



# Onsite N<sub>2</sub> Generator Manufacturer

Shandong Gamma Gas Engineering Co.Ltd

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# CONTENTS



**01** **Company Introduction**

**02** **Products Introduction**

**03** **Advanced Technologies**

**04** **Cases introduction**

# 01

## PART ONE

# Company Introduction

Company Profile

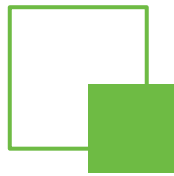
Enterprise Culture

Company Development

Honors and Qualifications







# Company Profile



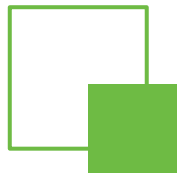
Gamma Gas was founded in 2003;

Focus on the R&D and manufacturing of pressure swing adsorption (PSA) nitrogen generators, oxygen generators, gas purification equipment .

Leading normal temperature air separation products manufacturer in China.







*We make it pure*

## Mission

Bring advanced PSA technology to every user in the world, and build a pure world of gas separation!

## Vision

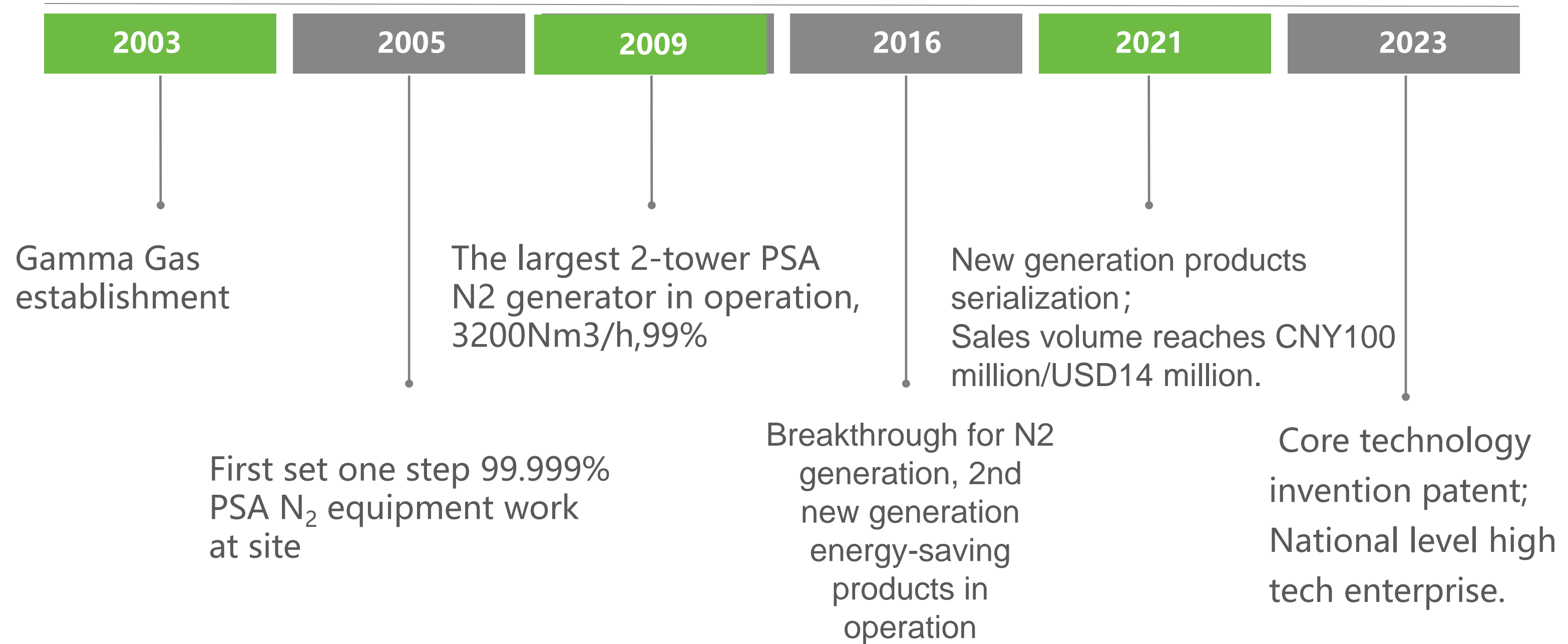
Become a global leader in PSA gas separation system manufacturing.

