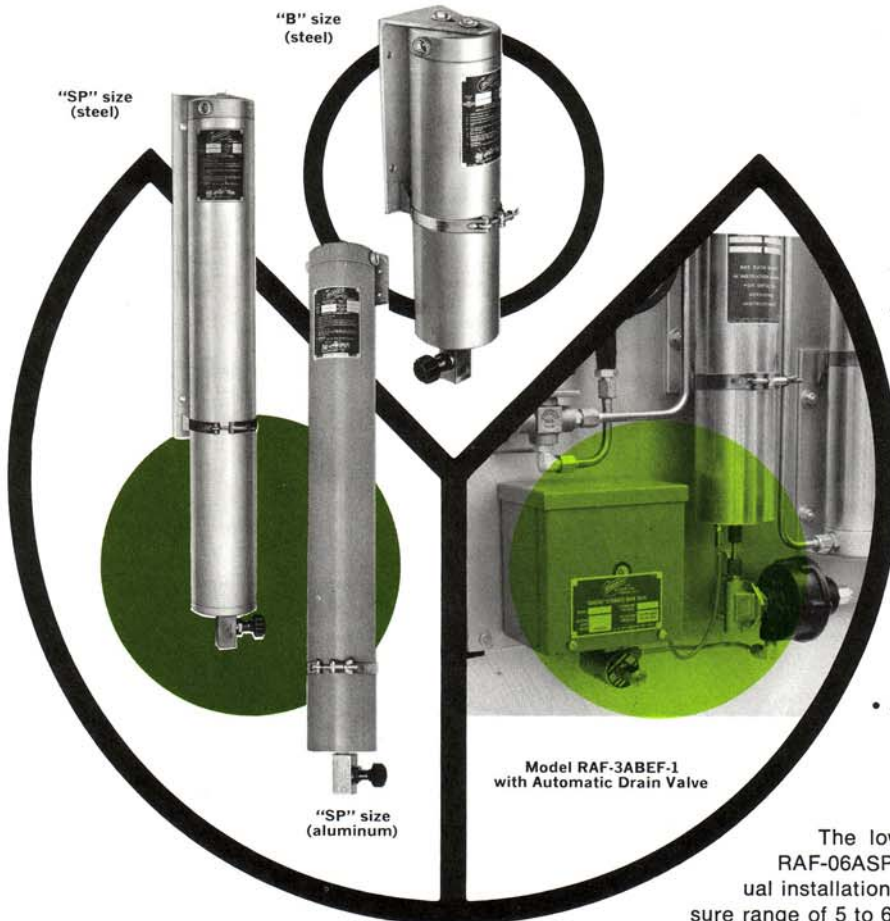


**DESCRIPTIVE, ORDERING, INSTALLATION,  
AND MAINTENANCE INFORMATION**

**DATA SHEET  
RAF®  
MECHANICAL  
FILTERS**



No. 3.103 A



- Available as individual units or as components of RAF® Purification Systems and RAF® Filter-Driers
- Operating pressures from 5 to 10,000 PSIG
- Filtration of solid particles to 10 microns nominal
- Removal of all liquid contaminants . . . such as water and oil droplets
- Minimum servicing — once a year . . . or less!
- 4-to-1 safety factor (ASME Code)

The low pressure models (RAF-06ABEF and RAF-06ASPEF) are primarily designed for individual installation and are very effective in the low pressure range of 5 to 600 PSIG. They are ideally suited for filtration of plant air used to operate pneumatic tools and equipment, prolonging their life by protecting them from corrosion and clogging.

The aluminum models, because of their light weight, are particularly desirable for airborne use and other applications where weight is a consideration.

Mechanical Filters come in two sizes which differ only in length and flow capacity: "B" size models are approximately 17 inches long, and "SP" size models are about 32 inches long. Both sizes are available in several pressure and flow ratings (as shown in Table II) enabling the user to select the correct Filter for his application.

RAF® Mechanical Filters are built to conform to the ASME Code for Unfired Pressure Vessels and have a 4-to-1 minimum safety factor. With the exception of the stainless steel models, Mechanical Filters are stock items. They are supplied complete with Filter Element Assembly and Manual Drain Valve. An Automatic Drain Valve can be supplied on the "B" size Mechanical Filter on all 3000 PSI and 3500 PSI Purification Systems.

