Liberty Systems
Nitrogen Generation

Modified Atmosphere Packaging
Controlled Atmosphere

www.LibertyN2.com

Modified Atmosphere Packaging
Controlled Atmosphere

What We Do

We provide solutions and help business conserve money by supplementing or replacing their current nitrogen supply with the use of on location nitrogen generators.

Modified Atmosphere Packaging

Modified Atmosphere Packaging (MAP) uses natural gasses to combat spoilage and to protect the appearance, flavor, and texture of packaged foods. This is commonly accomplished using a technique known as flushing. Nitrogen is one of the more widely used gasses and once the packaging is opened, the gases dissipate into the atmosphere with no harmful effects.

Modified atmosphere packaging is commonly associated with food production but it is used successfully in the packaging of pharmaceuticals, electronics and medical devices.

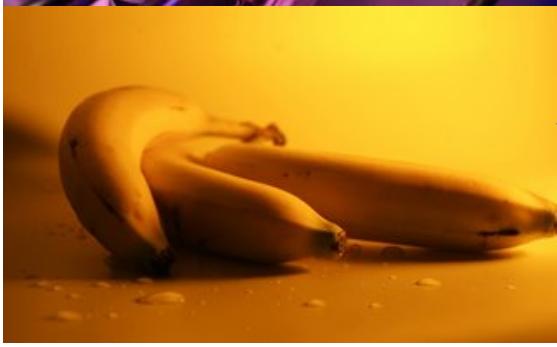
Controlled Atmosphere

Freshly harvested fruits and vegetables are living plant materials that are highly perishable. Their quality and their storage life are reduced by the loss of moisture, decay, and physiological breakdown, in part, due to the presence of oxygen. Slowing the deterioration process by controlling the environment to which they are exposed by reducing the oxygen level and increasing the nitrogen and carbon dioxide levels.

The difference between controlled atmosphere and modified atmosphere is in the way the storage atmosphere is achieved and maintained.

Equilibrium Modified Atmosphere Packaging

When packaging vegetables and fruits the gas atmosphere of the package is not air but consists usually of a lowered level of oxygen and a heightened level of carbon dioxide. This type of packaging slows down the normal respiration of the product and prolongs the shelf-life of the product.



Beyond the Technology

Solutions

Using Liberty Systems air separation membrane or pressure swing adsorption nitrogen generators, oxygen and moisture levels are reduced, this helps prevent oxidation. To prevent the growth of micro-organism such as bacteria and viruses, we add redundant sterile air filtration to our systems. Depending on the application we are able to offer two or three part gas proportional mixers as part of a package.

Our nitrogen is certified by the Canadian Food Inspection Agency (CFIA) for use in modified atmosphere packaging.

Air Separation Using Membrane

Gas separation with polymer membranes is a mainstream separation technology. The most widely practiced separations are enriched nitrogen production from air. Such purified nitrogen is widely used for applications that require nitrogen purities of 99.9% or less and flow rates below 5000 cubic feet per hour. Relative to pressure swing adsorption systems, membranes systems have a lower capital and operating cost. A small footprint makes them ideal for use in applications where space is valuable.

Pressure Swing Adsorption Using Carbon Molecular Sieve

Pressure swing adsorption (PSA) is attractive, because it is capable of producing a very pure nitrogen product (99.999%) and higher flow rates than membrane based systems. PSA nitrogen generators are commonly used for applications that require nitrogen purity above 99.9% as in the electronics or pharmaceutical industry.

The Benefits

Although most applications are specific to the process, our systems offer a safer and cheaper alternative to cylinders and help eliminate rental, delivery and refill costs. We have a core line of both membrane and PSA nitrogen generators. We are committed to high standards of quality and continually strive to surpass our client's expectations.

Series M1

Series M1 nitrogen generators are membrane based and work with your compressed air supply. The quality of that compressed air supply is vital to the longevity of your nitrogen generator.

Although we have developed an effective, proprietary blend of media designed to help remove oil and water vapor from your feed air, pre-filtration cannot remove all of the contaminants present in a compressed air stream.

Ensure that your compressed air supply contains less than 7 ppm/v THC (oil) and less than 1500 ppm/v H2O. This is generally accomplished with a functioning refrigerated air dryer upstream of you nitrogen generator.

With minimum preventive maintenance, your membrane based nitrogen generator is expected to have a life of more than 10 years.

