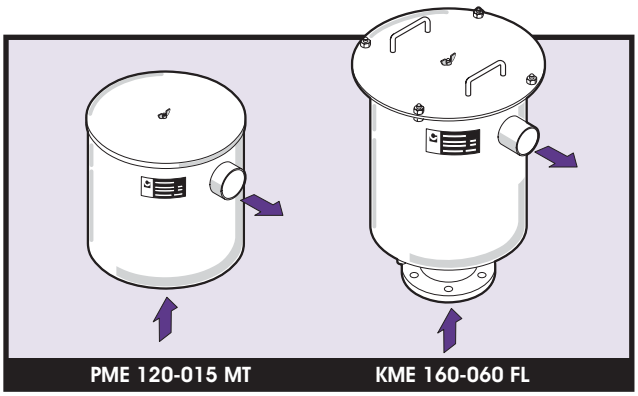
Graver Technologies

INDUSTRIAL FILTRATION PRODUCTS

CONSLER PME/KME SERIES EXHAUST SEPARATORS



Features

- Multi-stage design coalescing element
- Low pressure drop & long element life
- Economical, replaceable elements
- Direct mounting to machinery
- Oil return drain minimizes oil loss and allows recycling of filtered oil
- Custom modified element and housing designs available

Applications

- High efficiency separation of oil, aerosols and smoke from an air or gas exhaust stream.
- Removal of liquids and solids down to 0.3 μm in size. Efficiencies to 99.95%.
- Effective elimination of visible oil, smoke and mist from rotary and reciprocating vacuum pump discharge air.
- Use as a fine filter/breather on compressor or turbine oil sumps, or liquid tank reservoir vents.
- Ideal for satisfying O.E.M. requirements and specifications.

Element Performance

The PME Series "oil mist and smoke eliminators" feature a highly efficient coalescing design element. The filter's cylindrical, multi-stage element effectively removes the heavy concentrations of oil mist and oil smoke from the exhaust stream of oil-sealed, oil-lubricated, mechanical vacuum pumps. The filter can also be used in special applications as a mist eliminator/breather when it is installed on the vent connection of compressor or turbine oil sumps, or liquid tank reservoirs.

Generally speaking, coalescing is simply a "gathering" of minute liquid droplets to form larger droplets. The small droplets that enter the inside of the multi-stage element are intercepted or impinged by the filter medium and

Once formed, the larger droplets drain off the outside of the element and fall by gravity to the bottom of the filter housing where a drain connection is provided for removing and/or recycling the coalesced oil. The element actually becomes more efficient as it is wetted or saturated with liquid, and will provide long service life before replacement is required.

At rated flow, the initial pressure loss is 2.5 psi. Filter oversizing or the use of special, custom element materials is recommended for applications where lower differential pressure is required.

Element Design and Construction

The multi-stage design element is constructed with two concentric tubes of ultra-fine fiberglass along with metallic sleeves for structural support and drainage assistance. The fiberglass material portion consists of an inner, ultra-high efficiency stage to coalesce fine droplets, and an outer, coarser stage for promoting liquid drainage and preventing re-entrainment. The element end seals are composed of a molded, flexible, oil-resistant plastisol material which provides for a positive leak-tight seal.

The elements may be custom modified to satisfy each original equipment manufacturer's requirements for specific separation efficiencies, flow rates, and differential pressure levels.

Housing Design and Construction

The PME Series offers lightweight, compact filter housings. The units may be mounted directly to the exhaust port of a vacuum pump and are easily disassembled when servicing.

KME models may be used in applications with inlet pressures up to 10 psi. A minimum inlet pressure of ½ to 1 psi is required for proper functioning of the filter.

Our standard filter housings may also be custom modified to meet application needs. Typical design modifications include special end connection types and sizes, and special controls and accessories. One modified version of a standard housing uses a flanged cover to provide a leak-tight seal in applications where the outlet exhaust line is piped away from the pump/process access area.

