

Air/Oil Separators



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Technical Data

Oil Mist Discharge Filters



General

Recent developments in product design allow for the possible selection of oil mist discharge filters based on the type of equipment being used. It is, for the first time, possible to identify the appropriate grade of aerosol discharge filter because of the extensive research completed by the Solberg R&D department. Please follow the rules below to correctly size your oil mist discharge filter. If further consultation is required, please contact Solberg or your Solberg sales representative in your area.

Filter Selection Guidelines

#1:

Forget all that you know about air/oil separators for Compressed Air Systems, as such systems repeatedly fail in a vacuum pump application. The first consideration is to determine the type of Vacuum Pump being used. The particle size distribution and mass of oil aerosol discharging from a vacuum pump is as varied as the number of separator tank designs utilized by the industry. The main pump types are Rotary Vane, Rotary Screw, Rotary Piston, Liquid Ring, and Reciprocating Vacuum Pumps. Each type of pump produces its own specific oil discharge characteristics and requires the appropriate media make-up to effectively capture and drain oil aerosols.

#2:

Determine the type of oil being used in the vacuum pump. Trade names, viscosity/grade of oil, and the lubricant base (mineral, synthetic, etc.) are all useful in determining the discharge aerosol characteristics.

#3:

Determine how much oil the pump consumes under normal operating conditions. Typical consumption rates are gallons or liters per hour. The amount of oil consumed is typically the amount of oil being discharged.

#4:

Pump operating cycles including vacuum range, temperature fluctuations, contaminant gases or vapors, and hours of operation per day/week. Also, determine the maximum pressure drop or filter restriction the system will allow.

#5:

Determine the operating temperature at the discharge connection. If it is above +220 ° F, methods of cooling the aerosol should be considered.

#6:

Note the Horsepower of the pump, the outlet connection, and the air flow.

#7: When an external unit is to be used as the primary or sole air/oil separator in a system, a multi-stage Severe Duty system is required.

#8: In the case where an existing air/oil separator (internal or external) is already used, it is important to specify the desired goal for a second filter. Is it planned to have a multi-staged system for severe or extreme duty applications, or is there a requirement for exceptionally clean discharge air? If a multiple stage system is needed, try to identify the primary stage unit and the purpose for the second stage.

#9: Consider where to install the Filter. Where possible it is best to install in moderate temperature (+36° to +100°F) environments and avoid freezing conditions to ensure the oil drains freely without causing undue back pressure to the vacuum pump.



Technical Data Oil Mist Discharge Filters

Applications & Equipment

- Vacuum Pumps & Systems
- Vacuum Furnaces & Ovens
- Vacuum Freeze Drying & Outgassing
- Vacuum Metallizing
- Vacuum Drying
- Vacuum Coating
- Custom Vacuum Pumping Systems
- Food Processing & Packaging
- Industrial Vacuum Processes
- Pressure Unloading Vents on Piston Compressors
- Reciprocating Engines
- Crankcase
- Medical Work Areas
- Industrial Aerosol Scrubbing
- Heat Treating Equipment/Vacuum Hold Down
- Routing Equipment
- Laboratory Industry
- Leak Detectors
- Autoclaving, Sterilization

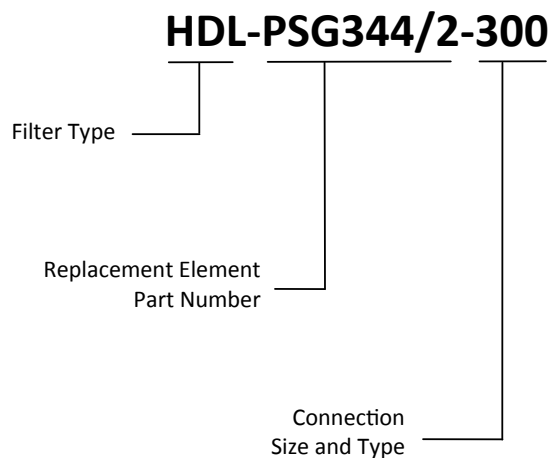
Identification

All Solberg products should have an identification label/nameplate that gives the following information:

