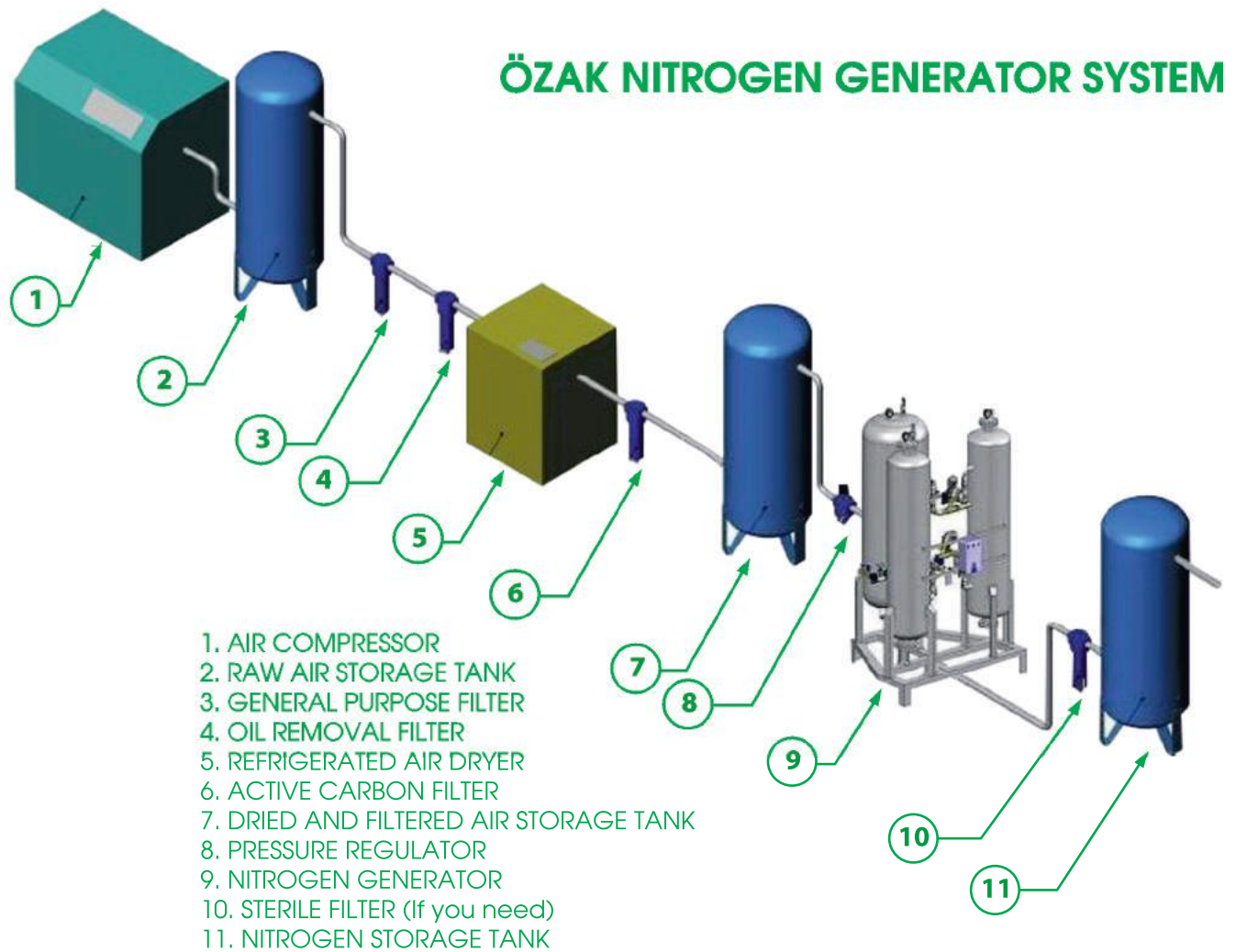


## NITROGEN GENERATOR SELECTION:

ÖZAK PSA type nitrogen generator produces nitrogen from compressed air. Nitrogen molecules, which constitute 78% of air, are separated from oxygen and argon molecules by a material called carbon molecular sieve (CMS).

