



Filtration and Nitrogen Gas Generation Products for the Food and Beverage Processing Industry

Bulletin FMB09-F



ENGINEERING YOUR SUCCESS.

Balston Filtration and Gas Generation Systems

Clean Compressed Air and Gases for Contaminant-Free Applications

Parker Hannifin Corporation, the global leader in motion and control technology, delivers an unmatched breadth of engineered products and solutions. Parker's Balston Operation, a unit of the Parker Filtration and Separation Division, delivers a complete line of compressed air and gas filters and gas generation systems. Balston Inc.

was established in 1970 to produce and market a unique filter design that set the standard for coalescing filters. In 1979, Balston introduced the first gas generator for laboratory use. In 2000, Balston was acquired by Parker Hannifin Corporation and, since 2000, has been an integral unit of the Filtration and Separation Division.

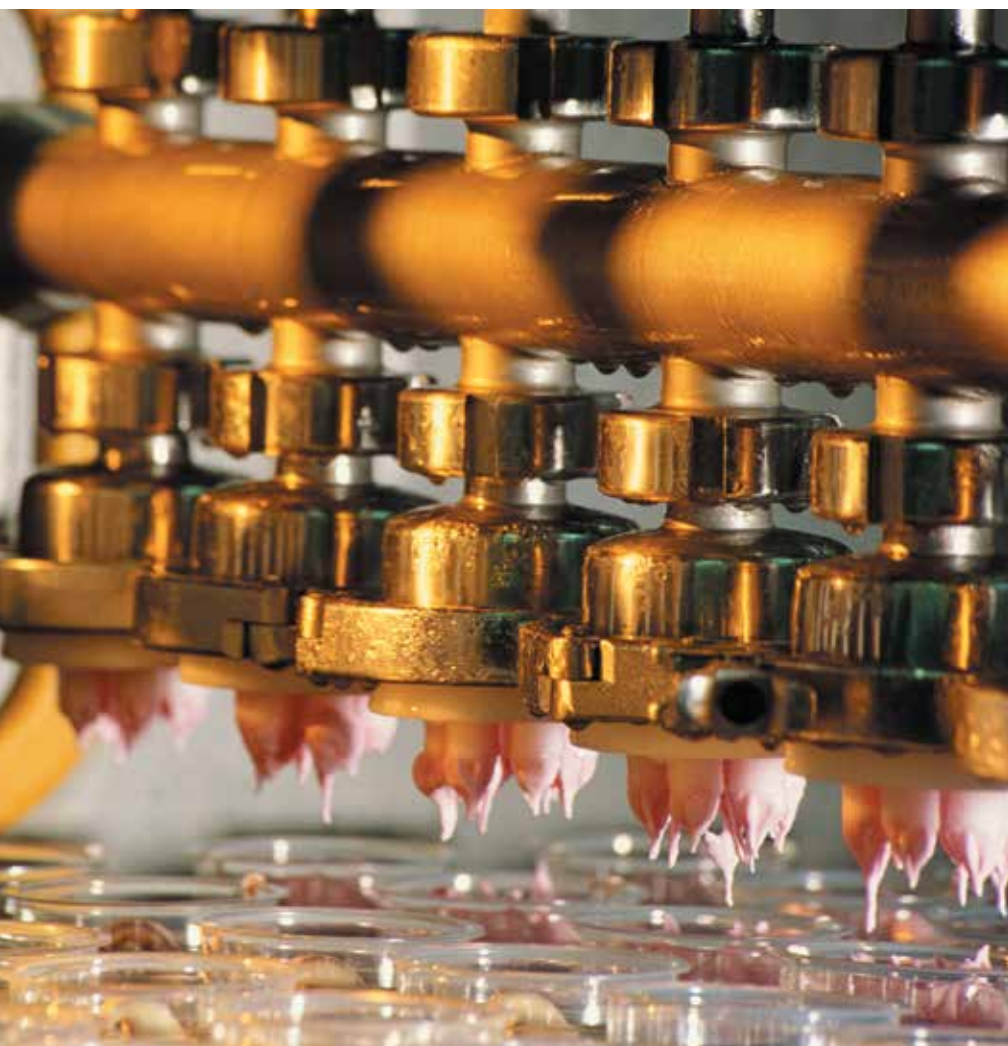
For over three decades the Balston brand has been the recognized leader in filtration, purification and gas generation technology.

All Parker Balston products are supported by a staff of highly trained sales and service specialists and are manufactured within strict guidelines of a total quality management program. All manufacturing facilities are ISO 9001 certified.

Parker's Motion and Control Technologies:

Aerospace	Hydraulics
Climate Control	Pneumatics
Electromechanical	Process Control
Filtration	Sealing & Shielding
Fluid & Gas Handling	

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Balston Filters and Accessories:

- Compressed Air/Gas Filters
- Instrumentation and Gas Sampling Filters
- Air Preparation Units (FRLs)
- Steam Filters
- Air Dryers
- Drains, Gauges, and other Accessories
- Nitrogen Generators
- Vacuum Pump Exhaust and
- Inlet Filters
- Natural Gas Filters

What Separates Balston Products From The Competition?



More than 75% of our standard items are made to order and ready for shipment within three days of order confirmation.

Mission

Our mission at the Filtration and Separation Division is to provide all of our customers with innovative, reliable, high quality products and services that will exceed their expectations.

Exceptional Lead Times

Our LEAN manufacturing capability assures that you will have the right filtration product at the right time. More than 75% of our standard items are made to order and ready for shipment within three days of order confirmation. This enables us to meet 98% of customers' request dates.

Outstanding Technical Assistance

We are committed to providing unmatched technical support to all our customers. Our degreed application engineers provide immediate response to technical questions and requests for specifications and quotes whenever possible. If they are busy serving other customers when you call, they make every effort to return your call within the hour.



Superior, Consistent Performance



USFDA, USDA, and 3A Compliance

Balston SR Steam Filters are in full compliance with the requirements of the US Food, Drug and Cosmetic Act. These filters may be used with steam, air, and other gases which directly contact food and food ingredients, including milk, alcoholic and non-alcoholic liquids.

These filters also meet the regulations for Indirect Food Additives used as Basic Components for Repeated Use Food Contact Surfaces as specified in 21 CFR Part 177, and Current Good Manufacturing Practices, 21 CFR Part 110.

The Balston SR Steam Filters are in full compliance with the 3A Accepted Practices (Number 609-03) for producing steam of culinary quality.

The Balston SR Steam Filters have also been accepted by the USDA for use in federally inspected meat and poultry plants.

Sterile Air Filter Systems

Remove all viable organisms

USDA accepted for use in federally inspected Meat and Poultry plants

Low pressure drop

Full compliance with FDA requirements

Here's what one of your colleagues found:

A Balston sterile air filter assembly, consisting of Models 200X Series, was tested at the University of Massachusetts, Department of Food Science and Nutrition, under the direction of Professor David A. Evans, Ph.D.

"This sterile air system produced commercially sterile air and, to the limits of detection, no viable colonies of microorganisms were found".

- Professor David A. Evans, Ph.D.



Filtration Products

Don't start the shift without us



Steam Filters

- Eliminate particulate contamination of food products
- Permit direct steam contact with food
- Eliminate taste and odor problems



Sterile Air Filters

- Remove all viable organisms
- USDA accepted for use in federally inspected meat and poultry plants
- Low pressure drop



Compressed Air Filters

- Removes 99.99% of all 0.01 micron sized particles and larger
- Flows from 1 to 52,000 SCFM
- Pressures to 250 psig
- 1" to 10" line size



Applications

- Washdown areas
- Packaging
- Direct steam injection
- Mixing



Stainless Steel Harsh Environment Filters

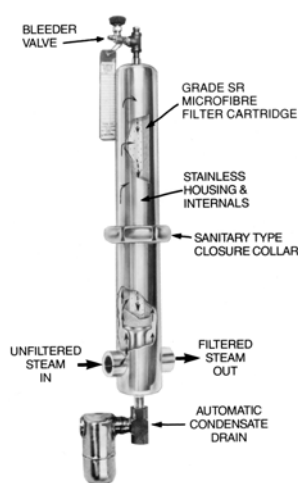
- All 304 stainless steel construction
- Remove 99.99% of 0.01 micron particles
- Remove all viable organisms
- USDA accepted for use in federally inspected meat and poultry plants
- Remove trace oil vapor with adsorbent cartridges

Steam Filters

Balston Series SR Filters are in full compliance with the requirements of the US Food, Drug and Cosmetic Act. They also meet the regulations for Indirect Food Additives used as Basic Components for Repeated Use Food Contact Surfaces as specified in 21 CFR Part 177, and Current Good Manufacturing Practices, 21 CFR Part 110. These filters have been accepted by the USDA for use in federally inspected meat and poultry plants. Balston Steam Filters are in full compliance with the 3A Accepted Practices (Number 609-04) for producing steam of culinary quality. They are also in full compliance with the requirements of the Health Protection Branch of Health and Welfare Canada.

Benefits

Balston Steam Filters eliminate particulate contamination of food products caused by direct contact with dirty steam. Other benefits include: reduction in steam condensate mixing with food products when steam is used for agitating, mixing, or cooking; eliminate taste and odor problems by reducing boiler feedwater carryover; Reduced maintenance requirements.



Recommended Steam Filters

For 3/4" and 1" Steam Lines	For 1-1/2" Steam Lines	For 2" Steam Lines
Model 23/75SR is recommended in smaller lines with a steam flow of up to 500 lbs. per hour. The filter is complete with filter cartridge, steam trap, and bleeder valve.	Model SP3-23/75SR is recommended. It will filter up to 1500 lbs. of steam per hour. Each of the three filters has its own steam trap. A master trap disposes of most condensate before it reaches the filters. Manifolds can be connected to flow from left to right or right to left.	Model SP4-23/75SR is recommended. It will filter up to 2000 lbs. of steam per hour. The Model SP6-23/75SR will filter up to 3000 lbs of steam per hour. Steam trap and manifold features are the same as the Model SP3-23/75.

Principal Specifications

Model	23/75SR	SP2-23/75R	SP3-23/75SR	SP4-23/75SR	SP6-23/75SR
Port Size	1" NPT	1 1/2" NPT	1 1/2" NPT	2" NPT	2" NPT
Max Pressure	125 psig	125 psig	125 psig	125 psig	125 psig
Flow Rate	500 lbs/hr	1000 lbs/hr	1500 lbs/hr	2000 lbs/hr	3000 lbs/hr
Materials of Construction	304 SS	304 SS	304 SS	304 SS	304 SS
Seals	EPR (2)	EPR (2)	EPR (2)	EPR (2)	EPR (2)
Shipping Wt	26 lbs. (12 kg)	Approx. 110 lbs	190 lbs. (86 kg)	220 lbs. (100 kg)	280 lbs. (127 kg)
Dimensions	7"W X 35"L (18cm X 88cm)	22"W X 46"L X 11"D (56cm X 117cm X 28cm)	29"W X 48"L X 21"D (74cm X 122cm X 53cm)	36"W X 48"L X 21"D (91cm X 122cm X 53cm)	50"W X 47.8"L X 22"D (74cm X 122cm X 53cm)

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model	23/75SR	SP2-23/75SR	SP3-23/75SR	SP4-23/75SR	SP6-23/75SR
Replacement Filter Cartridges (Box of 10)	200-75-SR (3)	200-75-SR (3)	200-75-SR (3)	200-75-SR (3)	200-75-SR (3)
Filter Cartridges per housing	1	2	3	4	6

Notes:

- 1 Each SP3, SP4, SP6 filter is supplied mounted on a stand.
- 2 Constructed of food grade EPR.
- 3 Each Steam Filter Assembly is supplied with filter cartridges installed.

Stainless Steel Filters for Washdown Areas

Protect your equipment and delicate instruments from the dirt, water, and oil usually found in compressed air and other gases. These filters will remove contaminants at a very high efficiency - up to 99.99% for 0.01 micron particles and droplets. Liquid releases from the filter cartridge to an automatic drain as rapidly as it enters the filter. This allows the filter to continue removing liquids for an unlimited time without loss of efficiency for flow capacity. Select 1/4" to 1" line filters are constructed of 304 stainless steel and are designed to hold up to the harshest environments.

Models 6102, 6002, 6904 are 1/4" size for lower flow systems and installations with space limitations. Models 6102 and 6002 offer two drain options: manual or auto float. Model 6904 offers 1/2 inlet and outlet connections for applications requiring 1/2" pipe with space limitations.

Model 6004 Series are 1/2" line size and are designed for moderate flow rate systems. This series has increased holding capacity to safeguard sensitive end use points.

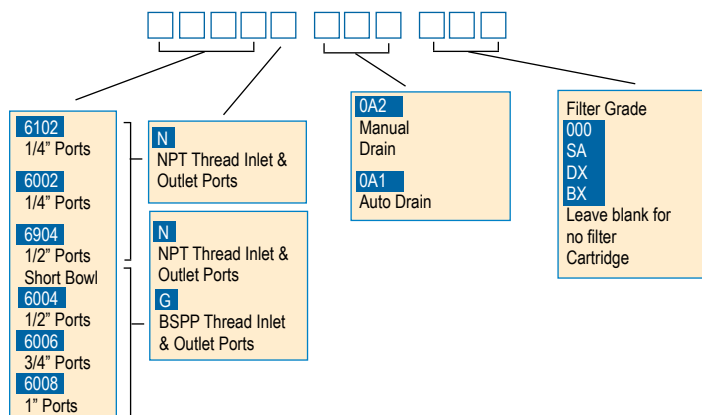
Models 6006 and 6008 are 3/4" and 1" line size filters respectively. They are designed for high flow rate systems servicing multiple end use points. They are also offered with a high capacity auto float drain option.



How to Order the Filter Assembly*

Build your own custom filter assembly using the guideline matrix below and specify your model number. Example: 1/2" filter with Auto Drain and Grade DX Filter = 6004N-0A1-DX.

*Consult Factory. Not all configurations are available.



Stainless Steel Filters for Washdown Areas



Filter Cartridge Description

General purpose applications such as plant compressed air	Single stage filtration. Use a Grade DX filter cartridge
Instrument air and other critical air requirements	Two stage filtration is necessary. Use a Grade DX followed by a Grade BX filter cartridge. As a general rule, a Grade BX filter cartridge should not be used alone.
Removal of trace compressor oil vapor	For rare instances where even a trace amount of oil vapor can cause a problem, three stage filtration is necessary. Use a Grade DX followed by a Grade BX, and a type CI cartridge.
Removal of bacteria and microorganisms	To produce sterile air use a Grade SA filter assembly.

Physical Properties, Microfiber Filter Cartridges

Temperature Range	-150°F to 300°F (-100°C - 149°C)
Maximum Pressure	
Differential Across Filter,	
Inside-to-Outside Flow:	100 psi
Materials of Construction	Borosilicate glass microfibers with fluorocarbon resin binder. Resistant to water, all hydrocarbon and synthetic lubricants.