Assembly Model

Replacement Element

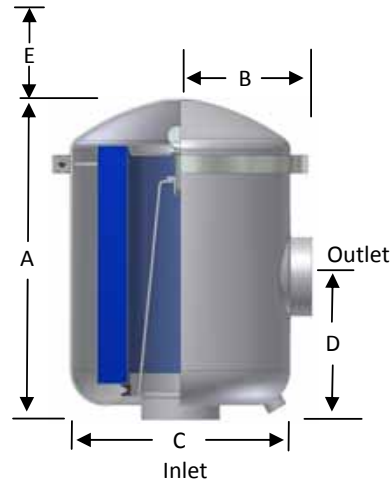
The part number designates the filter type, the element configuration and housing connection size. For example, the following part number identifies the filter as being a “HDL” design filter with a “PSG344/2” coalescing element, and 3” MPT connection size.



Air/Oil Separators



Oil Mist Discharge Filters HDL Series 1" - 2 1/2" FPT



Features

- Captures oil fog, mist or smoke from exhaust of oil flooded vacuum pumps
- Seamless drawn housings-no welds to rust or vibrate apart
- Positive engagement O-ring seal system
- Rugged all steel construction with baked white enamel finish
- 1/4" drain tap

Benefits

- Large oil holding capacity and easy field maintenance
- Pleated filter element provides increased surface area for low back pressure separation of ultra-fine oil mists

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)

Options

- Application specific filter media and gaskets/seals
- Custom connections
- Epoxy or PTFE coated finishes
- Stainless steel housings

FPT Connections

FPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number	Dimensions - inches				Suggested Service HT. E	Approx. Wt. lbs	Replacement Element Part No.	Element SCFM Rating
			A	B	C	D				
1"	40	HDL-PSG848-100HC	6 3/4	4 1/8	7 5/16	4 5/8	5 1/4	5	PSG848	50
1 1/4"	50	HDL-PSG848-125HC	6 3/4	4 1/8	7 5/16	4 5/8	5 1/4	5	PSG848	50
1 1/2"	50	HDL-PSG848-150HC	6 3/4	4 1/8	7 5/16	4 5/8	5 1/4	5	PSG848	50
2"	125	HDL-PSG850/1-200HC	11 1/4	4 9/16	8 3/4	5	9 1/4	15	PSG850/1	125
2"	175	HDL-PSG860/1-200HC	17 1/2	4 9/16	8 3/4	5	14 1/2	30	PSG860/1	200
2 1/2"	250	HDL-PSG244/2-250C	15 11/16	8 7/8	12	8 3/4	10	35	PSG244/2	300

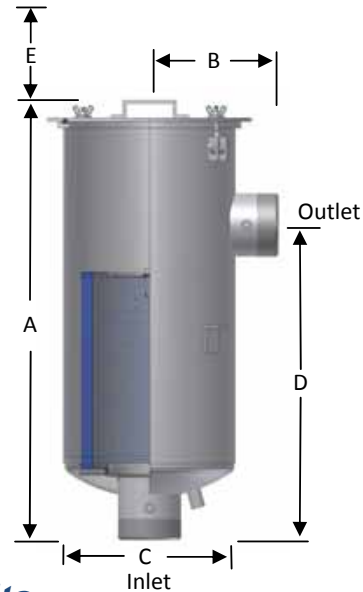
2 1/2" housing has 1/4" taps standard on inlet and outlet.

Dimension tolerance $\pm 1/4"$

See Discharge Filter Technical Data section for sizing guidelines.



Oil Mist Discharge Filters HDL Series 3" MPT - 8" FLG



Features

- Captures oil fog, mist or smoke from exhaust of oil flooded vacuum pumps
- Positive engagement O-ring seal system
- Rugged all steel construction with baked white enamel finish
- 1/4" drain tap

Benefits

- Large oil holding capacity and easy field maintenance
- Pleated filter element provides increased surface area for low back pressure separation of ultra-fine oil mists
- Multiple separation stages in single element design

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)
- Housing pressure rating: 14.5 PSI

Options

- Application specific filter media and gaskets/seals
- Custom connections
- Epoxy or PTFE coated finishes
- Stainless steel housings
- Nameplate bracket
- Lifting lugs