RAF® Mechanical Filters are pressure vessels which contain a filtering element for removal of solid particles and liquid contaminants from a pressurized air or gas stream.

Filtration is accomplished by centrifugal action on the entering air or gas stream, separating *all* water and oil droplets and other liquid contaminants, and filtering out 98% of all solid particles down to 10 microns in size. These particles and droplets accumulate in the sump at the bottom of the Mechanical Filter and are subsequently drained off.

The Mechanical Filter may be used alone; or, if a higher degree of moisture and contamination removal is desired, it can be used in conjunction with RAF® Purifier Chambers containing Purifier Cartridges to make up a Purification "System." When used as a System component, the Mechanical Filter is the first unit in the flow path; and its filtering action lessens the load on the downstream Purifier Cartridges which are designed to remove gaseous or vaporized contaminants.

# MECHANICAL FILTER WITH MANUAL DRAIN VALVE

## DRAINING

The Mechanical Filter must be drained regularly by means of the Manual Drain Valve to clear the sump of accumulated waste liquids and coalesced material. Capacity of sump is about 1/2 pint for "B" size Mechanical Filter, and about 3 pints for the "SP" size. Experience with each particular installation will enable the operator to judge how often draining is required. Flooding of the Mechanical Filter sump (that is, allowing waste liquids to reach the level of the Filter Element Assembly) will clog the Filter Stone and result in downstream contamination. In the case of a Purification System, the entire System may have to be shut down, disassembled, cleaned, and all Cartridges replaced, before it can be returned to service.

**Mechanical Filter should be drained while under pressure**

## FREQUENCY OF SERVICING

When regularly drained, the Mechanical Filter requires only infrequent servicing—once a year is usually sufficient. More frequent servicing is required when input air or gas has a high oil or particle content. Condition at time of first servicing, plus experience gained through usage, will determine how often servicing is required thereafter.