The same nitrogen generator can produce nitrogen at various purities but its production capacity and efficiency (nitrogen/air ratio) is inversely proportional to purity, ie as purity goes up, production capacity goes down and specific air consumption goes up. For this reason it is very important to correctly determine the purity you really need as this will effect your investment and operating cost directly. For example, 98% - 99% purity is sufficient for tank blanketing while nuts packaging necessitates 99,5% - 99,9% and laser cutting 99,9% - 99,99%. If you ask for a purity higher than what you really need, you will get a bigger generator with higher cost and nitrogen it produces will cost more since it will use more air.

**A typical nitrogen production system comprises some auxiliary equipment and accessories as shown below:**



We can supply only the generator or complete system depending on your preference.

We will be happy to provide technical support in selection of the generator and complementary equipment.

## OPERATING PRINCIPLE OF ÖZAK NITROGEN GENERATOR

ÖZAK Nitrogen Generator operates on the proven PSA (Pressure Swing Adsorption) technique. In this technique nitrogen production is realized basically in two adsorption tanks. These tanks are filled with carbon granules called CMS (Carbon Molecular Sieve). CMS separates nitrogen from air with the help of difference in sizes of oxygen and nitrogen molecules. It has microscopic pores on its surface which are large enough to hold oxygen molecules but small enough not to hold nitrogen molecules. When compressed air gets in contact with CMS, oxygen molecules are absorbed (hold) by CMS and nitrogen molecules stay free.

Dried and filtered compressed air is introduced into one of these tanks from bottom. During its travel upwards, oxygen molecules are hold by CMS and nitrogen molecules reach the top. This pure nitrogen is taken out from top of the tank and sent either into a storage tank or directly to the process. At the same time, other tank is blown into the atmosphere from bottom and purged with a small portion of the nitrogen produced in the first tank so that its CMS is regenerated and ready to hold oxygen again (Fig.1)

After some time CMS in the first tank becomes saturated with oxygen and CMS in the other tank becomes completely regenerated. (Fig.2)

This time compressed air is fed into the second tank and first tank is blown into atmosphere for regeneration. (Fig. 3)

These steps are repeated continuously so that a continuous production of nitrogen is obtained.

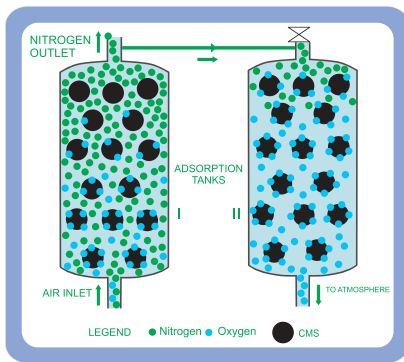


Figure 1

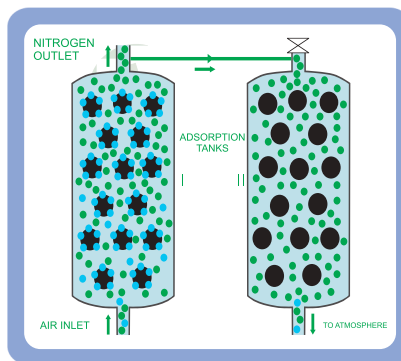


Figure 2

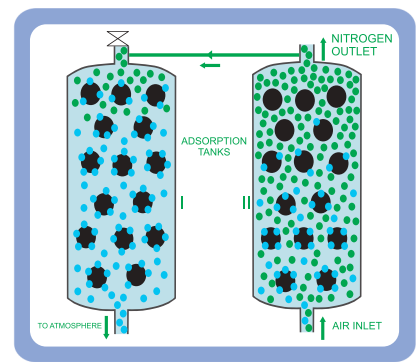


Figure 3

### Technical Data

<b>Air separation principle</b>	: Pressure Swing Adsorption
<b>Nitrogen supply pressure</b>	: About 1,5 bar less than air supply pressure (Maximum 7 bar)
<b>Power requirement</b>	: 220 VAC (Other voltages optional)
<b>Power consumption</b>	: Negligible (less than 300W)
<b>Operating environment</b>	: Should be installed in a covered and well ventilated area
<b>Operating temperature</b>	: +5/+40°C