Housing Materials

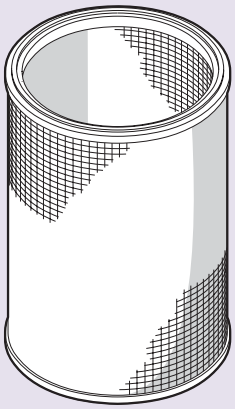
The PME Series housings are fabricated from heavy-gauge carbon steel. A rust preventative primer coating is provided beneath a durable all-weather paint. Alternate materials including stainless steel are available.

PME Series Specifications

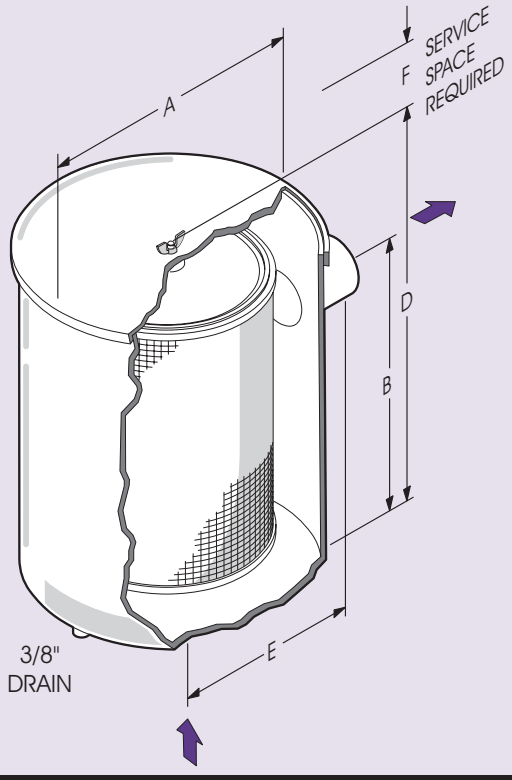
Model No.	Connection		Dimensions - Inches*					Housing Gasket Part No.	Rated CFM @△P 2.5 psi	Element			Approx. Weight Lbs.
	Size	Style	A	B	D	E	F			Part No.	No Req'd.	Total filter Area Sq. Ft.	
PME 110-012 MT	1 1/4	MPT	6 1/2	5 5/8	8 1/8	3 3/4	5 1/2	40318	30	11235	1	.5	12
PME 120-015 MT	1 1/2	MPT	8 1/2	5 3/4	9 3/8	4 9/16	6 1/2	40318	50	11236	1	.8	16
PME 130-015 MT	1 1/2	MPT	10 1/8	8 3/4	12 3/8	5 9/16	9 1/2	40318	100	11237	1	1.3	22
PME 140-020 MT	2	MPT	15 1/4	11	15 1/4	8 1/8	12	40319	200	11238	1	2.9	55
PME 140-030 MT	3	MPT	15 1/4	11 1/2	15 3/4	8 1/8	12	40319	200	11238	1	2.9	60
PME 150-030 MT	3	MPT	25 1/4	14	20 5/8	15	17	40320	400	11239	1	5.6	105
PME 150-040 MT	4	MPT	25 1/4	14	20 5/8	15	17	40320	400	11239	1	5.6	110
PME 160-040 MT	4	MPT	25 1/4	14	20 5/8	15	17	40320	575	15501	1	6.6	115
PME 160-060 FL	6	FLG	25 1/4	14 3/8	21	15	17	40320	575	15501	1	6.6	115
PME 170-050 FL	5	FLG	25 1/4	23 5/8	30 1/4	15	23 1/2	40320	750	11240	1	9.9	180
PME 170-060 FL	6	FLG	25 1/4	23 5/8	30 1/4	15	23 1/2	40320	750	11240	1	9.9	190
PME 170-080 FL	8	FLG	25 1/4	23 5/8	30 1/4	16	23 1/2	40320	750	11240	1	9.9	200
PME 180-080 FL	8	FLG	25 1/4	34	40 5/8	16	17	40320	1000	15501	2	13.2	240
PME 190-080 FL	8	FLG	25 1/4	47	53 5/8	16	23 1/2	40320	1500	11240	2	19.7	275

*All dimensions are approximate.