Retention Efficiency

Grade	Efficiency for 0.01 Micron Particles and Droplets
DX	93%
BX	99.99%
SA	99.9999+%

Flow Rates

Filter Housing Model	Port Size	Filter Cartridge Grade	Flow rates (SCFM) at 2 psi drop at indicated line pressure. Refer to Principal Specification Charts in each product data sheet for maximum pressure rating of each housing								
			Operating Pressure PSIG (barg)								
			2	20	40	80	100	125	150	200	250
6102N	1/4"	DX	3.5	8	11	20	25	30	36	---	---
		BX	1	2	3.5	5.7	6.8	8	10	---	---
6002N 6904N	1/4" 1/2"	DX	9	19	39	51	63	76	90	117	145
		BX	3	8	11	21	25	31	36	47	58
		CI	2	5	7	12	15	18	22	28	35
		SA	---	8	11	21	25	31	36	---	---
6004N	1/2"	DX	19	41	65	113	137	166	196	257	316
		BX	9	19	30	51	63	76	90	117	145
		CI	6	12	19	32	39	48	56	73	90
		SA	---	19	30	51	63	76	90	---	---
6006N	3/4"	DX	37	78	123	214	259	315	371	484	596
		BX	10	21	34	56	70	85	101	131	162
		CI	8	16	26	44	53	65	76	99	122
		SA	---	21	34	56	70	85	101	---	--
6008N	1"	DX	55	115	181	314	380	463	546	711	877
		BX	11	23	37	64	77	94	111	144	178
		CI	10	20	32	56	67	82	96	125	154
		SA	---	23	37	64	77	94	111	---	---

Principal Specifications

Model	6102	6002	6904	6004	6006	6008
Port Size	1/4" NPT	1/4" NPT	1/2" NPT	1/2" NPT	3/4" NPT	1" NPT
Materials of Construction						
Head	316 Stainless Steel	304 Stainless Steel				
Bowl	316 Stainless Steel	304 Stainless Steel				
Internals	Acetal	Stainless Steel				
Seals	Viton	Buna-N Food Grade				
Maximum Temperature (1)	140°F (60°C)	120°F (49°C)				
Maximum Pressure (2)	150 psig	175 psig				
Minimum Pressure (3)	15 psig	15 psig				
Shipping Weight	3.5 lbs.	3.5 lbs.	3.5 lbs.	4.0 lbs.	11 lbs.	12 lbs.
Dimensions	1.5"W x 4.2"L (3.8cm x 11.7cm)	3"W X 7"L (7cm X 18cm)	3"W X 7"L (7cm X 18cm)	3"W X 10"L (7cm X 25cm)	4"W X 10"L (10cm X 25cm)	4"W X 12"L (10cm X 30cm)
Accessories	6102	6002	6904	6004	6006	6008
Mounting Bracket	---	CO1-0094				
Bracket	CO2-2392	CO1-0109				

Notes:

1 Max. temperature with auto drain. Max. temperature with manual drain is 275°F.

2 Max. pressure with auto drain. Max. pressure with manual drain is 250 psi.

3 Required for proper operation of auto drain.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Assembly Ordering Information

Model P/N	Filter Tube	Drain (Manual)	Drain (Auto. Float)	Mounting Bracket (stainless steel)
6102N-0A0-(?X)	070-063-(?X)	SAP05481	N/A	N/A
6102N-0A1-(?X)	070-063-(?X)	N/A	CO2-2392	N/A
6002N-0A2-(?X)	100-12-(?X)	CO1-0108	N/A	CO1-0094
6002N-0A1-(?X)	100-12-(?X)	N/A	CO1-0109	CO1-0094
6002N-0A2-SA	100-12-SA	CO1-0108	N/A	CO1-0094
6002N-0A2-000	CI-100-12-000	CO1-0108	N/A	CO1-0094
6904N-0A2-(?X)	100-12-(?X)	CO1-0108	N/A	CO1-0094
6904N-0A2-(?X)	100-12-(?X)	N/A	CO1-0109	CO1-0094
6904N-0A2-SA	100-12-SA	CO1-0108	N/A	CO1-0094
6904N-0A2-000	CI-100-12-000	CO1-0108	N/A	CO1-0094
6004N-0A2-(?X)	100-18-(?X)	CO1-0108	N/A	CO1-0094
6004N-0A1-(?X)	100-18-(?X)	N/A	CO1-0109	CO1-0094
6004N-0A2-SA	100-18-SA	CO1-0108	N/A	CO1-0094
6004N-0A2-000	CI-100-18-000	CO1-0108	N/A	CO1-0094
6006N-0A2-(?X)	200-176-(?X)	CO1-0108	N/A	CO1-0094
6006N-0A1-(?X)	200-176-(?X)	N/A	CO1-0109	CO1-0094
6006N-0A2-SA	200-176-SA	CO1-0108	N/A	CO1-0094
6006N-0A2-000	200-176-000	CO1-0108	N/A	CO1-0094
6008N-0A2-(?X)	200-185-(?X)	CO1-0108	N/A	CO1-0094
6008N-0A1-(?X)	200-185-(?X)	N/A	CO1-0109	CO1-0094
6008N-0A2-SA	200-185-SA	CO1-0108	N/A	CO1-0094
6008N-0A2-000	200-185-000	CO1-0108	N/A	CO1-0094

Replacement Filter Cartridge Ordering Information

Model P/N	6102	6002/6904	6004	6006	6008
Replacement Filter Cartridges					
Number required	1	1	1	1	1
Box of 5	5/070-063-(?X)	5/100-12-(?X)	5/100-18-(?X)	5/200-176-(?X)	5/200-185-(?X)
Box of 10	070-063-(?X)	100-12-(?X)	100-18-(?X)	200-176-(?X)	200-185-(?X)
Box of 10	070-063-SA	100-12-SA	100-18-SA	200-176-SA	200-185-SA
CI Cartridges (box of 1)	---	CI100-12-000	CI100-18-000	CI200-176-000	CI200-185-000

Retention Efficiency

Grade		Efficiency for 0.01 Micron Particles and Droplets
(?) =	DX	93%
	BX	99.99%
	SA	99.9999+%

3 Stage Sterile Air Filters



Safeguard your operations from rust, pipescale, water, oil, and organisms. These filters will remove contaminants at a very high efficiency - up to 99.99% for 0.01 micron particles and droplets. Liquid releases from the filter cartridge to an automatic drain

as rapidly as it enters the filter. This allows the filter to continue removing liquids for an unlimited time without loss of efficiency or flow capacity.

The final stage of filtration removes all viable organisms with

an efficiency rating of 99.9999+ at 0.01 microns. Select 1/4" to 1" line filters are constructed of 304 stainless steel and are designed to hold up to the harshest environments.

Product Features:

- All 304 stainless steel construction, ideal standing up to aggressive washdown chemicals
- Remove 99.9999% of 0.01 micron particles of oil, water, and dirt from compressed air and other gases
- Remove all viable organisms
- USDA accepted for use in federally inspected meat and poultry plants
- Low pressure drop
- Continuously trap and drain liquids

Application

Compressed air is contaminated with compressor oil, water condensate, pipe scale and rust all of which provide the ideal environment and means to grow bacteria. This natural occurring contaminate can also effect the taste, appearance and shelf life of food product. The food processing and packaging industry utilizes compressed air extensively throughout their facilities. Compressed air is used to push and propel product, cut and mix product in addition to packaging product.

Cahoon Farms in Walcott, New York uses Parker Balston three stage filtration systems for all their compressed air and sterile air applications. Cahoon Farms packages fresh sliced apples and cherries, dried apples, and other assorted dried fruits. Compressed air is

used extensively throughout the facility servicing pneumatic equipment, slicing and mixing food product, and packaging. The sterile compressed air applications are filtered to an efficiency of 99.9999+% at 0.01 microns which is 30 times better than the accepted industry standard. Cahoon Farms safeguards their food product from any possible contamination that could lead to bacteria and mold growth. The investment in these filtration systems ensures Cahoon Farms' products will maintain superior taste, quality and freshness with an extended shelf life.



Sterile Air Filter Rating Information

Balston grade SA filter cartridges, rated at 99.9999+% efficiency for 0.01 micron particles, is at least 30 times better than the accepted standard for sterile air filters developed by independent research organizations in the U.S. and U.K. (request bulletin TI-105 for a detailed discussion on Balston filter efficiency rating procedure, and Bulletin TI-935 for an independent test report on Balston Sterile Air Filters). Balston Sterile Air Filters are in full compliance with the requirements of the FDA.

Explanation for 3 Stage Sterile Air System

1st Stage: Grade DX	Removal of large quantities of oil, water, and dirt from compressed air. Prefilter to Grade BX
2nd Stage: Grade BX	Complete removal of trace quantities of oil, water, and dirt down to 0.01 microns.
3rd Stage: Grade SA	Removal of bacteria providing sterile air.

Retention Efficiency

Grade	Efficiency for 0.01 Micron Particles and Droplets
DX	93%
BX	99.99%
SA	99.9999+%

Flow Rates

Filter Housing Model	Port Size	Filter Cartridge Grade	Flow rates (SCFM) at 2 psi drop at indicated line pressure. Refer to Principal Specification Charts in each product data sheet for maximum pressure rating of each housing								
			Operating Pressure PSIG (barg)								
			2	20	40	80	100	125	150	200	250
3B-6002N-0A1 3B-6904N-0A1	1/4"	DX	9	19	39	51	63	76	90	117	145
	1/2"	BX	3	8	11	21	25	31	36	47	58
		SA	—	8	11	21	25	31	36	—	—
3B-6004N-0A1	1/2"	DX	19	41	65	113	137	166	196	257	316
		BX	9	19	30	51	63	76	90	117	145
		SA	—	19	30	51	63	76	90	—	—
3B-6006N-0A1	3/4"	DX	37	78	123	214	259	315	371	484	596
		BX	10	21	34	56	70	85	101	131	162
		SA	—	21	34	56	70	85	101	—	—
3B-6008N-0A1	1"	DX	55	115	181	314	380	463	546	711	877
		BX	11	23	37	64	77	94	111	144	178
		SA	—	23	37	64	77	94	111	—	—

Steam Sterilization Procedure

In installations where the sterile air filter requires steam sterilization, we recommend the following procedures: The steam sterilization pressure should not exceed 60 psig. Preferably, it should be held to 40 psig or less. A typical sterilization cycle is 30 psig steam for 30 minutes. Steaming time can be increased as desired without harm to the filter cartridges. The steam flow should not exceed the normal air flow for the unit. To ensure no buildup of condensate in the housing, condensate should be drained from the filter by a condensate drain valve during the steaming process. The cleanliness of the steam is an important factor influencing the life of the sterile air filter cartridges. Parker strongly recommends using model 23 steam filters to ensure optimum operating life. When autoclaving, the grade SA filter cartridges will tolerate temperatures to 300°F (149°C) in dry gas. Viton or other heat resistant seals should be used in the housing.

3 Stage Sterile Air Filter Systems



Principal Specifications

Model	3B-6002	3B-6904	3B-6004	3B-6006	3B-6008
Port Size	1/4" NPT	1/2" NPT	1/2" NPT	3/4" NPT	1" NPT
Materials of Construction					
Head	304 Stainless Steel				
Bowl	304 Stainless Steel				
Internals	Stainless Steel				
Seals	Buna-N Food Grade				
Maximum Temperature (1)	120°F (49°C)				
Maximum Pressure (2)	175 psig				
Minimum Pressure (3)	15 psig				
Shipping Weight	10.5 lbs.	10.5 lbs.	11.8 lbs.	33.7 lbs.	34 lbs.
Dimensions	9"W X 3"D X 8"L	9"W X 3"D X 8"L	9"W X 3"D X 8"L	13"W X 4"D X 11"L	13"W X 4"D X 12"L

Notes:
1 Max. temperature with auto drain. Max. temperature with manual drain is 275°F.

2 Max. pressure with auto drain. Max. pressure with manual drain is 250 psi.

3 Required for proper operation of auto drain.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Assembly Ordering Information

Model P/N	Mounting Bracket (stainless steel)	Replacement Cartridge		Mounting Bracket (stainless steel) (4)
		Box of 5	Box of 10	
3B-6002N-0A1	1/4" 3-Stage (DX, BX, SA) Stainless Filter Assembly	5/100-12-DX 5/100-12-BX 5/100-12-SA	100-12-DX 100-12-BX 100-12-SA	C01-0094
3B-6904N-0A1	1/2" 3-Stage (DX, BX, SA) Stainless Filter Assembly	5/100-12-DX 5/100-12-BX 5/100-12-SA	100-12-DX 100-12-BX 100-12-SA	C01-0094
3B-6004N-0A1	1/2" 3-Stage (DX, BX, SA) Stainless Filter Assembly	5/100-18-DX 5/100-18-BX 5/100-18-SA	100-18-DX 100-18-BX 100-18-SA	C01-0094
3B-6006N-0A1	3/4" 3-Stage (DX, BX, SA) Stainless Filter Assembly	5/200-176-DX 5/200-176-BX 5/200-176-SA	200-176-DX 200-176-BX 200-176-SA	C01-0094
3B-6008N-0A1	1" 3-Stage (DX, BX, SA) Stainless Filter Assembly	5/200-185-DX 5/200-185-BX 5/200-185-SA	200-185-DX 200-185-BX 200-185-SA	C01-0094

4 2 each of mounting brackets are required for adequate support.

Balston 2 Stage High Efficiency Air Filtration Systems

Safeguard your operations from rust, pipescale, water, and oil. The prefilters will remove contaminants at a very high efficiency - up to 93% for 0.01 micron particles and droplets. Liquid releases from the filter cartridge to an automatic drain as rapidly as it enters the filter. This allows the filter to continue removing liquids for an unlimited time without loss of efficiency or flow capacity.

The final stage of filtration removes all remaining contaminants with an efficiency rating of 99.99+% at 0.01 microns. Select 1/4" to 1 1/2" line filters are constructed of aluminum with a durable powder coating designed to hold up to the dirtiest compressed air systems.

The Parker Balston 2 stage filter systems offer the best protection to all your pneumatic equipment and instrumentation. These high efficiency filtration systems will eliminate costly maintenance and unexpected downtime due to contaminated compressed air.

Explanation for 2 Stage Compressed Air Filter System

1st Stage: Grade DX	Removal of large quantities of oil, water, and dirt from compressed air. Prefilter to Grade BX
2nd Stage: Grade BX	Complete removal of trace quantities of oil, water, and dirt down to 0.01 microns.

Grade	Efficiency for 0.01 Micron Particles and Droplets
DX	93%
BX	99.99%
SA	99.9999+%

Product Features:

- Full-featured with differential pressure indicators, auto drains, sight glasses, pressure relief valve, and bayonet bowl-to-head connection
- Lifetime (20 year) warranty
- Continuously trap and drain liquids
- Remove 99.99% of 0.01 micron particles of oil, water, and dirt from compressed air and other gases
- USDA accepted for use in federally inspected meat and poultry plants
- Low pressure drop

Application

These filters are ideal for safeguarding critical production equipment from corrosive compressor condensate that can cause catastrophic failures and unexpected downtime. Ideal applications are:

- Instrumentation
- Air actuators and air cylinders
- Pneumatic packaging machines
- Pneumatic conveyors
- Air operated production equipment
- Air operated lifts



2 Stage High Efficiency Air Filtration Systems



The Balston filter performance complies with several of the international standards as written in ISO8573-1 which is fast becoming the industry standard method for specifying compressed air purity. The following diagrams illustrate the various classes of purity that can be achieved by using the Balston grade DX filter media or BX media or a combination of both.

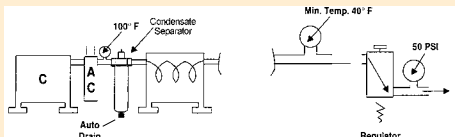
Class	Solid		Water		Oil	
	Maximum Particle Size (micron)	Maximum Concentration ppm (mg/m ³)	Maximum Pressure Dewpoint °F (°C)		Maximum Concentration ppm (mg/m ³)	
1	0.1	.08 (0.1)	-94 (-70)		.008 (0.01)	
2	1	.8 (1)	-40 (-40)		.08 (0.1)	
3	5	4.2 (5)	-4 (-20)		.83 (1)	
4	15	6.7 (8)	37 (+3)		4.2 (5)	
5	40	8.3 (10)	45 (+7)		21 (25)	
6	-	-	50 (+10)		-	-

ISO Class Example

1 Solid **4** Water **1** Oil

ISO Class 1 4 1

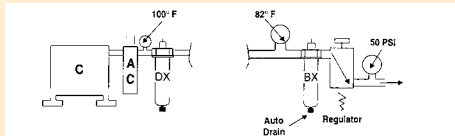
Any compressor with aftercooler, 2-stage coalescing and refrigerated dryer for use with instrument quality air.



ADDITIONAL SPECS: CGA - G7.1 (Grade D & E) ISA S7.3, sFed. Std. 209 (Class 100)

ISO Class 1 1 1

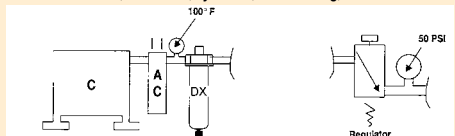
Any compressor with aftercooler and 2-stage coalescing. Air intended for use as lubricated control valves, cylinders and parts blow-down.



ADDITIONAL SPECS: Mil. Std. 282 H.E.P.A., U.S.P.H.S. 3A accepted particles for milk.

ISO Class 2 2 2

Any compressor with aftercooler and coalescer. Air intended for use with lubricated air tools, air motors, cylinders, shot blasting, non-frictional valves.



