Coalescing Compressed Air Filters

Balston Microfiber® Filter Assemblies:

Balston Coalescing Compressed Air Filters protect your equipment and delicate instruments from the dirt, water, and oil usually found in compressed air. Balston Coalescing Filters remove these 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 a Balston Coalescing Filter to continue removing liquids for an unlimited time without loss of efficiency or flow capacity. Select 1/4" to 2" line filters come with a lifetime (20 year) warranty which guarantees the product against defects and other failures.

Product Features:

- **Remove 99.99% of 0.01 micron particles of oil, water, and dirt from compressed air and other gases**
- **Continuously trap and drain liquids**
- **Service flow ranges from a few SCFM to 40,000 SCFM**
- **Remove trace oil vapor with adsorbent cartridges**
- **Lifetime warranty (20 year) with select 1/4" to 2" line filters**

Compressed Air Systems

Instrumentation and Automated Pnuematic Controls

Pnuematic Tools and Cylinders

Compressed Air Filters

Filter Cartridge and Housing Selection

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.

Physical Properties, Microfibre Filter Cartridges	
Temperature Range	-40°F to 300°F (-40°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%

Balston Filter Cartridges

Balston provides two grades of coalescing filter cartridges, Grade DX and Grade BX. Singly or in tandem, these filters satisfy all requirements for removing liquid and solid contaminants from compressed air. Balston also has an activated carbon adsorbent CI-type cartridge for the removal of trace oil vapors from a compressed air line. The activated carbon cartridge is Grade 000.

How to Select the Filter Cartridge and Housing

1. Decide which grade(s) of filter cartridges fits the application (see selection boxes at left).
2. Select the filter housing with a port size equal to the line size where the filter is to be located.
3. For a new installation in which the line size has yet to be selected, determine the gas flow rate and pressure at the point where the filter will be located, and then refer to the flow chart on the reverse side of this data sheet. NOTE: The filter port size must be equal to or larger than the line size (when specified).

How to Order the Filter Assembly

1. Build your own custom filter assembly using the guideline matrix on Page 16 and specify your model number. Example: 1/2” filter with DPI and Auto Drain with Grade DX Filter = 6004N-01A-DX.
2. Each assembly is shipped with the filter cartridge installed. To order additional filter cartridges, indicate the model number of the cartridges, and the grade. Examples 050-05-DX, 050-05-BX. The grade used for Type CI cartridges is 000 (CI-100-12-000).

Note: Assemblies with CI Cartridges are shipped with the adsorbent cartridge wrapped separately. This shipping method prolongs the life of the cartridge.

Compressed Air Filters

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 PSIG										
			2	20	40	80	100	125	150	200	250	400	650
A94A	1/4"	DX	4	9	13	24	29	36	43	55	67	—	—
A914, A914D, A914P		BX	1.2	2.4	4	7	8	9	12	15	17	—	—
2002	1/4"	DX	9	19	30	51	63	76	90	117	145	—	—
2003	3/8"	BX	3	8	11	21	25	31	36	47	58	—	—
2004	1/2"	CI	2	5	7	12	15	18	22	28	35	—	—
2104	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	—	—
2206	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	—	—
2208	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	—	—
2312	1 1/2"	DX	98	203	319	554	670	816	963	1254	1546	—	—
		BX	22	46	74	129	155	189	223	290	358	—	—
		CI	16	33	52	91	110	134	158	206	253	—	—
A15/80	2"	DX	160	333	525	908	1100	1340	1580	2060	2540	—	—
		BX	45	94	148	256	310	378	445	580	715	—	—
		CI	23	49	77	133	161	197	231	301	371	—	—
	3"	DX	364	760	1190	2060	2500	3045	3600	4680	5770	9030	14480
AKH-0280		BX	90	190	300	510	620	755	890	1160	1430	2240	3590
		CI	47	98	154	266	322	394	462	602	742	1160	1860
	4"	DX	740	1540	2430	4210	5100	6210	7300	9550	11750	18400	29480
AKH-0480		BX	180	380	590	1020	1240	1510	1780	2320	2860	4480	7180
		CI	94	196	308	632	644	780	920	1200	1480	2320	3710
	6"	DX	1500	3120	4910	8500	10300	12550	14800	19300	23700	37120	59460
AKH-0880		BX	360	750	1180	2050	2480	3020	3560	4640	5710	8940	14330
		CI	188	392	616	1064	1280	1560	1840	2390	2950	4620	7400
	8"	DX	2620	5450	8580	14860	18000	21900	25800	33700	41540	65050	104200
AKH-1480		BX	630	1310	2070	3580	4340	5300	6230	8120	10010	15680	25100
		CI	329	686	1078	1860	2250	2740	3230	4210	5190	8130	13020
	10"	DX	4080	8470	13350	23110	28000	34100	40200	52400	64590	101150	162050
AKH-2280		BX	1000	2070	3270	5660	6850	8340	9840	12800	15780	24700	39600
		CI	516	1077	1690	2920	3540	4310	5070	6610	8150	12760	20450