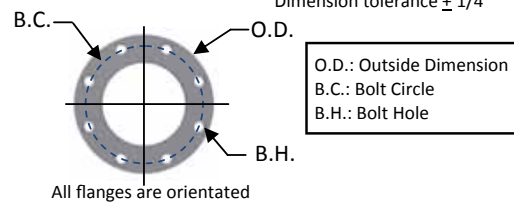
MPT/Flange Connections

MPT Inlet & Outlet	Assembly SCFM Rating	Assembly Part Number	DIMENSIONS - inches				Suggested Service HT.	Approx. Wt. lbs	Replacement Element Part No.	Element SCFM Rating
			A	B	C	D				
3"	300	HDL-PSG344/2-300	31 1/8	9	14	22 1/2	15	75	PSG344/2	500
4"	500	HDL-PSG344/2-400	31 1/8	9	14	22 1/2	15	78	PSG344/2	500
5"	800	HDL-PSG474/2-500	38 1/8	11	18 1/2	29 1/2	22	160	PSG474/2	1100
6"	1100	HDL-PSG474/2-600	39 1/8	12	18 1/2	30 1/2	22	160	PSG474/2	1100
8" FLG	1800	HDL-PSG476-800F	38 13/16	14	21	25 1/2	22	180	PSG476/2	1800

See Discharge Filter Technical Data section for sizing guidelines.

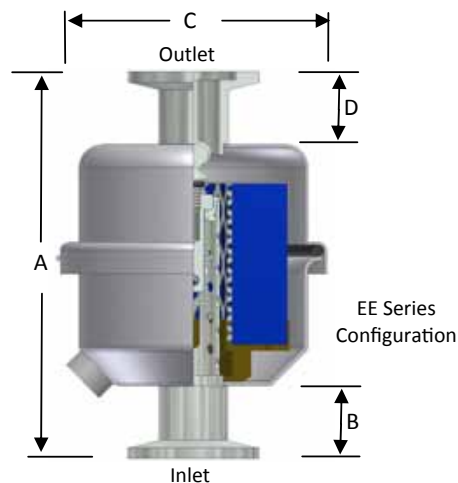
Dimension tolerance $\pm 1/4"$

125/150# Pattern Flg	Dimensions - inches			No. of Holes	Flange Thickness
	O.D.	B.C.	B.H.		
8"	13.5	11 3/4	0.88	8	0.38



Air/Oil Separators

Compact Closed Oil Mist Filters EE/SV Series 3/8" - 1" MPT, ISO Flg



Features

- Captures oil fog, mist or smoke from exhaust of oil flooded vacuum pumps
- Seamless drawn housings – no welds to rust or vibrate apart
- Rugged all steel construction

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)

EE Series Specifications

- Back pressure valve designed to release element at 0.5 bar (7.35 PSI) differential for pump safety
- 1/8" oil drain

Inlet Type	Outlet Type	Assembly SCFM Rating	Assembly Part Number	Dimensions - inches				Replacement Element Part No.	Element SCFM Rating
				A	B	C	D		
3/4" MPT	1/2" FPT	8	EE-GL915-075	4 11/16	1 1/4	3 1/4	1/2	GL915	8
16mm ISO Flg	16mm ISO Flg	8	EE-GL915-QF16	4 11/16	7/8	3 1/4	7/8	GL915	8
25mm ISO Flg	25mm ISO Flg	8	EE-GL915-QF2516	4 11/16	7/8	3 1/4	7/8	GL915	8
25mm ISO Flg	25mm ISO Flg	20	EE-PSG925-QF25	7 3/4	7/8	5 1/4	7/8	PSG925	20

SV Series Specifications

- Configured without valve or external drain

3/8" BSPT	5/8" Tube	4	SV-GL910-039	3 1/2	7/8	2 1/2	1/2	GL910	4
1/2" MPT	5/8" Tube	4	SV-GL910-050	3 1/2	7/8	2 1/2	1/2	GL910	4
3/4" MPT	1/2" FPT	8	SV-GL915-075	4 11/16	1 1/4	3 1/4	1/2	GL915	8
16mm ISO Flg	16mm ISO Flg	8	SV-GL915-QF16	4 11/16	7/8	3 1/4	7/8	GL915	8
25mm ISO Flg	25mm ISO Flg	8	SV-GL915-QF2516	4 11/16	7/8	3 1/4	7/8	GL915	8
25mm ISO Flg	25mm ISO Flg	20	SV-PSG925-QF25	7 3/4	7/8	5 1/4	7/8	PSG925	20

See Oil Mist Discharge Filter Technical Data section for sizing guidelines.

