

# Parker Nitrogen Gas Generators for Packaging Plant-based Pharmaceuticals

Market Application Publication



## Background:

Modified atmosphere packaging (MAP) is a process that has been used for many years in the Food & Beverage industry to combat food spoilage. MAP involves packaging or storing product in a modified form of the Earth's natural atmosphere. Air inside a package is displaced with a protective gas to keep oxygen at controlled levels, generally less than 2 percent. Too much oxygen and moisture in a package leads to bacterial growth and oxidation, which results in spoilage, inconsistent flavors, poor product quality, and shortened shelf-life. Nitrogen gas is usually used as a protective gas in MAP because of its dry, inert qualities.

Over the years, the Food & Beverage industry has developed many commonly used best practices for packaging their products and these methods can be directly applied to packaging plant-based pharmaceuticals. As previously noted, oxygen is the major culprit in the degradation and spoilage of products where freshness and shelf-life are critical. For plant-based pharmaceutical products, the exposure to oxygen tends to convert the active ingredients into undesirable compounds, which lowers the value of the product as well as its potency. Exposure to oxygen also reduces the freshness for many plant-based pharmaceuticals, resulting in a stale product.

## The Solution:

The most effective way to prevent oxygen damage is to displace the oxygen and replace it with an inert gas like nitrogen. Traditionally, nitrogen is supplied in the form of high pressure cylinders, liquid mini tanks or bulk liquid storage vessels. However, a delivered nitrogen supply can present a host of problems including: creating a safety plan for storing high pressure gas on-site, training workers on how to properly handle high pressure cylinders and managing the gas supply contracts and subsequent delivery schedules.

Producing nitrogen on-site from compressed air is an economical alternative to buying it. Parker's NITROSource and MIDIGAS nitrogen generators are plug and play systems that use standard plant compressed air to produce high purity, pharmaceutical grade nitrogen. Installation involves connecting a compressed air line to the inlet and connecting the outlet to the nitrogen line. The system is designed to produce a continuous and consistent supply of commercially sterile nitrogen.



NITROSource



MIDIGAS



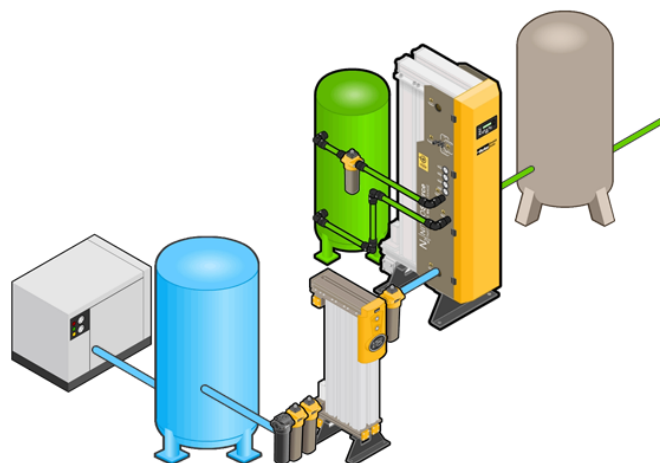
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# NITROSource

## Nitrogen Gas Generators

The cost-effective, reliable and safe solution for medium to large nitrogen requirements.



### Product Selection:

Performance data is based on 102 psi g (7 bar g) air inlet pressure and 68° - 77°F (20° - 25°C) ambient temperature. Consult Parker for performance under other specific conditions.

