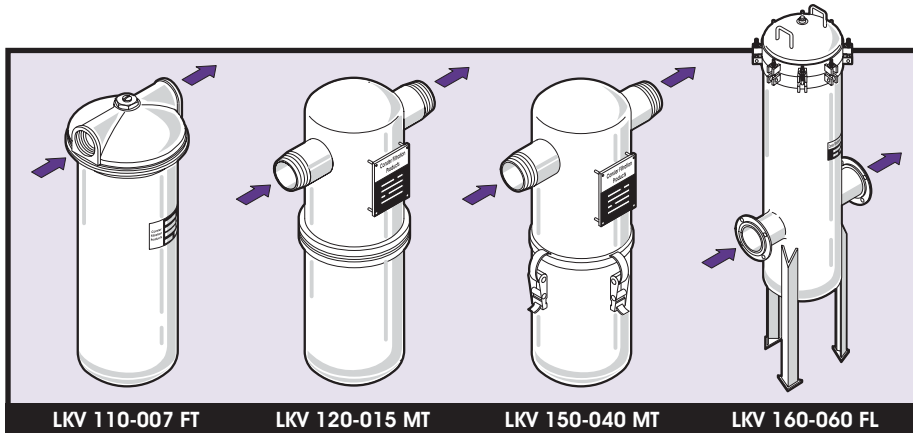


INDUSTRIAL FILTRATION PRODUCTS

CONSLER LKV/HKV SERIES VACUUM FILTERS



particle retention range from 0.3 to 750 microns. Optional filter medium materials include fiberglass, cotton, nylon, polypropylene, NOMEX*, rayon, wool, DACRON*, TEFLON*, and wire cloth providing an application range from sub-zero temperatures to 1000° F.

Standard elements are furnished with a carbon steel center core and galvanized steel support frame. 304 Stainless Steel and other materials are also available.

Features

- Pleated, maximum area elements
- Low pressure loss design
- Large dirt holding capacity, longer operation between element changes
- Positive sealing, high vacuum capability
- Cleanable, reusable filter element
- Modified and custom designs available

Applications

- Efficient removal of dust, dirt, pipescale, and other solid particulate from air and gas vacuum lines.
- Positive protection of vacuum pumps and other pipeline equipment in vacuum furnace, distillation, packaging and other processes.
- LKV for low vacuum service (above 1.0 Torr); HKV for high vacuum service (below 1.0 Torr).
- Filtering of solid particles ranging from 0.3 to 750 microns in size.
- Optional high temperature medias to +300° F.

Element Design and Construction

The LKV and HKV Series filters offer a replaceable, cleanable element that features a pleated or "radial fin" cartridge design. This design offers maximum filter area in a compact filter assembly, and provides positive gasket sealing to prevent by-pass of unfiltered fluids. Long filter life, low pressure drop, large dirt holding capacity, and efficient filtration are assured. Most models employ only one filter element to permit quick and simple cartridge changeout.

Standard models LKV 115, HKV 115, and larger are furnished with a cleanable, sewn-end constructed element, which can be reconditioned before replacement is necessary. Following several field cleanings this unique element style can be returned to the factory for recovery and reconditioning.

Element Materials

Standard elements are furnished with a polyester filter medium providing 10 micron solids nominal retention. Vacuum filter elements are also supplied in many alternate materials offering a

Housing Design and Construction

LKV Series housings are designed for low vacuum services ranging from 760 Torr (atmospheric pressure) down to 1.0 Torr.

HKV Series housings are designed and constructed for high vacuum applications operating in a range from 760 Torr down to 0.001 Torr. All sealing surfaces are machined to a 63 micro-inch finish to assure leak tightness under high vacuum service conditions.

All models can be quickly serviced without breaking pipe connections and the inlet/outlet connections are furnished in a horizontal in-line configuration. Leg supports and hinged or swing-away closure devices are standard on larger sized models. All models provide a large volume sump area for collection of contaminants below the filter element. Standard filters may also be modified to meet unique or special application needs, including designing to higher pressures.

