

by ecerkom

nitrotech

Nitrogen Generation System

nitrotech.com.tr

What Is nitrotech?

Nitrotech is a nitrogen generation system designed to produce high-purity nitrogen gas from a compressed air source, based on PSA (Pressure Swing Adsorption) technology. The process begins with filtration, where particles, humidity, and oil are removed. The purified air is then directed to adsorption towers filled with CMS (Carbon Molecular Sieve). In these towers operating on the PSA principle, oxygen and other gases are selectively adsorbed, while nitrogen is separated and collected in pure form. The double tower system ensures continuous production through cyclic switching. Gas purity is monitored in real time by analyzers installed at the outlet line, and all parameters are optimized via a PLC-based control system to ensure uninterrupted process operation. This methodology delivers high performance and process safety with low operating costs.



WHAT IS NITROGEN GAS?

Nitrogen gas (N_2) is the diatomic form of nitrogen, the element with atomic number 7 in the periodic table and constitutes approximately 78% of the Earth's atmosphere. Its molecular weight is 28.0134 g/mol. Under normal conditions (0 °C and 1 atm), it is a colorless, odorless, tasteless, and inert (non-reactive) gas. Its boiling point is -195.79 °C, and its melting point is -210 °C. The critical temperature of nitrogen is -146.95 °C, above which it cannot be liquefied regardless of pressure; its critical pressure is approximately 3.39 MPa.

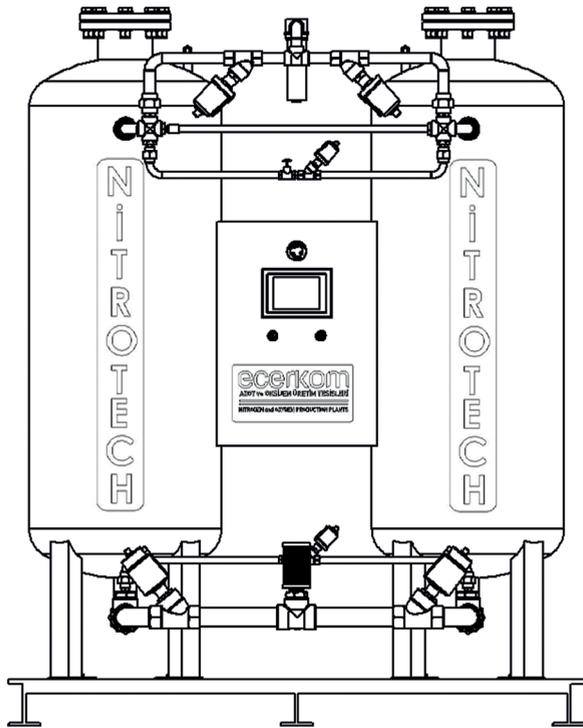
Industrial nitrogen is typically produced in a purity range of 95% to 99.9999%. The required purity level is determined by the application; for example, purities of 99.999% (5.0 grade) and above are preferred in the electronics and pharmaceutical industries.

Thanks to its inert nature, nitrogen is widely used to suppress flammable and explosive atmospheres; by displacing oxygen, it prevents oxidation, combustion, and microbiological degradation. For this reason, nitrogen plays a critical role in many fields such as food packaging, metallurgy (heating and annealing), chemical processes, laser cutting, pharmaceutical manufacturing, and electronics production.

It has low solubility in water (approximately 0.015 g/L at 20 °C) and does not conduct electricity. Due to these properties, it can be used in dielectric environments and for insulation purposes. In addition, in its cryogenic form (liquid nitrogen), it is used in applications requiring ultra-low temperatures. Its ability to be produced at high purity, chemical inertness, and safe transportability have made nitrogen gas one of the most widely used industrial gases.

Up to 90% Cost Savings in Nitrogen Gas Usage!





It eliminates the cost of nitrogen cylinders, contamination, filling expenses and purchasing procedures.

Only a compressed air line and electrical/power connection are required.

Ensures safe storage and use of heavy and high-pressure cylinders.

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Designed to provide savings and enable your investment to be amortized in a short period.

Provides independence from nitrogen market price fluctuations and external gas sources.

Produces nitrogen with purity up to 99.9999%.



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Benefits of the Nitrotech Nitrogen Generator



Energy Savings

Nitrotech technology is an energy-efficient solution that significantly reduces nitrogen production costs.