Dimension tolerance $\pm 1/4"$

Benefits

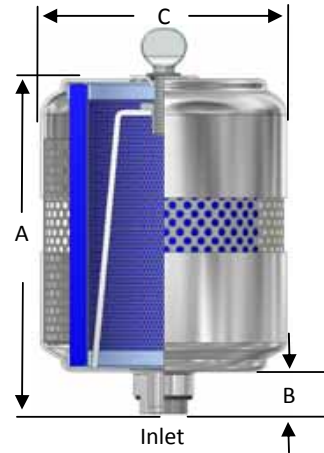
- Compact low profile design
- Easy field maintenance

Options

- Additional ISO flange connections
- Additional coating options available
- Side outlet configuration
- Drain for SV Series



Compact Oil Mist Filters EF Series 1/2" - 1 3/4", MPT, ISO Flg



Features

- Captures oil fog, mist or smoke from discharge of oil flooded vacuum pumps
- Steel construction with nickel plated finish

Benefits

- Easy thumb screw access for element maintenance
- Seamless drawn housings – no welds to rust or vibrate apart

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)

Options

- Additional ISO flange connections
- Special connections

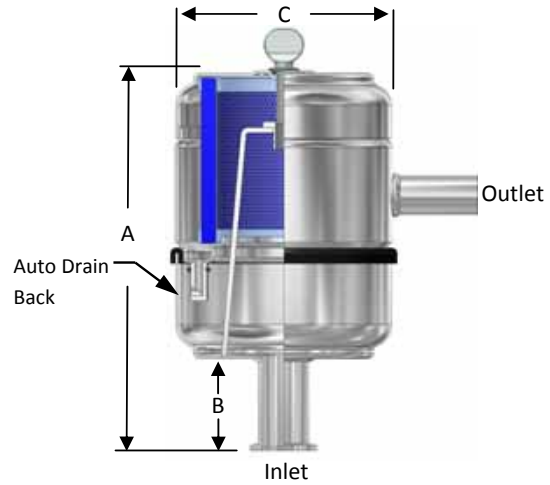
Connection Sizes & Styles

Inlet Size	Inlet Type	Assembly SCFM Rating	Assembly Part Number	DIMENSIONS - inches			Approx. Wt. lbs.	Replacement Element Part No.
				A	B	C		
1/2"	MPT	4.5	EF-FG5-050	4 1/2	1	2 1/2	0.6	FG5
1/2"	MPT	7	EF-FG7-050	5 1/2	1	2 1/2	1.8	FG7
3/4"	20 Fine Thread	4	EF-FG3-077	3 1/4	1	2 1/2	1.2	FG3
3/4"	MPT	4.5	EF-FG5-075	5	1	2 1/2	0.9	FG5
3/4"	MPT	7	EF-FG7-075	6	1 1/2	2 1/2	1.8	FG7
1"	20 Fine Thread	4.5	EF-FG5-103	3 7/8	7/8	2 1/2	0.7	FG5
1"	20 Fine Thread	7	EF-FG7-103	5	7/8	2 1/2	0.8	FG7
1"	20 Fine Thread	16	EF-FG9-103	5 1/8	7/8	5 1/8	1.8	FG9
1"	20 Fine Thread	24	EF-FG10-103	7 1/4	7/8	5 1/8	7	FG10
1 3/4"	20 Fine Thread	24	EF-FG10-177	8 1/8	1 3/4	5 1/8	3.5	FG10
16mm	ISO Flange	4.5	EF-FG5-NW16	4 1/2	7/8	2 1/2	0.6	FG5
25mm	ISO Flange	4.5	EF-FG5-NW2516	4 1/2	7/8	2 1/2	1.4	FG5
25mm	ISO Flange	24	EF-FG10-KF25	9 1/4	2 1/8	5 1/8	3.5	FG10
40mm	ISO Flange	44	EF-FG20-KF40	7 1/2	2 1/8	10 1/4	7	FG20
40mm	ISO Flange	55	EF-FG24-KF40	9 1/4	2 1/8	10 1/4	9	FG24