- Materials of construction include carbon steel, 304 and 316 Stainless Steel as well as other alloys.

Filter Materials & Ratings

- Housing—Carbon Steel
LKV 110: 1 Torr–150 PSIG at 100° F
LKV 115–150, threaded or flanged conns: 1–760 Torr at 650° F
LKV 160 & larger, flanged conns: 1 Torr–50 PSIG at 650° F
HKV 110: 0.001 Torr–150 PSIG at 100° F
HKV 115–150, threaded or flanged conns: 0.001–760 Torr at 650° F
HKV 160 & larger, flanged conns: 0.001 Torr–50 PSIG at 650° F
- Closure Gasket—NEOPRENE*–300° F max.
- Standard "K5" Elements—
LKV & HKV 110: 10 micron polyester media, wool gaskets; 200° F max.; cleanable
LKV & HKV 115 & larger: 10 micron polyester media, wool gaskets; 200° F max.; cleanable & recoverable

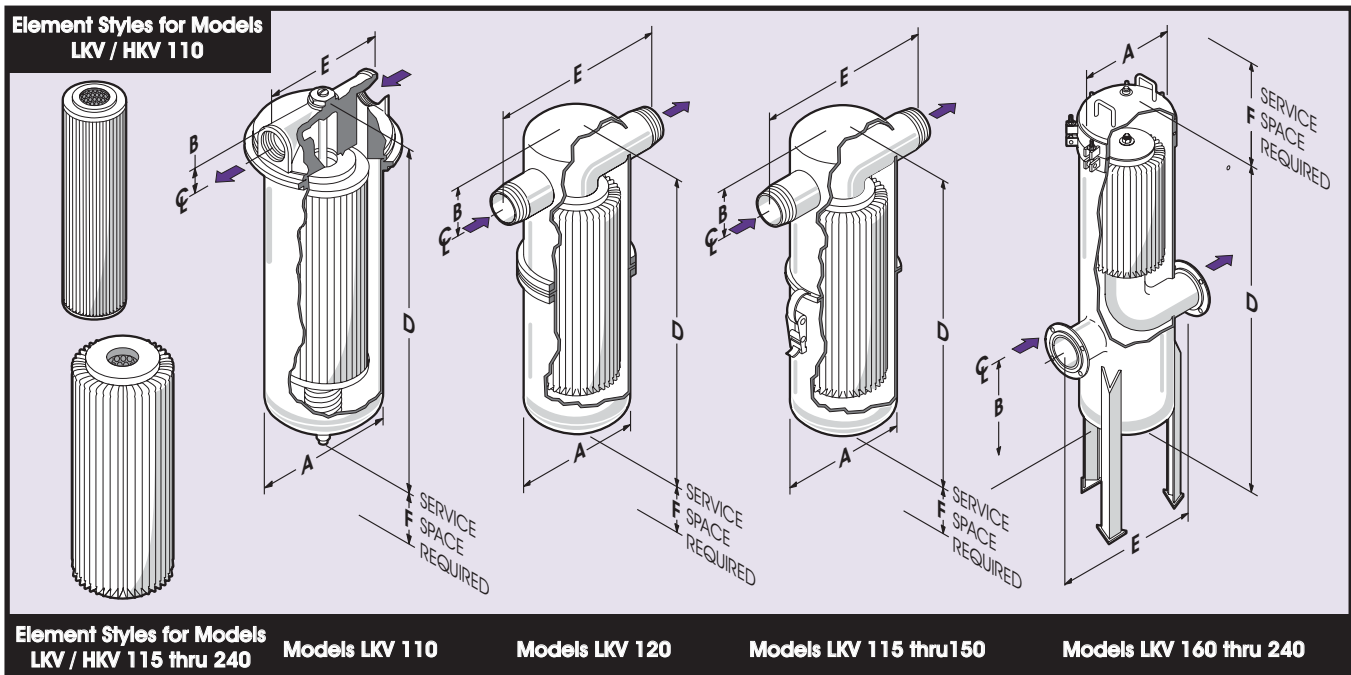
*DuPont registered trademark.