High Efficiency

Nitrotech generators produce nitrogen gas by using the air from your compressor in the most efficient way.





Reliability

Nitrotech generators are designed for robust and reliable operation by using long-lasting original components.

Ease of Use

Nitrotech generators feature a user-friendly interface and an automatic control system, making them easy to install and operate.



Low Maintenance Costs

Nitrotech generators feature a special design that requires minimal maintenance.

Environmentally Friendly

Nitrotech generators produce no harmful emissions and are an environmentally friendly solution.



Technical Criteria to Consider When Selecting a Nitrogen Generator

1. Required Flow Rate (Nm³/h):

The system's required hourly nitrogen demand must be accurately determined. Based on instantaneous and continuous process consumption, taking into account possible peak demands and a safety margin. As incorrect capacity selection can lead to either insufficient performance or unnecessary energy consumption.

2. Operating Pressure:

The generator's outlet pressure must match the minimum operating pressure required by the system and processes. PSA systems typically operate in the 5–9 bar range; higher pressure requirements may require an additional booster compressor.

3. Energy Consumption and Efficiency:

Since PSA systems operate together with auxiliary equipment such as compressors and dryers, total energy consumption should be carefully analyzed. Energy efficiency should be evaluated based on kWh consumption per Nm³ of nitrogen produced. Low-consumption systems provide significant long-term operating cost advantages. Thanks to its low energy consumption, Nitrotech delivers substantial cost savings over time.



4. Ease of Maintenance and Service Continuity:

Maintenance and replacement intervals for filter cartridges, carbon molecular sieve (CMS) fillings, and moving parts such as valves are completed in minimal time thanks to Nitrotech's design, which allows for easy access and intervention. In addition, a 24/7 service approach guarantees uninterrupted spare parts availability.



Purity Requirements and Industry Specific Solutions in Nitrogen Generators

Right Purity, Right Performance in Industrial Production:

Nitrogen is the safest inert gas used in industrial processes to eliminate oxygen-related risks and ensure production quality; however, each industry requires a different nitrogen purity level. Therefore, as ECERKOM, we design application-specific nitrogen generators by analyzing process requirements, product sensitivity, and cost optimization.

Why Different Purity Levels?

Each process has a different level of sensitivity to oxygen.

- In some applications, 95–97% purity is sufficient,
- In critical sectors such as food and pharmaceuticals, 99.5%+ purity is required,
- In electronics, laser cutting and argon replacement applications, 99.999% (5N) purity is mandatory.

As purity increases, air consumption, adsorbent structure and generator design change, so NITROTECH is optimized with custom engineering for each industry.

Industry-Specific Purity Requirements:

Food and Packaging Industry

- MAP (Modified Atmosphere Packaging), Coffee, snacks, powdered milk, ready meal packaging,

Required Purity: 99% – 99.99%

- Prevents oxidation
- Extends shelf life,
- Preserves aroma and fat stability,

Metal Processing, Laser Cutting, Heat Treatment

Fiber laser and CO₂ laser machines

Required Purity:

- For medium-carbon steels: 98% – 99%
- For stainless steel and aluminum: 99.99% – 99.999%
- Improves cutting quality and reduces burr formation.
- High-pressure laser cutting applications require 5N (99.999%) purity.

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Pharmaceuticals and Biotechnology

Required Purity: 99.5% – 99.999%

- Purity is critical for sterility and process safety,
- ISO and GMP compliance,
- Maximum safety in reactor inerting, transport and filling areas,

Chemicals & Petrochemicals

Required Purity: 98% – 99.999%

- Reactor inerting,
- Inerting of storage tanks,
- Reducing explosion risk,

Laboratories and Analytical Devices

Required Purity: 98% – 99.999%

GC, LC-MS, ICP-MS, TOC analyses,

- Required Purity: 99.999% (5N) – 99.9995% (5.5N),
- Ultra-high-purity requirements for the most sensitive applications,



Beverage Industry

Required Purity: 99% – 99.9%

- Reduces oxidation,
- Ensures flavor and color stability,
- Stability in filling lines,

Oil, Gas and Energy Industry

Required Purity: 95% – 99.5%

- Pipeline Pressure Testing,
- Storage, purging and inerting operations,
- High-flow, low-purity solutions,



ECERKOM – Application-Specific Nitrogen Generators With Customized Purity Levels

Every industry has different needs; therefore, we provide process-oriented engineering rather than standard solutions.