## Core Values

Professional  
Ambitious  
Social Responsibility



# Company Development







# Company Development



Year 2005



Year 2007



Year 2011



Year 2019







# Company Development



Year 2024



Year 2024



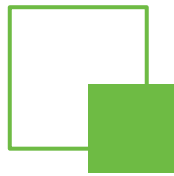
Year 2024



Year 2024







# Honors and Qualifications







**20 honors**

-  National High-tech Enterprise
-  Shandong Province Gazelle Enterprise
-  Specialized and Innovative Small and Medium-sized Enterprise
-  Science and Technology Innovation-oriented Enterprise
-  Member of China Gas Separation Equipment Association
-  .....



**10  
certifications**

-  ISO9001、ISO14001、ISO45001
-  2A-level Integration of Informatization and Industrialization Management System
-  DCMM Level 2 Certification
-  .....



# 02

## PART TWO

# Products Introduction

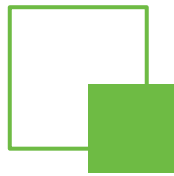
Main Products

PSA N<sub>2</sub> Generator Series

Air to N<sub>2</sub> ratio

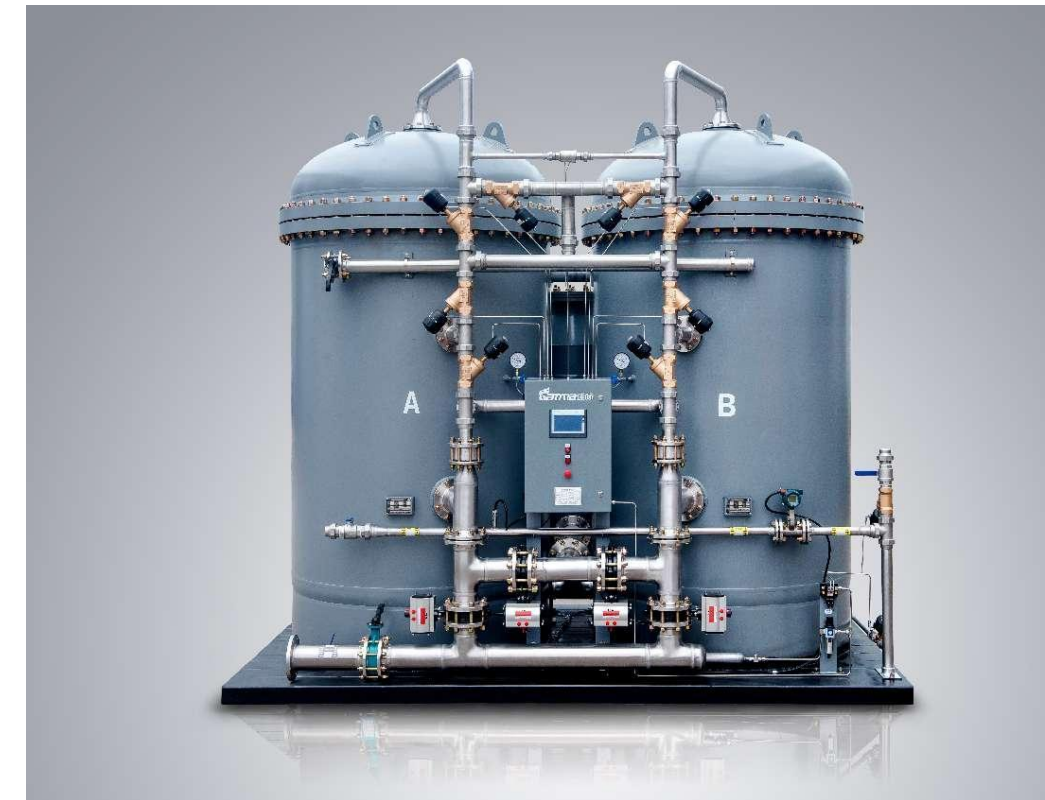






## PSA Nitrogen Generators

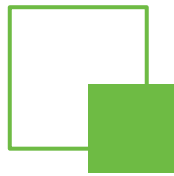
The comprehensive technical level of Gamma PSA nitrogen generators has surpassed the highest level in the domestic and international industry.



## PSA Oxygen Generators

Gamma new generation PSA oxygen generator has been developed and is about to be serialized. It is the flagship product for us to expand its market scale in the next step.





## Integrated N<sub>2</sub>/O<sub>2</sub> generators

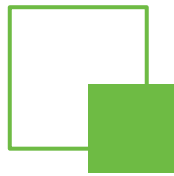
Gamma Gas provides all-in-one nitrogen(oxygen) production solution.



