

# HIGH PERFORMANCE FILTERS FOR COMPRESSED AIR & GAS

## P-2000 SERIES



Value and  
Performance  
Through  
Advanced  
Technology



PNEUMATIC PRODUCTS

## VALUE AND PERFORMANCE THROUGH TECHNOLOGY

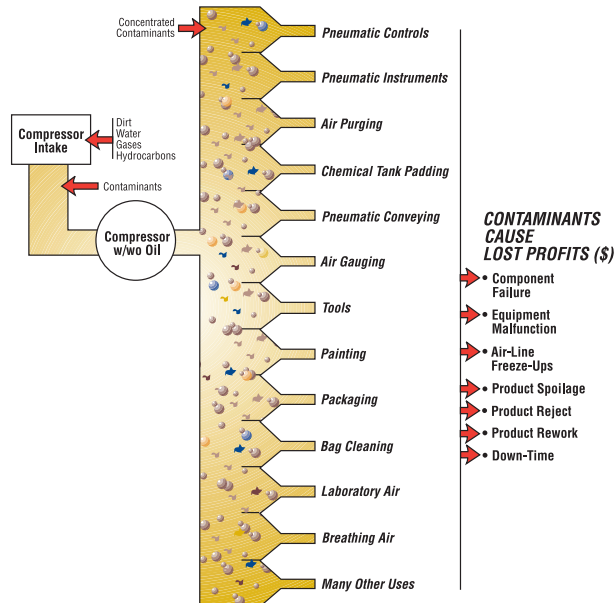
New state-of-the-art technologies in filtration medias, engineering design and manufacturing practices are incorporated in the Pneumatic Products P-2000 Compressed Air Filter Products.

The result is a product unmatched in value... ***Long element life, high contaminant removal efficiencies and low differential pressure drop at a system price you can afford.***



## THE NEED FOR P-2000 FILTERS

### THE CHAIN OF EVENTS



Contaminants in your compressed air and gas systems dramatically increase your operating cost. Dirt, moisture, oils, hydrocarbons, gases and bacteria aggressively attack, corrode and erode your piping systems, controls, instruments and tools. This causes maintenance and repair costs to escalate dramatically.

Many industries are experiencing a 10 - 17% reduction in maintenance costs as a result of improving compressed air and gas quality.

What does an hour of unplanned down-time on the production line caused by a failed component cost your company?

Air utilized in various processes that contact your product affect your operating costs. Contaminated air can result in increased scrap, rejects and rework.

**Reducing the high cost of maintenance, down-time and rejects is essential to achieve "World Class" competitiveness and quality.**

## DESIGN CHALLENGES FOR A HIGH EFFICIENCY COALESCER

There are many end user requirements that challenge a manufacturer to design the ultimate high efficiency coalescer filter element. These challenges include:

- Design a coalescer **effective on a wide range of aerosols, 1 micron to .01 micron** to ensure maximum liquid contaminant removal.
- Design a coalescer with **high liquid removal efficiency consistent throughout the life of the filter element.**
- Design a coalescing filter **with a low saturated pressure drop to maximize working pressure downstream and reduce electrical utilities.** **Note:** 1 psi of pressure drop costs \$65.00/year per 100 scfm based on \$.07 per kilowatt hour.
- Design a coalescer with **long life to reduce the cost of maintenance** associated with filter element replacement.