NITROSource Models	Flow rate unit	Oxygen Content											
		10ppm	50ppm	100ppm	250ppm	500ppm	0.1%	0.5%	1.0%	2%	3%	4%	5%
N2-20P	scfh	159	237	283	343	392	438	625	752	893	1052	1091	1190
	(m <sup>3</sup> /hr)	(4.5)	(6.5)	(8)	(9.7)	(11.1)	(12.4)	(17.7)	(21.3)	(25.3)	(29.8)	(30.9)	(33.7)
N2-25P	scfh	240	357	424	516	590	657	939	1130	1342	1579	1639	1787
	(m <sup>3</sup> /hr)	(6.8)	(10.1)	(12)	(14.6)	(16.7)	(18.6)	(26.6)	(32)	(38)	(44.7)	(46.4)	(50.6)
N2-35P	scfh	318	473	565	685	784	876	1250	1504	1787	2105	2182	2380
	(m <sup>3</sup> /hr)	(9)	(13.4)	(16)	(19.4)	(22.2)	(24.8)	(35.4)	(42.6)	(50.6)	(59.6)	(61.8)	(67.4)
N2-45P	scfh	399	593	706	858	982	1095	1564	1882	2235	2631	2730	2977
	(m <sup>3</sup> /hr)	(11.3)	(16.8)	(20)	(24.3)	(27.8)	(31)	(44.3)	(53.3)	(63.3)	(74.5)	(77.3)	(84.3)
N2-55P	scfh	477	710	848	1028	1176	1314	1875	2257	2680	3157	3274	3570
	(m <sup>3</sup> /hr)	(13.5)	(20.1)	(24)	(29.1)	(33.3)	(37.2)	(53.1)	(63.9)	(75.9)	(89.4)	(92.7)	(101.1)
N2-60P	scfh	530	788	939	1141	1303	1455	2080	2500	2970	3500	3627	3959
	(m <sup>3</sup> /hr)	(15)	(22.3)	(26.6)	(32.3)	(36.9)	(41.2)	(58.9)	(70.8)	(84.1)	(99.1)	(102.1)	(112.1)
N2-65P	scfh	604	901	1074	1303	1490	1663	2377	2857	3394	3998	4146	4524
	(m <sup>3</sup> /hr)	(17.1)	(25.5)	(30.4)	(36.9)	(42.2)	(47.1)	(67.3)	(80.9)	(96.1)	(113.2)	(117.4)	(128.1)
N2-75P	scfh	657	978	1169	1420	1624	1812	2589	3115	3697	4358	4517	4926
	(m <sup>3</sup> /hr)	(18.6)	(27.7)	(33.1)	(40.2)	(46)	(51.3)	(73.3)	(88.2)	(104.7)	(123.4)	(127.9)	(139.5)
N2-80P	scfh	731	1088	1300	1575	1805	2013	2875	3461	4111	4842	5018	5474
	(m <sup>3</sup> /hr)	(20.7)	(30.8)	(36.8)	(44.6)	(51.1)	(57)	(81.4)	(98)	(116.4)	(137.1)	(142.1)	(155)



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# NITROSource

## Nitrogen Gas Generators

The cost-effective, reliable and safe solution for medium to large nitrogen requirements.



### Inlet Parameters

Inlet Air Quality	ISO 8573-1: 2010 Class 2.2.2 (2.2.1 with high oil vapour content)
Inlet Air Pressure Range	73-189 psi g

### Environmental Parameters

Ambient Temperature	41-122°F
Humidity	50% @ 22°F (80% @ MAX @ 88°F)
IP Rating	IP20 / NEMA 1
Pollution Degree	2
Installation Category	II
Altitude	< 6562 ft
Noise	<80 dB (A)

### Electrical Parameters

Generator Supply	100 - 240 +/- 10% Vac 50/60Hz
Generator Power	55 W
Fuse	3.15 A (Anti Surge (T), 250v, 5 x 20mm HBC, Breaking Capacity 1500A @ 250v, IEC 60127, UL R/C Fuse)

### Port Connections

Air Inlet	1" NPT
N2 Outlet to Buffer	1" NPT
N2 Inlet from Buffer	1/2 " NPT
N2 Outlet	1/2 " NPT

### Weights and Dimensions

Model	Height (in)	Width (in)	Depth (in)	Weight (lbs)
N2-20P	74.6	21.7	34.7	659
N2-25P			41.3	847
N2-35P			48	1034
N2-45P			54.6	1219
N2-55P			61.3	1407
N2-60P			68	1592
N2-65P			74.6	1779
N2-75P			81.3	1967
N2-80P			87.9	2152

### Packed Weights and Dimensions

Model	Height (in)	Width (in)	Depth (in)	Weight (lbs)
N2-20P	28.7	78.7	42.9	878
N2-25P			49.6	1092
N2-35P			56.3	1280
N2-45P			63.0	1513
N2-55P			69.7	1725
N2-60P	32.8		76.2	1978
N2-65P			82.7	2199
N2-75P			89.6	2411
N2-80P			96.3	2616