Dimension tolerance $\pm 1/4"$

Air/Oil Separators

Oil Mist Filters w/Drain Back EFDB Series



Features

- Captures oil fog, mist or smoke from exhaust of oil flooded vacuum pumps
- Auto drain back design to recycle oil mist:
 - Internal drain returns oil back into pump
 - Prevents oil blow back with auto sealing
 - Enclosed housing allows clean environment

Benefits

- Easy thumb screw access for element maintenance
- Compact design
- Seamless drawn housings – no welds to rust or vibrate apart

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)

Options

- Additional ISO flange connections
- Special connections

Air/Oil Separators

Connection Styles & Sizes

Inlet Size & Style	Assembly SCFM Rating	Assembly Part Number	Dimensions - inches			Approx. Wt. lbs	Replacement Element
			A	B	C		
KF25 ISO Flange	16	EFDB-FG9-KF25	8 3/8	2 1/8	5 1/8	2.5	FG9
1"-20 Fine	16	EFDB-FG9-103	7 1/8	7/8	5 1/8	2.3	FG9
1 3/4"-20 Fine	24	EFDB-FG11-177	9 5/8	2	6 1/4	2.5	FG11

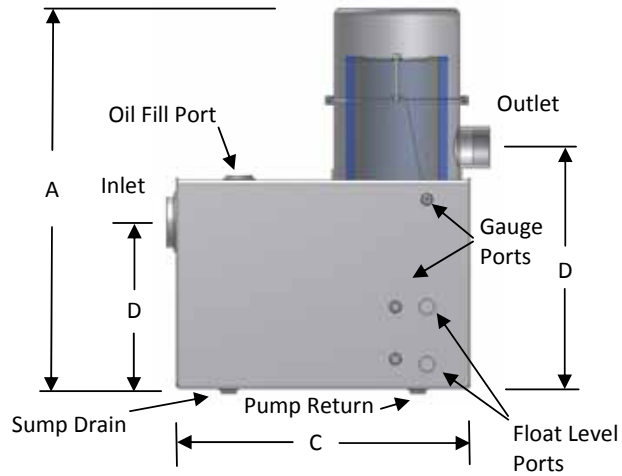
See Oil Mist Discharge Filter Technical Data section for sizing instructions.

Dimension tolerance $\pm 1/4"$





Air/Oil Sump & Separator Tank For Vacuum Pumps, ATS Series



Features

- Complete separator package for vacuum pumps
- Captures oil fog, mist or smoke from exhaust of oil flooded vacuum pumps
- Multiple separation stages
- Separator baffle system for larger particles
- Rugged carbon steel construction
- 2" NPT oil fill port
- 1" NPT sump drain
- 1" NPT pump return port
- 1/4" tap hole standard: 3" housing

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)

Connection Styles & Sizes

FPT Inlet	FPT Outlet	Assembly SCFM Rating	Assembly Part Number	DIMENSIONS - inches						Sump Capacity Liters
				A	B	C	D	E	F	
1 1/2"	2"	100	ATS-PSG850/1-150HC	29 1/2	22 5/8	11 7/8	8	8 5/8	14	15
2"	2"	200	ATS-PSG860/1-200HC	36 1/8	23 1/8	16	12	10 13/16	16 1/8	30
3"	3"	400	ATS-PSG344/2-300C	47 13/16	32 5/16	20	15	20	27 3/4	65

See Oil Mist Discharge Filter Technical Data section for sizing instructions.

Dimension tolerance $\pm 1/4"$

Benefits

- Low profile design
- Connects directly to discharge; no hardware needed
- Simplifies system packaging by integrating sump tank with separator
- Pleated separator element provides increased surface area for low back pressure separation of ultra-fine oil mists

Options

- Specialty media configuration
- Housing material
- Special connections

Air/Oil Separators



Vacuum Assisted Oil Mist Eliminators Reciprocating Engines and Turbines



Our Vacuum Assisted Oil Mist Eliminators are designed for field upgrades and new reciprocating engines and turbine installations around the world. Our high efficiency filtration systems eliminate vented oil mist emissions while controlling engine pressure in crankcases and turbine lube oil reservoirs. We offer either vapor extractor and static options based on application requirements.