What Do We Provide?

- A wide purity range from 95% to 99.999%,
- Advanced adsorption technologies based on PSA & CMS,
- Energy-optimized control algorithms,
- Food-compatible, hygienic design options,
- High-pressure option (up to 300 bar),
- Integrated booster, air compressor and dryer solutions,
- Pressure vessels compliant with EN 13445 & PED 2014/68/EU,



Custom-Designed Machines for Every Purity Level

Within the scope of ECERKOM engineering, we deliver a fully customized solution for every customer, including

- Process analysis report,
- Purity-flow rate optimization,
- Energy consumption analysis,
- 100% locally manufactured,
- Remote monitoring & industrial automation are prepared and a generator is designed specifically for the application.

Result: Optimal Purity for Your Industry at the Most Competitive Cost

As ECERKOM, instead of producing a single standard machine, we design nitrogen generators optimized according to the needs of each industry.

As a result:

- There is no unnecessary energy consumption,
- The machine's lifespan is extended,
- Guaranteed process quality,
- Customer-specific engineering value is maximized.

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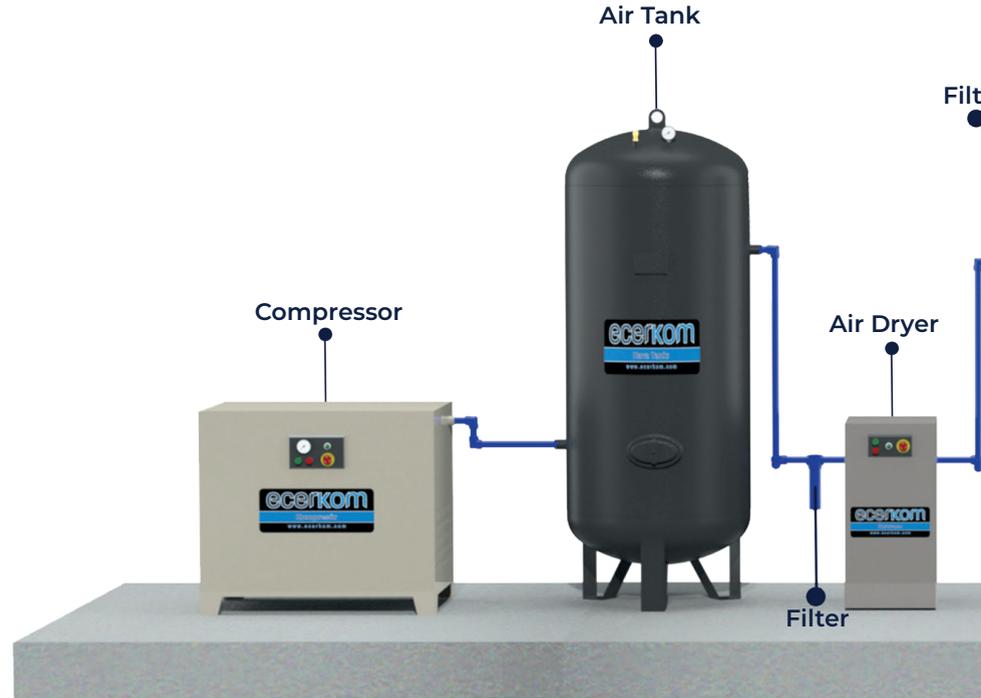
Measurable Quality In Nitrogen Production!