- Standard filters are supplied with high efficiency fiberglass elements with PVC ends (200° F max.), and a neoprene gasket. Contact your Consler representative for other available materials.
- Models PME 110 thru 160 have a male NPT inlet conn. and female NPT outlet.
- Models PME 160 thru 190 have a flanged inlet conn. and female NPT outlet.
- Models PME 140 thru 190 have two (2) handles for cover removal, and use four (4) sets of hold-down rods and nuts to secure the element and cover.
- Models PME 180 and 190 have two (2) elements stacked in one column.



TYPICAL PME ELEMENT



PME SERIES

KME Series Specifications

Model No.	Connection		Dimensions - Inches*					Housing Gasket Part No.	Rated CFM @△P 2.5 psi	Element			Approx. Weight Lbs.
	Size	Style	A	B	D	E	F			Part No.	No Req'd.	Total filter Area Sq. Ft.	
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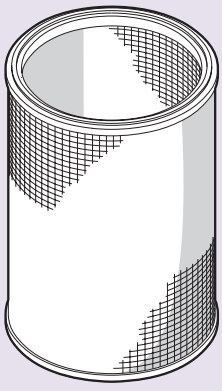
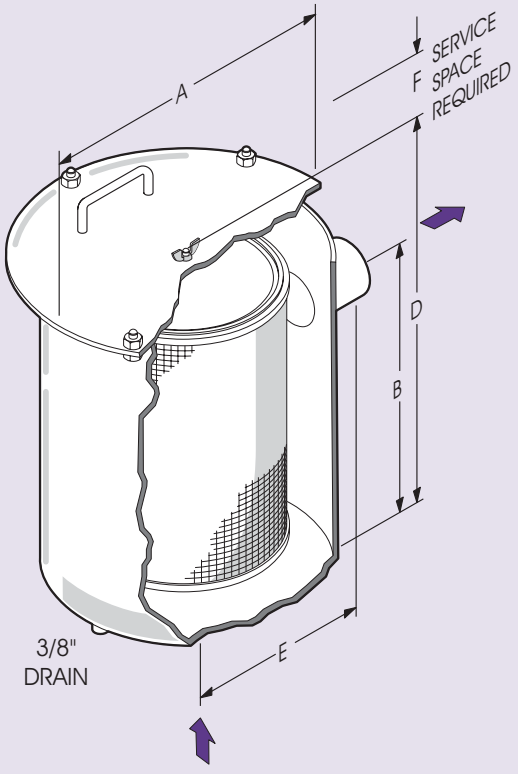
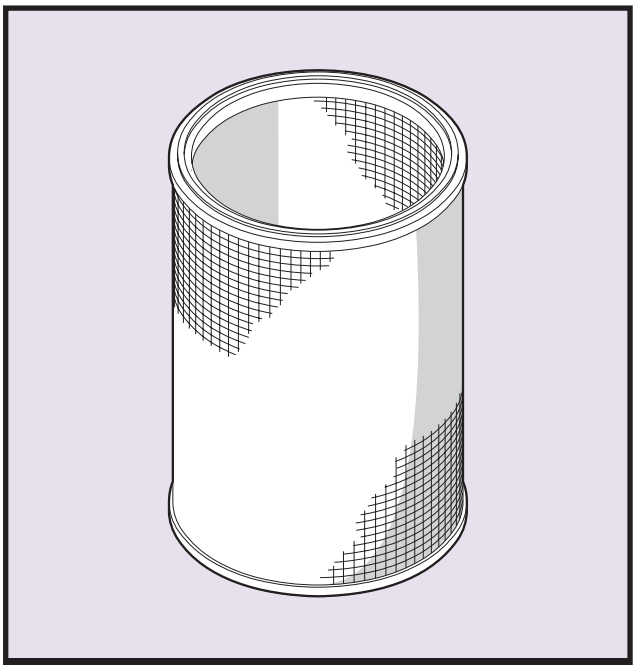