Series Specific Applications



Reciprocating Engines: Stationary

- Crankcase ventilation systems ensure environmental compliance and protect surrounding workplace from harmful oil mist emissions
- Open and closed system designs
- Prevents engine intake system contamination & seal leakage
- Improves engine performance
- Controls crankcase pressure
- Applications: landfill gas to energy, standby power, prime power and mechanical drive

Gas & Steam Turbines

- Retrofits and upgrades to replace outdated and inefficient vapor extractors for lube oil systems
- Typical systems include: high efficiency coalescing element, vacuum / pressure controls and integrated bypass device to simply maintenance and reduce operating costs
- Applications: peaking, nuclear, and base load power plants



Reciprocating Engines: Marine

- Crankcase ventilation systems ensure safety and reliability
- Unique piping configuration for easy installation, self regulation and seal leak prevention
- Captures vented oil mist emissions and reduces breathing and slipping hazards
- Applications: passenger ships, workboats, military vessels



Air/Oil Separators



SOLBERG

Vacuum Assisted Oil Mist Eliminators 1 - 1500 CFM



Features

- Eliminates visible oil mist emissions
- High efficiency and long lasting replaceable coalescing elements
- Rugged carbon steel construction
- Industrial grade powder coat finish
- Drain ports for oil recovery
- Control valves for precise pressure regulation
- Large assortment of motor options (Explosion proof, ATEX, etc.)
- Integrated vacuum relief for motor protection
- Contact factory for specific flow ratings and sizes.

Technical Specifications

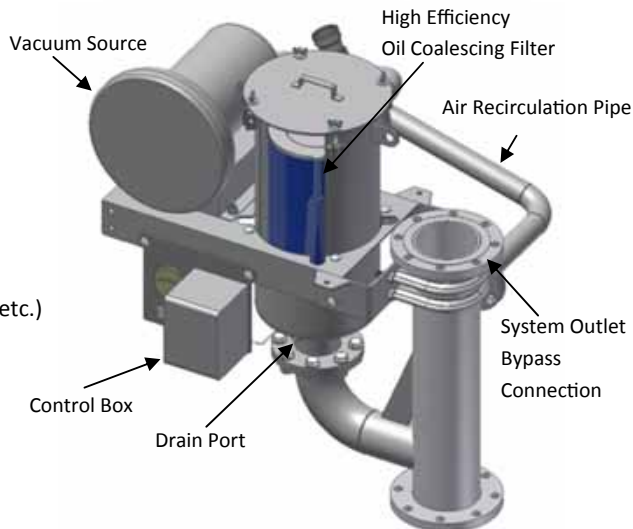
- 0.3 micron media; 99.97% efficiency
- Flow range: 1-1,500 ft³/m (1-2550 m³/h) std, higher flows are available on request
- Pressure Rating: 1 bar full vacuum (most models)

Environmental Compliance

Based on the U.S. EPA's RICE NESHAP* ruling, stationary engines over 300HP must be equipped with a crankcase ventilation system by 2013. The objective is to reduce the harmful crankcase emissions emitted into the environment.

Solberg is committed to partnering with plant operators to update their equipment and lessen their environmental impact.

* *Reciprocating Internal Combustion Engines*



Recirculation System Configuration Example

Options

- Redundant equipment to ensure continuous operation
- Full automation: PLC and DCS compatible
- Stainless steel construction for harsh environments
- Custom coating and colors
- ASME Section VIII or PED pressure certifications
- Explosive environ. options: ATEX, Class I Div. 1, etc.
- Motor listings: UL, CE, IEC, CSA, IEEE, KOSHA, etc.
- Motor accessories: Heaters, starters, switches, VFD, etc.
- Skid mounted units for ease of transport & installation
- Service and maintenance platforms
- GOST certification

Air/Oil Separators



Closed Crankcase Ventilation Systems Capture Vented Crankcase Emissions



CCV Series

Solberg designs and manufactures high efficiency Closed Crankcase Ventilation Systems to capture oil mist and particulate emissions (blow-by) from the crankcases of a reciprocating engine.

Solberg's closed systems protect an engine's turbo, intercoolers and exhaust catalysts from oil mist and particulate contamination. The results are optimized engine performance and a reduction in costly repairs and maintenance.

