

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:** First of all air/oil separators used in compressed air systems, repeatedly fail in a vacuum pump applications. 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 +180 ° 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 may be 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.

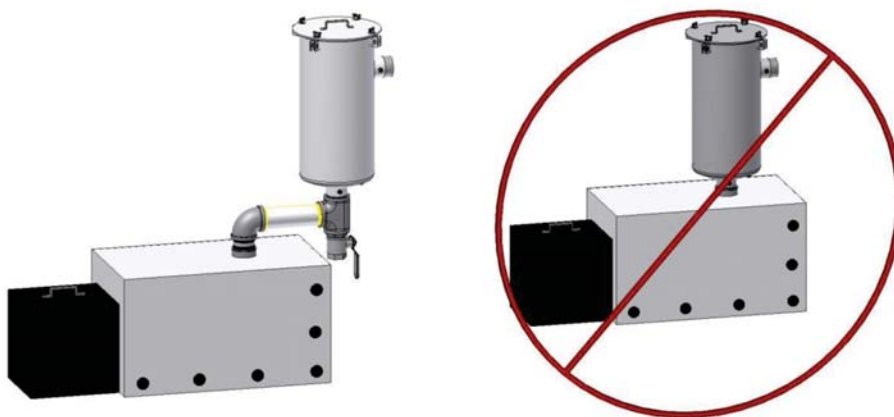
Once as much information as possible is obtained, send the data to Solberg for review and/or review our data sheets in the catalog or on our web page www.solbergmfg.com.

Applications & Equipment

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

Installation & Maintenance

Mounting orientation is typically top-up vertical so draining can occur. See figure below for proper installation method. Request appropriate maintenance manual from your Solberg representative or through www.solbergmfg.com.



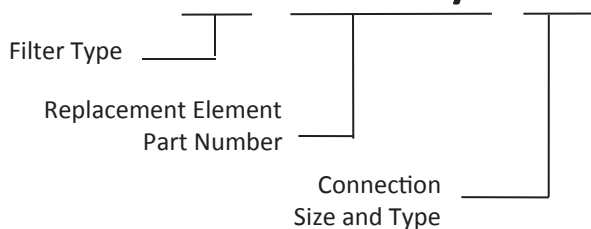
Identification

Standard Solberg assemblies should have an identification label/nameplate that gives the following information:

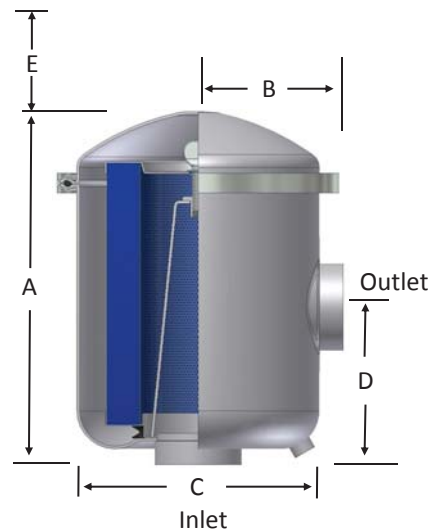
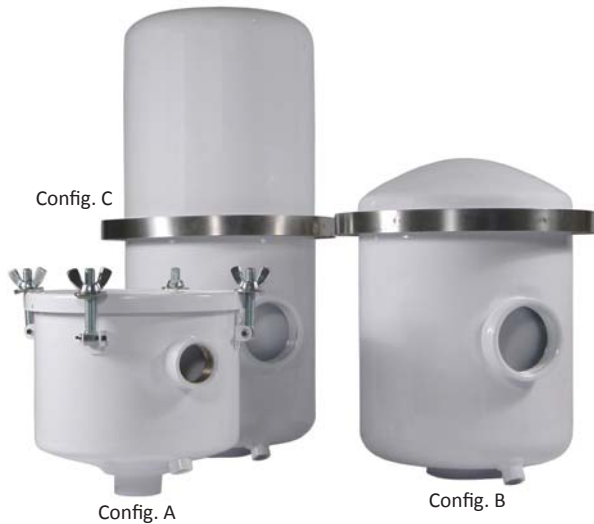
Assembly Model #
Replacement Element #

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.