Compressed Air Filters

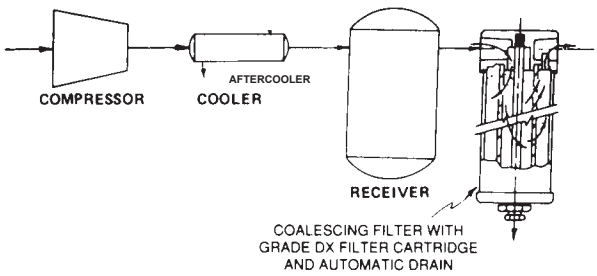
Filter Installation Recommendations

Recommendations for Typical Filter Installations

Selecting the proper location for a filter in a compressed air line is as important as selecting the proper filter. In most cases you will probably be able to base your own installation on these recommendations for typical installations.

Placing the Filter at the Compressor

The standard compressor installation consists of a prefilter (mounted on the compressor), a compressor, aftercooler, and a receiver. The Balston filter should be installed downstream from the receiver. In a system with an efficient aftercooler, the distance from the receiver to the filter is not important. Since the filter is usually maintained by the personnel responsible for the compressor, it is often convenient to install the filter downstream from the receiver. If there is no aftercooler, or the aftercooler is not efficient, coalescing filter be installed as close to the point(s) of use as possible.



Compressor Filter Specifications	
Microfibre Filter Cartridge	Grade DX
Filter Housing	Determine filter size from flow chart on page 3, but port size must be equal to or larger than the line size
Automatic Drain	Recommended
Differential Pressure Indicator	Recommended

Some compressor installations do not have an aftercooler (this is an undesirable situation). Air saturated with water vapor leaves a compressor at 240°F to 400°F (116°C to 204°C). Without an aftercooler, the air cools close to room temperature in the distribution lines and water condenses throughout the air distribution system. About two-thirds of the total water content of the air will be condensed when the air has cooled to 100°F (38°C). A filter located just before the main air line branches into smaller distribution lines will remove most of the water load from the system. The filter requirements for the main line are described above; they are the same as for a system with an aftercooler. However, since the air will continue to cool in the distribution system, additional filters located at end- use points will be required to remove water condensed downstream from the main line filter.

How to Obtain a Trouble-Free Coalescer

The mechanism of coalescing leads to three important considerations in selecting and installing a coalescing filter:

1. The filter should be large enough to ensure that the air exits the filter at low velocity and does not carry over coalesced liquid. Proper sizing of a Balston coalescing filter is easily done by using the recommendations or the maximum flow rate data. There is no danger on oversizing the filter. A Balston coalescing filter is even more efficient at extremely low flow rates than at its maximum rated flow capacity.
2. To avoid liquid carryover, the coalesced liquid should not be allowed to build up in the filter housing above the level of the bottom of the filter tube.