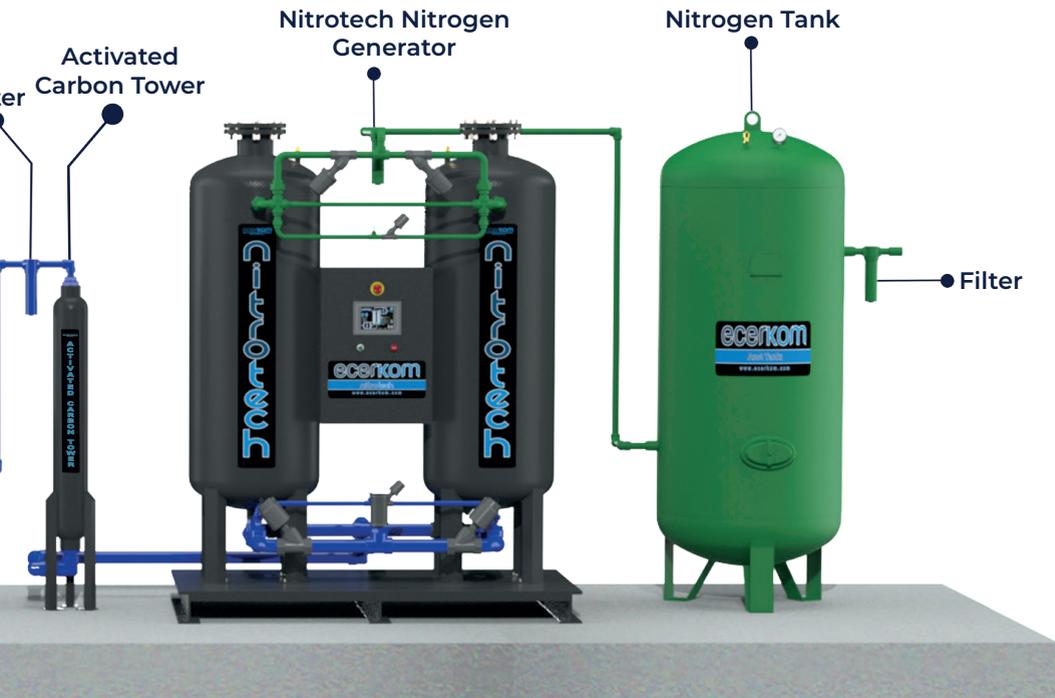
Purity, flow and pressure values are optimized through Nitrotech engineering which is measured under real production conditions and continuously monitored.

Nitrotech Nitrogen Production Data

NITROTECH NITROGEN GENERATOR	Nitrogen Purity & Oxygen Level & m ³ / Hours										
	95%	97%	98%	99%	99,50%	99,90%	99,95%	99,99%	99,999%	99,9995%	99,9995%
	5%	3%	2%	1%	0,5%	0,10%	500 PPM	100 PPM	10 PPM	5 PPM	1 PPM
ENG-10	2,9	2,3	2,0	1,6	1,1	0,8	0,7	0,5	0,3	0,2	0,1
ENG-20	4,6	3,7	3,2	2,5	2,1	1,4	1,2	0,9	0,4	0,4	0,3
ENG-30	8,1	6,5	5,6	4,4	3,7	2,5	2,2	1,5	0,8	0,6	0,5
ENG-40	13,9	11,1	9,7	7,6	6,3	4,2	3,7	2,7	1,3	1,1	0,9
ENG-50	24,1	19,3	16,8	13,1	10,9	7,3	6,4	4,6	2,3	1,9	1,5
ENG-60	32,2	25,8	22,4	17,5	14,6	9,7	8,6	6,2	3,1	2,6	2,0
ENG-70	39,4	31,5	27,4	21,4	17,9	11,9	10,5	7,5	3,8	3,1	2,4
ENG-80	62,8	50,3	43,7	34,1	28,5	19,0	16,8	12,0	6,0	5,0	3,8
ENG-90	83,0	66,4	57,7	45,1	37,6	25,1	22,2	15,8	7,9	6,6	5,1
ENG-100	112,2	89,8	78,1	61,0	50,8	33,9	30,0	21,4	10,7	8,9	6,9
ENG-110	128,7	102,9	89,5	69,9	58,3	38,9	34,4	24,6	12,3	10,2	7,9
ENG-120	142,8	114,3	99,3	77,6	64,7	43,1	38,2	27,3	13,6	11,4	8,7
ENG-130	186,9	149,5	130,0	101,6	84,6	56,4	49,9	35,7	17,8	14,9	11,4