HDL-PSG344/2-300



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



Features

- Captures oil fog, mist or aerosol from exhaust of oil sealed vacuum pumps
- Seamless drawn housings
- O-ring sealed housings
- Corrosive resistant carbon steel construction
- White powder coat finish
- Discharge baffle
- 1/4" NPSC drain tap

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) up to 180°F (80°C)
- Mounted vertically
- Pressure rating: 5 psi

Benefits

- Easy field maintenance
- Pleated filter element provides increased surface area for low back pressure separation of ultra-fine oil mists
- Waste oil can be recycled

Options



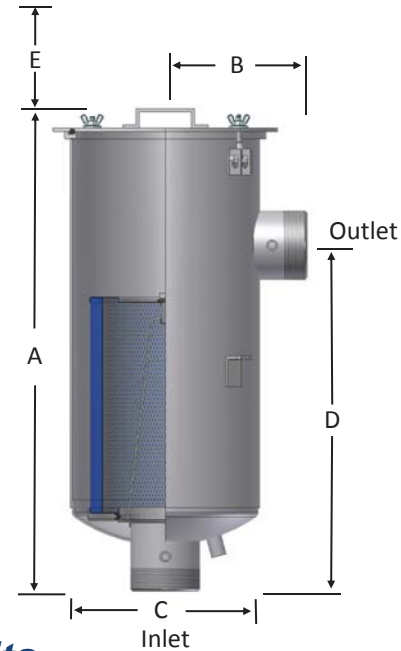
- Lower back pressure media
- Application specific gaskets/seals
- Custom connections
- Nonstandard finishes
- Stainless steel housings (select models)

Inlet/Outlet		Assembly SCFM Rating	Housing Config.	Assembly Part Number	Dimensions - inches				Suggested Service HT. E	Approx. Wt. lbs	Replacement Element Part No.	Element SCFM Rating
Size	Type				A	B	C	D				
1"	NPSC	40	A	HDL-PSG848-100HC	6 11/16	4 1/8	7 3/8	4 1/2	5 1/4	5	PSG848	50
1 1/4"	NPSC	50	A	HDL-PSG848-125HC	6 11/16	4 1/8	7 3/8	4 1/2	5 1/4	5	PSG848	50
1 1/2"	NPSC	50	A	HDL-PSG848-150HC	6 3/4	4 3/16	7 3/8	4 1/2	5 1/4	5	PSG848	50
2"	NPSC	125	B	HDL-PSG850/1-200HC	11 1/4	4 5/8	8 4/5	5	9 1/4	15	PSG850/1	125
2"	NPSC	175	C	HDL-PSG860/1-200HC	17 3/8	4 5/8	8 3/4	5	14 1/2	30	PSG860/1	200
2 1/2"	FPT	250	B	HDL-PSG244/2-250C	15 11/16	8 13/16	13 1/4	8 3/4	10	35	PSG244/2	300

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

See Discharge Filter Technical Data section for sizing guidelines.

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.



Features

- Captures oil fog, mist or aerosol from exhaust of oil sealed vacuum pumps
- O-ring sealed housings
- Corrosive resistant carbon steel construction
- White powder coat finish
- 1/4" NPSC drain tap

Technical Specifications

- 0.3 micron media; 99.97% efficiency
- Continuous operating temp: 68°F (20°C) up to 180°F (80°C)
- Mounted vertically
- Pressure rating: 14.5 psi

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
- Waste oil can be recycled

Options

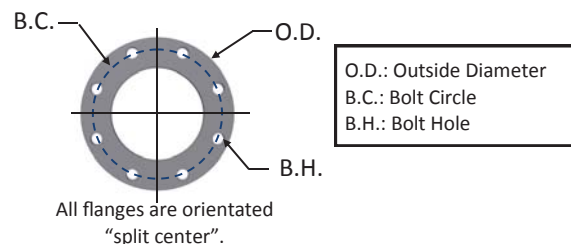


- Lower back pressure media
- Application specific gaskets/seals
- Various nonstandard finishes and connection styles
- Stainless steel housings
- Nameplate bracket
- Lifting lugs