M1 Flows

Flow Shown Below are at 100 psig Inlet (Maximum 200 psig)							
Model	**Flow @ 99.9%**	**Flow @ 99.5%**	**Flow @ 99.0%**	**Flow @ 97%**	**Flow @ 95%**	**Dimensions H x W x D (in)**	**Weight (lbs)**
M1-2	n/a	**2**	5	10	14	18 x 24 x 8	9
M1-18	n/a	**18**	23	42	64	48 x 36 x 8	11
M1-63	30	**63**	84	165	243	48 x 40 x 8	20
M1-126	63	**126**	168	330	486	48 x 40 x 8	35
M1-189	94	**189**	252	495	729	48 x 44 x 8	50
M1-317	158	**317**	423	777	1130	48 x 40 x 8	85
M1-634	317	**634**	826	1554	2260	48 X 60 X 24	380
M1-951	475	**951**	1268	2331	3390	48 x 60 x 24	450
M1-1268	634	**1268**	1652	3108	4520	48 x 60 x 24	520

Contact us for flow rates at higher inlet pressures

Flows are listed in scfh, for NM3/H the multiplier is 0.0283
Maximum operating ambient temperature is 140°F

Semi annual maintenance is required on all models

Annual Pre-Filter Maintenance Kit	Model
FMK21010	M1-2 and M1-18
FMK21020	MI-63 thru M1-317
FMK21030	M1-634 thru M1-951
FMK21040	M1-1268

M3 Flows

M3 Nitrogen generators are membrane based and include a Kaeser fixed speed rotary screw compressor

Flow Shown Below are at 125 psig Delivery								
Model	**Flow @ 99.9%**	**Flow @ 99.5%**	**Flow @ 99.0%**	**Flow @ 97%**	**Flow @ 95%**	**Dimensions H x W x D (in)**	**Weight (lbs)**	**HP**
M3-100	50	**100**	134	257	388	64 x 36 x 53	820	8
M3-200	100	**200**	268	514	776	64 x 36 x 53	870	10
M3-300	150	**300**	402	771	1164	64 x 36 x 53	910	15
M3-400	200	**400**	536	1028	1552	76 x 60 x 42	1430	15
M3-500	250	**500**	635	1200	1730	76 x 60 x 42	1430	20
M3-1000	500	**1000**	1270	12400	3460	76 X 84 X 42	2750	30

Flows are listed in scfh, for NM3/H the multiplier is 0.0283
Maximum operating ambient temperature is 140°F

Semi annual maintenance is required on all models

Annual Pre-Filter Maintenance Kit	Model
FMK21020	M3-100 thru M3-400
FMK21030	M3-500 and M3-1000

M5 Flows

M5 Nitrogen generators are membrane based and include a Kaeser variable speed rotary screw compressor

Flow Shown Below are at 205 psig Delivery								
Model	**Flow @ 99.9%**	**Flow @ 99.5%**	**Flow @ 99.0%**	**Flow @ 97%**	**Flow @ 95%**	**Dimensions H x W x D (in)**	**Weight (lbs)**	**HP**
M5-750	375	**750**	1048	1941	2750	76 x 84 x 42	2250	30
M5-1500	750	**1500**	2000	3800	5400	86 x 90 x 47	3180	50
M5-2250	1125	**2250**	3000	Custom	Custom	96 x 96 x 50	4300	60
M5-3000	1500	**3000**	4000	Custom	Custom	96 x 96 x 50	5620	100

Flows are listed in scfh, for NM3/H the multiplier is 0.0283
Maximum operating ambient temperature is 140°F

Semi annual maintenance is required on all models

Annual Pre-Filter Maintenance Kit	Model
FMK21030	M5-750 and M5-1500
FMK21040	M5-2250 and M5-3000

Pressure Swing Adsorption (PSA)

PSA based nitrogen generators provide higher flow rates and greater nitrogen purity than membrane based nitrogen generators.

PSA based nitrogen generators are geared towards applications where oxygen (O2) levels need to be ≤ 1000 ppm. PSA systems will typically have a larger footprint than a membrane based nitrogen generator.

Series P1

P1 nitrogen generators are PSA based and work with your compressed air supply. The quality of that compressed air supply is vital to the longevity of your nitrogen generator.

Ensuring that your compressed air supply contains less than 7 ppm/v THC (oil) and less than 1500 ppm/v H2O and the minimum preventive maintenance, your PSA based nitrogen generator is expected to have a life of more than 10 years.