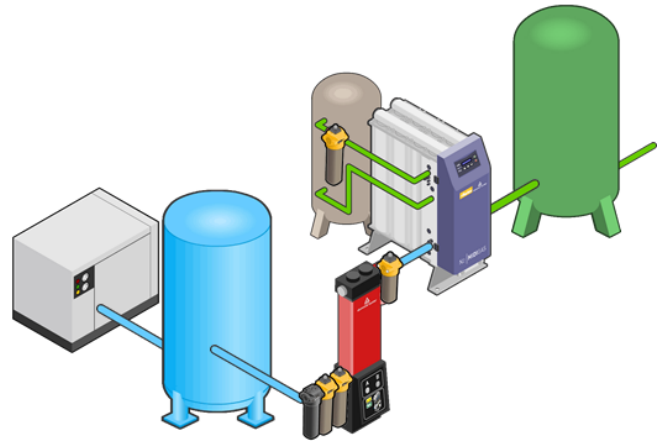
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# MIDIGAS

## Nitrogen Gas Generators

The cost-effective, reliable and safe solution for small to medium nitrogen requirements.



### Product Selection

Performance data is based on 7 bar g (100 psi g) air inlet pressure and 20°C - 25°C (66°F - 77°F) ambient temperature. Consult Parker for performance under other specific conditions.

Nitrogen flow rate m <sup>3</sup> /hr vs Purity (Oxygen Content)												
Model	Unit	10ppm	100ppm	250ppm	500ppm	0.1%	0.5%	1.0%	2.0%	3.0%	4.0%	5.0%
MIDIGAS2	m <sup>3</sup> /hr	0.55	1.2	1.5	1.9	2.4	3.4	4.3	5.8	7.2	8.4	9.4
	cfm	0.3	0.7	0.9	1.1	1.4	2.0	2.5	3.5	4.2	4.9	5.5
MIDIGAS4	m <sup>3</sup> /hr	1.2	2.4	3.2	3.9	4.7	6.9	8.5	11.6	14.3	16.7	18.8
	cfm	0.7	1.4	1.9	2.3	2.8	4.1	5.0	6.8	8.4	9.8	11.1
MIDIGAS6	m <sup>3</sup> /hr	1.5	3.2	4.2	5.3	6.5	9.5	11.5	15.2	18.7	21.7	24.5
	cfm	0.9	1.9	2.5	3.1	3.8	5.6	6.8	8.9	11.0	12.8	14.4
Outlet Pressure	bar g	5.6	5.4	5.9	5.7	5.6	5.7	6.0	6.0	5.8	5.7	5.6
	psi g	81	78	86	83	81	83	87	87	84	83	81

m<sup>3</sup> reference standard = 20°C, 1013 millibar(a), 0% relative water vapour pressure.

### Inlet Parameters

Inlet Air Quality	ISO 8573-1:2010 Class 2.2.2 (2.2.1 with high oil vapour content)
Inlet Air Pressure Range	6 - 13 bar g 87 - 217 psi g

### Electrical Parameters

Supply Voltage	115 / 230 ±10% V ac 50/60Hz
Power	80 W
Fuse	3.15A (Anti Surge (T), 250v, 5 x 20mm HBC, Breaking Capacity 1500A @ 250v, UL Listed)

### Environmental Parameters

Ambient Temperature	5 - 50 °C 41 - 122 °F
Humidity	50% @ 40°C (80% MAX ≤ 31°C)
IP Rating	IP20 / NEMA 1
Altitude	<2000m (6562 ft)
Noise	< 80 dB (A)

### Port Connections

Air Inlet	G <sup>1</sup> / <sub>2</sub> "
N <sub>2</sub> Outlet to Buffer	G <sup>1</sup> / <sub>2</sub> "
N <sub>2</sub> Inlet from Buffer	G <sup>1</sup> / <sub>2</sub> "
N <sub>2</sub> Outlet	G <sup>1</sup> / <sub>2</sub> "

### Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
MIDIGAS2	1034	41	450	18	471	19	98	216
MIDIGAS4	1034	41	450	18	640	26	145	320
MIDIGAS6	1034	41	450	18	809	33	196	432

### Packed Weights and Dimensions

Model	Height (H)		Width (W)		Depth (D)		Weight	
	mm	in	mm	in	mm	in	kg	lb
MIDIGAS2	612	24	1490	59	950	38	174	383
MIDIGAS4	612	24	1490	59	950	38	221	487
MIDIGAS6	612	24	1490	59	950	38	272	597



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