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 1/4	9 1/8	14	22 1/2	15	75	PSG344/2	500
4"	500	HDL-PSG344/2-400	31 1/4	9	14	22 1/2	15	78	PSG344/2	500
5"	800	HDL-PSG474/2-500	38 1/4	11	18 1/2	29 1/2	22	160	PSG474/2	1100
6"	1100	HDL-PSG474/2-600	39 1/4	11	18 1/2	30 1/2	22	160	PSG474/2	1100
8" FLG	1800	HDL-PSG476-800F	38 15/16	14	22 1/2	25 1/2	22	180	PSG476	1800

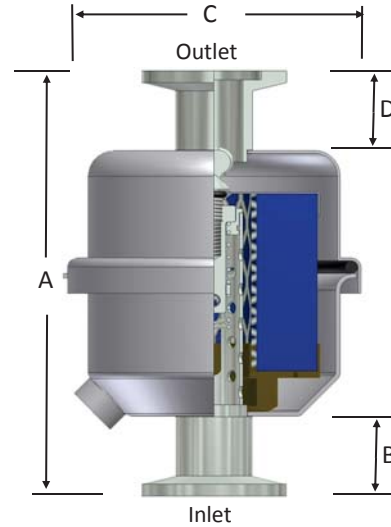
See Discharge Filter Technical Data section for sizing guidelines.

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



Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

Compact Closed Oil Mist Filters EE Series Threaded, ISO FLG



Features

- Captures oil fog, mist or aerosol from exhaust of oil sealed vacuum pumps
- Back pressure valve designed to release element at 0.5 bar (7.35 PSI) differential for pump safety
- Seamless drawn housings
- Corrosive resistant carbon steel construction
- White powder coat finish
- 1/8" NPSC oil drain

Technical Specifications

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

Benefits

- Compact low profile design
- Easy field maintenance

Options

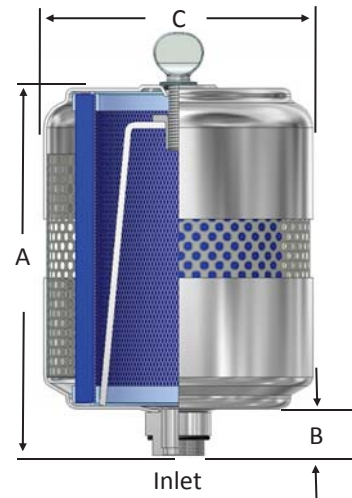
- Additional ISO flange connections
- Nonstandard finishes available
- Assemblies without a valve

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" NPSC	8	EE-GL915-075	4 9/16	1 1/8	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 3/8	7/8	5 1/4	7/8	PSG925	20

Note: QF2516 Designation: Unit has an ISO NW25 flange with a 16mm tube (neck).

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

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.



Features

- Captures oil fog, mist or aerosol from discharge of oil sealed vacuum pumps
- Steel construction with nickel plated finish
- Nickel plated finish
- Seamless drawn housings
- Easy thumb screw access for element maintenance
- Oil run off from the filter returns to the pump

Technical Specifications

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

Options

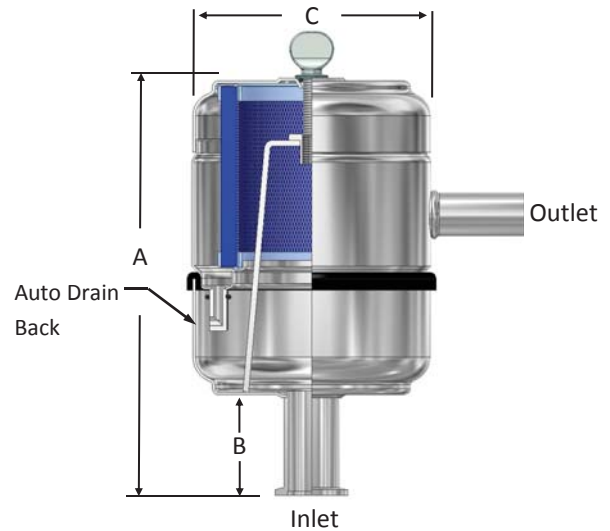
- Additional ISO flange connections
- Nonstandard connection styles