ADDITIONAL SPECS: CGA - G7.1 (Grades A & Ba1)



Flow Rates

Filter Housing Model	Port Size	Filter Cartridge Grade	Flow rates (SCFM), at 2 psi drop at indicated line pressure. Refer to Principal Specification Charts in each product data sheet for maximum pressure rating of each housing								
			Operating Pressure PSIG (barg)								
			2	20	40	80	100	125	150	200	250
2A-2002N-3B1	1/4"	DX	9	19	39	51	63	76	90	117	145
2A-2003N-3B1	3/8"	BX	3	8	11	21	25	31	36	47	58
2A-2004N-3B1	1/2"										
2A-2104N-3B1	1/2"	DX	19	41	65	113	137	166	196	257	316
		BX	9	19	30	51	63	76	90	117	145
2A-2206N-3B1	3/4"	DX	37	78	123	214	259	315	371	484	596
		BX	10	21	34	56	70	85	101	131	162
2A-2208N-3B1	1"	DX	55	115	181	314	380	463	546	711	877
		BX	11	23	37	64	77	94	111	144	178
2A-2312N-3B1	1 1/2"	DX	98	203	319	554	670	816	963	1254	1546
		BX	22	46	74	129	155	189	223	290	358

Principal Specifications

Model	2A-2002, 2003, 2004	2A-2104	2A-2206	2A-2208	2A-2312
Port Size	1/4" NPT	1/2" NPT	3/4" NPT	1" NPT	1.5" NPT
Materials of Construction					
Head	Aluminum				
Bowl	Aluminum				
Internals	Aluminum				
Seals	Buna-N Food Grade				
Maximum Temperature (1)	120°F (49°C)				
Maximum Pressure (2)	175 psig				
Minimum Pressure (3)	15 psig				
Shipping Weight	4.2 lbs.	5 lbs.	11.7 lbs.	11.7 lbs.	27 lbs.
Dimensions	6.25"W X 8.5"L	6.25"W X 11"L	8.3"W X 13"L	8.3"W X 13"L	10.5"W X 17"L
Auto Drain	21552				
Mounting Bracket	CO2-2091		CO2-2121		CO2-2122

Notes:

1 Max. temperature with auto drain

2 Max. pressure with auto drain. Max. pressure with manual drain is 250 psi.

3 Required for proper operation of auto drain.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Assembly Ordering Information

Model P/N		Replacement Cartridge	
		Box of 5	Box of 10
2A-2002N-3B1	1/4" 2-Stage (DX, BX) Filter Assembly	5/100-12-DX	100-12-DX
2A-2003N-3B1	3/8" 2-Stage (DX, BX) Filter Assembly	5/100-12-BX	100-12-BX
2A-2004N-3B1	1/2" 2-Stage (DX, BX) Filter Assembly		
2A-2004N-3B1	1/2" 2-Stage (DX, BX) Filter Assembly	5/100-18-DX	100-18-DX
		5/100-18-BX	100-18-BX
2A-2006N-3B1	3/4" 2-Stage (DX, BX) Filter Assembly	5/200-176-DX	150-19-DX
		5/200-176-BX	150-19-BX
2A-2008N-3B1	1" 2-Stage (DX, BX) Stainless Assembly	5/200-185-DX	150-19-DX
		5/200-185-BX	150-19-BX

3 Stage Compressed Sterile Air Filters



Product Features:

- Remove all viable organisms - at 99.9999+% @0.01 microns
- Remove 99.99% of 0.01 micron particles of oil, water, and dirt from compressed air and other gases
- USDA accepted for use in federally inspected meat and poultry plants
- Low pressure drop
- Continuously trap and drain liquids

Safeguard your operations from rust, pipescale, water, oil, and organisms. The prefilters will remove contaminants at a very high efficiency - up to 99.99% for 0.01 micron particles and droplets. Liquid releases from the filter cartridge to an automatic drain

as rapidly as it enters the filter. This allows the filter to continue removing liquids for an unlimited time without loss of efficiency or flow capacity.

The final stage of filtration removes all viable organisms with an

efficiency rating of 99.9999+% at 0.01 microns. Select 1/4" to 1 1/2" aluminum with a durable powder coating designed to hold up to the dirtiest compressed air systems.

Application

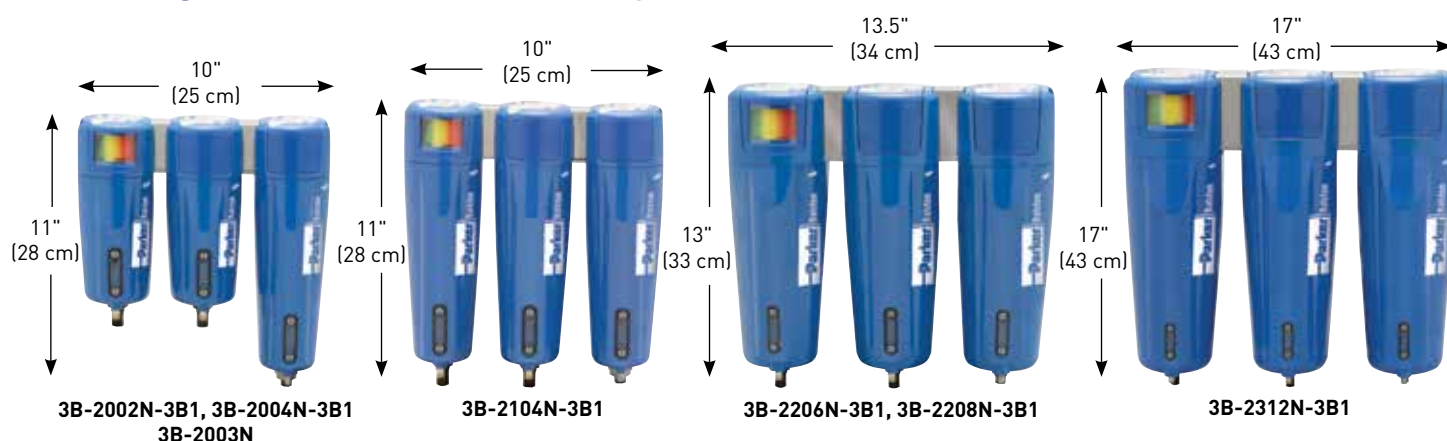
Compressed air is contaminated with compressor oil, water condensate, pipe scale and rust all of which provide the ideal environment and means to grow bacteria. This natural occurring contaminate can also effect the taste, appearance and shelf life of food product. The food processing and packaging industry utilizes compressed air extensively throughout their facilities. Compressed air is used to push and propel product, cut and mix product in addition to packaging product.

Cahoon Farms in Walcott, New York uses Parker Balston three stage filtration systems for all their compressed air and sterile air applications. Cahoon Farms packages fresh sliced apples and cherries, dried apples, and other assorted dried fruits. Compressed air is

used extensively throughout the facility servicing pneumatic equipment, slicing and mixing food product, and packaging. The sterile compressed air applications are filtered to an efficiency of 99.9999+% at 0.01 microns, which is 30 times better than the accepted industry standard. Cahoon Farms safeguards their food product from any possible contamination that could lead to bacteria and mold growth. The investment in these filtration systems ensures Cahoon Farms' products will maintain superior taste, quality and freshness with an extended shelf life.



3 Stage Sterile Air Filter Systems



Sterile Air Filter Rating Information

Balston grade SA filter cartridges, rated at 99.9999+% efficiency for 0.01 micron particles, is at least 30 times better than the accepted standard for sterile air filters developed by independent research organizations in the U.S. and U.K. (request bulletin TI-105 for a detailed discussion on Balston filter efficiency rating procedure, and Bulletin TI-935 for an independent test report on Balston Sterile Air Filters). Balston Sterile Air Filters are in full compliance with the requirements of the FDA.

Explanation for 3 Stage Filter System

1st Stage: Grade DX	Removal of large quantities of oil, water, and dirt from compressed air. Prefilter to Grade BX.
2nd Stage: Grade BX	Complete removal of trace quantities of oil, water, and dirt down to 0.01 microns.
3rd Stage: Grade SA	Removal of bacteria providing sterile air.

Grade	Efficiency for 0.01 Micron Particles and Droplets
DX	93%
BX	99.99%
SA	99.9999+%

Flow Rates

Filter Housing Model	Port Size	Filter Cartridge Grade	Flow rates (SCFM), at 2 psi drop at indicated line pressure. Refer to Principal Specification Charts in each product data sheet for maximum pressure rating of each housing								
			Operating Pressure PSIG (barg)								
			2	20	40	80	100	125	150	200	250
3B-2002N-3B1 3B-2003N-3B1 3B-2004N-3B1	1/4"	DX	9	19	39	51	63	76	90	117	145
	3/8"	BX	3	8	11	21	25	31	36	47	58
	1/2"	SA	—	8	11	21	25	31	36	—	—
3B-2104N-3B1	1/2"	DX	19	41	65	113	137	166	196	257	316
		BX	9	19	30	51	63	76	90	117	145
		SA	—	19	30	51	63	76	90	—	—
3B-2206N-3B1	3/4"	DX	37	78	123	214	259	315	371	484	596
		BX	10	21	34	56	70	85	101	131	162
		SA	—	21	34	56	70	85	101	—	—
3B-2208N-3B1	1"	DX	55	115	181	314	380	463	546	711	877
		BX	11	23	37	64	77	94	111	144	178
		SA	—	23	37	64	77	94	111	—	—
3B-2312N-3B1	1 1/2"	DX	98	203	319	554	670	816	963	1254	1546
		BX	22	46	74	129	155	189	223	290	358
		SA	16	33	52	91	110	134	158	206	253

3 Stage Sterile Air Filter Systems

Principal Specifications

Model	3B-2002, 2003, 2004	3B-2104	3B-2206	3B-2208	3B-2312
Port Size	1/4" NPT	1/2" NPT	3/4" NPT	1" NPT	1.5" NPT
Materials of Construction					
Head	Aluminum				
Bowl	Aluminum				
Internals	Aluminum				
Seals	Buna-N Food Grade				
Maximum Temperature (1)	120°F (49°C)				
Maximum Pressure (2)	175 psig				
Minimum Pressure (3)	15 psig				
Shipping Weight	6.75 lbs.	7.5 lbs.	17.5 lbs.	17.5 lbs.	41.25 lbs.
Dimensions	10"W x 11"L	10"W x 11"L	13.5"W x 13"L	13"W x 13"L	17"W x 17"L

Notes:

- 1 Max. temperature with auto drain 2 Max. pressure with auto drain. Max. pressure with manual drain is 250 psi. 3 Required for proper operation of auto drain.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Assembly Ordering Information

Model P/N		Replacement Cartridge	
		Box of 5	Box of 10
3B-2002N-3B1	1/4" 3-Stage (DX, BX, SA) Filter Assembly	5/100-12-DX	100-12-DX
3B-2003N-3B1	3/8" 3-Stage (DX, BX, SA) Filter Assembly	5/100-12-BX	100-12-BX
3B-2004N-3B1	1/2" 3-Stage (DX, BX, SA) Filter Assembly	5/100-12-SA	100-12-SA
3B-2104N-3B1	1/2" 3-Stage (DX, BX, SA) Filter Assembly	5/100-18-DX	100-18-DX
		5/100-18-BX	100-18-BX
		5/100-18-SA	100-18-SA
3B-2206N-3B1	3/4" 3-Stage (DX, BX, SA) Filter Assembly	5/200-176-DX	150-19-DX
		5/200-176-BX	150-19-BX
		5/200-176-SA	150-19-SA
3B-2208N-3B1	1" 3-Stage (DX, BX, SA) Stainless Assembly	5/200-185-DX	150-19-DX
		5/200-185-BX	150-19-BX
		5/200-185-SA	150-19-SA
3B-2312N-3B1	1 1/2" 3-Stage (DX, BX, SA) Stainless Assembly	5/200-35-DX	200-35-DX
		5/200-35-BX	200-35-BX
		5/200-35-SA	200-35-SA

- 4 2 each of mounting brackets are required for adequate support.

Sterile Air Filters

Remove all viable organisms

USDA accepted for use in federally inspected Meat and Poultry plants

Low pressure drop

Full compliance with FDA requirements



Balston grade SA filter cartridges, rated at 99.9999+% efficiency for 0.01 micron particles, is at least 30 times better than the accepted standard for sterile air filters developed by independent research organizations in the U.S. and U.K. (request Bulletin TI-105A for a detailed discussion on Balston filter efficiency rating procedure, and Bulletin TI-935 for an independent test report on Balston Sterile Air Filters). Balston Sterile Air Filters are in full compliance with the requirements of the FDA.

Here's what one of your colleagues found:

A Balston sterile air filter assembly, consisting of Models 200X Series, was tested at the University of Massachusetts, Department of Food Science and Nutrition, under the direction of Professor David A. Evans, Ph.D.

"This sterile air system produced commercially sterile air and, to the limits of detection, no viable colonies of microorganisms were found".

- Professor David A. Evans, Ph.D.



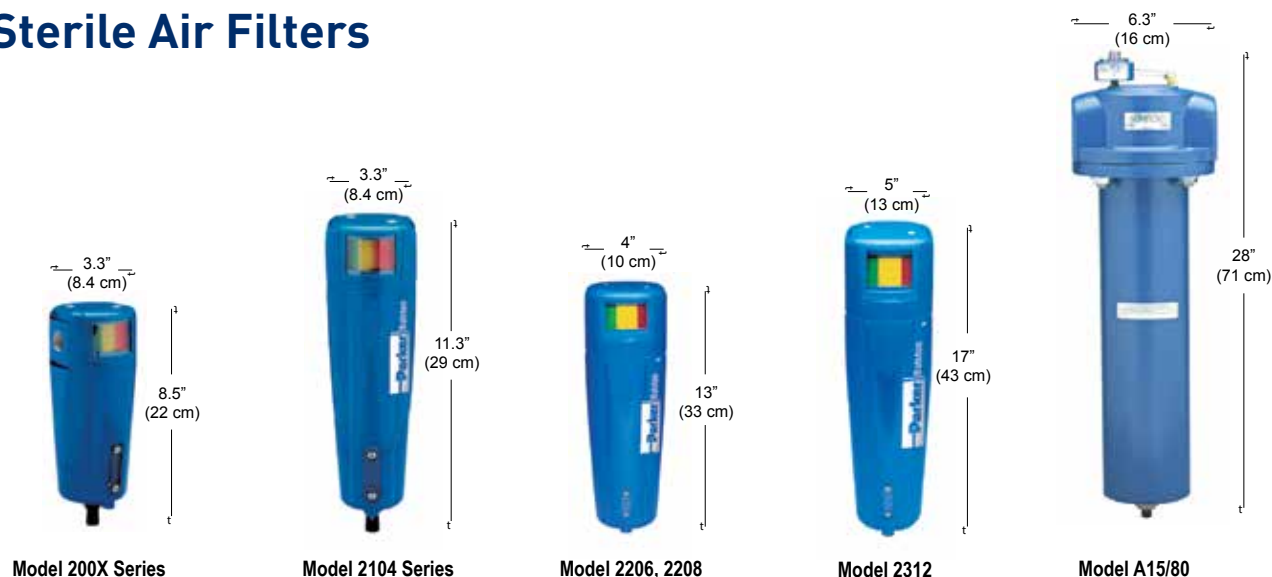
Sterile Air Filters

Flow Rates - 1/4" to 2" Line Size

Filter Assemblies Assemblies in BLUE are Steam Sterilization			Flow rates (SCFM), at 7 psi drop at indicated line pressure (over 3 stages) Refer to Principal Specification Charts in each product data sheet for maximum Recommended for pressure rating of each housing							
1st Stage	2nd Stage	3rd Stage	Port Size	20	40	60	80	100	125	150
2002N-IBI-DX	2002N-IBI-BX A33B-SA	2002N-OAO-SA	1/4"	8	11	16	21	25	31	36
2104N-IBI-DX	2104N-IBI-BX A45B-SA	2104N-OAO-SA	1/2"	19	30	41	51	63	76	90
2208N-IBI-DX	2208N-IBI-BX A27/35B-SA	2208N-OAO-SA	1"	23	37	50	64	77	94	111
2312N-IBI-DX	2312N-IBI-BX A27/80B-SA (1)	2312N-OAO-SA	1 1/2"	46	74	101	129	155	189	223
A15/80-DX	A15/80-BX A15/80S6-SA	A15/80-SA	2"	94	148	202	256	310	378	445
AFF3-0128-HFC	AFF3-0128-HEC AKSB-0280-SA	AKC-0280-SA	3"	190	300	400	510	620	755	890
AFF4-0125-HFC	AFF4-0125-HEC AKSB-0480-SA	AKC-0480-SA	4"	380	590	810	1020	1240	1510	1780
AFF6-0136-HFC	AFF6-0136-HEC AKSB-0880-SA	AKC-0880-SA	6"	750	1180	1620	2050	2480	3020	3560
AFF8-0428-HFC	AFF8-0428-HEC AKSB-1480-SA	AKC-1480-SA	8"	1310	2070	2830	3580	4340	5300	6230
AFF10-0728-HFC	AFF10-0728-HEC AKSB-2280-SA	AKC-2280-SA	10"	2070	3270	4460	5660	6850	8340	9840