# PNEUMATIC PRODUCTS EXCEEDS THE CHALLENGE

## P-2000 COALESCING FILTRATION FEATURES

### Differential Pressure Gauge

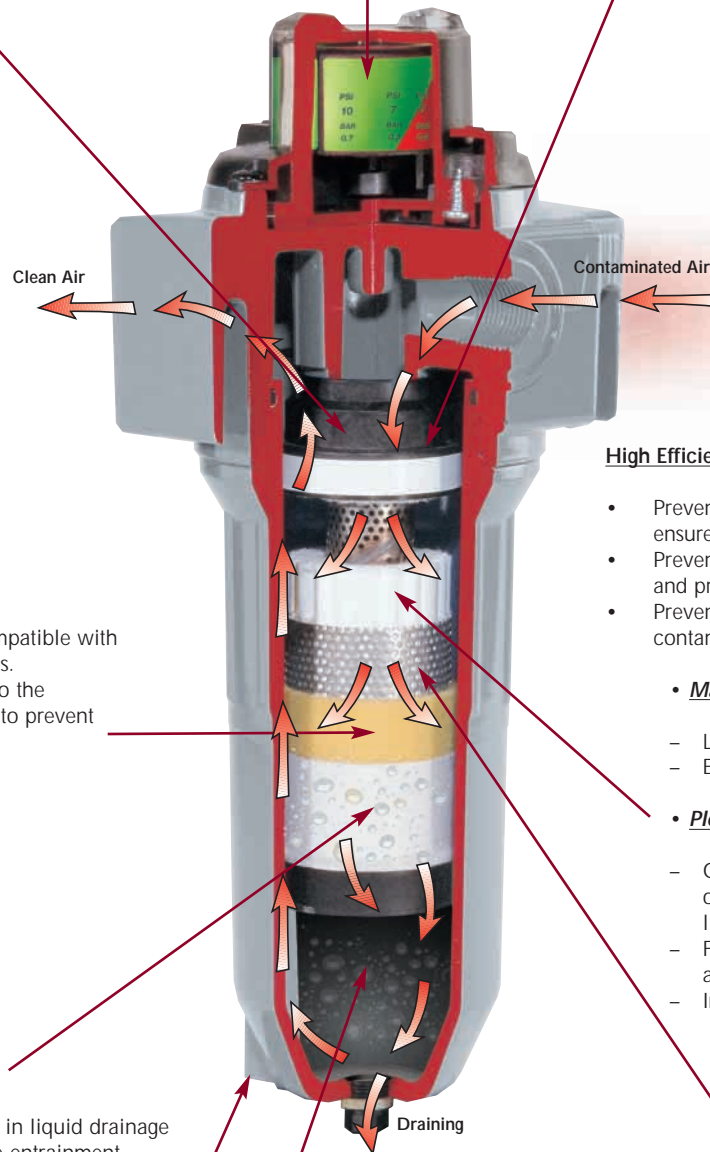
- Unique carousel movement.
- Color-coded index.
- Visibility top, front and back.
- Instrument quality gauge movement.

### POSI-Lock Snap-On Feature

- No tie rods - quick and easy to install.
- Non-metallic construction - no corrosion, easy to remove elements.
- Positive O-ring seal - no contaminant bypass while in operation.
- Non-silicone O-rings, compatible with all compressor lubricants.

### End-Cap

- Non-metallic, will not corrode out.
- Complete, total structural support.



### High Efficiency Coalescing Media Bonded/Uniform Pore

- Prevents channeling throughout life of the element, ensures consistent performance.
- Prevents liquid re-entrainment during fluctuating flows and pressures to ensure consistent performance.
- Prevents media migration and contamination downstream.

#### • **Maximized Void Volume (Pores)**

- Lowers saturated pressure drop saving energy.
- Extends element life to save on replacement costs.

#### • **Pleated Media**

- Offers 6 to 9 times the surface area of "wrapped" or "depth style" elements. Provides longer element life and lower pressure drop.
- Full-Flow Pleat - Non-pinched, increases surface area and extends element life.
- Inside-to-out flow design to prevent re-entrainment.

### First Stage Drain Layer

- Poly Foam Wrap - Compatible with all compressor oil types.
- Quickly drains liquid to the bottom of the element to prevent liquid carry-over.

### Second Stage Drain Layer - Re-Entrainment Barrier

- Unique structure aids in liquid drainage and prevents liquid re-entrainment and carryover.
- Eliminates the need for special media treatments.

### Sump Area

- Ample area for liquid collection and draining.
- Connection for automatic drain valve.

### Inside/Outside Support Core

- Provides structural strength to filtration media, prevents media degradation during fluctuating flows and pressures. Good to 100 psi pressure differential.