Connection		Assembly SCFM Rating	Assembly Part Number	DIMENSIONS - inches			Approx. Wt. lbs.	Replacement Element Part No.
Size	Type			A	B	C		
1/2"	MPT	4.5	EF-FG5-050	4	7/8	2 1/2	0.6	FG5
1/2"	MPT	7	EF-FG7-050	5	1	2 1/2	1.8	FG7
3/4"	3/4-20 UNEF	4	EF-FG3-077	3 1/4	1	2 1/2	1.2	FG3
3/4"	MPT	4.5	EF-FG5-075	4 3/8	1	2 1/2	0.9	FG5
3/4"	MPT	7	EF-FG7-075	5 3/8	1 1/4	2 1/2	1.8	FG7
1"	1-20 UNEF	4.5	EF-FG5-103	4	13/16	2 1/2	0.7	FG5
1"	1-20 UNEF	7	EF-FG7-103	5	13/16	2 1/2	0.8	FG7
1"	1-20 UNEF	16	EF-FG9-103	5 1/8	7/8	5	1.8	FG9
1"	1-20 UNEF	24	EF-FG10-103	7	7/8	5	7	FG10
1 3/4"	1 3/4-20 UN	24	EF-FG10-177	8 3/16	2	5	3.5	FG10
16mm	ISO Flange	4.5	EF-FG5-NW16	4	7/8	2 1/2	0.6	FG5
25mm	ISO Flange	4.5	EF-FG5-NW2516	4	7/8	2 1/2	1.4	FG5
25mm	ISO Flange	24	EF-FG10-KF25	8 5/16	2 1/8	5	3.5	FG10
40mm	ISO Flange	44	EF-FG20-KF40	7	2	10 1/4	7	FG20

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

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

Oil Mist Filters w/Drain Back EFDB Series



Features

- Captures oil fog, mist or aerosol from exhaust of oil sealed 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
- Steel construction
- Nickel plated finish
- Seamless drawn housings
- Easy thumb screw access for element maintenance
- Oil run off from the filter returns to the pump

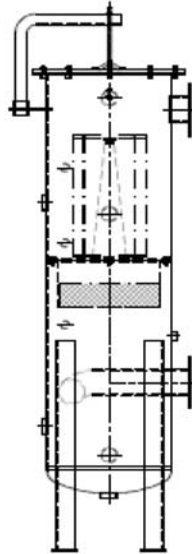
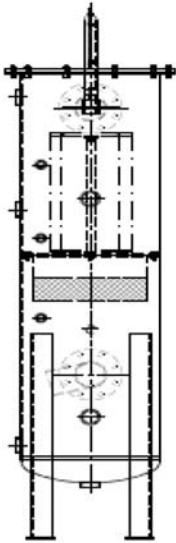
Technical Specifications

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

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

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

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.



Note: Drawings are for reference purposes only.

Series Specific Applications

- Landfill and Bio-Gas recovery
- Fuel gas purity for
 - Reciprocating Engines
 - Gen-Sets
 - Turbines
- Gas compression
- Oil sealed screw compressor discharge
- Gas pipeline boosting

Features

- Protects equipment from condensate, oil, and particulate entrained in the gas stream
- Multi-stage separation
 - 316 SS vane pack and/or demister pad for heavy condensate and oil removal
 - 99.97% efficient at 0.3 micron separator for oil mist
- Corrosive resistant carbon steel construction
- Contact factory for model offering and availability



Options ATEX Available

- Special standards: PED, CRN, 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
- Davit arm for vessel lid removal