LKV/HKH Series Specifications - Vacuum Service

Model No.	Connection		Dimensions - Inches*					Housing Gasket Part No.	Element			Approx. Weight Lbs.
	Size	Style	A	B	D	E	F		Part No.	No Req'd.	Total filter Area Sq. Ft.	
LKV/HKV 110-005 FT	1/2	FPT	3 5/8	7/8	12 3/4	4 5/8	12 3/4	40313	10824K5	1	1.8	7
LKV/HKV 110-007 FT	3/4	FPT	3 5/8	7/8	12 3/4	4 5/8	12 3/4	40313	10824K5	1	1.8	7
LKV/HKV 110-010 FT	1	FPT	3 5/8	7/8	12 3/4	4 5/8	12 3/4	40313	10824K5	1	1.8	7
LKV/HKV 115-015 MT	1 1/2	MPT	5 1/4	3	17	11	10	6003N03	15474K5	1	2.8	15
LKV/HKV 120-015 MT	1 1/2	MPT	6 1/4	3	19	12	12	6004N04	10958K5	1	3.9	30
LKV/HKV 130-020 MT	2	MPT	8 1/4	4 1/2	20	18	12	6005N04	10469K5	1	6.3	40
LKV/HKV 140-030 MT	3	MPT	8 1/4	4 1/2	27 1/4	18	17	6005N04	10962K5	1	7.2	45
LKV/HKV 150-040 MT	4	MPT	10 1/4	5 1/2	35	20	21	6006N04	10963K5	1	12.7	75
LKV/HKV 150-040 FL	4	FLG	10 1/4	5 1/2	35	20	21	6006N04	10963K5	1	12.7	85
LKV/HKV 160-060 FL	6	FLG	12 3/4	11 1/2	51	22 3/4	26	6007N03	15468K5	1	22.0	310
LKV/HKV 180-080 FL	8	FLG	16	13	77	26	26	6008N03	10943K5	2	72.2	434
LKV/HKV 190-100 FL	10	FLG	20	15 1/2	84	32	26	6009N03	10945K5	2	115.6	768
LKV/HKV 200-120 FL	12	FLG	24	17 1/2	90	36	26	6010N03	11810K5	2	132.5	1025
LKV/HKV 210-140 FL	14	FLG	28	19 1/2	93	44	26	6011N03	11019K5	2	192.0	1235
LKV/HKV 220-160 FL	16	FLG	30	21	122	50	26	6012N03	10950K5	3	345.0	1678
LKV/HKV 230-200 FL	20	FLG	36	25	132	54	26	6013N03	10952K5	3	414.0	2452
LKV/HKV 240-240 FL	24	FLG	42	28	142	62	26	6017N03	10953K5	3	495.0	3344

*All dimensions are approximate.

- Standard filters are supplied with 10 micron polyester filter medium and a NEOPRENE closure gasket. Contact your CONSLER representative for other available materials.
- Models LKV 160 thru 240 have a 1 1/2" NPT drain connection. Models HKV 160 thru 240 have a 1 1/2" ANSI flat face flanged drain (with blind flange cover).
- Models LKV and HKV 160 have two handles for closure removal.
- Models LKV and HKV 180 thru 200 have a hinged closure with one handle.
- Models LKV and HKV 210 thru 240 have a swing away closure device and one handle.
- Models LKV and HKV 160 thru 240 have three leg supports with length of 18" from bottom of vessel to grade.
- Flanged end models have 150# ANSI flat face flanges.