   Rather than relying on operator attention to this easily-overlooked job, Parker Hannifn Corp. recommends automatic drains with all coalescing filters.
3. The flow direction through the Microfibre filter tube must be inside-to-outside to permit the liquid to drip from the outside of the tube to the drain in the filter housing. If installed outside-to-inside, the filter will at first function as a coalescing filter, but liquid will collect on the inside of the filter tube. Since there is no way of draining the liquid, the level will build up rapidly until it begins to be carried downstream by the air flow. The filter will work at removing liquids for a short time, and then not work at all. If the Balston coalescing filter exhibits these symptoms, reversing the flow direction will solve the problem.

Compressed Air Filters

Filter Installation Recommendations

Removing Oil from Compressed Air

The source of oil in compressed air is the compressor lubricant. The common plant problems resulting from oil in the air are caused by liquid oil depositing in valves, instrument control surfaces, and other critical points in the air distribution system.

Balston often receives inquiries from users of compressed air about removing oil vapor from the air, yet the only reason for concern about oil vapor in most applications is that it may condense to liquid oil. Just like water vapor, oil vapor will condense to liquid when the temperature is reduced or the air pressure is increased at constant temperature. However, the table below show that while in theory, condensation of oil vapor and water vapor are similar, in practice the effect of condensation of the two vapors is quite different.

Concentration of vapor, parts per million by weight (ppm) in air at 100 psig, at indicated temperature

	Petroleum Base Oil	Synthetic Oil	Water
80°F	0.012	0.002	2,743.
100°F	0.05	0.01	5,137.
125°F	0.2	0.06	10,508.
150°F	0.7	0.2	20,119.
200°F	3.5	2.4	62,371.

From the above figures, one can calculate that if 100 SCFM of air is filtered at 125°F to remove all liquids, and is subsequently cooled to 80°F, condensed liquids would consist of: water 3.6 lbs per hour, and either petroleum base oil 0.001 lbs. per hour, or synthetic oil 0.0003 lbs per hour. Condensed water is potentially a serious problem, but the quantity of condensed oil vapor is extremely small.

Field tests show that the liquid oil in air from a well-maintained reciprocating compressor is typically in the range of 15 to 30 ppm. With an oil-sealed rotary screw compressor, liquid oil content in the compressed air can vary from 10 to more than 100 ppm, depending upon the efficiency of the bulk oil separator. Compared to these figures, the approximate 0.2 ppm of liquid oil which could result from oil vapor condensation is for practical purposes negligible.

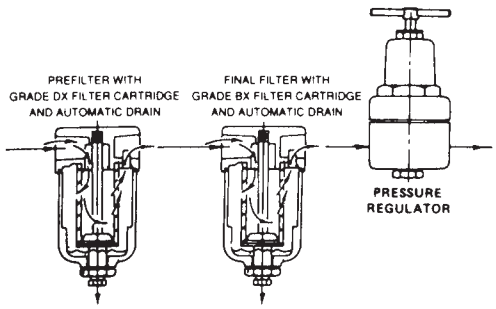
Therefore, removing the liquid oil from compressed air with a Balston coalescing filter, even at temperatures as high as 125°F, will eliminate the chance of oil-caused problems downstream in virtually all installations.

There are rare instances in which even 0.2 ppm oil vapor in the air or gas can cause a problem; for example, in contact with a sensitive catalyst or other highly reactive material.

In those cases, the trace quantity of oil vapor can be reduced using an adsorbent-loaded cartridge, following coalescing filter to remove the liquid oil.

Placing the Filter at the Point-Of-Use

Whether or not the system has an aftercooler, Balston strongly recommends a filter at each critical end-use point, even if a main line Grade DX filter has been used. The point-of-use filters will remove dirt and oil which may have been in the distribution lines, as well as water that has condensed downstream from the main filter. If there is a pressure regulator at the end-use point, the filter should be installed immediately upstream from the regulator. Alternatively, replace the existing regulator with a combination Balston filter-regulator.