ENG-140	228,6	182,9	159,0	124,2	103,5	69,0	61,1	43,6	21,8	18,2	14,0
ENG-150	278,0	222,4	193,4	151,1	125,9	83,9	74,3	53,1	26,5	22,1	17,0
ENG-160	306,7	245,4	213,4	166,7	138,9	92,6	82,0	58,5	29,3	24,4	18,8
ENG-170	339,9	271,9	236,4	184,7	153,9	102,6	90,8	64,9	32,4	27,0	20,8
ENG-180	459,5	367,6	319,7	249,7	208,1	138,7	122,8	87,7	43,8	36,5	28,1
ENG-190	535,8	428,6	327,7	291,2	242,7	161,8	143,2	102,3	51,1	42,6	32,8
ENG-200	642,4	513,9	446,9	349,1	291,0	194,0	171,7	122,6	61,3	51,1	39,3
ENG-210	792,4	633,9	551,3	430,7	358,9	239,3	211,7	151,2	75,6	63,0	48,5
ENG-220	928,5	742,8	645,9	504,6	420,5	280,4	248,1	177,2	88,6	73,8	56,8
ENG-230	1070,9	856,7	745,0	582,0	485,0	323,0	286,1	204,4	102,2	85,2	65,5
ENG-240	1289,0	1031,2	896,7	700,6	583,8	389,2	344,4	246,0	123,0	102,5	78,9
ENG-250	1591,1	1272,9	1106,9	864,7	700,6	480,4	425,1	303,7	151,8	126,5	97,3
ENG-260	1892,7	1514,2	1316,7	1028,7	857,2	571,5	505,7	361,2	180,6	150,5	115,8
ENG-270	2126,0	1700,8	1478,9	1155,4	962,9	641,9	568,1	405,8	202,9	169,1	130,0
ENG-280	2596,6	2077,3	1806,3	1411,2	1176,0	784,0	693,8	495,6	247,8	206,5	158,8
ENG-290	2856,3	2285,0	1987,0	1552,3	1293,6	862,4	763,2	545,1	272,6	227,1	174,7