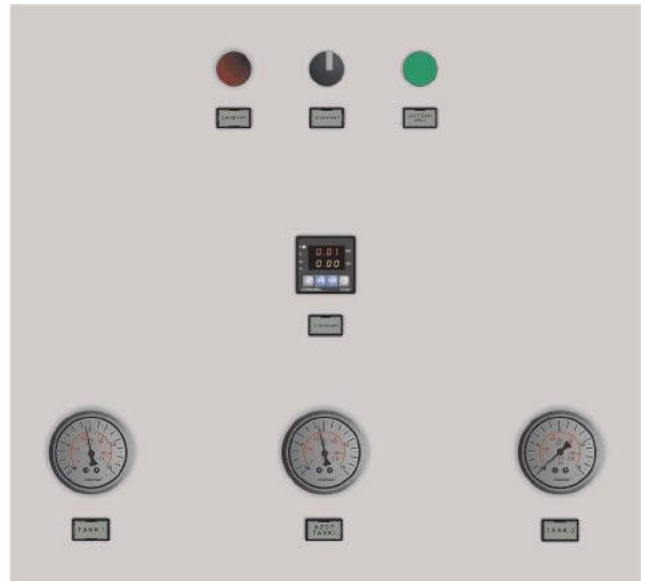
### Feed Air Requirement

<b>Minimum pressure</b>	: 8,5 bar (It can work at pressures down to 6,5 bar but with lower capacity)
<b>Temperature</b>	: Maximum 30°C
<b>Oil</b>	: $\leq 0,003 \text{ mg/m}^3$
<b>Particulate</b>	: $\leq 0,01 \text{ micron}$
<b>Dew point</b>	: $\leq 3^\circ\text{C}$



## Standard Instrumentation

- Oxygen content is continuously measured and displayed.
- If oxygen content is higher than a user programmable preset value, then generated nitrogen is diverted to waste so that the product does not get contaminated.
- Stops automatically when the nitrogen storage tank pressure rises to a preset value. Shall start automatically when the pressure drops. This pressure set value can be adjusted by the user.
- Nitrogen purity can be adjusted manually by the user.
- Displays warning message for changing the element of the activated carbon filter.
- **Displays:**
  - Percent oxygen
  - Operating hours
  - On/Off indicator



## Optional Instrumentation and accessories

Any other features and components which can be done technically are possible (eg touchpad operator panel, remote access and diagnostic, recording of measured parameters, automatic purity adjustment and control). Please advise us of your extra requirements.