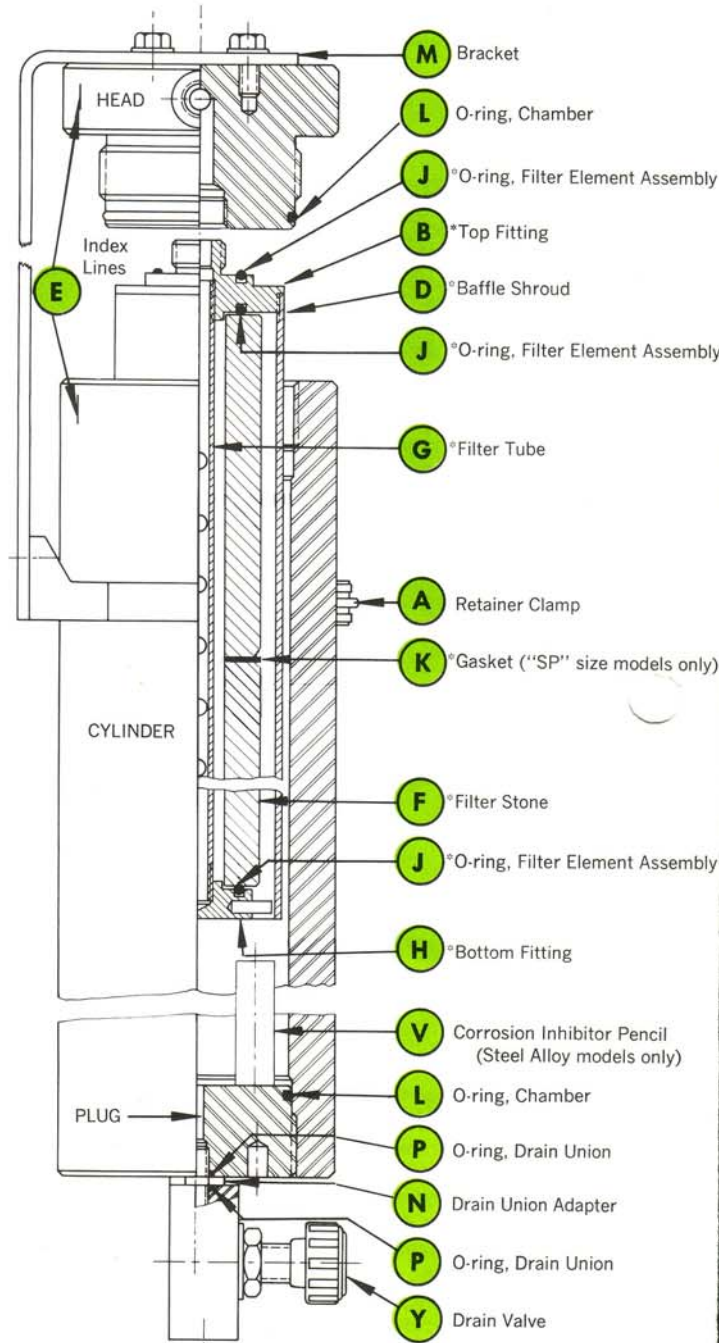
## SERVICING

Main assembly parts are not interchangeable. If more than one Mechanical Filter is to be serviced, make sure Head and Plug are reinstalled on the same Cylinder from which they were removed.

1. Open Drain Valve to empty sump.
2. **Release pressure in Mechanical Filter.**
3. Unlock Retainer Clamp (A) and remove Cylinder and Plug as a unit by unscrewing Cylinder from Head with a strap wrench.
4. Unscrew Filter Element Assembly from Head.
5. Using 2" spanner wrench, unscrew Plug from Cylinder. Remove Drain Valve from Plug and service valve per Robbins Data Sheet for that valve series.
6. **Steel Alloy models only:** Inspect Corrosion Inhibitor Pencil (V) in Plug for signs of disintegration. Replace if necessary.
7. Clean Head, Cylinder, and Plug thoroughly. Lubricate all threaded parts lightly.
8. Inspect O-rings (L) for wear and replace as required, first lubricating lightly and making sure they are well seated in O-ring grooves.
9. **If Filter Element Assembly is to be replaced as a unit,** lubricate threads and O-ring on Top Fitting (B) of new Filter Element Assembly, and screw it into Mechanical Filter Head, hand-tight, until metal-to-metal contact is made.
10. **If Filter Element Assembly is to be dismantled, cleaned, and re-installed,** proceed as follows:
  - A. Using an adjustable spanner wrench, unscrew Baffle Shroud (D) from Top Fitting (B), and Top Fitting from Filter Tube (G).
  - B. Remove Filter Stone (F), leaving Filter Tube attached to Bottom Fitting (H). (If an "SP" size model, there will be two Filter Stones with a Gasket between them.)
  - C. Flush Filter Stone with a solvent (such as trichloroethylene or trichlorethane), remove foreign particles with a brush, and dry thoroughly. Clean remaining Filter Element Assembly parts thoroughly. Inspect O-rings (J) for wear and replace as required, first lubricating lightly and making sure they are well seated in O-ring grooves. Lubricate all threaded parts lightly.
  - D. **If an "SP" size model,** place clean lightly lubricated Gasket (K) between the two Filter Stones, making sure it is well centered.
  - E. Reinstall Filter Stone and Top Fitting on Filter Tube, tightening Top Fitting securely until contact is made between Stone and either Top or Bottom Fitting (i.e. tight enough to ensure good O-ring sealing, but not so tight as to bear down on Stone.)
  - F. Blow clean dry air through center opening in Top Fitting until Filter Stone is thoroughly dry.
  - G. Screw Baffle Shroud on Top Fitting securely; then screw Top Fitting into Mechanical Filter Head, hand-tight, until metal-to-metal contact is made.
11. Matching single Index Lines (E) on Cylinder and Head, screw Cylinder on Head tightening only until Index Lines match. **Do not tighten beyond this point** or mating parts may "freeze."
12. Install Plug in Cylinder, tightening only until double Index Lines match.
13. Close and lock Retainer Clamp.
14. Pressurize slowly and check for leaks.



Mechanical Filters on certain RA compressor's automatic drain system or the automatic drain valves after itself are the same.