Point-of-Use Filter Recommendations

Microfibre Filter Cartridge	Grade BX
Filter Housing	Size from flow chart or by line size
Automatic Drain	Recommended (refer to Page 18)

If there is no Grade DX filter upstream from the final filter, or if a significant amount of water or oil is expected, then a two-stage system, Grade DX followed by Grade BX, is required at each use point. The housing and automatic drain for the Grade DX prefilter should be the same as for the Grade BX final filter (if the flow capacities permit).

Even if the application is not particularly sensitive to impurities in the air - for example, an air-driven tool - it is still good practice to remove condensed water with a filter at the end of the line. Parker recommends a single-stage Grade DX filter with automatic drain.

Compressed Air Filters

1/4” and 1/2” Line Size Filters

Models A914D, A914P, A914, A914A

Models A914P and A914D are 1/4” line size assemblies with simple, reliable “automatic” drains used for low flow applications with moderate levels of liquid contaminate. The A914P is designed to empty condensate when there is a sudden pressure drop through the system (intermittent compressed air demand applications). The A914D incorporates an overnight drain which will drain liquid contaminate when the compressed air system pressure drops below 5 psig. The standard A914 utilizes a standard manual threaded drain. All models have a transparent polycarbonate bowl with an aluminum head. The Model A914A has a zinc bowl.

Model A914D, A914P, A914

Model A914A

Models 2002, 2003, and 2004

Models 2002 and 2003 are 1/4” and 3/8” line size assemblies. These filters have increased liquid holding capacity and are equipped with high capacity float drains, differential pressure indicators, sightglass, pressure relief valve, and 1/4 turn bayonet bowl closures. The 2004 series is designed to service 1/2” compressed air lines with low flow rates.

Model 200X Series

Model 2104

The Model 2104 is a 1/2” line size assembly with an aluminum bowl. The filter housing has a large liquid holding capacity and a high capacity float drain, differential pressure indicator, sightglass, pressure relief valve, and 1/4 turn bayonet bowl closure.

Model 2104 Series

Compressed Air Filters

1/4” and 1/2” Line Size Filters

Principal Specifications

Model	A914	A914A	2002, 2003, 2004 (1)	2104 (1)
Port Size	1/4” NPT	1/4” NPT	1/4”, 3/8”, 1/2” NPT	1/2” NPT
Materials of Construction				
Head	Anod. Alum.	Anod. Alum.	Anod. Alum.	Anod. Alum.
Bowl	Polycarbonate	Zinc	Anod. Alum.	Anod. Alum.
Internals	Nylon	Nylon	Nylon	Nylon
Seals	Buna-N	Buna-N	Buna-N	Buna-N
Maximum Temperature	120°F (49°C)	220°F (104°C)	130°F (54°C) (2)	130°F (54°C) (2)
Maximum Pressure	150 psig (3)	250 psig (3)	250 psig (3)	250 psig (3)
Minimum Pressure	5 psig (4)	5 psig (4)	15 psig (4)	15 psig (4)
Shipping Weight	0.5 lbs. (0.2 kg)	0.5 lbs. (0.2 kg)	2.0 lbs. (0.9 kg)	2.5 lbs. (1.1 kg)
Dimensions	1.5”W X 4.0”L (4cm X 10cm)	1.5”W x 4.0”L (4cm X 10cm)	3.3”W X 8.5L” (8cm X 20cm)	3.3”W X 11.3”L (8cm X 28cm)

Ordering Information

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

Model	A914	A914A (8)	2002, 2003, 2004 (1)	2104 (1)
Differential Pressure Indicator	Not Included (7)	Not Included (7)	Included (7)	Included (7)
Replacement Filter Cartridges				
No. Required	1	1	1	1
Box of 5	5/050-05-❑ (5)	5/050-05-❑ (5)	5/100-12-❑ (5)	5/100-18-❑ (5)
Cartridges Box of 10	050-05-❑ (5)	050-05-❑ (5)	100-12-❑ (5)	100-18-❑ (5)
CI Cartridge Box of 1	—	—	CI-100-12-000 (5)	CI-100-25-000 (5)

Notes:

1 Lifetime (20 year) Warranty included. Contact your local representative for details.

2 Automatic drain and Differential Pressure Indicator are temperature limiting factors. For Temperature capabilities to 220°F (104°C), order assemblies without automatic Drain and Differential Pressure Indicator.