## Membrane nitrogen generator

Gamma can provide membrane nitrogen products according to customer needs.





# PSA Nitrogen Generator Series



P



GNP Series

Top energy efficiency  
Contract  
energy management

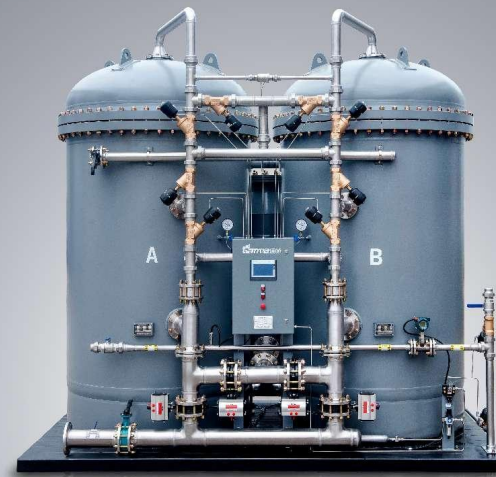
V



GNV Series

Excellent energy-  
saving performance  
for life time cost  
saving

C



GNC Series

The balance between  
energy-saving and  
affordability.

B



GNB Series

The best choice for  
trouble free operation  
and cost effectiveness.



# Air to N<sub>2</sub> ratio

Product Purity	PSA nitrogen generator Air factor/Air to N2 ratio			
	GNB	GNC	GNC+	GNV
Series				
97%	2.0			
98%	2.1			
99%	2.3			
99.5%	2.55			
99.9%	3.2	3.1		
99.95%	3.6	3.45	3.25	
99.99%	4.45	4.2	3.8	3.3
99.995%		4.6	4.1	3.6
99.999%		5.0	4.5	3.9





# 03

## PART THREE

# Advanced Technologies (PSA-N<sub>2</sub>)



Gamma Gas is a technology-oriented company with core competitiveness, and its technical capabilities are far ahead in the industry.

- Annual R&D investment > 5%

With our core patented technology  
Gamma Gas PSA nitrogen generators have  
the lowest air-to-nitrogen ratio.

Long-term trouble-free  
operation to avoid production  
line downtime for users.