\*Forms a part of Filter Element Assembly when supplied pre-assembled for replacement as a unit

**LUBRICATION:** An inert lubricant (such as Halocarbon 25-5S, Do light lubrication of all threads and O-rings at time of servicing

**MECHANICAL FILTERS**

**REPLACEMENT PARTS**

Size	Model No.	Max. Flow (air) at Max.			Pressure Vessel Material	DIMENSIONS							Bracket	Re-tainer Clamp	Chamber O-ring (2 ea.)	Corrosion Inhibitor Pencil Assembly (a.)	Filter Element Manual Drain Valve	Automatic Drain Valve	Drain Union Adapter	Drain Union O-Ring (2 ea.)
		Operating Pressure PSIG	Oper. Press. SCFM	Approx. Weight Lbs.		A	B	C	D	E	F									
<b>"B"</b> (Approx. 17" long)	RAF-06ABEF	5-600	40	26	Steel Alloy	17.24	5.31	4.60	3.48	3.32	2.37	A825	10403	5232-51	10499	A846	INSG103-2P	—	10223	6004-55(c)
	RAF-3ABEF	3000 max.	155	26	Steel Alloy	17.24	5.31	4.60	3.48	3.32	2.37	A825	10403	5232-51	10499	A846	INSG103-2P(d)	—	10223	6004-55(c)
	RAF-3ABEF-1	3000 max.	155	34	Steel Alloy	—	5.31	4.60	3.48	3.32	2.37	A825	10403	5232-51	10499	A846	—	A8203-1	—	—
	RAF-35BEF	3500 max.	180	14	Aluminum	16.25	—	4.90	3.98	3.82	2.40	927 (b)	10412	5232-51	—	A846	INSG103-2P	—	10223	6004-55(c)
	RAF-35BEF-1	3500 max.	180	22	Aluminum	—	5.31	4.90	3.98	3.82	2.40	927 (b)	10412	5232-51	—	A846	—	A8203-1	—	—
	RAF-4BEF	4000 max.	200	14	Aluminum	16.25	—	4.90	3.98	3.82	2.40	927 (b)	10412	5232-51	—	A846	—	—	10062	6004-55
	RAF-45BEF-769	4500 max.	215	37	316 St. Stl.	17.00	5.31	5.10	3.98	3.82	2.62	A825-4	10412	5232-51	—	A846	SSKG250-4T	—	10062-4	6004-55
	RAF-6ABEF	6000 max.	245	37	Steel Alloy	17.00	5.31	5.10	3.98	3.82	2.62	A825	10412	5232-51	10499	A846	AKG250-4T	—	10062	6004-55
	RAF-6ABEF-769	6000 max.	245	54	316 St. Stl.	17.00	5.31	5.60	4.48	4.32	2.87	A825-4	10413	5232-51	—	A846	SSKG250-4T	—	10062-4	6004-55
	RAF-10ABEF	10000 max.	275	54	Steel Alloy	17.63	5.31	5.60	4.48	4.32	2.87	A825	10413	5232-51	10499	A846	510G-KA5-4T4T	—	10062-4	6004-55
RAF-10ABEF-769	10000 max.	275	87	316 St. Stl.	17.63	5.31	6.50	5.48	5.32	3.37	A825-4	10418	5232-51	—	A846	510G-KA5-4T4T	—	10062-4	6004-55	
<b>"SP"</b> (Approx. 32" long)	RAF-06ASPEF	5-600	120	43	Steel Alloy	16.06	4.60	3.48	3.32	2.37	A826	10403	5232-51	10499	A847	INSG103-2P	—	10223	6004-55(c)	
	RAF-3ASPEF	3000 max.	335	43	Steel Alloy	32.49	16.06	4.60	3.48	3.32	2.37	A826	10403	5232-51	10499	A847	INSG103-2P	—	10223	6004-55(c)
	RAF-35SPEF	3500 max.	365	27	Aluminum	32.37	—	4.90	3.98	3.82	2.40	927 (b)	10412	5232-51	—	A847	INSG103-2P	—	10223	6004-55(c)
	RAF-4SPEF	4000 max.	395	27	Aluminum	32.37	—	4.90	3.98	3.82	2.40	927 (b)	10412	5232-51	—	A847	AKG250-4T	—	10062	6004-55
	RAF-45SPEF-769	4500 max.	420	66	316 St. Stl.	32.25	16.06	5.10	3.98	3.82	2.62	A826-4	10412	5232-51	—	A847	SSKG250-4T	—	10062	6004-55
	RAF-6ASPEF	6000 max.	495	66	Steel Alloy	32.25	16.06	5.10	3.98	3.82	2.62	A826	10412	5232-51	10499	A847	AKG250-4T	—	10062	6004-55
	RAF-6ASPEF-769	6000 max.	495	98	316 St. Stl.	32.25	16.06	5.60	4.48	4.32	2.87	A826-4	10413	5232-51	—	A847	SSKG250-4T	—	10062	6004-55
	RAF-10ASPEF	10000 max.	685	98	Steel Alloy	32.88	16.06	5.60	4.48	4.32	2.87	A826	10413	5232-51	10499	A847	510G-KA5-4T4T	—	10062	6004-55
	RAF-10ASPEF-769	10000 max.	685	165	316 St. Stl.	32.88	16.06	6.60	5.48	5.32	3.37	A826-4	10418	5232-51	—	A847	510G-KA5-4T4T	—	10062	6004-55