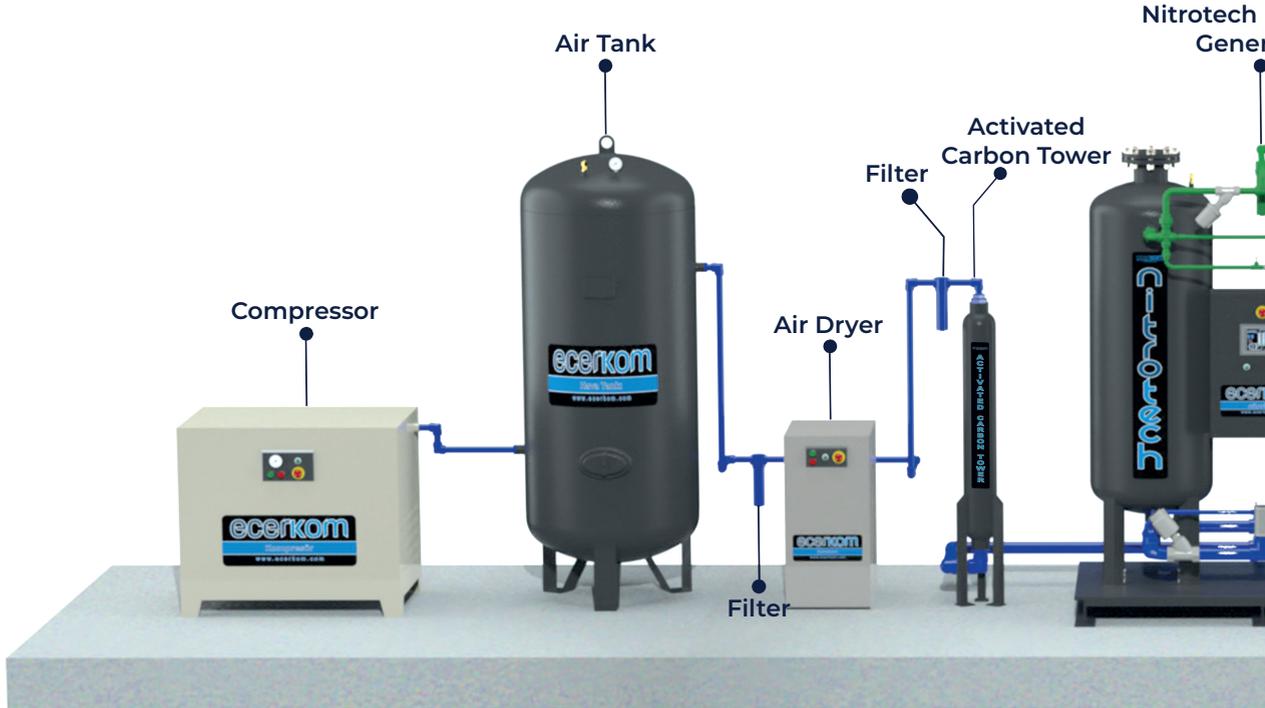
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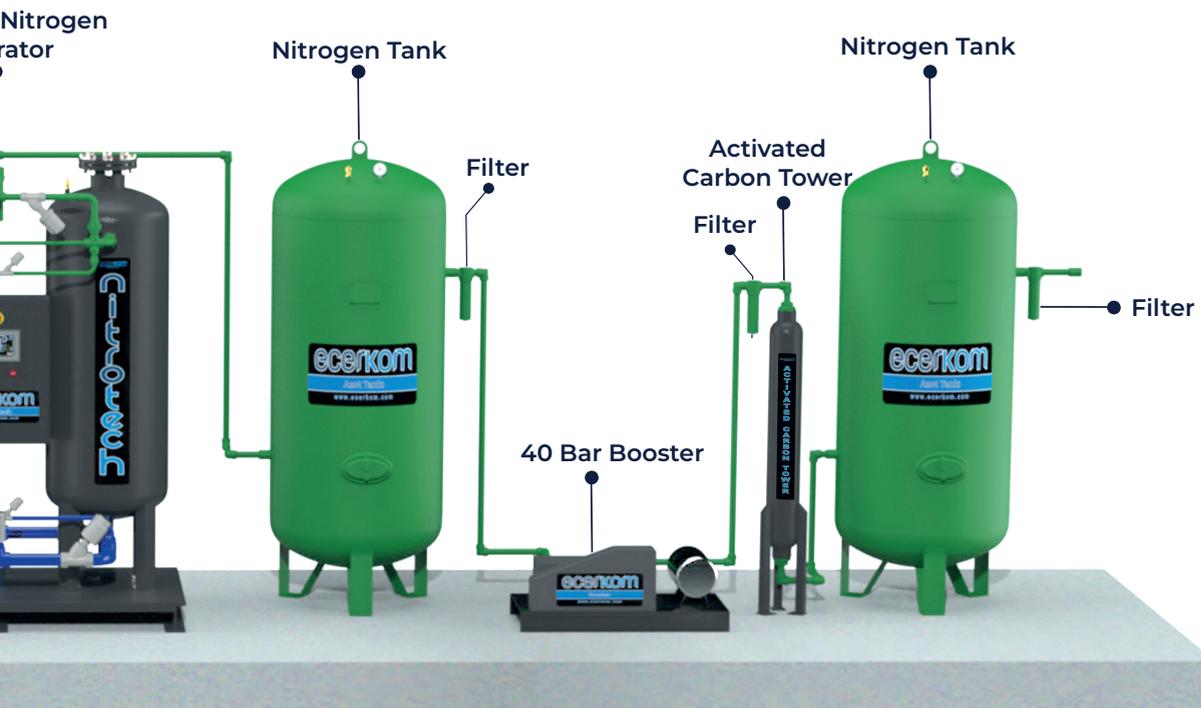