Energy saving  
> 30%



Lifetime  
×2



Stable gas  
supply



Convenient to  
use

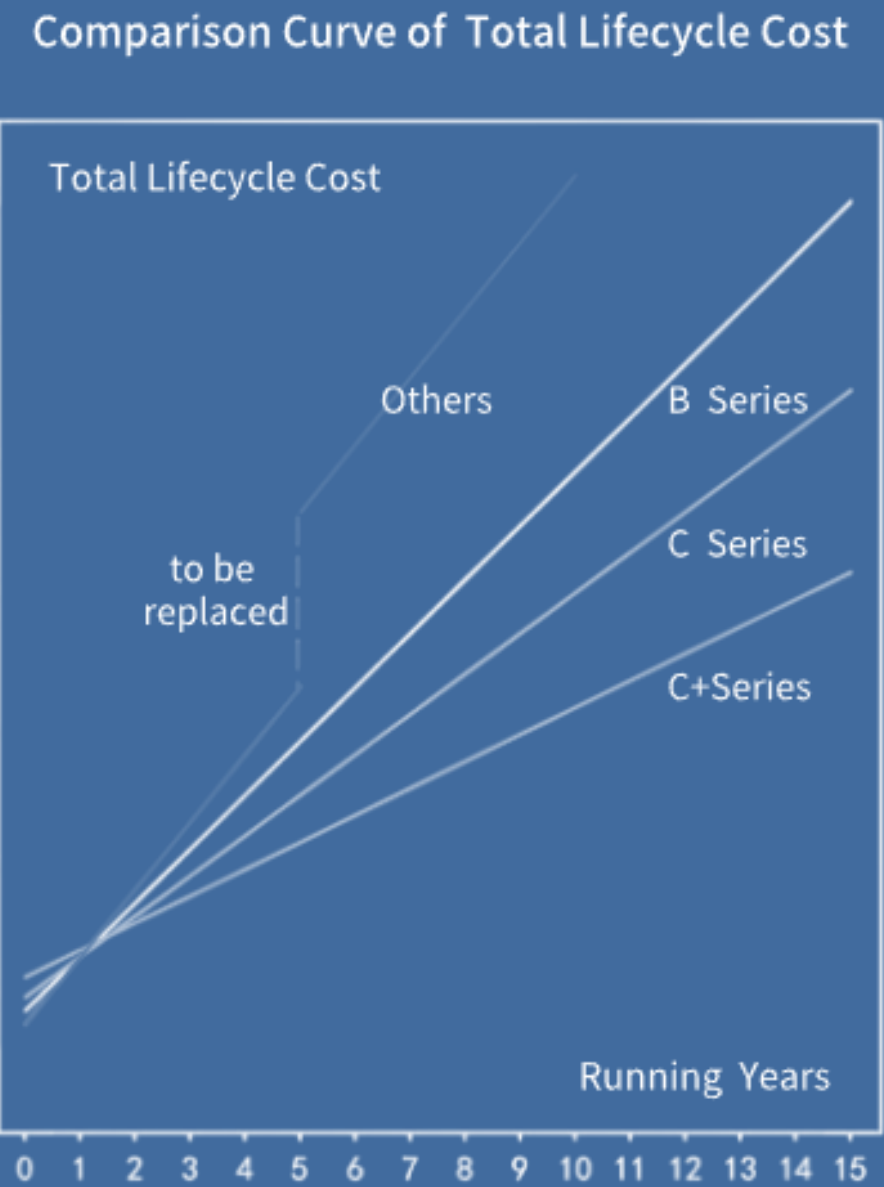
Customized CMS  
15-year non-powdering

PSA N2 generation system  
Simple installation.  
Convenient operation.



# Lowest Cost

Total lifecycle cost consists of the initial investment cost, the service cost, and the operating energy cost. Gammairsep PAS generator has the lowest initial investment cost or the lowest operating cost, each of which has the lowest service cost.



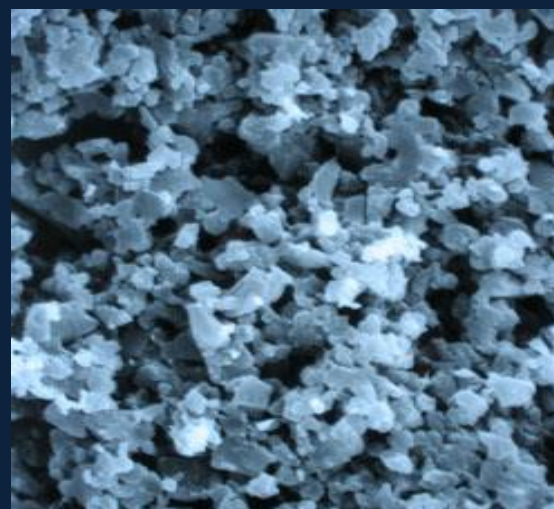
# Lower Air-to-Nitrogen Ratio

Gamma PSA process has declared the patents of invention, and Gamma self-developed CMS has been proved high-performance. The perfect combination of these two key technologies makes Gamma generators have the lower air-to-nitrogen ratio, that is the lower compressed air consumption , and that is the lower energy cost.

Taking GPV59-400L N2 generator as an example, compared to internationally advanced Atlas Copco products, it saves 544,000 KW electricity consumption annually.

Brand	Purity	N2 production (Nm³/h)	Air N2 ratio	Air consumption		Compressor power (KW)	Annual power consumption
				m³/h	m³/min		(KW/8000h)
Gamma	99.999%	400	3.8	1520	25.33	152	1216000
Atlas Copco	99.999%	400	5.5	2200	36.67	220	1760000
Others	99.999%	400	7	2800	46.67	280	2240000

High efficiency  
CMS



Patent PSA process

Variable Path Sequential Pressure Equalization  
--202211388349.8

## 15 Years Adsorber Lifetime

Multiple technologies are combined to ensure the CMS does not pulverize within 15 years, including:

Air flow uniform distribution

Gas flow velocity control

Full area elastic compression

Snowstorm CMS filling technology

The adsorber is designed a running life of 15 years.