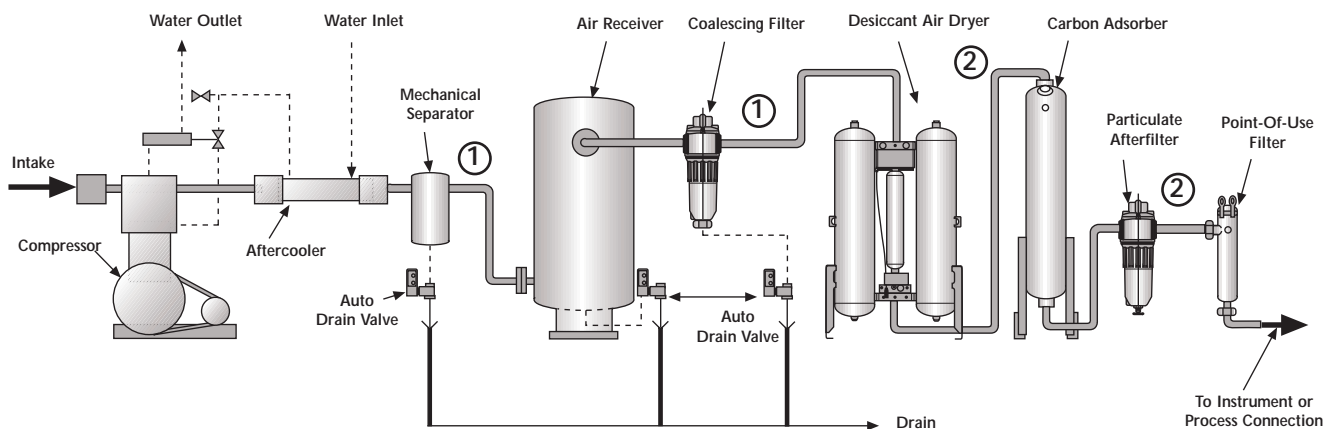
### Liquid Presence Indicator

- Test for liquid and/or pressure in bowl.

# P-2000 COALESCER APPLICATIONS

Where	Benefits
Downstream of Aftercoolers & Mechanical Separators	Compensates for cooler/separator inefficiencies.
Downstream of Air Receivers	Removes additional liquids as air cools to ambient.
Upstream of Refrigerant Dryers	Protects system heat exchanger from fouling and improves performance.
Downstream of Refrigerant Dryers	Compensates for system inefficiencies through the heat exchangers and separators.
Upstream of Desiccant Dryers	A characteristic of desiccant dryers is that they remove vapors only. Coalescers remove harmful liquids, aerosols and mist to improve performance and extended desiccant life.
Point-of-Use on Critical Applications	Ensures critical instruments and applications are protected.

## FLOW DIAGRAM FOR COMPRESSED AIR SYSTEMS



① Coalescing filters required at these locations.

② Particulate filters required at these locations.

# P-2000 COALESCER PERFORMANCE AND EVALUATION

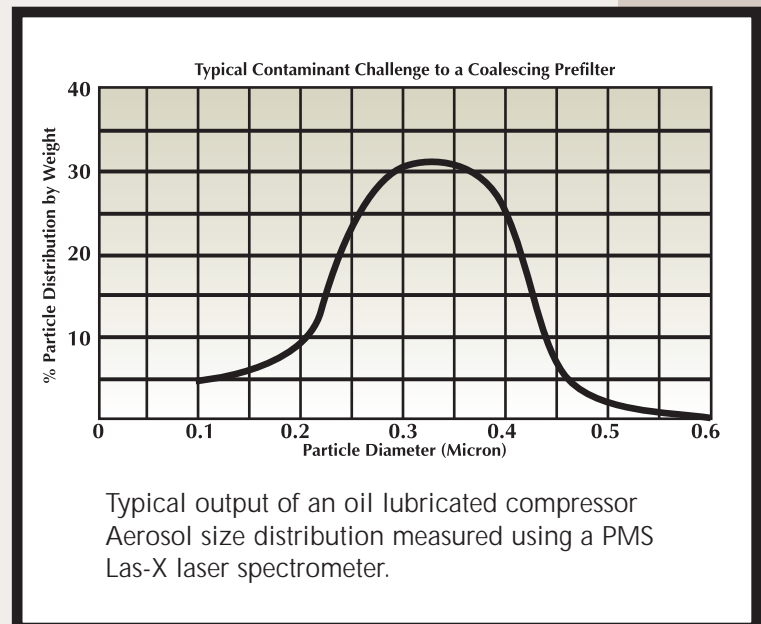
- Liquid removal efficiency .001 ppmw based on 20 ppmw challenge.
- Less than 1.5 psid pressure drop, clean and dry.
- Exceeds ISO8573 Class I standards for oil content.
- Less than 3 psid pressure drop, clean and saturated.
- Removes liquid aerosols down to .01 microns.
- **Note: Many manufacturers rely on a "DOP" rating for performance criteria. The DOP (dioctylphthalate) technique is outdated.**

The DOP test does not measure coalescing efficiency accurately because it examines coalescers under artificial conditions.