TYPICAL KME ELEMENT



KME SERIES



LOW DENSITY ELEMENT

Optional Low Density Elements

These elements are constructed of a lower density coalescing fiberglass material and are recommended for applications where a lower pressure loss is required. They are well suited for the removal of oil and other liquid mist but are less effective than the standard elements for removal of oil smoke. At the rated PME flow, pressure loss with a low density element will be 1 PSI. Elements remove solids and liquids to 4 microns in size at 99% efficiency.

MODEL	ELEMENT	MODEL	ELEMENT
PME 110	13931	PME 150	13935
PME 120	13932	PME 160	17362
PME 130	13933	PME 170	13936
PME 140	13934		

Graver Technologies also makes:

- Air Intake Filters
- Air Intake Filter/Silencers
- Air/Gas Pressure Filters
- Vacuum Filters
- Liquid Filters/Strainers
- Smoke/Oil Mist Eliminators
- Filter Separators
- Special and Custom-Designed Filters and Filter Elements
- Lube Oil Filters and Filter Elements

Graver Technologies has representatives in major cities of the United States, Mexico and Canada. Representatives are also located in many other countries around the world.

Consler brand filters are manufactured in Honeoye Falls, NY. For more details about Consler brand filters contact your representative or Graver Technologies. Graver has a policy of continued product improvement and reserves the right to change specifications without notice.

Visit our web site at www.gravertech.com.

Graver Technologies

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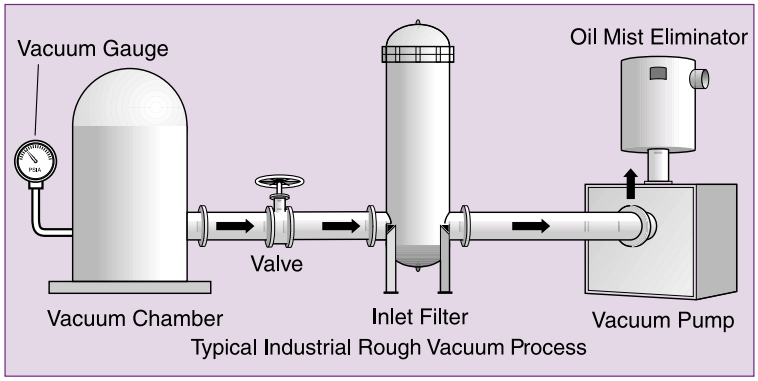
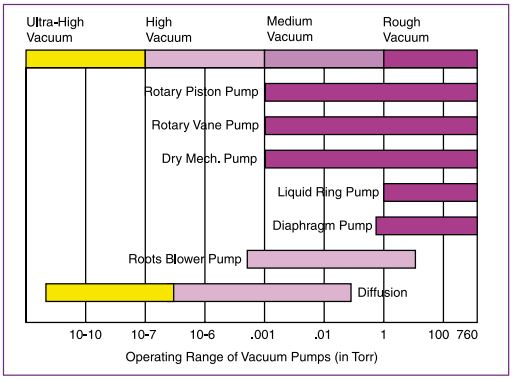
Filters for Vacuum Pumps



Typical Industrial Rough Vacuum Process



Operating Range of Vacuum Pumps (in Torr)

ISSUE 2

The Process

A vacuum is a negative pressure condition created to remove gas molecules from a process work chamber. The objective is to provide a clean space, free of gases that can affect product quality and process performance. Vacuum is used for a number of industrial products, processes, and applications:

Packaging	Chemical Process
Pharmaceutical Processes	Food Processing
Circuit Board Tests	Semiconductor Processes
Drying	Plastics
Heat Treat Furnaces	Evaporation
Pneumatic Conveying	Degassing liquids & steel
Distillation	Freeze drying
Incandescent & neon lights	