Sterile Air Filters



Principal Specifications for 1/4" to 2" Line Size Sterile Air Filters

Principal Specifications

Model	2002,2003,2004(5)	2104(5)	2206(5)	2208(5)	2312(5)	A15/80
Port Size	1/4", 3/8", 1/2" NPT	1/2" NPT	3/4" NPT	1" NPT	1 1/2" NPT	2" NPT
Maximum Pressure	250 psig (1)	250 psig (1)	250 psig (1)	250 psig (1)	250 psig (1)	250 psig (1)
Maximum Temperature	170°F (77°C)	170°F (77°C)	130°F (54°C)	130°F (54°C)	130°F (54°C)	130°F (54°C)
Materials of Construction						
Head	Anod. Alum.	Anod. Alum.	Anod. Alum.	Anod. Alum.	Anod. Alum.	Anod. Alum.
Bowl	Anod. Alum.	Anod. Alum.	Anod. Alum.	Anod. Alum.	Anod. Alum.	Steel
Internals	Nylon	Nylon	Aluminum	Aluminum	Aluminum	St. Steel
Seals	Buna-N	Buna-N	Buna-N	Buna-N	Buna-N	Buna-N
Shipping Weight	2 lbs. (0.9 kg)	2.5 lbs. (1 kg)	8 lbs. (3.6 kg)	8 lbs. (3.6 kg)	15 lbs. (6.8 kg)	11 lbs. (5 kg)
Dimensions	3.3"W X 8.5"L (8cm X 22cm)	3.3"W X 11.3"L (8cm X 28cm)	4"W X 13"L (10cm X 33cm)	4"W X 13"L (10cm X 33cm)	5.0"W X 17"L (13cm X 43cm)	6.3"W X 28"L (16cm X 71cm)

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model	2002,2003,2004(5)	2104(5)	2206(5)	2208(5)	2312(5)	A15/80
Assembly with Grade DX Filter Cartridge	200?-IBI-DX	2104N-IBI-DX	2206N-IBI-DX	2208N-IBI-DX	2312N-IBI-DX	A15/80-DX
Assembly with Grade BX Filter Cartridge	200?-IBI-BX	2104N-IBI-BX	2206N-IBI-BX	2208N-IBI-BX	2312N-IBI-BX	A15/80-BX
Assembly with Grade SA Filter Cartridge & Support Core	200?-OAO-SA	2104N-OAO-SA	2206N-OAO-SA	2208N-OAO-SA	2312N-OAO-SA	A15/80-SA
Differential Pressure Indicator (optional)(2)	Included	Included	Included	Included	Included	Included
Filter Cartridges (3)						
Number Required	1	1	1	1	1	1
Box of 3 (3, 4)	3/100-12-	3/100-18-	3/150-19-	3/150-19-	3/200-35-	3/200-80-
Box of 5 (3, 4)	5/100-12-	5/100-18-	5/150-19-	5/150-19-	5/200-35-	5/200-80-
Box of 10 (3, 4)	100-12-	100-18-	150-19-	150-19-	200-35-	200-80-

Notes:

1 Maximum pressure ratings are for temperatures to 130°F (54°C). Please consult factory for maximum pressure ratings at elevated temperatures.

2 Differential Pressure Indicator is not supplied with assemblies containing Grade SA Cartridges. Maximum pressure rating for 41-082 is 250 psig. The DPI is sensitive in the range of 0-5 psi differential.

3 To order filter cartridges, indicate the grade of filter cartridge by placing the appropriate letter after the ordering number. Examples: 5/100-12-DX, 100-18-BX, 150-19-SA.

4 Grades BX, DX are available only in boxes of 5 and 10. Grade SA is available in boxes of 3 and 10.

5 Lifetime (20 year) warranty included. Contact your local representative for details.

3" to 10" Line Size Sterile Air Filters



Model AKC-0280



Model AKC-1480

Product Features:

- Remove all viable organisms at 99.9999% @ .01microns
- Full compliance with FDA requirements
- High flow rates
- USDA accepted for use in federally inspected meat and poultry plants

Principal Specifications

For flow rates, see page 20

Model	AKC-0280	AKC-0480	AKC-0880	AKC-1480	AKC-2280
Port Size	3" Flange	4" Flange	6" Flange	8" Flange	10" Flange
Maximum Pressure	250 psig (1)	250 psig (1)	200 psig (1)	200 psig (1)	200 psig (1)
Maximum Temperature	230°F (110°C) (2)	230°F (110°C) (2)	250°F (110°C) (2)	250°F (110°C) (2)	250°F (110°C) (2)
Materials of Construction	Carbon steel vessel with 303 Stainless Steel filter tube holders and Buna N seals.				
Closure Type	Flat flanged top with swing bolts and Buna N "O" rings.				
Shipping Weight	132 lbs. (60 kg)	210 lbs. (95 kg)	360 lbs. (163 kg)	590 lbs. (268 kg)	880 lbs. (400 kg)
Dimensions	36"H X 16"W (91cm X 40cm)	36"H X 21"W (91cm X 53cm)	38"H X 25"W (97cm X 64cm)	54"H X 34"W (137cm X 86cm)	56"H X 36"W (142cm X 91cm)
Flange Center Line to Floor Dimension	7.75" (20cm)	6.25" (11cm)	7.5" (19cm)	16.25" (41cm)	17.25" (44cm)

Ordering Information (3)

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model	AKC-0280	AKC-0480	AKC-0880	AKC-1480	AKC-2280
Assembly with Grade SA Filter Cartridge & Support Core	AKC-0280-SA	AKC-0480-SA	AKC-0880-SA	AKC-1480-SA	AKC-2280-SA
Filter Cartridges					
Number Required	2	4	8	14	22
Box of 3 (4)	3/200-80-	3/200-80-	3/200-80-	3/200-80-	3/200-80-
Box of 5 (4)	5/200-80-	5/200-80-	5/200-80-	5/200-80-	5/200-80-
Box of 10 (4)	200-80-	200-80-	200-80-	200-80-	200-80-

Notes:

- 1 Vessel is ASME Section VIII, Division 1 code stamped for rated pressure. All AKC series housings have CRN registration numbers assigned in all Canadian provinces.
- 2 Maximum operating temperature may be limited by seal material. Consult factory for recommendations at elevated temperatures.
- 3 Filter assemblies are shipped complete with automatic drain, filter cartridges, and differential pressure indicator.

Automatic Drain

The maximum operating pressure for the Model 20-211 Automatic Drain is 400 psig. Minimum operating pressure is 10 psig.

Differential Pressure Indicator

The maximum operating pressure for the Differential Pressure Indicator Model 41-071 is 250 psig. The DPI is sensitive in the range of 0-5 psi.

The Automatic Drain and Differential Pressure Indicator are not included with assemblies containing SA cartridges.

- 4 To order filter cartridges, indicate the grade of filter cartridge by placing the appropriate letter after the ordering number. Examples: 5/100-12-SA, 100-18-SA, 150-19-SA.

CAMTU Compressed Air Microbial Test Unit

Identify Sources of Contamination in Compressed Air and Improve Food Safety



Product Features:

- Lightweight and ergonomically designed for ease of use
- Built in timer with indicator lights
- Pre-filled agar plates with specialized tryptic soy or potato dextrose agar designed to hold up to compressed air flow/pressure
- No electrical supply required
- Quick sampling time - 20 seconds
- Complete kit with connection tubing, pressure regulator/ metering orifice, shut off valve, timer and agar plates.
- Constructed of durable polypropylene - easily sanitized

Compressed air is used in a broad range of applications in the food processing industry, such as mixing of ingredients, cutting, sparging, drying of product, transporting/propelling product through processing systems and packaging of final product.

In many of these applications, compressed air is in direct or indirect contact with food product exposing it to bacteria and other micro-organisms which can result in:

Food contamination which can affect color and taste

Reduced shelf life

Product recalls

Compressed air is warm, dark and contains moisture which is the ideal environment to promote the growth of microbes. These microbes migrate through the entire compressed air system and are released at exit points; critical areas at which food, packaging or surface areas come into direct contact.

Most GFSI food safety schemes now recognize food contact compressed air as a potential contamination risk.

Safe Quality Foods (SQF) has released the 7.2 Edition. Sections 11.5.7.1 and 11.5.7.2 state:

"Compressed air that contacts food or food contact surfaces shall be clean and present no risk to food safety...Compressed air systems used in the manufacturing process shall be maintained and regularly monitored for purity."

The CAMTU provides a quick, effective, cost efficient method of identifying potential sources of contamination

At high risk food contact points where contamination is detected Parker Balston Sterile Air Filters can be used to protect the processes.

British Compressed Air Society has produced a specification for dewpoint (-40F/C), oil removal <0.01mg/m³ and particulate removal (including microbiological particles) 0.1-0.5 microns. (Request white paper by Lee Scott, "Reducing Contamination Risks of Compressed Air in Food Plants".)

To date, the only devices capable of sampling compressed air systems for microbes are expensive, very cumbersome, require lengthy sampling times and extensive training. Parker Balston recognized the need for an alternative device that is easily transported throughout the food plant and can provide a quick qualitative analysis of compressed air purity requiring very little training.

The CAMTU weighs less than one pound and is easily transported. It comes complete with Anti Microbial Tubing, shut off valve and a specially designed pressure regulator and metering orifice.



These matched components provide the exact amount of compressed air exposure for each sampling.

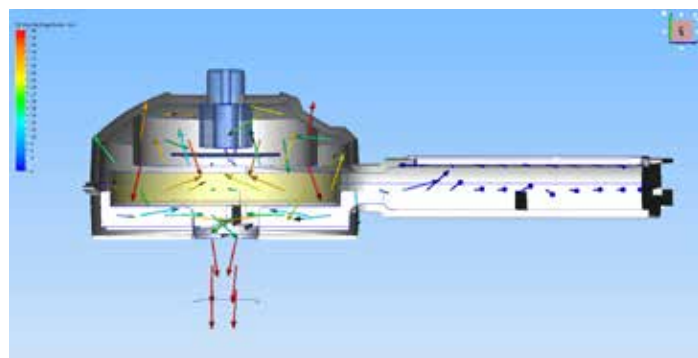
The agar plates are filled with specialized Tryptic Soy Agar (TSA) or Potato Dextrose Agar (PDA) designed to hold up to compressed air flow and pressure. TSA is used for the cultivation of a wide variety of microorganisms including most bacteria and mold spores.

The CAMTU has been validated by Dr. McIandsborough, head of the Food Science Department of the University of Massachusetts, Amherst MA. (Request white paper by Dr. McIandsborough "Comparison of the Compressed Air Microbial Testing Unit (CAMTU) to a standard method of bioaerosol sampling.")

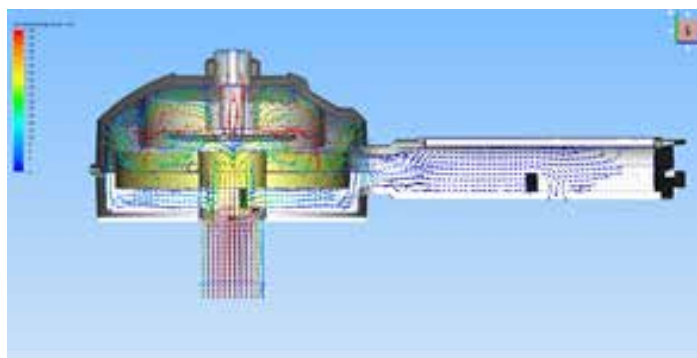
To obtain a sample, simply plug the

connection tubing into the sample point on the compressed air system, insert an agar plate into the CAMTU, close the CAMTU, open the shutoff valve and expose the agar for 20 seconds. After exposure simply place the agar plate in an incubator for 48 hours or in a controlled environment of at least 68°F and observe for colony forming units (CFUs).

New Custom Designed Agar Plate Provides Enhanced Exposure to the Agar



Flow dynamics original CAMTU with standard agar plate

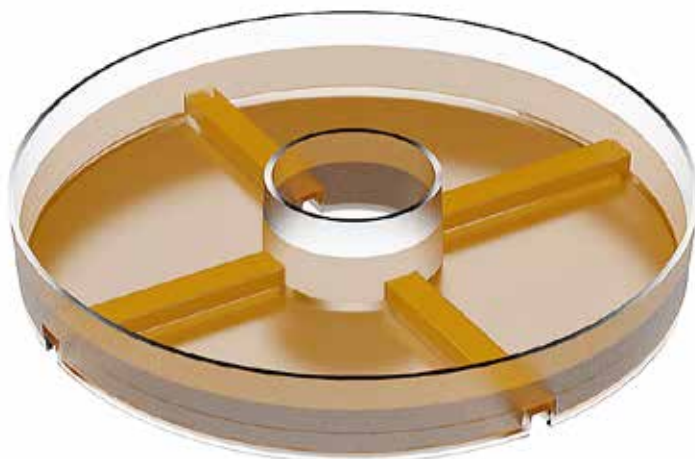


Flow dynamics new CAMTU with custom agar plate providing more compressed air exposure over the agar plate

Optimum Agar Plate Design

Unlike the conventional agar plate, this unique CAMTU agar plate offers greater dispersion of the compressed air over the agar as a result of an improved air flow path through the center hole in the plate. This provides optimum detection performance and enhanced capture of microbes.

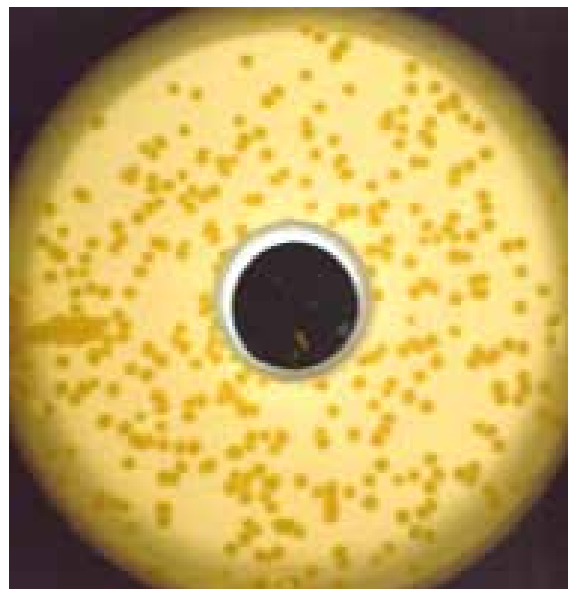
The CAMTU is an ideal device to incorporate into your Good Manufacturing Practices program for monitoring all identified HACCP risk points.



CAMTU Agar Plate

IMPORTANT

Agar plates are shelf-life sensitive and must be stored in a refrigerated environment upon arrival to maximize shelf life. Agar have a 60 day shelf life remaining at time of shipment and cannot be returned.



CFUs growing on an agar plate

Recommendation for High Risk Points

For those risk points where microbes were detected, Parker recommends installing Balston 3 stage sterile air systems which will remove oil, water, rust, pipescale and all microbes from the compressed air (Request Bulletin FMB09). The CAMTU can then be used to monitor those filter systems for optimum performance.



Parker Balston 6000 Series Sterile Air Filter Systems





Storage and Carrying Case

Description	Part No.
Complete CAMTU Kit Includes 5 Tryptic Soy Agar Plates	C01-0136
Agar Plates (5 total) Tryptic Soy*	C01-0143
Agar Plates (5 total) PDA*	C01-0134

IMPORTANT: These items are considered perishable and must be shipped via 1 or 2 day air and refrigerated immediately after receipt

*Agar plates are shelf life sensitive and should be stored in a refrigerated environment upon arrival to maximize shelf life. Agar plates will have a minimum of 60 days of shelf life remaining at time of shipment and cannot be returned.