Flow Capacities¹

Capacity (ACFM) vs. Differential Pressure (mm Hg)
at 60° F-Gas Specific Gravity 1.0 (Air)²

Inlet Press.	LKV/HKV Model	Δ p in torr (mmHg)		
		0.5	1.0	5.0
760 torr (mmHg)	110-005 FT	5	8	15
	110-007 FT	7	12	26
	110-010 FT	12	20	40
	115-015 MT	30	50	100
	120-015 MT	30	50	100
	130-020 MT	50	80	160
	140-030 MT	80	130	260
	150-040 MT	135	225	450
	160-060 FL	300	500	1000
	180-080 FL	525	875	1750
	190-100 FL	850	1400	2800
	200-120 FL	1200	2000	4000
	210-140 FL	1320	2200	4400
	220-160 FL	1800	3000	6000
	230-200 FL	3000	5000	10000
	240-240 FL	4500	75000	15000

Inlet Press.	LKV/HKV Model	Δ p in torr (mmHg)			
		.005	.01	.02	.05
1 torr (mmHg)	110-005 FT	8	11	15	22
	110-007 FT	12	18	26	39
	110-010 FT	20	29	40	60
	115-015 MT	50	65	100	150
	120-015 MT	50	65	100	150
	130-020 MT	80	105	160	240
	140-030 MT	130	170	260	390
	150-040 MT	225	290	450	675
	160-060 FL	500	650	1000	1500
	180-080 FL	875	1150	1750	2625
	190-100 FL	1400	1800	2800	4200
	200-120 FL	2000	2600	4000	6000
	210-140 FL	2200	2860	4400	6600
	220-160 FL	3000	3900	6000	9000
	230-200 FL	5000	6500	10000	15000
	240-240 FL	7500	9800	15000	22500

Inlet Press.	LKV/HKV Model	Δ p in torr (mmHg)			
		0.25	0.5	1.0	2.0
150 torr (mmHg)	110-005 FT	8	11	15	22
	110-007 FT	12	18	26	39
	110-010 FT	20	29	40	60
	115-015 MT	50	70	100	150
	120-015 MT	50	70	100	150
	130-020 MT	85	115	160	240
	140-030 MT	135	185	260	390
	150-040 MT	230	325	450	675
	160-060 FL	520	720	1000	1500
	180-080 FL	910	1250	1750	2625
	190-100 FL	1460	2000	2800	4200
	200-120 FL	2080	2400	4000	6000
	210-140 FL	2300	3150	4400	6600
	220-160 FL	3100	4300	6000	9000
	230-200 FL	5200	7200	10000	15000
	240-240 FL	7800	10800	15000	22500

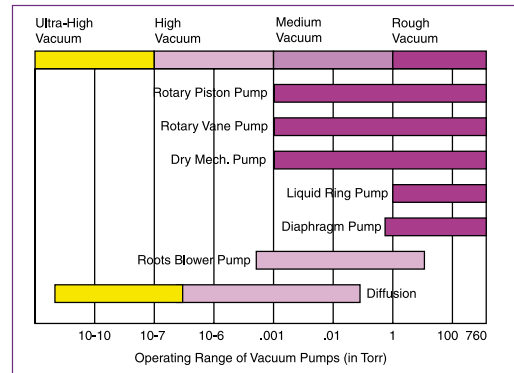
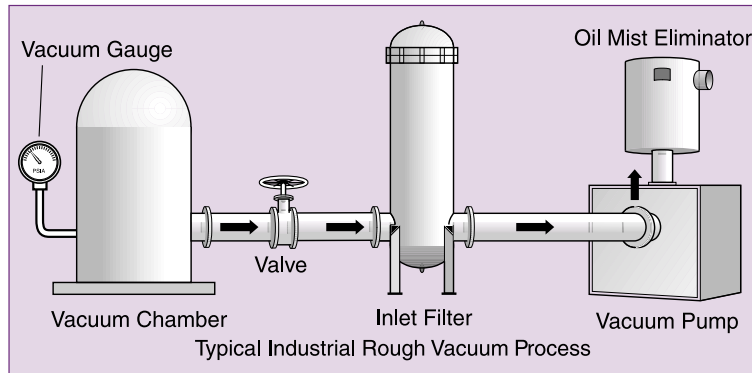
Inlet Press.	HKV Model	Δ p in torr (mmHg)		
		.0005	.001	.0025
0.1 torr (mmHg)	110-005 FT	8	15	22
	110-007 FT	12	26	39
	110-010 FT	20	40	60
	115-015 MT	50	100	150
	120-015 MT	50	100	150
	130-020 MT	80	160	240
	140-030 MT	130	260	390
	150-040 MT	500	450	675
	160-060 FL	225	1000	1500
	180-080 FL	875	1750	2625
	190-100 FL	1400	2800	4200
	200-120 FL	2000	4000	6000
	210-140 FL	2200	4400	6600
	220-160 FL	3000	6000	9000
	230-200 FL	5000	10000	15000
	240-240 FL	7500	15000	22500