- DOP only tests monodispersed dry aerosols; wet polydispersed aerosols are not tested.
- DOP only tests at atmospheric pressure, not at system pressure.
- DOP tests are dry, and coalescers operate in a wet, saturated environment.

The DOP test does not evaluate important considerations for a coalescer. ISO8573 specifies and defines testing measurements required and qualifies a filter's ability to:

- Coalesce
- Drain
- Minimize re-entrainment
- Establish differential pressure (saturated)



## A WORD ABOUT THIS TEST

ISO8573 - This test specifies purity classes for compressed air with respect to particles, water and oil. For the purpose of assessing purity classes and performance, testing shall be in accordance with ISO standards.

Testing samples are taken for a specified length of time. Measurements are carried out at actual operating flows, temperatures and pressure; results are based on a mean value of all samples taken.

# PNEUMATIC PRODUCTS PARTICULATE FILTERS

## CHALLENGES FOR A PARTICULATE FILTER

The challenge is to design a particulate filter element that:

- Exceeds ISO8573 Class II standards for particulate filters.
- Is effective on a wide range of particulate size, 1 micron to 6 microns.
- Has high dirt load capability to maximize element service life.
- Has low pressure drop to maximize working pressure and reduce the cost of electric utilities associated with pressure drop.

## PNEUMATIC PRODUCTS EXCEEDS THE CHALLENGE

### P-2000 PARTICULATE ELEMENT FEATURES

#### A. POSI-Lock Snap-On Feature

- No tie rods - quick and easy to install.
- Non-metallic construction - no corrosion, easy to remove.
- Positive O-ring seal - no contaminant bypass.
- Non-silicon O-rings suitable for all applications.

#### B. Inside/Outside Support Core

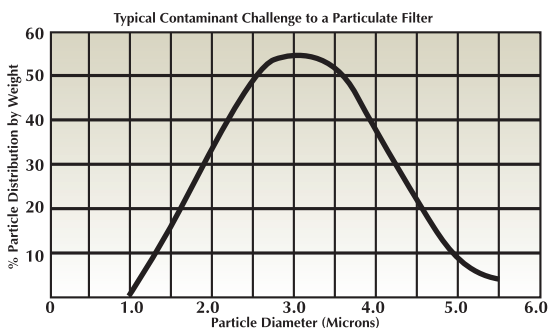
- Provide structural strength to filtration media.
- Can be used as a pre-coarse coalescer (Reverse flow through the cartridge).

**Note:** .5 ppmw efficiency as coalescer with 20 ppmw challenge.

**Benefit:** In high dirt load applications, this filter extends life of higher cost high efficiency coalescer when used in series.

#### C. High Efficiency Particulate Media

- Bonded Fiber Construction
  - Prevents channeling due to pore size enlargement.
  - Consistent performance.
  - Prevents media migration downstream
    - no contaminant downstream.
- Pleated Media
  - Offers 6 - 9 times the surface area of “wrapped” or “depth-style” elements, longer element life and lower differential pressure.
- Removal efficiency down to .9 micron, (100% absolute).



Typical particle size distribution downstream of an adsorption bed (activated alumina, silica gel, zeolites, or carbon). Particle size distribution measured using a PMS Las-X laser spectrometer.

## P-2000 PARTICULATE APPLICATIONS

Where	Benefits
Downstream of desiccant dryers	Prevents dry air system from being exposed to desiccant dust.
Pilot air source for dryer controls	Allows clean, dry air for valves and controls on dryers.
Downstream of adsorbers	Prevents dust from carbon, desiccant or molecular sieve from entering system.
Point-of-use applications	With dry air in piping system, prevents scale and other particles from damaging tools, paint lines, instruments and many other applications.
General purpose coalescer or upstream of high efficiency coalescers	Extends higher cost coalescer element life, or used as a general coalescer with .5 ppmw efficiency with a 20 ppmw challenge.