Replacement Parts	
CAMTU Sampling Housing	C01-0142
Timer	C01-0139
DFU Assembly	C02-2418
Tubing ¼" OD	A01-0484
Regulator/Metering Assembly	C01-0125
Sanitizing spray bottle	C01-0124
Shut off valve	C01-0126
Petri dishes (5 total) Empty	C01-0133
Additional Specifications	
Complete CAMTU Kit Dimensions	15.63"w x 13.63"h x 6.38"d (40cm x 35cm x 16cm)
Shipping Weight	7 lbs. (3.2 kg)

Steam Sterilizable Sterile Air Filters

1/4" to 1" Line Size Filters



Model A33B-SA



Model A45B-SA



Model A27/35B-SA, A27/80B-SA

Product Features:

- Remove all viable organisms
- Low pressure drop
- Full compliance with FDA requirements
- In-line steam sterilization
- USDA accepted for use in federally inspected meat and poultry plants

Principal Specifications

For flow rates, see page 23

Model	A33B	A45B	A27/35B	A27/80B
Inlet and Outlet Ports	1/4" NPT (1)	1/2" NPT (1)	1" NPT (1)	1" NPT (1)
Drain Port	1/8" NPT (2)	1/8" NPT (2)	1/4" NPT (2)	1/4" NPT (2)
Materials of Construction				
Head	316SS	316SS	316SS	316SS
Bowl	316SS	316SS	316SS	316SS
Internals	316SS	316SS	316SS	316SS
Seals	Viton (3)	Viton (3)	Viton (3)	Viton (3)
Maximum Temperature	400°F (204°C)	400°F (204°C)	400°F (204°C)	400°F (204°C)
Maximum Pressure	425 psig (4)	250 psig (4)	800 psig (4)	800 psig (4)
Maximum Steam Pressure for Sterilization	60 psig	60 psig	60 psig	60 psig
Shipping Weight	3 lbs. (1 kg)	5 lbs. (2 kg)	16 lbs. (7 kg)	20 lbs. (9 kg)
Dimensions	2.6"Dia X 4.9"L (7cm X 12cm)	2.6"Dia. X 8.4"L (7cm X 21cm)	4.0"Dia. X 16"L (10cm X 40cm)	4.0"Dia. X 27"L (10cm X 69cm)

Notes:

1 Adaptors are available which convert threaded ports to sanitary type clamp connections.

Ordering Information:

Part # 73803 1" NPT x 1" Sanitary

Part # 73804 1 1/2" NPT x 1 1/2" Sanitary

Part # 73805 2" NPT x 2" Sanitary

2 Condensate drain valve required. Supplied by customer.

3 Constructed of food grade Viton.

4 Maximum pressure ratings are for temperatures to 130°F (54°C). Please consult factory for maximum pressure ratings at elevated temperatures.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model	A33B	A45B	A27/35B	A27/80B
Assembly with Grade SA Filter Cartridge	A33B-SA	A45B-SA	A27/35B-SA	A27/80B-SA
Filter Cartridges:				
Number Required	1	1	1	1
Box of 3	3/100-12-SA	3/100-25-SA	3/200-35-SA	3/200-80-SA
Box of 10	100-12-SA	100-25-SA	200-35-SA	200-80-SA

2” - 10” Line Size Filters



Model AKSB-0280-3-SA



Model AKSB-1480-SA

Product Features:

- Remove all viable organisms at 99.9999% @ .01 microns
- Full compliance with FDA requirements
- High flow rates
- USDA accepted for use in federally inspected meat and poultry plants

Principal Specifications

For flow rates, see page 20

Model	AKSB-0280-2-SA	AKSB-0280-3-SA	AKSB-0480-SA	AKSB-0880-SA	AKSB-1480-SA	AKSB-2280-SA
Port Size	2" Flange	3" Flange	4" Flange	6" Flange	8" Flange	10" Flange
Materials of Construction	316SS	316SS	316SS	316SS	316SS	316SS
Seals	Viton (1)	Viton (1)	Viton (1)	Viton (1)	Viton (1)	Viton (1)
Maximum Pressure	200 psig (2)	200 psig (2)	200 psig (2)	200 psig (2)	200 psig (2)	200 psig (2)
Maximum Temperature	200°F (93°C)	200°F (93°C)	200°F (93°C)	200°F (93°C)	200°F (93°C)	200°F (93°C)
Maximum Steam Pressure for Sterilization	60 psig	60 psig	60 psig	60 psig	60 psig	60 psig
Shipping Weight	140 lbs. (64 kg)	140 lbs. (64 kg)	210 lbs. (95 kg)	360 lbs. (163 kg)	590 lbs. (268 kg)	880 lbs. (400 kg)
Dimensions	16"W X 36"L (41cm X 91cm)	16"W X 36"L (41cm X 91cm)	20"W X 36"L (53cm X 91cm)	25"W X 38"L (64cm X 97cm)	34"W X 54"L (86cm X 137cm)	36"W X 56"L (91cm X 142cm)

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model	AKSB-0280-2	AKSB-0280-3	AKSB-0480	AKSB-0880	AKSB-1480	AKSB-2280
Assembly with Grade SA Filter Cartridge	AKSB-0280-2-SA	AKSB-0280-3-SA	AKSB-0480-SA	AKSB-0880-SA	AKSB-1480-SA	AKSB-2280-SA
Filter Cartridges						
Box of 3	3/200-80-SA	3/200-80-SA	3/200-80-SA	3/200-80-SA	3/200-80-SA	3/200-80-SA
Box of 10	200-80-SA	200-80-SA	200-80-SA	200-80-SA	200-80-SA	200-80-SA
Number per housing	2	2	4	8	14	22

Notes:

- 1 Constructed of food grade Viton.
- 2 Vessel is ASME Section VIII Division 1 Code stamped for rated pressure.

Air Dryers

Protect your products and your working environment

Cabinet Air Dryer



The Balston Cabinet Air Dryer is designed to eliminate moisture problems in electrical cabinets and motors. Simply connect a compressed air supply to the dryer. Connecting the outlet to the interior of the cabinet reduces the humidity to less than 10% RH. A built in flow regulator eliminates any unwanted pressure build-up inside the cabinet.

- Protects electrical cabinet components from damage caused by high humidity in wash down areas
- Positive pressure keeps dust and moisture out
- Requires no electricity



Do your cabinets look like this?

Corrosion leads to premature component failure

Water accumulation in electrical cabinet



Cabinet Dryers for Wash Down Areas

The Balston Cabinet Air Dryer is designed to eliminate moisture problems in electrical cabinets and motors. The dryer will reduce humidity inside the cabinet to less than 10% RH.

- Designed specifically for wash down areas
- Protects electrical cabinet components from damage caused by water and high humidity
- Minimizes pools of water inside cabinets
- Positive pressure keeps dust out
- Adds no heat to the cabinet
- Reduces cabinet humidity to less than 10% RH
- Requires no electricity, low operating costs
- Easy to install and maintain
- Quiet operation
- Protect motors, touch screens and other critical components

Principal Specifications

Model Number	CD0005	CD0010	CD0030
Cabinet Size Range*	0 - 4 FT ³ (0 - 0.11m ³)	4 - 12 FT ³ (0.11m ³ - 0.34m ³)	12 - 36 FT ³ (0.34m ³ - 1m ³)
Min/Max Inlet Air Temp	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)
Min/Max Ambient Air Temp	35°F/120°F (2°C/49°C)	35°F/120°F (2°C/49°C)	35°F/120°F (2°C/49°C)
Air Consumption	0.6 SCFM (17 slpm)	1.25 SCFM (35.4 slpm)	3.5 SCFM (99 slpm)
Min/Max Air Pressure	60 psi/150 psi (4.1 bar/10.3 bar)	60 psi/150 psi (4.1 bar/10.3 bar)	60 psi/150 psi (4.1 bar/10.3 bar)
Delivered Dew Point (1)	-7°F/-22°C	-7°F/-22°C	-7°F/-22°C
Inlet Port Size	1/4" NPT	1/4" NPT	1/4" NPT
Outlet Port Size	1/4" NPT	1/4" NPT	1/4" NPT
Electrical Requirements	None	None	None
Dimensions	3"w x 9.2"h x 2"d (8cm x 2cm x 5cm)	3"w x 15.2"h x 2"d (8cm x 39cm x 5cm)	4.6"w x 15.3"h x 2.9"d (12cm x 39cm x 7cm)
Shipping Weight	1.5 lbs (0.68 kg)	2 lbs (0.9 kg)	2.5 lbs (1.1 kg)

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model Number	CD0005	CD0010	CD0030
Replacement Filter Elements	070-063-BX	070-063-BX	070-063-BX
Replacement Auto Drain	C02-2392	C02-2392	C02-2392

Notes:

1 Dewpoint specified for saturated inlet air at 100°F (38°C) and 100 psig (6.9 bar). Outlet flows will vary slightly for other inlet conditions.

* If the cabinet is not tightly sealed, consider upsizing to the next module size.

Filtration efficiency: 99.99% at 0.01 micron.



What our customers say:

"We tried heaters, fans and vortex coolers, our only solution was to use a Parker Balston dryer that continuously purges the cabinet with dry air."

Lee Clarkson
Ross Industries

Membrane Air Dryers for -40°F (-40°C) Dewpoint



Model 76-01



Model 76-02



Model 76-10



Model 76-20



Model 76-40

- Offer a reliable, efficient, and economical alternative to pressure swing and refrigerant dryer technologies
- Require no electricity thus low operating costs
- Dewpoints as low as -40°F (-40°C) prevent freeze-ups
- Explosion proof
- Silent operation
- No desiccant to change

- “We have not had one shutdown due to freeze-ups since the Balston Membrane Dryer was installed.”

Peter Vogt
International Filler Corp.

Flow Rates

Outlet Flow in SCFM (Nm³/Hr) at Indicated Operating Pressure in psig (Nm³/Hr) for -40°F (-40°C) Atmospheric Dewpoint

Pressure Dewpoint	60 psig (4.1 barg) -40°F(-40°C)	80 psig (5.5 barg) -40°F(-40°C)	100 psig (6.9 barg) -40°F(-40°C)	120 psig (8.3 barg) -40°F(-40°C)	140 psig (9.7 barg) -40°F(-40°C)
Model 76-01	.3 (.5)	.6 (1)	1 (1.7)	1.3 (2.2)	1.7 (2.9)
Model 76-02	.6 (1)	1 (1.7)	2 (3.4)	2.4 (4.1)	3.4 (5.8)
Model 76-10	3.0 (5)	5 (8.5)	10 (17)	13 (22)	17 (29)
Model 76-20	6.0 (10)	10 (17)	20 (34)	26 (44)	34 (58)
Model 76-40	12.0 (20)	20 (34)	40 (68)	52 (88)	68 (116)

Membrane Module Regeneration Flow

Regeneration Flow in SCFM (Nm³/Hr) at Indicated Operating Pressure in psig (Nm³/Hr) and all dewpoints

Pressure Dewpoint	60 psig (4.1 barg)	80 psig (5.5 barg)	100 psig (6.9 barg)	120 psig (8.3 barg)	140 psig (7.7 barg)
Model 76-01	.2 (.34)	.2 (.34)	.3 (.5)	.3 (.5)	.3 (.5)
Model 76-02	.34 (.58)	.4 (.68)	.5 (.84)	.6 (1)	.7 (1.2)
Model 76-10	1.7 (2.9)	2.1 (3.6)	2.5 (4.2)	3 (5)	3.3 (5.6)
Model 76-20	3.4 (5.8)	4.2 (7.1)	5 (8.5)	6 (10)	6.6 (11.2)
Model 76-40	6.8 (11.6)	8.4 (14.3)	10 (17)	12 (20)	14 (23.8)

Filtration efficiency: 99.99% at 0.01 micron.

Principal Specifications - Membrane Air Dryers for -40°F (-40°C) Dewpoint

Principal Specifications

Model	76-01	76-02	76-10	76-20	76-40
Max. Flow Rate At -40°F (-40°C)					
Dewpoint (Nm ³ /Hr.)	1 SCFM (1.7) (1)	2 SCFM (3.4) (1)	10 SCFM (17) (1)	20 SCFM (34) (1)	40 SCFM (68) (1)
Min/Max Inlet Air Temp.	40°F/120°F (4°C/49°C) (2)				
Ambient Temp. Range	40°F - 120°F (4°C - 49°C)				
Min/Max Inlet Pressure	60 psig/150 psig (4.1 BARG/10.3 BARG)				
Compressed Air Requirement	Total Air Consumption: Regeneration Flow + Outlet Flow Requirements (see tables on pg.166)				
Max. Pressure Drop	5 psid (.34 barg) (3)	5 psid (.34 barg) (3)	5 psid (.34 barg) (3)	5 psid (.34 barg) (3)	5 psid (.34 barg) (3)
Wall Mountable	Yes	Yes	Yes	Yes	Yes
Prefilter (included)	Yes (4)	Yes (4)	Yes (4)	Yes (4)	Yes (4)
Inlet/Outlet Port Size	1/4" NPT (female)	1/4" NPT (female)	1/2" NPT (female)	1" NPT (female)	1 1/2" NPT (female)/ 3/4" NPT (female)
Electrical Requirements	None	None	None	None	None
Dimensions	6"W x 22"H x 5"D (15cm x 58cm x 13cm)	6"W x 23"H x 5"D (15cm x 58cm x 13cm)	6"W x 37"H x 5"D (15cm x 94cm x 13cm)	12"W x 37"H x 7"D (30cm x 94cm x 18cm)	19"W x 39"H x 8"D (48cm x 99cm x 21cm)
Shipping Weight	9 lbs. (4 kg)	10 lbs. (5 kg)	18 lbs. (9 kg)	20 lbs. (9 kg)	35 lbs. (16 kg)

Notes:

1 Dewpoint specified for saturated inlet air at 100°F (38°C) and 100 psig (6.9 barg). Outlet flows will vary slightly for other inlet conditions.

2 Inlet compressed air dewpoint must not exceed the ambient air temperature.

3 5 psid (.34 barg) at -40°F (-40°C) dewpoint operating parameters.

4 If compressed air is extremely contaminated, a Balston Grade DX prefilter should be installed directly upstream from the membrane dryer.

5 Filtration efficiency 99.99% at 0.01 micron.

Ordering Information

for assistance, call 800-343-4048, 8 to 5 Eastern Time

Description	Model Number				
Balston Membrane Air Dryer	76-01	76-02	76-10	76-20	76-40
Replacement Prefilter Cartridges	100-12-BX	100-12-BX	100-18-BX	150-19-BX	200-35-BX
Optional Additional Coalescing Prefilter	2002N-1B1-DX	2002N-1B1-DX	2104N-1B1-DX	2208N-1B1-DX	2312N-1B1-DX
Replacement Filter Cartridges for Optional Prefilter	100-12-DX	100-12-DX	100-18-DX	150-19-DX	200-35-DX
Pressure Regulator (0-130 psig) 1/2" NPT Ports	72-130	72-130	72-130	-----	---

Membrane Air Dryers for +35°F (2°C) Dewpoint*



Offer a reliable, efficient, and economical alternative to pressure swing and refrigerant dryer technologies

Require no electricity thus lowering operating costs

Produce +35°F (2°C) dewpoint, ideal for critical points of use

Produce +15°F (-9°C) dewpoint in air systems with existing refrigerated air dryers

No moving parts

Silent operation

No desiccant to change

Flow Rates

Model Number	IT0010-35	IT0030-35	IT0080-35	IT0150-35	IT0250-3560	IT0250-3500	IT0500-3560	IT0500-3500	IT1000-3560	IT1000-3500
Flow @ 100 psig Inlet Pressure (scfm, Nm ³ /Hr)	1 (1.7)	3 (5.1)	8 (13.6)	15 (25.5)	25 (42.5)	N/A	50 (85)	N/A	100 (170)	N/A
Flow @ 101-150 psig Inlet Pressure (scfm)	1 (1.7)	3 (5.1)	8 (13.6)	15 (25.5)	N/A	25 (42.5)	N/A	50 (85)	N/A	100 (170)
Regeneration Flow @ 100 psig (scfm) (1)	0.25 (.42)	0.5 (.85)	1.5 (2.5)	2.7 (4.6)	4.5 (7.6)	4.5 (7.6)	9.0 (15.3)	9.0 (15.3)	18.0 (30.6)	18.0 (30.6)

Notes: 1 Total Air Consumption = Regeneration + Outlet Flow.

* If the house compressed air is equipped with a refrigerated dryer, the dewpoint drops to +15°F (-9°C).