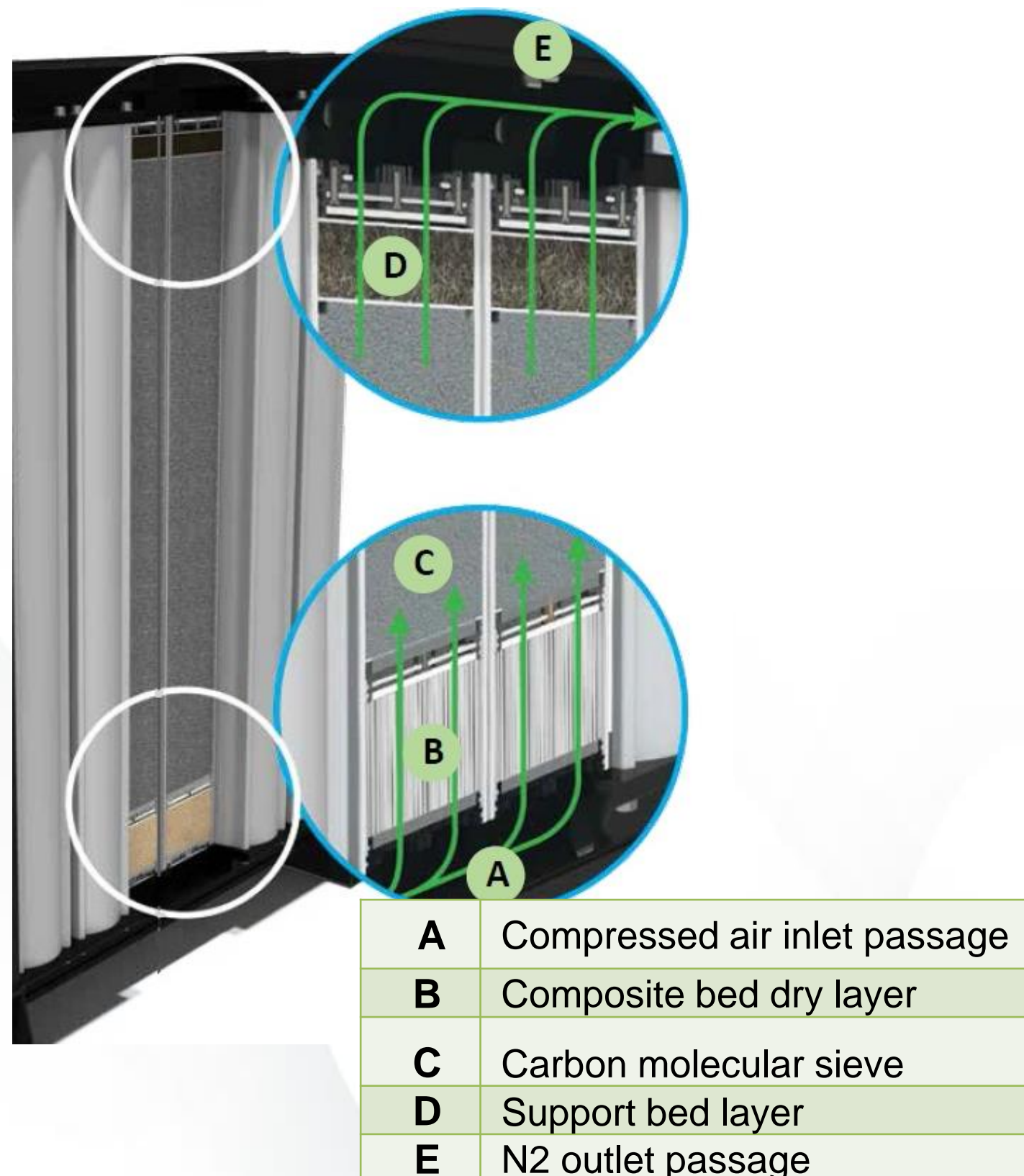
# Lower Dewpoint & Higher Purity

Compressed air enters from the inlet passage (A) to the combined (Alumina) layer (B) to remove water deeply

Then pass through carbon molecular sieve (C). Other trace gases such as oxygen and carbon dioxide are preferentially adsorbed, so that the nitrogen is concentrated in the upper part of the CMS.

After that, nitrogen enters the buffer vessel through support bed layer (D) and outlet passage (E), and finally is filtered by dust filter and send out as product nitrogen gas.

Alumina layer + flow speed control technologies achieve -60°C and lower dew point.





# Continuous and Stable Gas Supply

Consistent high quality and long operating lifetime of Gamma PSA nitrogen generator are built on:

Scientific design

Well-chosen material

Advanced processing equipment

Digitized quality control system.