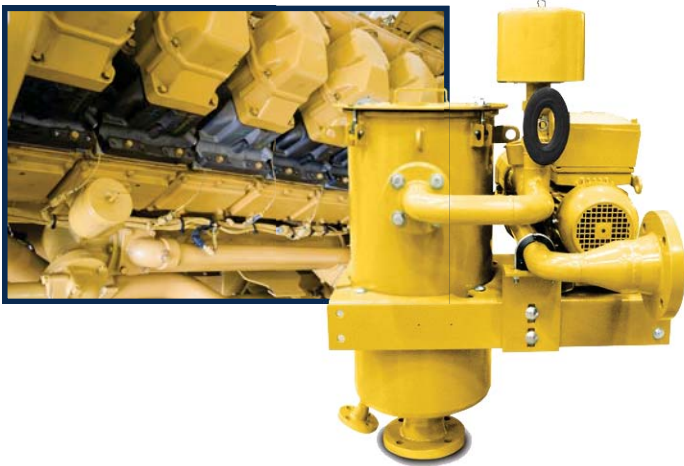
Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

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 and 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





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

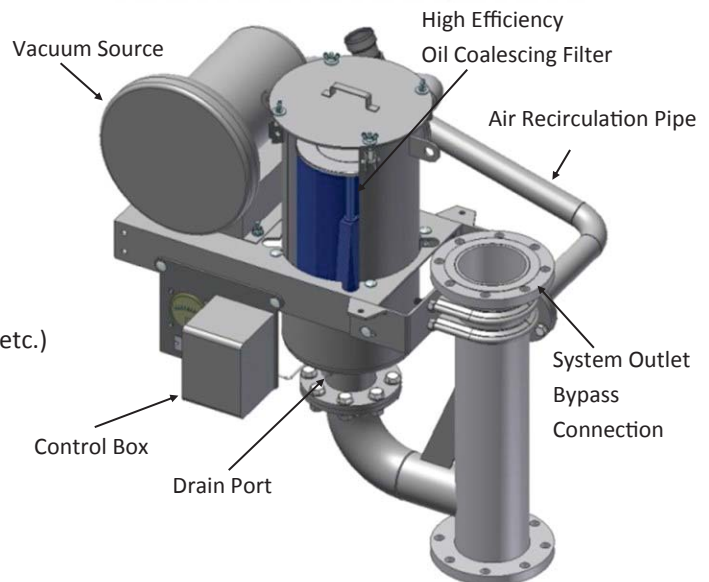
- 0.3 micron media; 99.97% efficiency
- Flow range: 1-1,500 ft³/m (1-2550 m³/h) std, higher flows are available on request
- Pressure Rating: 1 bar full vacuum (most models)

Environmental Compliance

Based on the 2013 U.S. EPA's RICE NESHAP* ruling, stationary engines over 300HP should have been equipped with a crankcase ventilation system. The objective was 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

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 turbocharger, 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
- Jenbacher
- Waukesha
- MTU
- Guascor
- Wartsila
- Cummins
- Fairbanks Morse



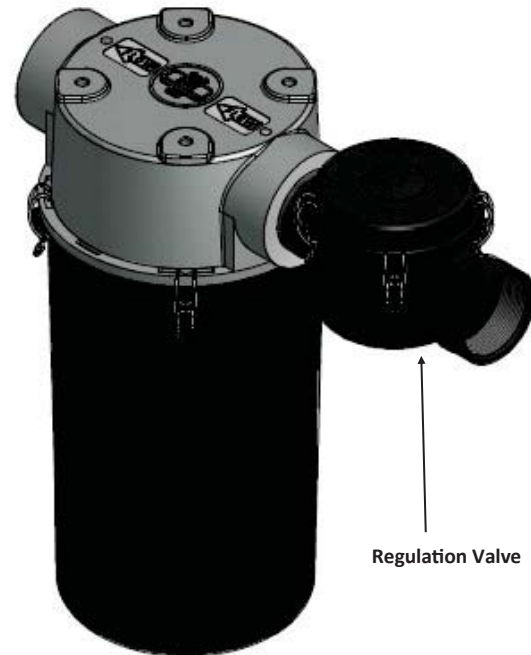
Closed Crankcase Ventilation System
Guascor Engine Installation

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 Regulation Valve

CLV Package

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.