Principal Specifications - Membrane Air Dryers for +35°F (2°C) Dewpoint*

Model Number	IT0010-35	IT0030-35	IT0080-35	IT0150-35	IT0250-3560	IT0250-3500	IT0500-3560	IT0500-3500	IT1000-3560	IT1000-3500
Min/Max Inlet Air Temp.	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)
Min/Max Ambient Air Temp.	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)	40°F/120°F (4°C/49°C)
Min/Max Inlet Pressure	60/150 psig (4.1/10 barg)	60/150 psig (4.1/10 barg)	60/150 psig (4.1/10 barg)	60/150 psig (4.1/10 barg)	60/100 psig (4.1/6.9 barg)	100/150 psig (6.9/10 barg)	60/100 psig (4.1/6.9 barg)	100/150 psig (6.9/10 barg)	100/150 psig (6.9/10 barg)	100/150 psig (6.9/10 barg)
Max. Pressure Drop (1)	3 psid (.2 bard)	3 psid (.2 bard)	3 psid (.2 bard)	3 psid (.2 bard)	5 psid (.34 bard)	5 psid (.34 bard)	5 psid (.34 bard)	5 psid (.34 bardD)	5 psid (.34 bard)	5 psid (.34 bard)
Wall Mountable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mechanical Separator (Included)	F14F17B	F06F18B	F06F18B	F07F38B	F07F38B	F07F38B	F07F38B	F07F38B	F602-08WJR	F602-08WJR
Coalescing Prefilters (1)	8A02N-OB2-BX	2002N-OB1-BX	2002N-OB1-BX	B2004N-1B1-DX B2004N-OB1-BX	2104-1B1-DX 2104-OB1-BX	2104N-1B1-DX 2104-OB1-BX	2208N-1B1-DX 2208N-OB1-BX	2208N-1B1-DX 2208N-OB1-BX	2208N-1B1-DX 2208N-OB1-BX	2208N-1B1-DX 2208N-OB1-BX
inlet Port Size	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1/2" NPT	1" NPT	1" NPT
Outlet Port Size	1/4" NPT	1/4" NPT	1/4" NPT	1/2" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT	1" NPT
Electrical Requirements	None	None	None	None	None	None	None	None	None	None
Dimensions in inches (cm)	17.5"Lx8"Wx2.5"D (44.5 x 20.3 x 6.3)	18.1"Lx10"Wx4"D (45.2 x 10.5 x 6.3)	24"Lx11.1"Wx4"D (61 x 28.2 x 6.3)	25"Lx16"Wx4.5"D (63.5 x 40.6 x 11.4)	26"Lx18"Wx6"D (66 x 45.7 x 15.2)	26"Lx18"Wx6"D (66 x 45.7 x 15.2)	39"Lx21"Wx6"D (99 x 53.3 x 15.2)	39"Dx21"Wx6"D (99 x 53.3 x 15.2)	47"Dx28"Wx7"D (119 x 71 x 18)	47"Dx28"Wx7"D (119 x 71 x 18)
Shipping Weight	1.62 lbs (.73 kg)	6.68 lbs (3 kg)	6.68 lbs (3 kg)	14.88 lbs (6.75 kg)	24.5 lbs (11.11 kg)	24.5 lbs (11.11 kg)	36.5 lbs (16.55 kg)	36.5 lbs (16.55 kg)	52 lbs (24 kg)	52 lbs (24 kg)

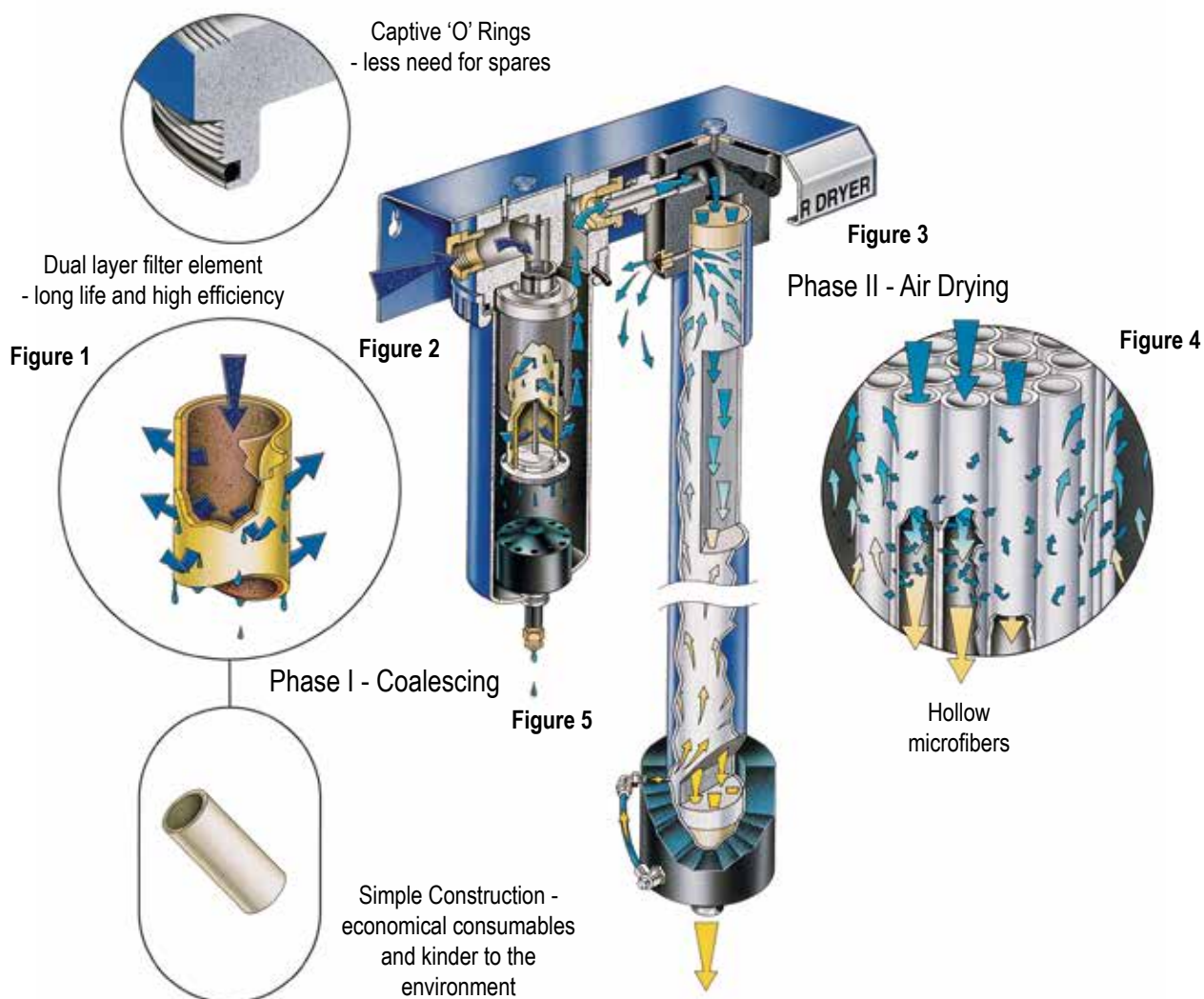
Notes:
 1 If compressed air is extremely contaminated, a Grade DX prefilter should be installed directly upstream of the membrane dryer.

Ordering Information for assistance, call 800-343-4048, 8 to 5 Eastern Time

Model Number	IT0010-35	IT0030-35	IT0080-35	IT0150-35	IT0250-3560	IT0250-3500	IT0500-3560	IT0500-3500	IT1000-3560	IT1000-3500
Replacement Prefilter Cartridges*										
Stage 1	PS403	PS702	PS702	PS802	PS802	PS802	PS802	PS802	EK602VB	EK602VB
Stage 2	---	---	---	5/100-12-DX	5/100-18-DX	5/100-18-DX	5/100-19-DX	5/150-19-DX	5/150-19=DX	5/150-19-DX
Stage 3	5/050-05-BX	5/100-12-BX	5/100-12-BX	5/100-12-BX	5/100-18-BX	5/100-18-BX	5/150-19-BX	5/150-19-BX	5/150-19-BX	5/150-19-BX

* If the house compressed air is equipped with a refrigerated dryer, the dewpoint drops to +15°F.

Membrane Air Dryer - Principle of Operation



Phase I - Coalescing Filtration

Prior to entering the membrane drying module, the compressed air passes through a high efficiency coalescing filter to remove oil and water droplets and particulate contamination with an efficiency of 99.99% at 0.01 micron. The liquids removed by the filter cartridge continuously drip from the filter cartridge into the bottom of the housing, where they are automatically emptied by an autodrain assembly (see Fig. 1 and Fig. 2). The air leaving the prefilter, therefore, is laden only with water vapor, which will be removed in the membrane module.

Phase II - Drying

The water vapor in the compressed air is removed by the principle of selective permeation through a membrane (see Fig. 3). The membrane module consists of bundles of hollow membrane fibers (see Fig. 4), each permeable only to water vapor. As the compressed air passes through the center of these fibers, water vapor permeates through the walls of the fiber, and dry air exits from the other end of the fiber. A small portion of the dry air (regeneration flow) is redirected along the length of the membrane fiber to carry away the moisture-laden air which surrounds the membrane fibers. The remainder of the dry air is piped to the application.

Industrial Nitrogen Gas Generators

Performance under pressure

Nitrogen is widely used in food operations to extend shelf-life, minimize spoilage, prevent bacteria growth, and eliminate moisture.



Membrane Nitrogen Generators

- Smaller flows and lower purities
- Produce 95-99% pure, commercially sterile nitrogen from a compressed air supply
- Dewpoints to -58°F (-50°C)
- No electrical line required
- All models include a 0.01 membrane filter



PSA Nitrogen Generators

- Larger flows and higher purities
- Mono and Dual bed designs
- Complete package with prefiltration and receiving tank
- Produce 95 - 99.999% pure nitrogen
- Dewpoints to -58°F (-50°C)

Membrane Nitrogen Generators

Lower cost...eliminates the need for costly gas cylinders

Complete package with pre-filters, carbon filter, and membrane filter

Compact - frees up valuable floor space

Eliminates unexpected shutdowns due to a "bad" or empty cylinder

Hassle-free, easy to install, easy to operate

Safe and reliable

No electrical line required



Balston Membrane Nitrogen Generators produce up to 99% pure, commercially sterile nitrogen at dewpoints to -58°F (-50°C) from a compressed air supply. All Membrane Nitrogen Generators include a 0.01 micron membrane filter which ensures the nitrogen is completely free of suspended impurities. For applications requiring monitoring and controlling, Parker Hannifin offers systems which include oxygen monitors.

Balston Nitrogen Generators are one of the most efficient membrane systems available with higher recovery rates and lower operating costs than many other membrane systems.

The benefits of using nitrogen for packaging are well known: Residual oxygen within a package promotes bacterial growth, which can compromise product quality and shelf life. Using nitrogen minimizes the levels of oxygen present, preserving quality and significantly improving shelf life. A nitrogen generator, which separates nitrogen and oxygen from a compressed air supply, can often be the most effective way to supply this nitrogen.

Applications

- Wine and beverage bottling
- CAP & MAP food packaging
- Tank blanketing
- Sparging
- Long term storage



Membrane Nitrogen Generators - HFX Series

Flow Rates SCFH (Nm³/hr) @ 100 psig (7 barg) @ 68°F (20°C)*

Flow Correction Factors at Indicated Operating Pressure (PSIG)

Model	95	96	97	98	99	58	73	87	101	116	130	145
HFX-1	40 (1.1)	33 (0.9)	26 (0.7)	16 (0.5)	11 (0.3)	.52	.65	.86	1	1.15	1.35	1.44
HFX-3	148 (4.2)	120 (3.4)	95 (2.7)	70 (2.0)	42 (1.2)	.54	.68	.85	1	1.14	1.3	1.43
HFX-5	279 (7.9)	229 (6.5)	176 (5.0)	131 (3.7)	76 (2.2)	.52	.65	.85	1	1.14	1.34	1.43
HFX-7	452 (13)	360 (10)	283 (8.0)	209 (5.9)	120 (3.4)	.53	.66	.86	1	1.14	1.32	1.43
HFX-9	752 (21)	600 (17)	452 (13)	330 (9.3)	201 (5.7)	.44	.65	.85	1	1.1	1.3	1.4
HFX-11	1201 (34)	992 (28)	780 (22)	572 (16)	248 (7.0)	.44	.65	.85	1	1.2	1.4	1.6

* At 100 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

Principal Specifications - HFX Series

Model Number	HFX-1	HFX-3, HFX0-3	HFX-5, HFX0-5	HFX-7, HFX0-7, HFX-9, HFX0-9, HFX-11, HFX0-11
Min/Max Operating Press.	60 psig/145 psig (4 barg/10 barg) ⁽¹⁾	60 psig/145 psig (4 barg/10 barg) ⁽¹⁾	60 psig/145 psig (4 barg/10 barg) ⁽¹⁾	60 psig/145 psig (4 barg/10 barg) ⁽¹⁾
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Max. Press. Drop (at 95% N ₂ , 125 psig)	10 psig (0.7 barg)	10 psig (0.7 barg)	10 psig (0.7 barg)	HFX-7, HFX0-7: 10 psig (0.7 barg) HFX-9, HFX0-9: 15 psig (1.03 barg) HFX-11, HFX0-11: 20 psig (1.4 barg)
Recommended Inlet/Ambient Operating Temperature	77°F (25°C)	77°F (25°C)	77°F (25°C)	77°F (25°C)
Temperature Range	40°F/110°F (4°C/43°C)	40°F/122°F (4°C/50°C)	40°F/122°F (4°C/50°C)	40°F/122°F (4°C/50°C)
Electrical Requirements	None ⁽²⁾	None ⁽²⁾	None ⁽²⁾	None ⁽²⁾
Inlet/Outlet Port Sizes	1/4" NPT	1/4" NPT	1/4" NPT	1/4" NPT
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.9999+% at 0.01µm	99.9999+% at 0.01µm	99.9999+% at 0.01µm	99.9999+% at 0.01µm
Dimensions	12.8"w x 7.5"d x 16.3"h (32cm x 19.1cm x 41cm)	16"w x 16"d x 50"h (41cm x 25cm x 91cm)	16"w x 16"d x 50"h (41cm x 25cm x 91cm)	24"w x 20"d x 69"h (61cm x 51cm x 175cm)
Shipping Wt.	38 lbs (17.3 kg)	127 lbs (58 kg)	138 lbs (63 kg)	250 lbs (114 kg)

Notes:

1 Maximum operating pressure in Europe is 8 barg. 2 No electrical power required unless used with an oxygen analyzer @ 120VAC / 60Hz / 30 Watts.

Ordering Information - HFX Series

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Model	Maintenance Kit	Maintenance Kit w/O2 Monitor	Maintenance Kit Components				
			Replacement Filter Cartridges 1st stage	Replacement Filter Cartridges 2nd stage	Replacement Filter Cartridges 3rd stage	Final Membrane Filter	Activated Carbon Filter
HFX-1	MK75005	N/A	100-12-DX	100-12-BX	---	9933-05-95	7700-L321
HFX-3, HFX0-3 (w/O2 monitor)	MK7579C	MK75790C	100-12-DX	100-12-BX	---	GS-100-12-95	75620
HFX-5, HFX0-5 (w/O2 monitor)	MK7579C	MK75790C	100-12-DX	100-12-BX	---	GS-100-12-95	75620
HFX-7, HFX0-7 (w/O2 monitor)	MK7576	MK76760	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303
HFX-9, HFX0-9 (w/O2 monitor)	MKHFX9	MKHFX09	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303
HFX-11, HFX0-11 (w/O2 monitor)	MKHFX11	MKHFX011	100-18-DX	100-18-BX	100-25-BX	GS-100-25-95	75303

PSA Nitrogen Generators

Monobed and Dual Bed Designs

Complete package with pre-filtration, and receiving tank

Safe and reliable

Produce 95 - 99.999% pure nitrogen

Dewpoints to -58°F (-50°C)

PSA towers require no maintenance

How the Technology Works

Balston Monobed and Dual Bed Nitrogen Generators produce up to 99.9995% pure, compressed nitrogen at dewpoints to -58°F (-50°C) from nearly any compressed air supply. The generators are designed to continually transform standard compressed air into nitrogen at safe, regulated pressures without operator attention.

Balston PSA Nitrogen Generators utilize a combination of filtration and pressure swing adsorption technologies. High efficiency prefiltration pretreats the compressed air to remove all contaminants down to 0.1 micron. Air entering the generator consists of 21% oxygen and 78% nitrogen. The gas separation process preferentially adsorbs oxygen over nitrogen using carbon molecular sieve (CMS). At high pressures the CMS has a greater affinity for oxygen, carbon dioxide, and water vapor than it does at low pressures. By raising and lowering the pressure within the CMS bed, all contaminants are captured and released, leaving the CMS unchanged. This process allows the nitrogen to pass through as a product gas at pressure. The depressurization phase of the CMS releases the absorbed oxygen and other contaminant gases to the atmosphere.