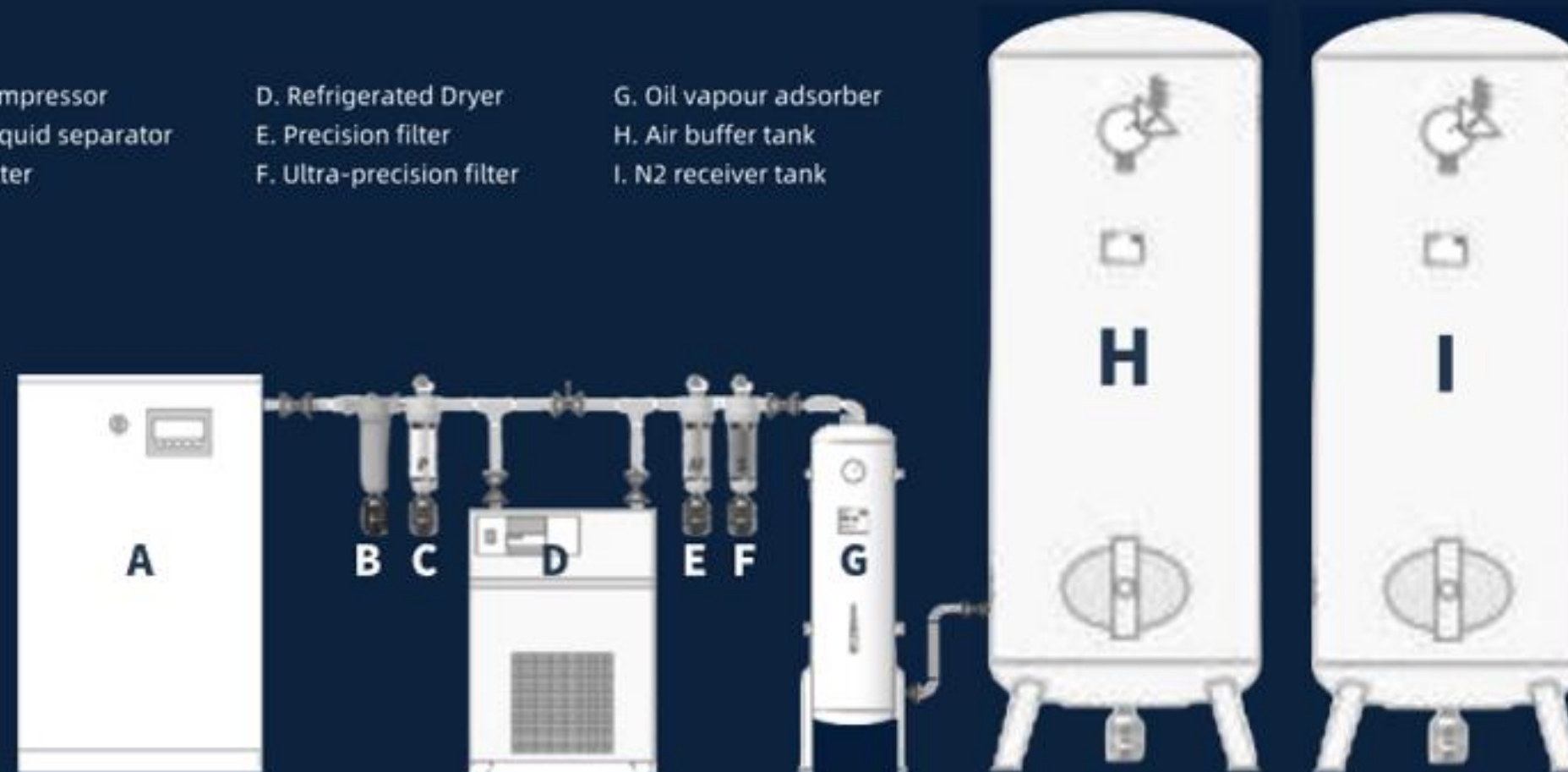


# Easy to Install & Operate

Scientific design for pipeline interface can greatly increase on-site layout flexibility and simplify piping. Integrated flowmeter, oxygen analyzer, dew point, temperature, pressure and other transmitters, enables users no need to configure data lines furthermore.