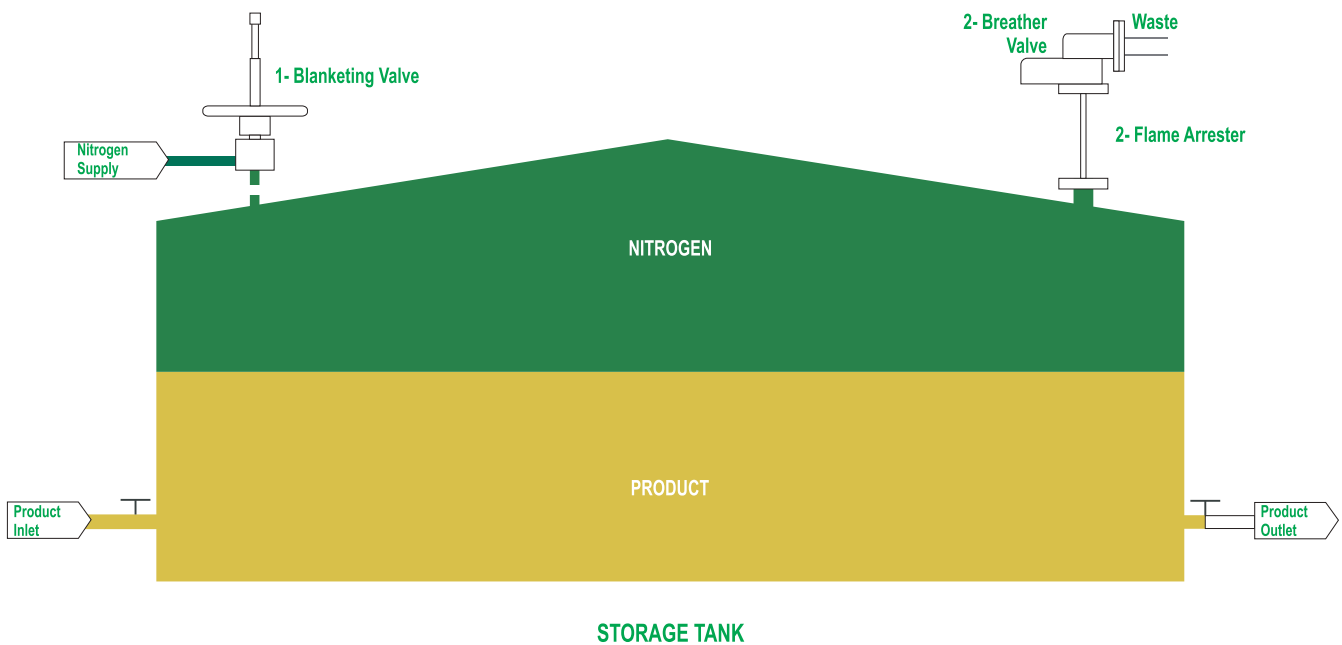


## NITROGEN BLANKETING SYSTEMS

In cases where the liquid stored in tanks is desired not to contact with the oxygen and humidity in the air, the space above the liquid is filled with an inert gas, usually nitrogen. This is called blanketing.

Tanks where blanketing is applied are atmospheric or low pressure tanks; nitrogen pressure must be controlled precisely in order to minimize product loss and nitrogen consumption and also to protect the tank against excessive high and low pressures. This demands precise equipment.

### A TYPICAL NITROGEN BLANKETING SYSTEM:



#### 1. Blanketing Valve (Regulator):

Reduces the pressure of the nitrogen coming from the nitrogen supply (generator, cylinder, liquid nitrogen tank etc.) to a very low value, which is in the order of millibars. When the blanket pressure drops below the set value (due to emptying the tank, cooling etc.), feeds nitrogen into the tank to restore the pressure.

#### 2. Breather (Pressure/Vacuum) Valve:

Protects the tank against excessive high and low pressures. When, for some reason, the blanket pressure rises above the set value (filling the tank, heating etc), the pressure pallet opens to relieve the excess pressure.

#### 3. Flame Arrester:

This equipment is used if the liquid in the tank is flammable. It is installed between the tank and the breather valve and prevents flames enter the tank in case of fire.

Other equipment may be used also depending on the application.