MB Series

Applications

- Wine and beverage bottling
- CAP & MAP food packaging
- Tank blanketing
- Sparging
- Long term storage



PSA Nitrogen Generators - Monobed Series

Principal Specifications - Monobed Nitrogen Generators

Model Number	MB-1	MB-3	MB-5
Recommended Inlet Pressure	110 psig (7.6 barg)	110 psig (7.6 barg)	110 psig (7.6 barg)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg) →		
Air Quality	Clean air without contaminants →		
Outlet Pressure at Corresponding Purity (Based on nominal conditions & standard 60 gallon, 110 psig (7.6 barg) N2 tank)	80 psig @ 99.99 - 95% 75 psig @ 95.0%	80 psig @ 99.99 - 96.0% 75 psig @ 95.0%	80 psig @ 99.99-99.5% 70 psig @ 99.0-95.0%
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120VAC/60 Hz., 180W	120VAC/60 Hz., 180W	120VAC/60 Hz., 180W
Inlet/Outlet Port Size	1/2" NPT (female)	1/2" NPT (female)	1/2" NPT (female)
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes
Final Filtration Efficiency	99.9999+% at 0.01µm	99.9999+% at 0.01µm	9.9999+% at 0.01µm
Generator Cabinet Dimensions	29"W x 27"D x 77"H (74cm x 69cm x 196cm) →		
N2 Tank Size	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)
N2 Storage Tank Dimensions	24"D x 53"H (61cm x 135cm)	24"D x 53"H (61cm x 135cm)	24"D x 53"H (61cm x 135cm)
Shipping Weight	724 lbs. (328 kg)	766 lbs. (347 kg)	835 lbs. (379 kg)

Ordering Information

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Model	MB-1	MB-3	MB-5	Maintenance Kits*
Balston Monobed without Oxygen Analyzer	MB-1**	MB-3**	MB-5**	MKMB1
Balston Monobed with the standard Oxygen Analyzer	MBO-1**	MBO-3**	MBO-5**	MKMB01
Balston Monobed with Advanced Instruments % Oxygen Analyzer	MBOC-1	MBOC-3	MBOC-5	MKMBOC1
Balston Monobed with Advanced Instruments Trace Oxygen Analyzer	MBOD-1	MBOD-3	MBOD-5	MKMBOD1

* Each kit contains two replacement prefilter and two final filter elements. Valve maintenance components are also included. Where needed, a replacement oxygen sensor is also included.

** Stand-by available on MB and MBO models. Add suffix -SB to model number. Stand-by is available up to 99.5%. Not available on the OC.

Nitrogen Purity Flow Chart - Monobed Nitrogen Generators

Flow Rate, SCFH (Nm³/hr)*

Purity (% N2)	MB-1	MB-3	MB-5
99.99	37 (1.1)	74 (2.1)	112 (3.2)
99.95	56 (1.6)	110 (3.1)	165 (4.7)
99.9	76 (2.2)	152 (4.3)	228 (6.5)
99.5	99 (2.8)	197 (5.6)	296 (8.4)
99	109 (3.1)	218 (6.2)	327 (9.3)
98	135 (3.8)	270 (7.6)	405 (11.5)
97	154 (4.4)	309 (8.7)	463 (13.1)
96	174 (4.9)	349 (9.9)	523 (14.8)
95	194 (5.5)	388 (11.0)	583 (16.5)

* At 110 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

PSA Nitrogen Generators - Dual Bed

Dual Bed Nitrogen Generation Systems

Fully enclosed (steel) with casters

High efficiency coalescing and sterile air filters

Oxygen analyzer available

PLC controls

High oxygen alarms and dry contacts available

Stand by mode⁽¹⁾

Purity easily adjusted between 95%-99.999% with flow control valve

Outlet pressure regulator

Vertical nitrogen storage tank

Energy efficient compared to delivered nitrogen

Final stage sterile filter is USDA accepted for use in federally inspected meat and poultry plants in full compliance with FDA and GFSI requirements. The filter achieves 6 log reduction of bacteria and microorganisms and 99.999+ % contaminant removal



Models DB5 through DB-20

Nitrogen Flow SCFH (Nm³/hr)⁽²⁾

% Nitrogen	DB-5	DB-10	DB-15	DB-20
99.999	94 (2.6)	189 (5.4)	283 (8.0)	377 (10.7)
99.995	150 (4.2)	300 (8.5)	450 (12.7)	600 (17.0)
99.99	194 (5.5)	388 (11.0)	583 (16.5)	777 (22.0)
99.95	314 (8.9)	629 (17.8)	943 (26.7)	1258 (35.6)
99.9	365 (10.3)	730 (20.7)	1095 (31.0)	1460 (41.3)
99.5	512 (14.5)	1024 (29.0)	1536 (43.5)	2048 (58.0)
99	618 (17.5)	1200 (34.0)	1853 (52.5)	2470 (70.0)
98	770 (21.8)	1541 (43.6) ⁽³⁾	2311 (65.4)	3081 (87.2)
97	892 (25.3)	1783 (50.5) ⁽³⁾	2675 (75.75)	3566 (101.0)
96	983 (27.8)	1966 (55.7) ⁽³⁾	2949 (83.5)	3931 (111.3)
95	1065 (30.2)	2130 (60.3) ⁽³⁾	3195 (90.5)	4260 (120.6)

Notes

1 Stand-by mode is not recommended for purities 99.995-99.999%

2 At 110 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

3 DB-10EC Models only. For DB-10 Models consult the factory.

Expansion System Options

As standard products, our DB-5 and DB-15 models (including those with an Oxygen Analyzer) can be expanded to the flow capacity of a DB-10 and DB-20, respectively.

The DB-5 and DB-10 Models can be incorporated into the cabinet of a DB-20 so that they can be expanded to the flow capacity of a DB-20. To get the larger cabinet, order

either the DB-5-EC or the DB-10-EC for future expansion to a DB-20. The expansion is integrated into the cabinet so no extra floor space is needed. Expansion Kit P/N EXP-DB-01.

Expansion Capabilities

DB-5	DB-10	DB-15	DB-20
DB-5 →	-	-	-
-	DB-10	-	-
-	-	DB-15 →	-
DB-5-EC →	-	-	-
-	DB-10-EC →	-	-

PSA Nitrogen Generators

Dual Bed Nitrogen Generation Systems

Principal Specifications - Models DB5, DB-10, DB-15, DB-20

Model Number	DB-5	DB-10	DB-15	DB-20
Recommended Inlet Pressure	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg)	→		
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Pressure Drop	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120 VAC / 60Hz., 180 W	120 VAC / 60Hz., 180W	120 VAC / 60Hz., 180W	120 VAC / 60Hz., 180W
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.99999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um
Generator Cabinet Dimensions	28.5"L x 34"D x 78"H 72 cm x 86 cm x 198 cm	28.5"L x 34"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 86 cm x 198 cm
Inlet / Outlet Port Size	1/2" NPT / 1/2" NPT	1/2" NPT / 1/2" NPT	1" NPT / 3/4" NPT	1" NPT / 3/4" NPT
N2 Storage Tank Size	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)
N2 Storage Tank Dimensions	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm
Shipping Weight	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)

Ordering Information - Models DB5, DB-10, DB-15, DB-20 For assistance, call toll-free at 1-800-343-4048 8AM to 5PM EST

DB N2 Generator without O2 Analyzer	DB-5	DB-10	DB-15	DB-20
DB N2 Generator with Std O2 Analyzer	DBO-5	DBO-10	DBO-15	DBO-20
DB N2 Generator with Advanced O2 Analyzer	DBOC-5	DBOC-10	DBOC-15	DBOC-20
DB N2 Generator with Trace O2 Analyzer	DBOD-5	DBOD-10	DBOD-15	DBOD-20

Maintenance Kits - Models DB5, DB-10, DB-15, DB-20⁽⁴⁾

DB N2 Generator without O2 Analyzer	MKDB5	MKDB5	MKDB15SS1	MKDB15SS1
DB N2 Generator with Std O2 Analyzer	MKDBO5	MKDBO5	MKDBO15SS1	MKDBO15SS1
DB N2 Generator with Advanced O2 Analyzer	MKDBOC5	MKDBOC5	MKDBOC15SS1	MKDBOC15SS1
DB N2 Generator with Trace O2 Analyzer	MKDBOD5	MKDBOD5	MKDBOD15SS1	MKDBOD15SS1

4 Each kit contains two replacement prefilter and two final filter elements. Also included are valve maintenance components. Where needed, a replacement oxygen sensor is also included.

Product Features and Benefits

Save up to 90% of your gas costs by eliminating expensive gas cylinders, dewars and bulk nitrogen

Typical payback 6-12 months

Eliminate dangerous and problematic nitrogen cylinder transport, storage and change-out issues

Easy to install, operate, and maintain

Long term price stability

Complete control of entire flow & purity range

No costly service visits or new equipment if your process specifications change

Compact – frees up valuable floor space

Proven technology with numerous references available

Parker is the market leader with over 50,000 successful generator installations

PSA Nitrogen Generators - Twin Tower

Twin Tower Nitrogen Generators

Principal Specifications

	DB-30	DB-40	DB-50	DB-80
Recommended Inlet Pressure	110 psig (7.6 bar)	110 psig (7.6 bar)	110 psig (7.6 bar)	110 psig (7.6 bar)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg)	80/140 psig (5.5/9.7 barg)	80/140 psig (5.5/9.7 barg)	80/140 psig (5.5/9.7 barg)
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Pressure Drop	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120VAC/60 Hz. 300W	120VAC/60 Hz. 300W	120VAC/60 Hz. 300W	120VAC/60 Hz. 300W
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um	99.9999+% @ 0.01um
Inlet Port Size	1.5" NPT Female	2" NPT Female	2" NPT Female	2" NPT Female
Outlet Port Size	1" NPT Female	1.5" NPT Female	1.5" NPT Female	1.5" NPT Female
Generator Skid Dimensions	64"W x 64"D x 96"H (163cm x 163cm x 244cm)	64"W x 64"D x 96"H (163cm x 163cm x 244cm)	64"W x 64"D x 103"H (163cm x 163cm x 244cm)	64"W x 64"D x 127"H (163cm x 163cm x 244cm)
N2 Storage Tank Size	240 Gal. (908 L)	240 Gal. (908 L)	400 Gal. (1514 L)	660 Gal. (2498 L)
N2 Storage Tank Dimensions	30"D x 92"H (76 cm x 234 cm)	30"D x 92"H (76 cm x 234 cm)	36"D x 101 "H (91 cm x 257 cm)	42"D x 125"H (107 cm x 318 cm)
Shipping Weight	3718 lbs (1686 kg)	4018 lbs (1823 kg)	4635 lbs (2102 kg)	5780 lbs (2622 kg)

Ordering Information - Models DB30, DB-40, DB-50, DB-80⁽¹⁾

For assistance, call 1-800-343-4048 8AM to 5PM EST

DB N2 Generator with Std O2 Analyzer	DB-30	DB-40	DB-50	DB-80
DB N2 Generator with Advanced O2 Analyzer	DBOC-30	DBOC-40	DBOC-50	DBOC-80
DB N2 Generator with Trace O2 Analyzer	DBOD-30	DBOD-40	DBOD-50	DBOD-80

Maintenance Kits - Models DB30, DB-40, DB-50, DB-80⁽²⁾

DN N2 Generator with Std O2 Analyzer	MKDB30-SS1	MKDB40-SS1	MKDB50-SS1	MKDB80-SS1
DB N2 Generator with Advanced O2 Analyzer	MKDBOC30-SS1	MKDBOC40-SS1	MKDBOC50-SS1	MKDBOC80-SS1
DB N2 Generator with Trace O2 Analyzer	MKDBOD30-SS1	MKDBOD40-SS1	MKDBOD50-SS1	MKDBOD80-SS1

Nitrogen Flow SCFH (Nm³/Hr)⁽³⁾

% Nitrogen	DB-30	DB-40	DB-50	DB-80
99.999	552 (14.5)	656 (17.2)	864 (22.7)	1381 (36.3)
99.995	715 (18.8)	847 (22.3)	1115 (29.3)	1783 (46.9)
99.99	1010 (26.6)	1198 (31.5)	1578 (41.5)	2525 (66.4)
99.95	1365 (35.9)	1622 (42.6)	2135 (56.1)	3417 (89.8)
99.9	1530 (40.2)	1812 (47.6)	2390 (62.8)	3818 (100.4)
99.5	2178 (57.3)	2585 (68.0)	3402 (89.4)	5445 (143.1)
99	2270 (59.7)	2690 (70.7)	3545 (93.2)	5670 (149.1)
98	2950 (77.5)	3505 (92.1)	4615 (121.3)	7385 (194.1)
97	3190 (83.9)	3780 (99.4)	4980 (130.9)	7960 (209.3)
96	3945 (103.7)	4680 (123.0)	6157 (161.9)	9845 (258.8)
95	4320 (113.6)	5140 (135.10)	6765 (177.8)	10815 (284.3)

Notes

1 For CRN/CSA use suffix "-CRN" on these models.

2 Each kit contains two replacement prefilter and two final filter elements. Valve maintenance components are also included. Where needed, a replacement oxygen sensor is also included.

3 At 110 psig nitrogen purity is pressure, temperature and flow dependent. Higher flow and purities can be achieved at higher pressures.

Parker Custom Nitrogen Gas Generators



Parker's Nitrogen Systems are customizable - our team of engineers will work with you to meet your specific requirements.

Energy Efficient Control System

Traditional PSA systems operate under a fixed time cycle even when customer nitrogen demand is low. This is very wasteful since it requires compressors to produce large amounts of air to feed the PSA. The Energy Efficient Control System (EECS) utilizes the on board nitrogen flow meter to monitor customer demand of nitrogen. During periods of low demand, the time cycle will automatically extend which reduces the air requirement to the PSA when compared to a 60 second fixed time cycle. This ultimately results in an energy savings since the air compressor does not have to stay continuously loaded requiring less kilo-watts consumed by the compressor. As an added benefit, valve life can also be extended since the valves are switching less.

Differential Pressure Bed Monitoring

Differential pressure indicators are included to allow the user to monitor excessive differential pressures across the bed. This is important since high differential pressures can lead fluidization of the CMS inside the adsorption vessels.

L/D ratios

Beds are sized to maintain a specific length-to-diameter ratio. Proper L/D is critical to prevent feed gas channeling making the nitrogen separation process inefficient. Optimum L/D is calculated to minimize the channeling effect so maximum bed surface area is realized.

Valve Leak Check

Incorporated in the system is a Valve Leak Check step which allows the user to determine valve seat health without having to remove the valves from the process. Valve Leak Check can be performed and completed in less than 10 minutes.

PSA Standby

Separate from the EECS controls is a Standby feature. If nitrogen is no longer required for a period of time, the control system detects a no flow condition which will result in the PSA entering a sleep mode or Standby. This will shut the system down which will in turn time-out the air compressors so they are not continuing to run unnecessarily. This will also improve valve seat life since they are no longer cycling. Once the control system detects nitrogen flow the system automatically starts back up and seamlessly resumes nitrogen production.

Bed Design

Our PSA vessels can be reloaded, unlike some of our competitors. We utilize an ASME flanged on top of the dual bed design (Carbon Molecular Sieve). Some competitors use welded tops and non ASME.

Oxygen Analyzer Options

TS-02A Analyzer

The Balston TS-02A is a hand held nitrogen analyzer suitable for spot checking lines in your plant. Simply install shraeder valves at the point of testing. Resolution to 0.1% and accuracy +/- 1% of full scale. This option is best for spot checking purities of 99.5% or lower.



TS-02A Analyzer

Standard % O2 Analyzer - O

The standard oxygen analyzer has a High/Low contact alarm and audible alarm. This option is best for nitrogen purities $\leq 99.9\%$. Includes High/Low dry contact Replacement Oxygen Sensor P/N 72695. Use P/N 72-730NA to order as a stand alone analyzer.



Standard % O2 Analyzer - O

Advanced O2 Analyzer - OC

The advanced oxygen analyzer with advanced galvanic sensor is capable of oxygen analysis from 0.05% to 100%. The sensor has a 1 year expected life. Standard features include auto-ranging capability, two-stage alarms, system diagnostic functions, zero and span calibration. Two sets of digital outputs and a 4-20mA output are available. This option is best for nitrogen purities $\leq 99.95\%$ Replacement Oxygen Sensor P/N GPR-11-60-4. Use P/N GPR-2900-W to order as a wall mount analyzer.



Advanced O2 Analyzer - OC

Trace O2 Analyzer - OD

The trace oxygen analyzer with advanced galvanic sensor is capable of oxygen analysis from 0-25%. The sensor has a 1 year expected life. Standard features include auto-ranging capability, two-stage alarms, system diagnostic functions, zero and span calibration. Two sets of digital alarm outputs and a 4-20mA output signal are available. This option is best for nitrogen purities $>99.95\%$ Replacement Oxygen Sensor P/N GPR-12-333. Use P/N GPR-1900W to order as a wall mount analyzer.