Pressure levels of a vacuum are often measured in units called Torr, mm Hg, atmosphere, Pascal, or mbar. Four generally accepted pressure ranges are used to classify vacuum work:

Rough Vacuum (RV):	760 to 1 torr
Medium Vacuum (MV):	1 to 0.001 torr
High Vacuum (HV):	0.001 to 10-7 torr
Ultra-High Vacuum (UHV):	less than 10-7 torr

Most industrial applications will fall into the rough to medium vacuum spectrum. The major components of this process are:

- **Vacuum Chamber:** The initial work location where gas molecules are to be evacuated from.
- **Vacuum Gauge:** Pressure gauge monitors the vacuum.
- **Valve:** Isolates work chamber from the pump.
- **Inlet Filter:** Particulate filter located on the suction side of the roughing vacuum pump.
- **Vacuum Pump:** Common rough to medium pump technologies used are: Oil Sealed (Rotary Vane, Rotary Piston), Liquid Ring, and Dry (Roots, Diaphragm, Claw, or Screw).
- **Oil Mist Eliminator:** Coalescing filter to remove oil mist from exhaust side of an oil sealed, oil lubricated mechanical vacuum pump.

The Problem

Filters and roughing pumps play a vital role in the performance of a vacuum system. Several criteria are often used to evaluate them.

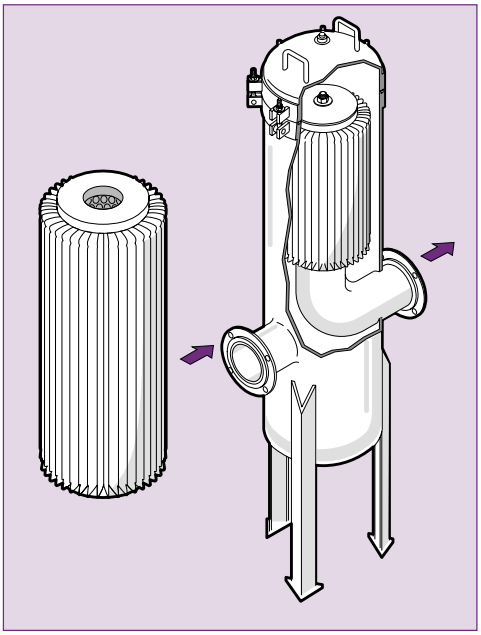
- **Contaminants:** The space in a vacuum needs to be very clean and gas molecules are considered contaminants. Air contains a mixture of gases, some harder to remove than others. The degree of its removal is affected by the application and vacuum pump.
- **Vacuum Pump Type:** Rarely does a single pump develop the needed degree of vacuum and often multiple pumps are teamed up. They are used two ways, either to "rough" pump the chamber to a certain vacuum level or as a "forepump" to exhaust a high vacuum pump. The choice of pump depends on its useful operating vacuum range and the application type.
- **Conductance:** An important factor in a vacuum is the ability of an opening or pipe to allow a volume of gas to pass through in a given time. Good conductance is achieved by using fewer turns, shorter pipe runs, larger pipe sizes, and larger pump and filter connections to maximize gas movement through the system.
- **Solid Particles Removal:** In a rough vacuum, a high incidence of solid particulates can become part of the dynamic gas flow being handled by a vacuum pump. If left unchecked, it can lead to abrasive wear or even loss of lubrication in oil sealed pumps. An inlet filter is essential to protect and extend the life of the vacuum pump. This filter is highly recommended for rough vacuum applications and is selected based on pump flow and vacuum rating.
- **Oil Mist Removal from Vacuum Exhaust:** The mechanical actions of oil lubricated, oil sealed vacuum pumps often generate large concentrations of sub-micron size visible oil, mist, or smoke in their exhaust stream. This can lead to contamination of the surrounding air and unsightly oil plumes on the side of a building. An oil mist coalescer is recommended to trap these airborne contaminants, conserve expensive pump oil by collecting and returning it back into the pump, and act as a pump silencer.
- **Materials:** Filters or vacuum pumps often require materials with:
  - A compatibility to wide changes in temperature: Fiberglass filter elements are common for applications above 300 F.
  - Low outgassing rate: Buna N and Viton are good elastomers.
  - Good seal connection: KF, LF, flat flange fittings are common.