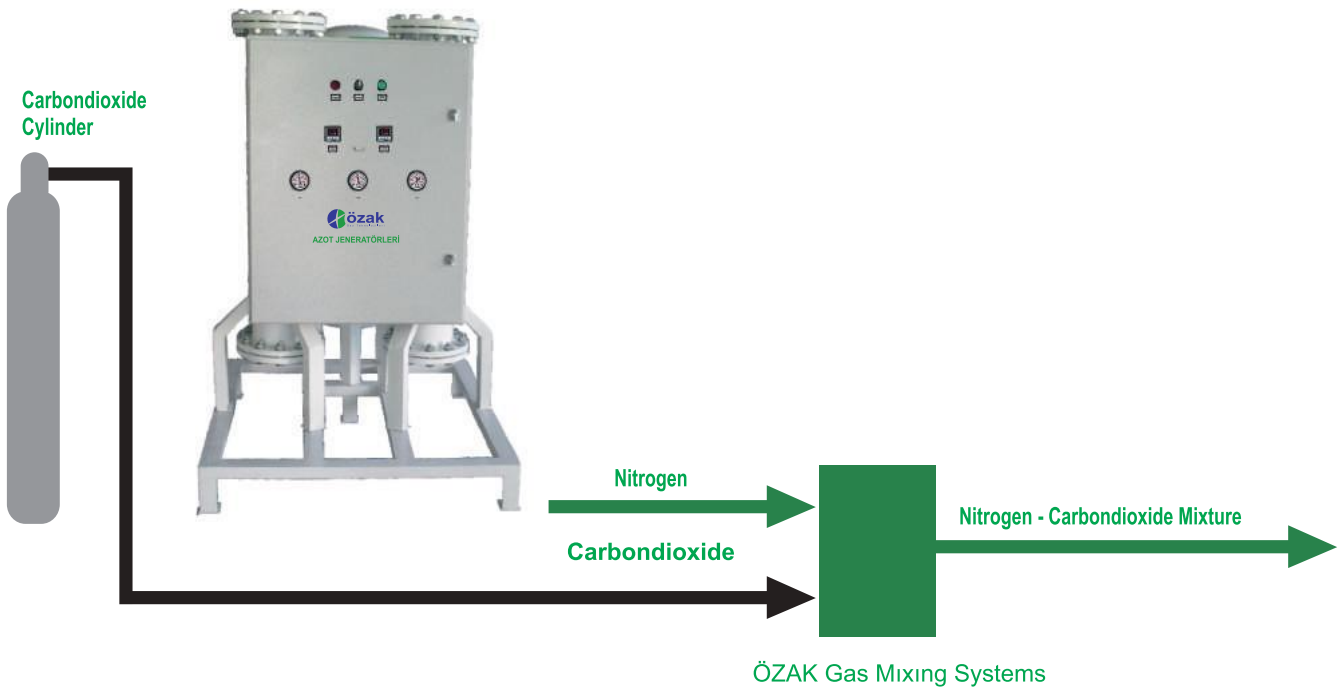
We provide for all phases of a blanketing system installation such as design, equipment selection and supply and implementation.

In our blanketing systems, we use the best quality equipment available in the world.

## GAS MIXING SYSTEMS

If you use nitrogen - carbon dioxide mixture, we have a very economical solution for you, which is:

- You can produce the nitrogen you need with an Özak Nitrogen Generator,
- Carbon dioxide is a low cost gas which can be found easily almost everywhere. You can obtain it from your local gas supplier,
- You mix the two gases with an Özak Gas Mixture System at any proportion you need.





## ABOUT US

ÖZAK Gas Technologies was established in 1993 to meet gas demand of industrial and medical enterprises and individuals safely, in compliance with the relevant standards and with optimum prices. Our company, which progressed continuously since the first day of its establishment thanks to its customer oriented, innovative and quality-wise non-compromising activities, always targeted to be “the best” and succeeded in this to a great extent.

Our philosophy of continuous progress has transformed us to a technological company expert on on-site gas production and we are proud of this.

In this context, we developed ÖZAK Nitrogen Generator of our own design after two years of hard and careful work. ÖZAK Nitrogen Generator has ceased nitrogen being an expensive gas and made it easily and economically available to everyone like compressed air.

ÖZAK Nitrogen Generator has proved its quality by being the choice of many users, both domestic and abroad.

## TAILOR MADE DESIGN AND PRODUCTION

Every user is unique and deserves special attention. If same products are offered to different users, then some things will be missing. We handle each case specially, work like a tailor and offer the best solution for that case. Almost all of the generators we manufactured are unique; not identical to any other one.

With our experienced and competent team of engineers, we would like to realize your projects and solve your problems related with gases.

We constantly work on developing our products and ourselves, please follow up with us.



ÖZAK INDUSTRIAL AND MEDICAL GASES LTD.