Trace O2 Analyzer - OD

Ordering Information - O2 Analyzer Options

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Model Numbers	TS-02A Analyzer	Standard % O2 Analyzer	Advanced Analyzer	Trace O2 Analyzer
O2 Analyzer Manufacturer	Balston	Balston	Advanced Instruments	Advanced Instruments
Purity	Standard %	Standard %	Upgraded %	High Purity
Output	LCD Display	High/Low Contact Alarm	4-20 Milliamp	4-20 Milliamp
Most suitable for	Spot Checks $\leq 99.5\%$	Audible Warning $\leq 99.9\%$	99.5% - 99.99%	PPM Levels
Replacement Sensors	75695-L9001	72695	GPR-11-60-4	GPR-12-333

Ordering Information - Models with O2 Analyzer

	MBO-X	MBO-X-SB	DBO-X	DBO-X-EC	DB-30 thru 80
Standard % O2 Analyzer; best for purities $\leq 99.5\%$	MBO-1 thru MBO-5	MBO-1-SB thru MBO-5-SB	DBO-5 thru DBO-20	DBO-5-EC thru DBO-20-EC	DB-30 thru DB-80
Advanced O2 Analyzer; best for purities 99.5%-99.95%	MBOC-1 thru MBOC-5	MBOC-1-SB thru MBOC-5-SB	DBOC-5 thru DBOC-20	DBOC-5-EC thru DBOC-20-EC	DBOC-30 thru DBOC-80
Trace O2 Analyzer; best for purities $>99.95\%$	MBOD-1 thru MBOD-5	MBOD-1-SB thru MBOD-5-SB	DBOD-5 thru DBOD-20	DBOD-5-EC thru DBOD-20-EC	DBOD-30 thru DBOD-80

WineMaker™ Series Nitrogen Generators

Creates a continuous supply of high purity nitrogen from compressed air

Generating your own nitrogen eliminates the hassles of supplied cylinders, dewars or bulk nitrogen. A nitrogen generator dispels any concerns about lines icing up, running low, or running out of nitrogen. Costly downtime, tank rental fees, Haz Mat fees, delivery fuel surcharges, price increases, evaporation concerns, and multi-year lease agreements will all be eliminated. Producing your own nitrogen eliminates reliance on outside vendors, allowing your winery to be more self-sufficient. The WineMaker Series Nitrogen Generators typically have a 9-18 month payback, and an operating life of greater than 15 years.

Installation is simple: pipe in compressed air and pipe out nitrogen. Just connect a standard compressed air line to the inlet of the generator, connect the outlet to your nitrogen line and the unit is ready for trouble-free operation. The system is designed to operate 24 hours/day, 7 days/week.

Expansion is done internally within the cabinet. The unit does not get any larger when expanded and there is no need to find more floor space. See bottom of page 10 for further information.



Wine Bottling

A nitrogen blanket reduces the oxygen concentration to less than 0.5% and minimizes contact between oxygen and the wine surface during storage (both pre and post bottling). This will prevent the growth of bacteria and other microbes. Nitrogen can also be used to purge air from pipes and hoses prior to bottling and to ensure oxygen is not introduced during transport. Finally, sparging with nitrogen will remove any oxygen or CO2 introduced during handling, helping to preserve wine integrity. A Parker nitrogen generator supplies a continuous stream of nitrogen to displace residual oxygen and fill the voids within the package, preserving taste and freshness and extending shelf life.

Complete package with prefiltration, and receiving tank

Digital Oxygen analyzer and Digital gas flow meter

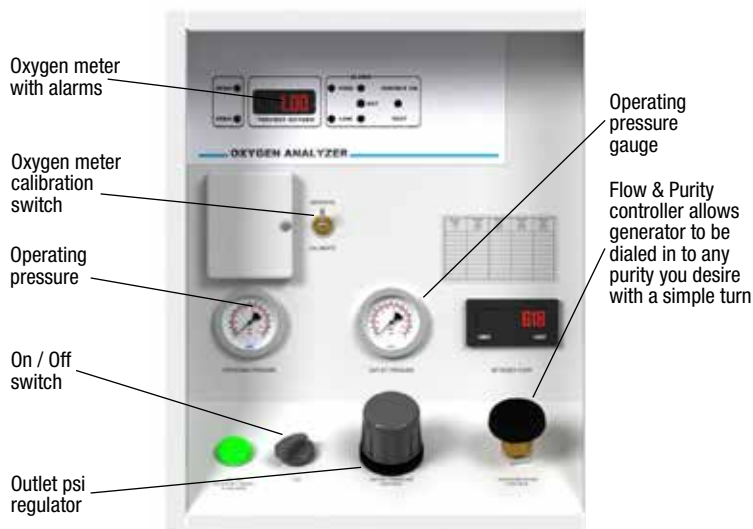
Plugs into 110 volt outlet

Portable and expandable

Lease to own options available

Serves wineries producing from 5,000 to 1 million+ cases

Ensures minimal DO pickup



Principal Specifications and Ordering Information

Standard Package Includes:

Fully enclosed cabinet with casters	High oxygen alarms and dry contacts available	Purity easily adjusted between 99%-99.9%
High efficiency coalescing and sterile air filters	PLC controls	Outlet pressure regulator
Oxygen analyzer available	Stand by mode	60 gal. vertical nitrogen storage tank

Principal Specifications - Models DB-5-W, DB-10-W, DB-15-W, DB-20-W

Model Number	DB-5-W	DB-10-W	DB-15-W	DB-20-W
Recommended Inlet Pressure	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)	110 psig (7.58 barg)
Min/Max Inlet Pressure	80/140 psig (5.5/9.7 barg)			
Air Quality	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants	Clean air without contaminants
Pressure Drop	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)	30 psid (2 bard)
Min/Max Ambient Temperature	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)	40°F/95°F (4°C/35°C)
Electrical Requirements	120 VAC / 60Hz., 180 W	120 VAC / 60Hz., 180W	120 VAC / 60Hz., 180W	120 VAC / 60Hz., 180W
Nitrogen Dewpoint	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)	-58°F (-50°C)
Commercially Sterile	Yes	Yes	Yes	Yes
Final Filtration Efficiency	99.9999%+ @ 0.01um	99.9999%+ @ 0.01um	99.9999%+ @ 0.01um	99.9999%+ @ 0.01um
Generator Cabinet Dimensions	28.5"L x 34"D x 78"H 72 cm x 86 cm x 198 cm	28.5"L x 34"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 131 cm x 198 cm	28.5"L x 51.5"D x 78"H 72 cm x 86 cm x 198 cm
Inlet / Outlet	1/2" NPT / 1/2" NPT	1/2" NPT / 1/2" NPT	1" NPT / 3/4" NPT	1" NPT / 3/4" NPT
N2 Storage Tank Size	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)	60 Gal. (227 L)
N2 Storage Tank Dimensions	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm	24"D x 53"H 61 cm x 135 cm
Shipping Weight	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)	1076 lbs (488 kg)

Ordering Information - Models DB-5-W, DB-10-W, DB-15-W, DB-20-W*

Dual Bed N2 Generator w/o O2 Analyzer	DB-5-W	DB-10-W	DB-15-W	DB-20-W
Dual Bed N2 Generator with O2 Analyzer	DBO-5-W	DBO-10-W	DBO-15-W	DBO-20-W
Maint. Kit for N2 Generator w/o O2 Analyzer	MKDB5	MKDB5	MKDB15	MKDB15
Maint. Kit for N2 Generator with O2 Analyzer	MKDBO-5	MKDBO-5	MKDBO-15	MKDBO-15
Oxygen Sensor	72695	72695	72695	72695

For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

* Each kit contains two replacement prefilter and two final filter elements. Also included are valve maintenance components. Where needed, a replacement oxygen sensor is also included.

Nitrogen Generator Flow (SCFH)** (Nm³/Hr)

% Nitrogen	DB-5-W	DB-10-W	DB-15-W	DB-20-W
99.9	365 (10.3)	730 (20.7)	1095 (31.0)	1460 (41.3)
99.5	512 (14.5)	1024 (29.0)	1536 (43.5)	2048 (58.0)
99	618 (17.5)	1200 (34.0)	1853 (52.5)	2470 (70.0)

** At 110 psig. Nitrogen generator purity is pressure, temperature, and flow dependent. Higher flow and purities can be accomplished at higher pressures.

PRD Series

Non-Cycling Refrigerated Air Dryers

for use with Balston Nitrogen Generators

The importance of compressed air as a provider of energy for modern industrial processes is widely known. What is often overlooked however is the need to provide quality treatment for this air.

In fact, the air entering the system contains moisture which, when cooled, will turn into liquid water, causing extensive damage not only to the compressed air network, but also to the finished product.

These costly contamination problems can be avoided by installing a PRD Series non-cycling refrigerated dryer package complete with Parker Balston high efficiency filtration.

Parker's revolutionary 3-in-1 heat exchanger (PRD10 - PRD175) features a 3-in-1 aluminum design with integral air connections. All models include an air-to-air freecooler, while the unique "slowflow" demister ensures perfect dewpoints whatever the operating conditions.

Compressed air purification equipment must deliver uncompromising performance and reliability while providing the right balance of air quality with the lowest cost of operation. Many manufacturers offer products for the filtration and purification of contaminated compressed air, which are often selected only upon their initial purchase cost, with little or no regard for the air quality they provide, the cost of operation throughout their life or their environmental impact. When purchasing purification equipment, delivered air quality, the overall cost of ownership and the equipment's environmental impact must always be considered.



Benefits of Models PRD10 - PRD175

"Plug and Play" design for easy installation

Robust timed solenoid drain equals improved reliability (PRD15 - PRD175)

Unique 3-in-1 heat exchanger

Oversized demister separator resulting in excellent liquid removal over all operating conditions

Oversized condenser to operate in ambients to 122°F (50°C)

Fan cycling ensures stable operation

All models incorporate a dewpoint indicator

Extremely compact footprint

Low pressure differential across dryer (1.45 psi average)

ETL listed complete unit

Ideal for Nitrogen Generator Air Preparation



Technical Information

Product Selection

Dryer Model	Air Connections	Nominal Capacity (scfm)*	Dimensions ins (mm)			Weight		Primary Voltages
			H	W	D	lbs	kg	
PRD10	1/2" NPT-F	10	16.9 (430)	8.3 (210)	17.7 (450)	42	19	115V/1Ph/60Hz
PRD15	1/2" NPT-F	15	16.9 (430)	8.3 (210)	17.7 (450)	42	19	115V/1Ph/60Hz
PRD25	1/2" NPT-F	25	19.9 (505)	8.3 (210)	19.7 (500)	52	24	115V/1Ph/60Hz
PRD35	1/2" NPT-F	35	19.9 (505)	8.3 (210)	19.7 (500)	52	24	115V/1Ph/60Hz
PRD50	3/4" NPT-F	50	22.2 (565)	8.9 (225)	20.5 (520)	58	27	115V/1Ph/60Hz
PRD75	3/4" NPT-F	75	22.2 (565)	8.9 (225)	20.5 (520)	68	31	115V/1Ph/60Hz
PRD100	3/4" NPT-F	100	22.2 (565)	8.9 (225)	20.5 (520)	77	35	115V/1Ph/60Hz
PRD150	1 1/2" NPT-F	150	23.4 (604)	16.7 (425)	21.9 (555)	128	58	115V/1Ph/60Hz & 230V/1Ph/60Hz
PRD175	1 1/2" NPT-F	175	23.4 (604)	16.7 (425)	21.9 (555)	132	60	230V/1Ph/60Hz

Recommended Dryer, Air Surge Tank Model, and Pre-Filter for Nitrogen Generators

Nitrogen Generator	Recommended Dryer Model	Air Surge Tank Size (Gallons)*	Air Surge Tank Model	Recommended Pre-Filter Model*
MB-1	PRD10-A11516016FLU	60	72-060AST	2104N-1B1-DX
MB-3	PRD25-A11516016TXU	60	72-060AST	2104N-1B1-DX
MB-5	PRD25-A11516016TXU	60	72-060AST	2104N-1B1-DX
DB-5	PRD50-A11516016TXU	60	72-060AST	2206N-1B1-DX
DB-10	PRD75-A11516016TXU	120	72-120AST	2206N-1B1-DX
DB-15	PRD150-A11516016TX	120	72-120AST	2312N-1B1-DX
DB-20	PRD150-A23016016TX**	200	72-200AST	2312N-1B1-DX
DB-30	PRD150-A23016016TX**	240	72-240AST	2312N-1B1-DX
DB-40	PRD175-A23016016TX	240	72-240AST	2312N-1B1-DX
HFX-1	PRD10-A11516016FLU	n/r	N/A	2104N-1B1-DX
HFX-3	PRD10-A11516016-FLU	n/r	N/A	2104N-1B1-DX
HFX-5	PRD25-A11516016-TXU	n/r	N/A	2104N-1B1-DX
HFX-7	PRD35-A11516016TXU	n/r	N/A	2104N-1B1-DX
HFX-9	PRD50-A11516016-TXU	n/r	N/A	2206N-1B1-DX
HFX-11	PRD100-A11516016-TXU	n/r	N/A	2206N-1B1-DX

* An Air Surge Tank installed between the dryer and the nitrogen generator assures consistent air pretreatment.

**For 230 VAC

Technical Information

Technical Data For assistance, call toll-free at 1-800-343-4048 8AM to 5PM Eastern Time

Models	Max Ambient Temperature	Max Inlet Temperature	Min Ambient Temperature	Max Inlet Pressure	Refrigerant
PRD10 - PRD175	122°F (50°C)	149°F (65°C)	41°F (5°C)	232 psi g (16 bar g)	R134a

*Flow rates at the following climatic conditions - Ambient Temperature: 100°F (38°C), Inlet Temperature: 100°F (38°C), Inlet Pressure: 100 psi g (7 bar g).

**Parker Balston recommends Grade DX pre-filter.
**Parker Balston recommends Grade BX after-filter.

Note: Filters supplied loose, pre-filter supplied standard with DNC models.

Correction Factors for Models PRD10 - PRD175

To obtain dryer capacity at new conditions, multiply nominal capacity x C1 x C2 x C3.

Ambient Temperature (C1)	°F	60	70	80	90	100	110	120	
	°C	16	21	27	32	38	43	49	
	CF	1.34	1.26	1.17	1.09	1.00	0.91	0.82	
Inlet Temperature (C2)	°F	90	100	110	120	140	149		
	°C	32	38	43	49	60	65		
	CF	1.24	1.00	0.81	0.67	0.45	0.43		
Working Pressure (C3)	psi g	60	80	100	125	150	175	200	230
	bar g	4	6	7	9	10	12	14	16
	CFP	0.83	0.93	1.00	1.07	1.12	1.16	1.19	1.22

Notes:

1 Standard equipment includes:
-Models PRD10 - PRD175 have electromechanical control
-6' power cord (115V models) on Models PRD10 - PRD125 only
-On/Off switch
-R134a environmentally friendly refrigerant

-Power On light
-Built-in demister for high efficient removal of condensed liquid
-Removable cabinet for easy access to internal components
-Moisture dewpoint indicator
-Automatic condensate drain on Model PRD10

-Tmed solenoid condensate drain on Models PRD15 - PRD175
2 For reliable operation and to meet warranty conditions, a pre-filter must be installed



Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

1. Terms and Conditions. Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

2. Price Adjustments; Payments. Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

3. Delivery Dates; Title and Risk; Shipment. All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyer's request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

4. Warranty. Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of twelve months from the date of delivery to Buyer or 2,000 hours of normal use, whichever occurs first. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

5. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. **IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

7. User Responsibility. The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Special Tooling. A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

10. Buyer's Obligation; Rights of Seller. To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. Improper use and Indemnity. Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

12. Cancellations and Changes. Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

13. Limitation on Assignment. Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

14. Force Majeure. Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

15. Waiver and Severability. Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidity of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

16. Termination. Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

17. Governing Law. This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

18. Indemnity for Infringement of Intellectual Property Rights. Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

19. Entire Agreement. This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act. Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

Worldwide Filtration Manufacturing Locations

North America

Gas Separation & Filtration
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716 686 6400
www.parker.com/faf

Haverhill, MA
978 858 0505
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Engine Filtration & Water Purification

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209 521 7860
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843 846 3200
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Racor – Village Marine Tec.
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310 516 9911
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Hydraulic Filter
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419 644 4311
www.parker.com/hydraulicfilter

Laval, QC Canada
450 629 9594
www.parkerfarr.com

Process Filtration
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