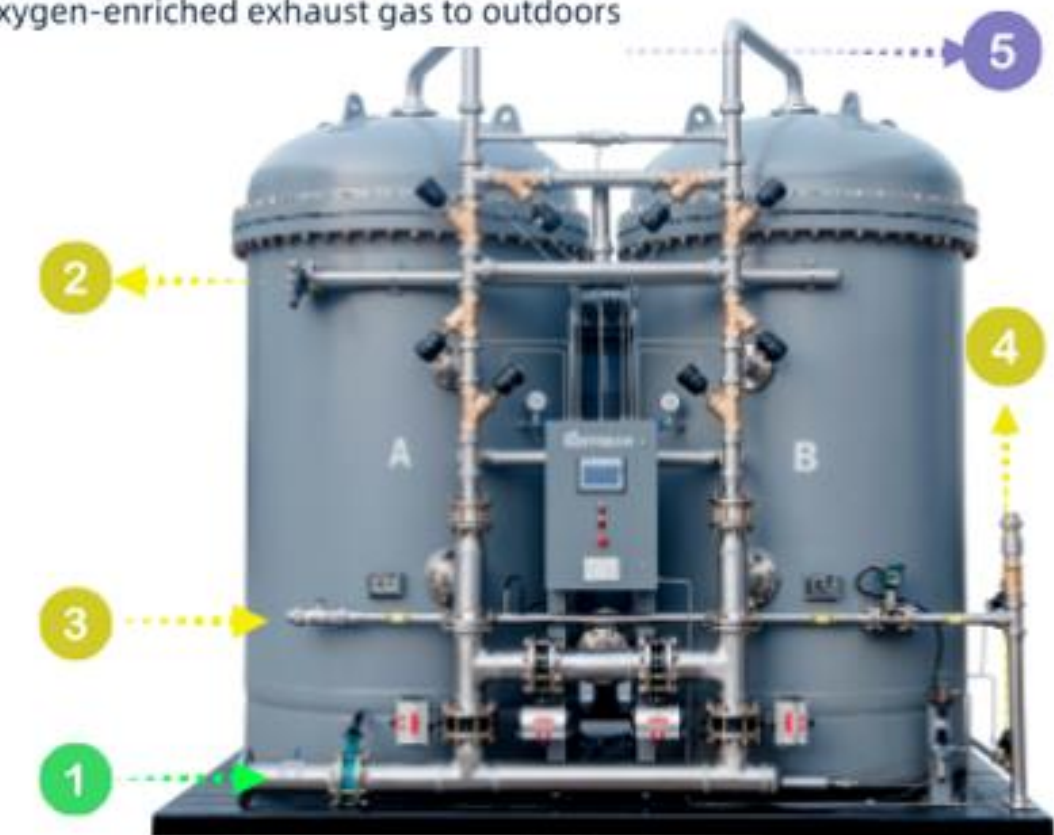
Gamma Gas PSA generator can be remotely operated and monitored by built-in IOT box.

- A. Air compressor
- B. Gas-liquid separator
- C. Pre-filter
- D. Refrigerated Dryer
- E. Precision filter
- F. Ultra-precision filter
- G. Oil vapour adsorber
- H. Air buffer tank
- I. N2 receiver tank



Optional partner products

- 1. Compressed air from air buffer tank
- 2. N2 to N2 receiver tank
- 3. N2 from N2 receiver tank
- 4. Nitrogen gas product to user
- 5. Oxygen-enriched exhaust gas to outdoors



Gamma core products



## Nitrogen Generators and Partner Products Selection Service



As the result of 20 years' experience, Gamma can provide users with the professional selection and consulting services according to users'on-site operating conditions and gas demand. This selection service is not just for nitrogen generators,but also for air compressors,dryers,filters,gas storage tanks,etc.

设计基准	
环境温度	20℃
相对湿度	80%
原料气压力	0.7MPa
原料气温度	5~30℃
原料气露点	≤10℃
原料气含油量	≤0.003mg/m <sup>3</sup>
氮气压力	0.6MPa
氮气露点	-60℃





## Maintenance & Parts Supply Service

Gamma provides maintenance packages, parts packages and comprehensive after sale service for customers, eliminating their worries of machine failure and making customers focus on their main business.





# One stop service

## Reengineering & upgrading

Gamma provides customers with services such as upgrading outdated equipment, energy-saving renovation and diagnosis of gas station or gas system. The energy management contracting mode is supported.



## System Integration Solution

Gamma can provide customers with system integration solution for a set of nitrogen generators or nitrogen stations. Containerized nitrogen production plant is a typical system integration application.



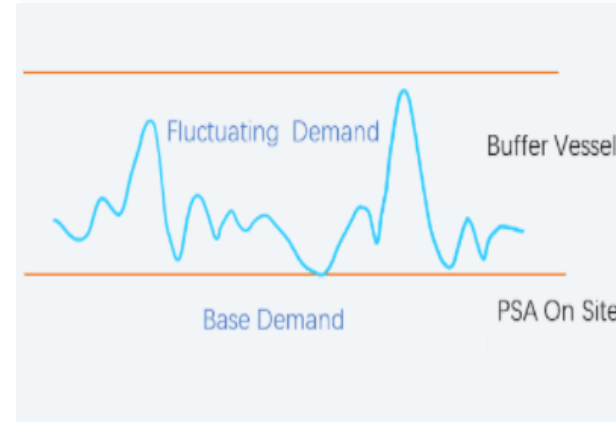
## Industrial IoT (IIoT) solutions

The whole system is integrated, provided with IIoT V-Box. Customers can remotely monitor the operation status of all the equipments through PC or APP. With this solution, Gamma can provide predictive services.