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
- Corrosive resistant carbon steel construction
- Powder coat finish
- Low back pressure filter element design: Pleated and wrapped fiberglass options
- Extensive flow range
- Continuous operating temp: 68°F (20°C) to 180°F (80°C)
- 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)



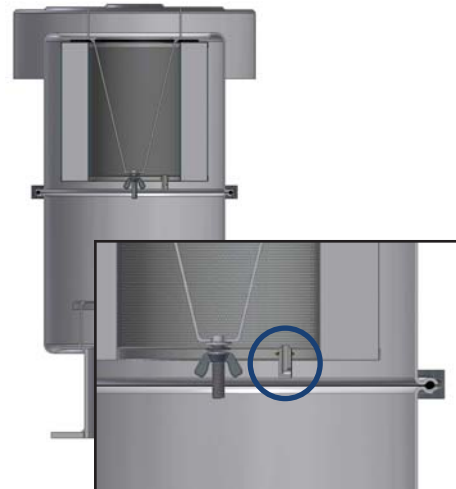
Gearbox Application



CVH Series



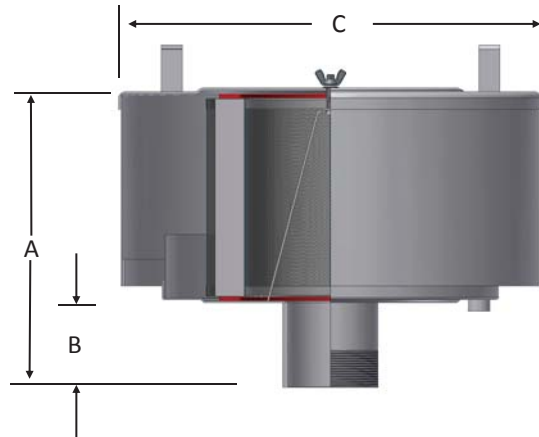
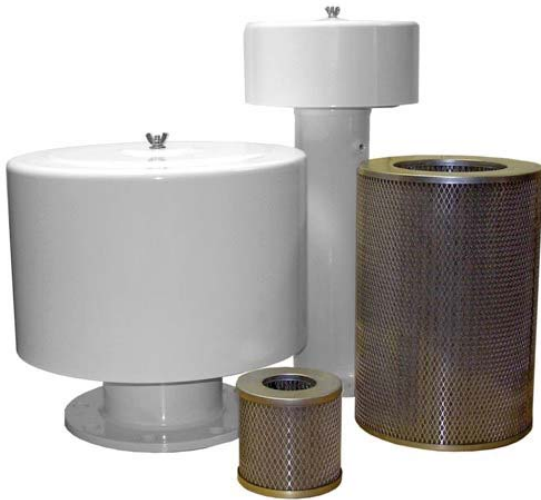
CV Series



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

Drawings and photos for
reference purposes only

Static Vent Oil Mist Eliminators CVB Series



Features

- Eliminates visible vented oil mist emissions
- Carbon steel construction with powder coat finish
- Low back pressure wrapped filter element design
- External drain-back

Series Specific Applications

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

Technical Specifications

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

Options

- Stainless steel construction and resistance coatings
- Alternative filtration media (Wire mesh demister)
- Pleated coalescing elements
- Vacuum assisted style available
- Extensive flow range available upon request

Outlet		Assembly Part Number	Dimensions - inches			Approx. Wt. lbs	Replacement Element Part No.
Size	Type		A	B	C		
1"	MPT	CVB-WP848-100	7 1/2	2	6 1/8	3	WP848
1 1/4"	MPT	CVB-WP848-125	7 1/2	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	12	2 1/2	10 1/4	5 1/2	WP850
2 1/2"	MPT	CVB-WP850-250	11 7/8	2 1/2	10 1/4	5 1/2	WP850
3"	MPT	CVB-WP274-300	14 3/4	3	20	15	WP274
4"	MPT	CVB-WP274-400	16 1/8	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 5/8	5	20	40	WP374

Note: Model offerings and design parameters may change without notice. See www.solbergmfg.com for most current offering.