## P-2000 PARTICULATE PERFORMANCE

- As a coarse coalescer < .5 ppmw on 20 ppmw oil challenge.
- As a particulate filter - 100% absolute removal rating .9 micron.
- Less than 1.5 psid pressure drop dry and 3.0 psid saturated when used as a coalescer.

### Particulate Afterfilter

- Pleated element design, 6 times more surface area
- Maximum particle passed: **0.9 micron absolute**
- 1 psid initial pressure drop
- Element construction eliminates release of fibers into airstream
- Bonded media prevents channeling and particulate unloading



### DDV 100/400 Drain Valves

- Recommended for coalescing filters.

## P-2000 FILTER HOUSINGS

SINGLE ELEMENT DESIGN FROM 35 scfm TO 1,200 scfm

- Straight in-to-out flow design for easy installation on dryers or point-of-use applications.
- The bowl is hand-threaded to head - easy element changeout, no special tools.
- POSI-Lock Snap-On Element - Easy to changeout, no contaminant bypass.
- No small pieces to lose or corrode.
- Baked powder coat finish inside and out for a long durable finish that resists corrosion, erosion and chipping.
- Built-in differential pressure gauge to indicate need for element changeout.
  - Easy to read carousel display
  - Color and numeric readings
  - Indicator visible top, front and back
  - Ball bearing movement for instrument accuracy.
- Liquid presence indicator.
- Pressure indicator (whistle-hole) in bowl for safety when changing element.



LARGE FLOW HOUSINGS - 1,600 TO 15,000 scfm

- Non-stacking, multi-cartridge design - easy to install, no special tools, no connecting rods, no element locknuts to corrode or lose.
- **L-Shaped flow** design for lower differential pressure; important on larger flow designs where utilities associated with pressure drop are more critical.
 

**Note:** 1 psid of pressure drop per 100 scfm costs \$65.00 at \$.07 per kilowatt hour.
- Carbon steel design, shot blast and treated with corrosion-resistant primer and a two-part epoxy top coat for a long durable finish.



# P-2000 SERIES FILTERS

FLOW RANGES - FROM 35 TO 1,200 scfm

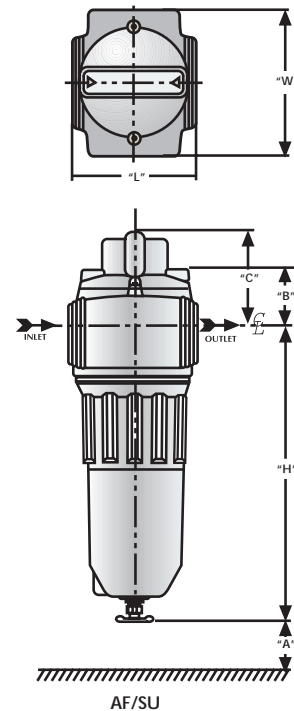
## DIMENSIONS

MODEL		DIMENSIONS (inches)							CONNECTIONS (inches)		Approx. Shipping Weight
Coalescer (SU)	Particulate Filter (AF)	H (AF)	H (SU)	L	W	A	B	C	In/Out (NPT)	Drain (NPT)	LBS.
P2001-35SU1-G8	P2001-35AF1-G8	10.1	9.5	4.4	5.2	6.5	2.0	3.3	1/2	1/4	6
P2001-60SU1-G12	P2001-60AF1-G12	14.6	14.0	4.4	5.2	11.0	2.0	3.3	3/4	1/4	8
P2001-100SU1-G16	P2001-100AF1-G16	13.2	12.5	5.8	6.6	9.0	2.3	3.6	1	1/4	12
P2001-150SU1-G18	P2001-150AF1-G18	17.9	17.3	5.8	6.6	13.8	2.3	3.6	1-1/4	1/4	14
P2001-275SU1-G24	P2001-275AF1-G24	17.7	17.7	7.0	7.8	12.0	2.8	4.1	1-1/2	1/2	18
P2001-400SU1-G32	P2001-400AF1-G32	25.3	25.3	7.0	7.8	19.8	2.8	4.1	2	1/2	24
P2001-600SU1-G40	P2001-600AF1-G40	29.6	29.6	8.1	7.1	22.5	3.8	5.0	2-1/2	1/2	28
P2001-800SU1-G40	P2001-800AF1-G40	34.6	34.6	8.1	7.1	37.5	3.8	5.0	2-1/2	1/2	32
P2001-1000SU1-G48	P2001-1000AF1-G48	39.6	39.6	8.1	7.1	32.5	3.8	5.0	3	1/2	36
P2001-1200SU1-G48	P2001-1200AF1-G48	44.6	44.6	8.1	7.1	37.5	3.8	5.0	3	1/2	39