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

4 Required for proper operation of piston drain, overnight drain, or float drain.

5 Indicate grade of filter cartridge by putting appropriate letter after ordering number. To order assembly with Type CI cartridges, add-000 after assembly number. Example: 2104N-0A0-000

6 Automatic drains not supplied with assemblies containing Type CI cartridges.

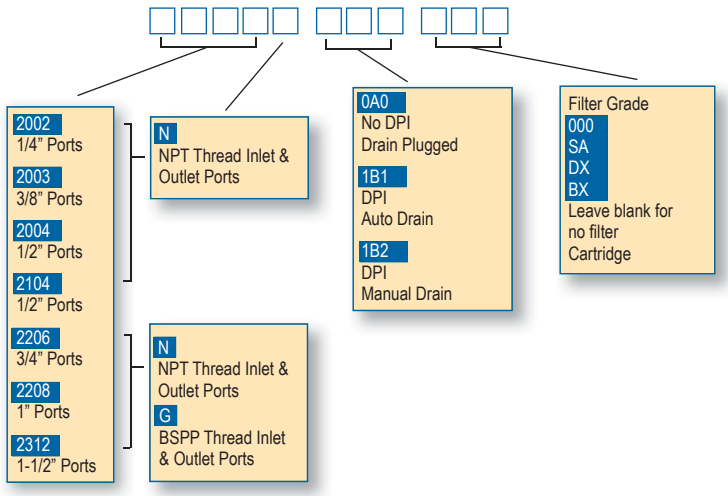
7 Differential Pressure Indicator (DPI) Kit may be ordered separately, P/N 41-071. DPI is sensitive in the range of 0-7 psi differential.

8 Order A914D-_X for overnight drain installed in the filter assembly.
Order A914P-_X for piston drain installed in the filter assembly.
Order A914A-_X for aluminum bowl and 250 psig rating.

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 DPI and Auto Drain with Grade DX Filter = 2104N-1B1-DX.

***Consult Factory. Not all configurations are available.**



Compressed Air Filters

3/4" to 2" Line Size Filters

Models 2206, 2208, 2312, and A15/80

The Model A15/80 filter assembly has 2" NPT inlet and outlet ports, an automatic float drain and differential pressure indicator installed. The Models 2206, 2208, and 2312 filter assemblies have 3/4", 1", and 1 1/2" NPT inlet and outlet ports, respectively; these models are also equipped with automatic drains, sight glasses, pressure relief valve, bayonet closures, and differential pressure indicators. Materials of construction are shown below.

Model 2312N

Model 2206N

Model A15/80

Principal Specifications

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

Ordering Information

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

Model	2206	2208	2312	A15/80
Differential Pressure Indicator	Included (6)	Included (6)	Included (6)	Included (6)
Replacement Filter Cartridges				
No. Required	1	1	1	1
Box of 5	5/150-19-❑ (5)	5/150-19-❑ (5)	5/200-35-❑ (5)	5/200-80-❑ (5)
Box of 10 CI Cartridge (Box of 1)	150-19-❑ (5) CI150-19-000	150-19-❑ (5) CI150-19-000	200-35-❑ (5) CI200-35-000	200-80-❑ (5) CI200-80-000

Notes:

1 Lifetime (20 year) Warranty included. Contact your local representative for details.

2 Automatic Drain and Differential Pressure Indicator are limiting factors. For temperature capabilities to 220°F (104°C), order assemblies without Auto Drain and Differential Pressure Indicator.

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

4 Required for proper operation of the float drain.

5 Indicate grade of filter cartridge by putting appropriate letter after ordering number (please refer to PK1-2). Example: 5/150-19-DX, 200-35-BX.

6 The DPI is sensitive in the range of 0-5 psi differential.