(a) Individual Filter Element Assembly parts are as follows:

Name	For No. A846 "B" size		For No. A847 "SP" size	
	Part No.	Qty.	Part No.	Qty.
Top Fitting	846A-4	1	846A-4	1
Baffle Shroud	846A-5	1	847A-2	1
Filter Tube	846-2	1	847-1	1
Bottom Fitting	846-3	1	A846-3-1	1
O-ring	5217-51	3	5217-51	3
Filter Stone	846-1	1	846-1	2
Gasket	—	—	847-3	1

(b) When panel-mounted on an RAF® Purification System, Bracket is No. A825.  
 (c) Only one O-ring required for this model.  
 (d) When Mechanical Filter is a component of an RAF® Purifier Tower or an RAF® Filter-Drier, Drain Valve is Model INS250B (1/4" NPT Fem. Outlet Port)

**TABLE III TECHNICAL DATA**

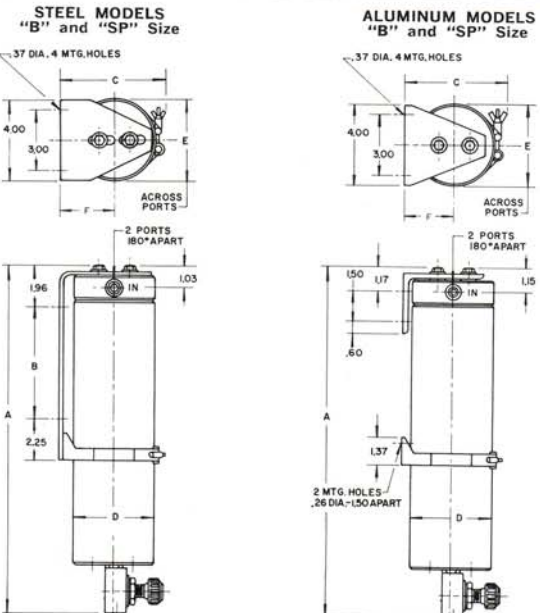
**Safety Factor:**..... 4:1  
**Operating Temperature:**..... +40°F to +200°F  
**O-ring material:**..... Buna-N  
**Orifice diameter:**..... 5/16"  
**Cylinder Leakage:**..... Zero  
**Operating Pressure:**.....

For optimum performance, Mechanical Filters should be operated at no less than 500 PSI below maximum rated pressures shown in Table II.

**Pressure Vessel Ports:**  
 600 PSI models — 1/4" NPT female  
 All others — 3/8" fem. tube SAE St. Thd. O-ring boss (interchangeable with AND10050-6, MC240-6, MS16142-3#, & MS33649-6)

**Drain Valve Ports:**  
 Valve models ending in 2P: 1/4" NPT female  
 Valve models ending in 4T: 1/4" female tube (AND10050-4)

**Fittings:**  
 To connect line tubing to Mechanical Filter use forged high pressure fittings only — such as Parker's:  
 "Triple-lok" FBTX Series male pipe connector for 600 PSI models  
 "Triple-lok" F5BX Series str. thd. O-ring ftg. for 3000 thru 6000 PSI models  
 "Super-lok" F5BU4 Series str. thd. O-ring ftg. for 10000 PSI models  
 Note: To ensure permanent leakproof connection, apply Teflon sealing tape to all male pipe threads, excepting the first thread



Minimum clearances required for servicing (when not panel-mounted on an RAF® Purification System)

"B" size - 11" downward from outlet port of drain valve.  
 "SP" size - 17" downward from outlet port of drain valve.

Dimensions are ± .06"



Valves and Gas Purification Equipment for ALL Industries

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