## MATERIALS OF CONSTRUCTION

COMPONENT	MATERIAL
Vessel Head, Bowl	Aluminum Alloy
Surface Finish	Baked Powder Coat
O-Rings	Buna N or Viton® (Optional)
Support Cores	Stainless Steel or Non-Corrosive Polymer
Element Materials	Microglass fibers and non-woven polyester; glass-filled nylon end caps
Element Adhesive	Two-part epoxy
Manual Drain	Brass
Liquid Presence Indicator	Brass

Maximum operating temperature: 150°F (65°C)  
 Maximum recommended filtration temperature: 120°F (49°C)  
 Minimum inlet filtration temperature: 34°F (1°C)  
 Maximum pressure: 300 psig



# SPECIFICATIONS 1,600 TO 15,000 scfm

## SELECTION CHART

MODEL		Max. Oper. Pressure psig	Dimensions (Inches)						Cartridge QTY	Min. Overhead Clearance Inches	Connections (Inches)			Approx. Shipping Weight (lbs.)
Coalescer (SU)	Particulate Filter (AF)		H	A	B	D	F	J			In/Out (Flange)	Drain (NPTF)	Relief Valve	
P2001-1600SU2-G49	P2001-1600AF2-G49	200	75.3	20.0	64.0	12.0	19.0	19.0	2	24.0	3	3/4	2 NPT	490
P2001-2000SU2-G65	P2001-2000AF2-G65	200	80.3	20.0	69.0	12.0	19.0	19.0	2	24.0	4	3/4	2 NPT	515
P2001-2400SU2-G65	P2001-2400AF2-G65	200	85.3	20.0	74.0	12.0	19.0	19.0	2	24.0	4	3/4	2 NPT	525
P2001-3000SU3-G65	P2001-3000AF3-G65	200	84.0	21.0	71.0	13.0	24.0	24.0	3	20.0	4	3/4	2 NPT	635
P2001-4000SU4-G97	P2001-4000AF4-G97	200	87.2	21.0	73.0	14.0	26.0	26.0	4	20.0	6	3/4	3 NPT	760
P2001-5000SU5-G97	P2001-5000AF5-G97	200	87.7	21.0	73.6	15.0	26.0	26.0	5	20.0	6	3/4	3 NPT	860
P2001-6000SU5-G97	P2001-6000AF5-G97	200	92.7	21.0	78.6	15.0	26.0	26.0	5	20.0	6	3/4	3 NPT	875
P2001-7200SU6-G129	P2001-7200AF6-G129	175	103.9	25.0	83.0	16.0	29.0	29.0	6	18.0	8	3/4	4 FLG	1050
P2001-8400SU7-G129	P2001-8400AF7-G129	175	103.9	25.0	83.0	16.0	29.0	29.0	7	18.0	8	3/4	4 FLG	1100
P2001-9600SU8-G129	P2001-9600AF8-G129	150	105.6	25.0	84.0	18.0	26.5	23.3	8	18.0	8	1	4 FLG	1325
P2001-10800SU9-G129	P2001-10800AF9-G129	150	105.6	25.0	84.0	18.0	26.5	23.3	9	18.0	8	1	4 FLG	1325
P2001-12000SU10-G129	P2001-12000AF10-G129	150	105.6	25.0	84.0	18.0	26.5	23.3	10	18.0	8	1	4 FLG	1325
P2001-15000SU13-G160	P2001-15000AF13-G160	150	109.0	25.0	86.0	21.0	33.3	28.8	13	18.0	10	1	6 FLG	1600