P1 Flows

Flow Shown Below are at 100 psig Inlet (Maximum 200 psig)							
Model	**Flow @ 99.999%**	**Flow @ 99.95%**	**Flow @ 99.9%**	**Flow @ 99.5%**	**Flow @ 95%**	**Dimensions H x W x D (in)**	**Weight (lbs)**
P1-440	60	250	274	**437**	998	96 x 60 x 48	2100
P1-660	91	374	413	**658**	1498	96 x 60 x 48	2240
P1-880	120	499	557	**878**	1997	96 x 60x 48	2300
P1-1100	149	629	696	**1094**	2496	96 x 72 x 60	2680
P1-1315	182	749	830	**1315**	2995	104 x 72 x 60	2875
P1-1660	245	955	1056	**1666**	3797	108 x 84 x 72	3100
P1-2015	302	1157	1282	**2016**	4598	108 X 84 X 72	3250

Contact us for higher flow rates or flow rates at higher inlet pressures

Flows are listed in scfh, for NM3/H the multiplier is 0.0283
Maximum operating ambient temperature is 140°F

Semi annual maintenance is required on all models

Annual Pre-Filter Maintenance Kit	Model
FMKP1030	P1-440 thru P1-880
FMKP1040	P1-1100 thru P1-2015

P3 Flows

P3 Nitrogen generators are PSA based and include a Kaeser fixed speed or Kaeser variable speed rotary screw compressor. Typical nitrogen delivery pressure is 125 psig. If higher delivery pressures are required please contact Liberty Systems.

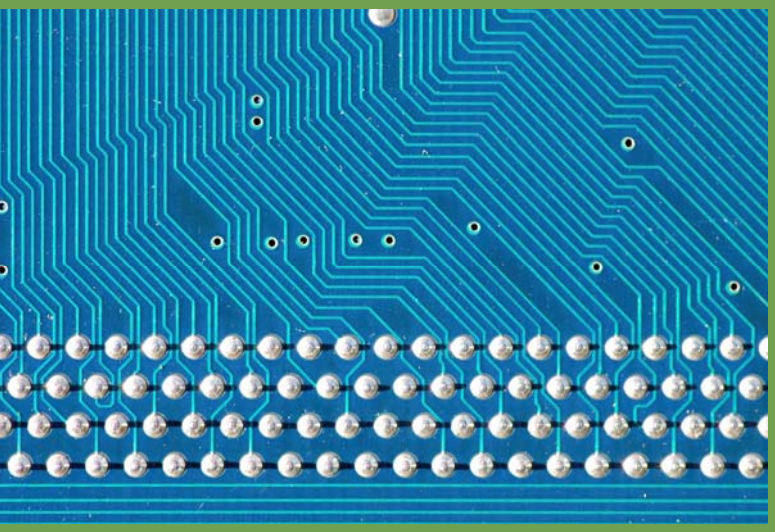
Flow Shown Below are at 100 psig Inlet (Maximum 200 psig)							
Model	**Flow @ 99.999%**	**Flow @ 99.95%**	**Flow @ 99.9%**	**Flow @ 99.5%**	**Flow @ 99.0%**	**Dimensions H x W x D (in)**	**Weight (lbs)**
P3-650	92	374	407	**650**	822	96 x 60 x 48	3000
P3-980	137	561	615	**979**	1229	96 x 60 x 48	3210
P3-1300	183	748	829	**1308**	1643	96 x 60x 48	3835
P3-1630	230	936	1036	**1629**	2051	96 x 72 x 60	3060
P3-1960	271	1120	1236	**1958**	2465	104 x 72 x 60	3980
P3-2480	364	1420	1572	**2479**	3123	108 x 84 x 72	5100
P3-3000	456	1720	1908	**3001**	3780	108 X 84 X 72	5495
P3-3915	542	2240	2472	**3916**	4930	104 x 72 x 60	6430
P3-4960	728	2840	3144	**4958**	6246	108 x 84 x 72	6800
P3-6000	912	3440	3816	**6002**	7560	108 X 84 X 72	8410

Contact us for higher flow rates or systems with higher delivery pressures

Flows are listed in scfh, for NM3/H the multiplier is 0.0283
Maximum operating ambient temperature is 140°F

Semi annual maintenance is required on all models

Annual Pre-Filter Maintenance Kit	Model
FMKP3030	P3-650 thru P3-3000
FMKP3040	P3-3915
FMKP3050	P3-4960 thru P3-6000



Beyond the Technology

Just a Phone Call Away!

For more information about opportunities regarding your application, please contact us or visit our website www.LibertyN2.com.

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