Solutions Designed For

- Caterpillar
- Guascor
- Jenbacher
- Wartsila
- Waukesha
- Cummins
- MTU
- Fairbanks Morse



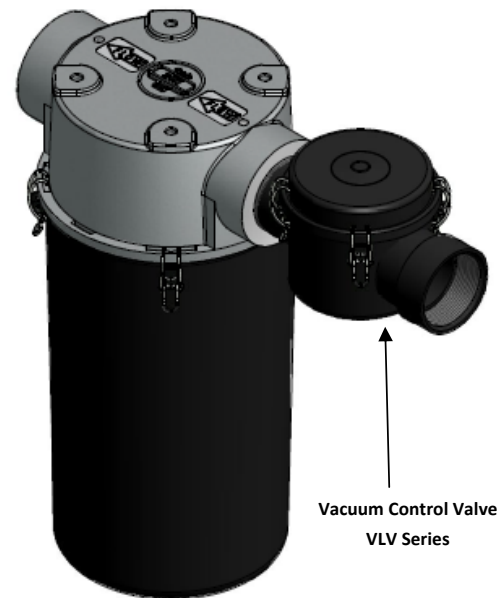
Closed Crankcase Ventilation System
Guascor Engine Installation

Typical Applications

- Electric Power Generation
- Marine Power Generation
- Marine Propulsion
- Gas Compression

Benefits & Purpose

- Captures the hazardous oil mist and particulate emissions "blow-by" vented from the crankcase.
- Achieves 99.97% efficiency for 0.3 micron oil mist and particulate
- Protects the turbocharger, intercoolers and exhaust catalysts from contamination and damage.
- Prevents potential health hazards from entering the surrounding environment and workplace
- Maintains required crankcase vacuum via integrated self-regulating valve
- Recovers expensive lube oil lost during the venting process, which allows for efficient operation and lower maintenance costs



Solberg Closed Crankcase Ventilation System With
Integrated Vacuum Control Valve

CLV Package

Air/Oil Separators





Static Vent Oil Mist Eliminators CV, CVH Series

Series Specific Applications

- Vents for Oil Reservoirs, Crankcases, Bearings, Coupling Guards
- Compressor, Turbine, Gearbox, Engine Applications

Features

- Eliminates visible vented oil mist emissions
- High efficiency fiberglass filter elements: 99.97% removal efficiency for 0.3 μm oil mist
- Carbon steel construction with durable powder coat finish
- Low back pressure filter element design: Pleated and wrapped fiberglass options
- Extensive flow range
- Continuous operating temp: 20°C (68°F) - 80°C (180°F)
- Contact factory for specific flows and sizes.

Options

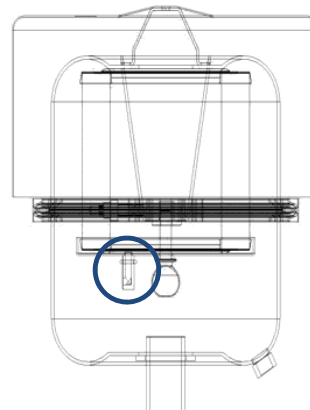
- Stainless steel construction
- Special coatings and finishes
- Internal drain-back mechanism
- Alternative filtration media (wire mesh demister, vane separator)
- Multiple configurations
- Vacuum assisted oil mist eliminators (See page 5-10 to 5-11)



CVH Series



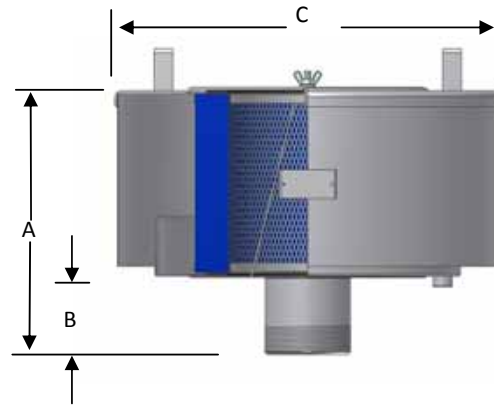
CV Series



Static Vent Oil Mist Eliminators w/Internal
Drain-Back Mechanism

Air/Oil Separators

Static Vent Oil Mist Eliminators CVB Series



Features

- Eliminates visible vented oil mist emissions
- Carbon steel construction with powder coat finish
- Low back pressure filter element design: Pleated and wrapped media options
- External drain-back mechanism
- Extensive flow range available upon request