Filters For Vacuum Pumps

Graver Technologies

LKV/HKV Series Inlet Filter

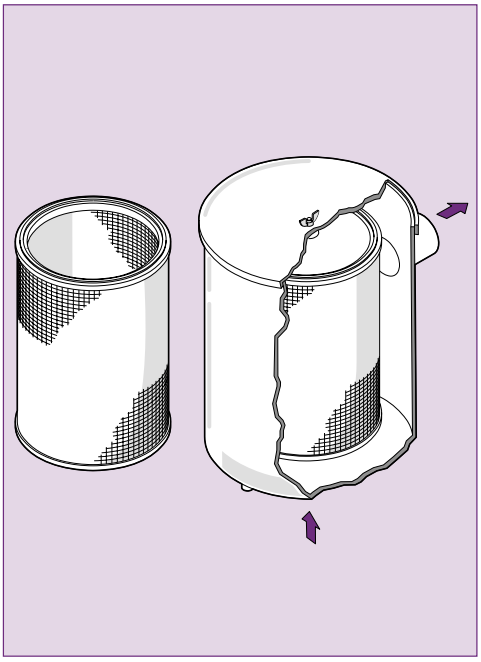
How it Works:
The LKV/HKV Series is a vacuum filter located on the inlet (i.e. suction) side of a vacuum pump and works to protect the pump from considerable amounts of particulate material that evolves from a vacuum process. The gas stream enters the housing and flows from the outside of the element inwards with solid particles being intercepted on the filter element exterior.



Features:
- Filtration of solid particulates from 0.3 up to 25 microns. Most inlet filters are nominally rated for 10 microns.
- Replaceable pleated, "radial fin" elements with extensive surface area for long life and high dust holding capacity.
- Filter media options including polyester and fiberglass. Fiberglass is often used for high temperature processes.
- LKV housings are for rough vacuum ratings above 1 torr.
- HKV is for medium vacuum ratings down to 0.001 torr.
- Many housing connection sizes available from 1/2" to 24" provide for maximum conductance in a vacuum.
- Connections: threaded, flat face flanges or KF fittings.
- Low outgassing O-ring sealing elastomers: Viton, Buna N.
- Housing materials available in carbon steel or stainless.

PME/KME Oil Mist Eliminator

How it Works:
The PME/KME Series is a high efficiency coalescer located on the exhaust side of an oil sealed, oil lubricated rough vacuum pump to trap and separate out small droplets of pump oil, preventing them from becoming airborne. The vacuum pump exhaust gas enters the bottom of the housing and flows upwards from the inside, through the element to the outside. The fine oil mist is intercepted or impinged by the filter medium and extracted from the vacuum exhaust stream. Coalesced larger droplets fall by gravity to the housing bottom for drainage.



Features:
- Replaceable multistage coalescing element constructed of two concentric tubes of ultra-fine microglass with metallic sleeves for support and drainage assistance. The inner tube provides an ultra-high efficiency stage to coalesce fine droplets while the outer tube is used to promote liquid drainage and prevent re-entrainment.
- Removes visible oil, smoke, and mist down to 0.3 micron at efficiencies to 99.95% from vacuum pump exhaust air.
- Easily mounts directly to exhaust port of a vacuum pump.
- Each housing has a bottom inlet and side discharge outlet with connections available in threaded or flanged.
- Connections available in sizes from 1" to 8".
- Employs a lower NPT drain tap for removing coalesced oil.

Graver Technologies
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