## Gas Supply Service

Gamma can provide customers with on-site gas supply equipment rental services, including the rental of PSA generator or the supply of liquid nitrogen.



## Installation Engineering Services

Gamma can offer customers complete turnkey projects. Gamma has the official approval of the pressure piping installation.





# 04

## PART FOUR

# Cases Introduction



# Products applications



Global industrial gases demand constantly increases and Gamma N2 generators have been serving more than 600 customers in the world, more than 20 industries.

Oil

New energy

Metallurgy

Mechanical  
engineering

Heat treatment

Electronics SMT

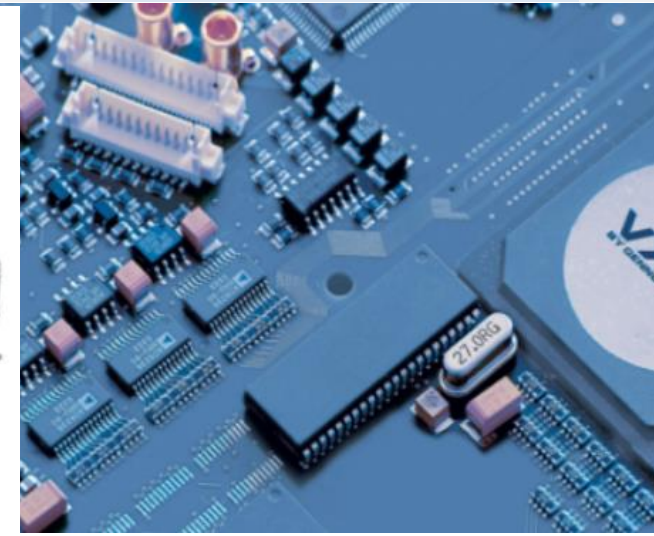
Pharmacy

Food

Electrics

Coal

Chemical



For the protection of metal materials in metal heat treatment processes;  
Used as shielding gas in welding and powder metallurgy sintering;  
Protection of raw filament production of high-performance chemical fiber materials;  
Nitrogen injection and oil recovery in the process of oilfield oil production;

Nitrogen protection for integrated circuit and electronic component processing;  
As shielding gas and purge gas in the metallurgical industry;  
Nitrogen filling for food preservation, pharmaceutical storage and containers;  
Sintering protection in the production process of anode materials and electrolytes.





# Customers



The customers selecting Gamma Gas N2 generators are mainly famous brands in their industries.

New energy	Electronics	Pharmacy	PVC	Manufacturing	Oil/Coal	Food/Brevery	Overseas
							
							
							
							
							



# New Energy Industry

BYD



中创新航



In 2019, Gamma Gas equipment entered the new energy battery industry, all of which are energy-saving equipment with a purity of over 99.99%.



# Electronics Industry



Cooperation since 2005, multiple sets of nitrogen generators with over 99.99% purity are ordered every year.





# Pharmaceutical Industry



In 2009, Gamma Gas entered the pharmaceutical industry, where there is a demand for various types of nitrogen generators with purities ranging from 95% to 99.999%.



# PVC & Calcium Carbide Industry

In 2004, Gamma Gas entered the PVC & calcium carbide industry. The main demand of this industry is nitrogen generators with purity below 99.9%





# Oilfield Extraction industry



Gamma Gas enters oilfield extraction industry in 2015, nitrogen purity in this field mainly ranges from 95%-99.9%





# Gas Investment Industry

**Iwatani**



Cooperation with Iwatani since 2010, big market potential, gas purity varies.



# Machines before delivery





# Machines at site





# International Business

- ✓ United States: Agilent, cooperation since 2011, with an annual purchase of approximately 200 sets of 99.5% nitrogen generators.
- ✓ Southeast Asia: There is a very high demand for nitrogen/oxygen generation equipment, mainly through agents.
- ✓ Russia: There is a very high demand for nitrogen/oxygen generation equipment, mainly through agents.
- ✓ Foxconn Vietnam and Mexico use equipment with a purity of over 99.99%.





# International Business





# International Business





# International Business







# THANK YOU!

S h a n d o n g   G a m m a   G a s   E n g i n e e r i n g   C o . , L t d .