Series Specific Applications

- Air/Oil Separation Vents for oil reservoirs, crankcases, bearings, coupling guards
- Compressors, turbines, gearboxes, engines and more

Technical Specifications

- 0.3 micron media; 99.97% efficiency; Typically 5 PPM or less*
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)
- * 150 PPM challenge or less

Options

- Stainless steel construction and resistance coatings
- Alternative filtration media (Wire mesh demister, vane separator)
- Vacuum assisted style available: **BAE Series**

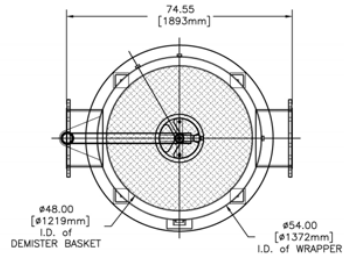
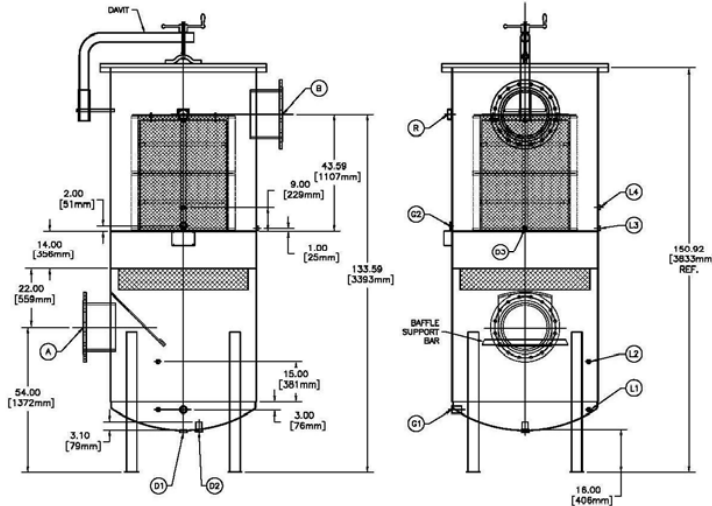
Air/Oil Separators

Outlet Size		Assembly Part Number	Dimensions - inches			Approx. Wt. lbs	Replacement Element Part No.
Type	A		B	C			
1"	MPT	CVB-WP848-100	7 7/16	2	6 1/8	3	WP848
1 1/4"	MPT	CVB-WP848-125	7 7/16	2	6 1/8	3	WP848
1 1/2"	MPT	CVB-WP848-150	7 7/16	2	6 1/8	3	WP848
2"	MPT	CVB-WP850-200	11 7/8	2 1/2	10 1/4	5.5	WP850
2 1/2"	MPT	CVB-WP850-250	11 7/8	2 1/2	10 1/4	5.5	WP850
3"	MPT	CVB-WP274-300	14 3/4	3	20	15	WP274
4"	MPT	CVB-WP274-400	15 3/4	4	20	15	WP274
4"	FLG	CVB-WP274-400F	15 3/4	4	20	20	WP274
5"	FLG	CVB-WP374-500F	20	4	20	38	WP374
6"	FLG	CVB-WP374-600F	21	5	20	40	WP374

Dimension tolerance $\pm 1/4"$



Natural Gas Filtration Oil Separators



Note: Drawings are shown with sample dimensions only.

Series Specific Applications

- Landfill and Bio-Gas recovery
- Fuel for reciprocating engines and gas turbines
- Gas compression
- Compressor packages
 - Rotary Screw
 - Centrifugal
 - Reciprocating
 - Vane

Features

- Protects equipment from condensate, oil, and particulate entrained in the gas stream
- Multi-stage separation
 - 316 SS vane pack or demister pad for heavy condensate and oil removal
 - High efficiency 99+% final filter elements
- Rugged carbon steel construction
- Contact factory for model offering and availability



Options

- Special standards: PED, CRN, ATEX, ASME Vessel code sec. VIII division I
- Stainless steel construction
- Special coatings or finishes
- Replaceable filter elements in various efficiencies for particulate removal
- Gauge ports, float switches
- Custom leg supports
- Flush port for vessel cleaning
- Removable vessel lid for element service
- Davit arm for vessel lid removal

Air/Oil Separators