Inlet Press.	LKV/HKV Model	Δ p in torr (mmHg)			
		0.05	0.1	0.2	0.5
25 torr (mmHg)	110-005 FT	8	11	15	22
	110-007 FT	12	18	26	39
	110-010 FT	20	29	40	60
	115-015 MT	50	70	100	150
	120-015 MT	50	70	100	150
	130-020 MT	85	115	160	240
	140-030 MT	135	185	260	390
	150-040 MT	230	325	450	675
	160-060 FL	520	720	1000	1500
	180-080 FL	910	1250	1750	2625
	190-100 FL	1460	2000	2800	4200
	200-120 FL	2080	2400	4000	6000
	210-140 FL	2290	3150	4400	6600
	220-160 FL	3100	4300	6000	9000
	230-200 FL	5200	7200	10000	15000
	240-240 FL	7800	10800	15000	22500

1. Values are based on actual test results or empirical calculations.
2. To determine proper filter sizing for gases other than air, multiply pressure drop by the correction factor for the appropriate gas from chart on back cover. For temperatures greater than 60° F, multiply pressure drop by the absolute temperature factor: $\frac{460 + (° F)}{520}$



Filters for Vacuum Pumps



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.



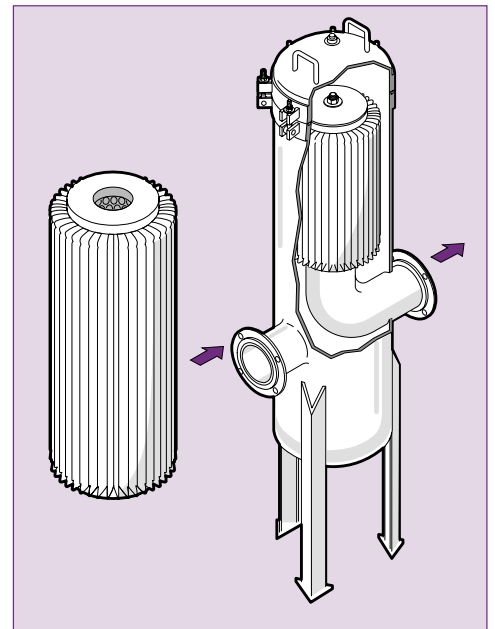
LKV/HKV Series Inlet Filter

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.



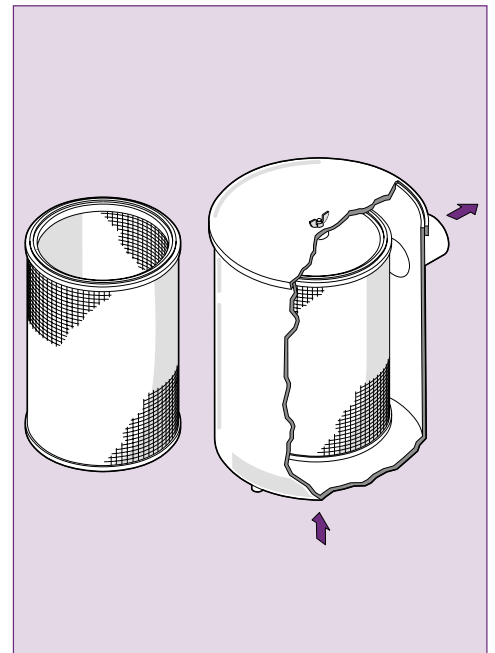
PME/KME Oil Mist Eliminator

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.



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