Nitrotech 8 Bar Diagram

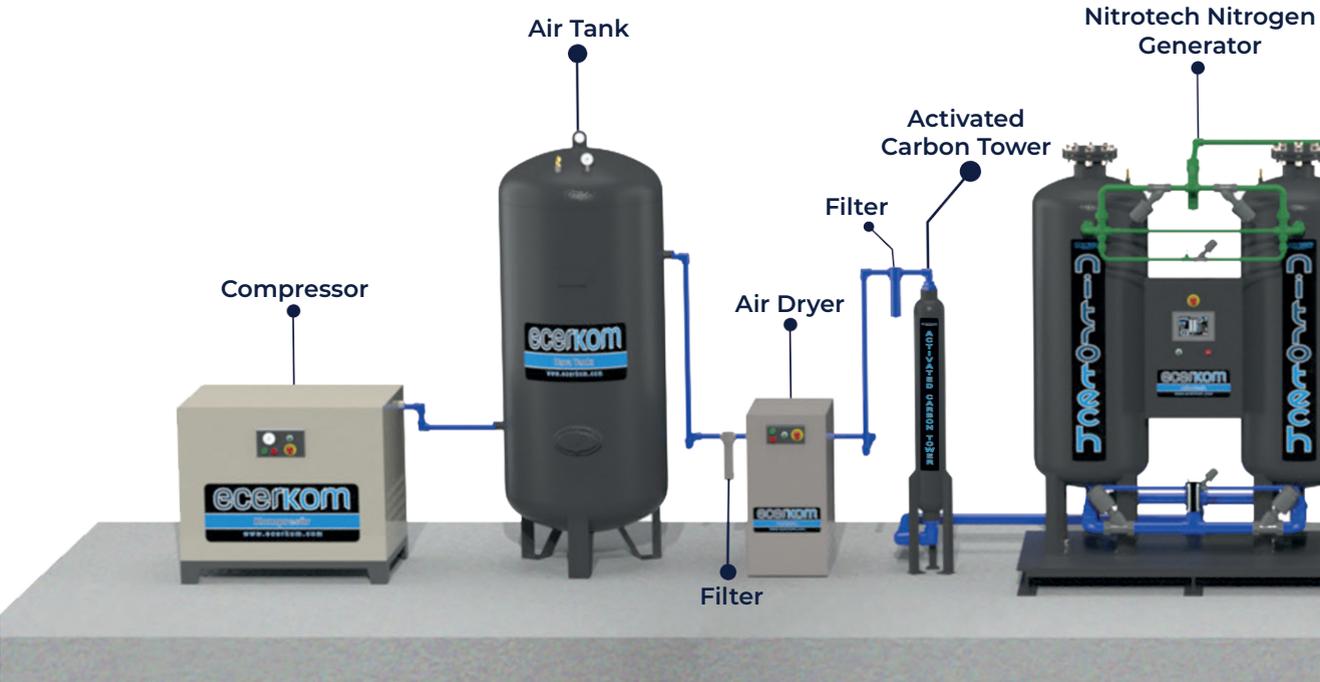
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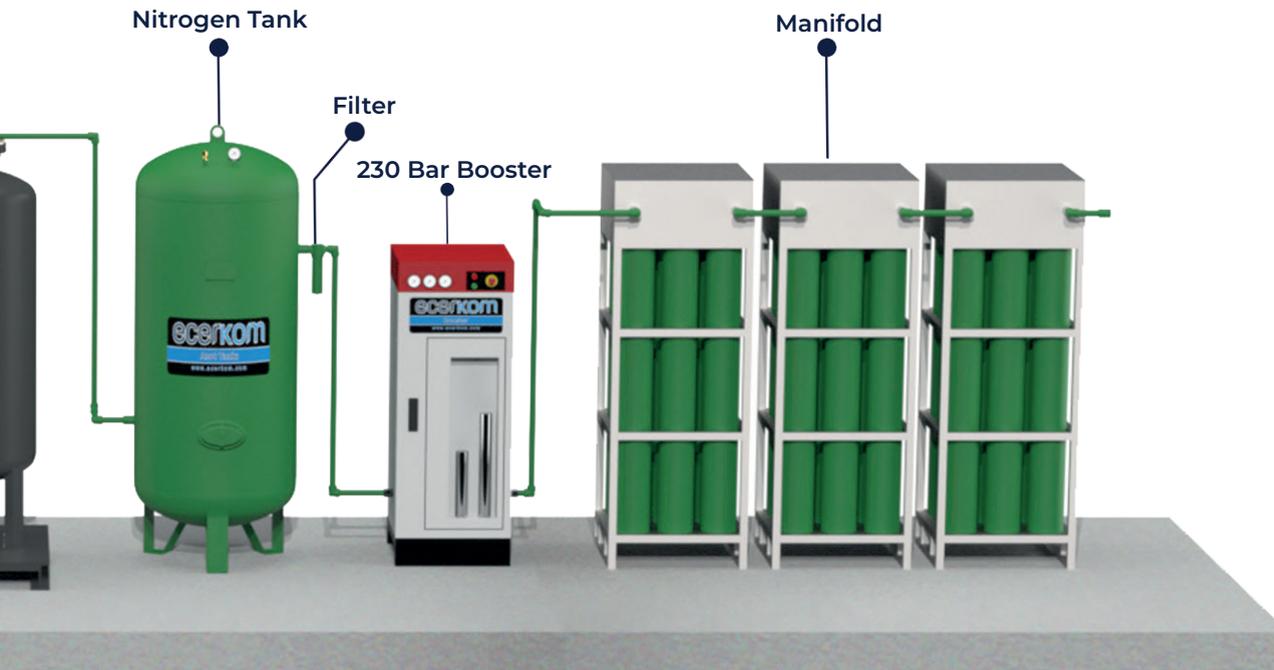




Nitrotech 40 Bar Diagram

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Nitrotech 230 Bar Diagram

Certificates



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