



## Discharge Filters

[www.solbergmfg.com](http://www.solbergmfg.com)

Note: Please read the maintenance instructions given by the OEM for the machinery first. The OEM's manual should be adhered to in order to protect the equipment. Solberg Manufacturing, Inc has made every effort to make sure that these instructions are accurate but is not responsible for any typos, slight variations or for human errors that may occur.

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA  
Ph: 630.773.1363 Fax: 630.773.0727 Email: [sales@solbergmfg.com](mailto:sales@solbergmfg.com) Web: [www.solbergmfg.com](http://www.solbergmfg.com)

# Maintenance Manual

## Discharge Filters

### **CONTENTS**

#### **Section A**

Introduction ..... pg. 3

#### **Section B**

General Information

1. Identification of Solberg Oil Mist Discharge Filters ..... pg. 3
2. Filtration Rules of Thumb ..... pg. 4
3. Element Specifications ..... pg. 6
4. Element Cleaning ..... pg. 7
5. Installation ..... pg. 8

#### **Section C**

Maintenance Recommendations ..... pg. 10

#### **Section D**

Replacement Parts List

1. HDL Series ..... pg. 11
2. EE Series ..... pg. 16
3. EF Series ..... pg. 18
4. EFS Series ..... pg. 20

*\*For Further Information Please Call: 630-773-1363*



## Section A

### **INTRODUCTION**

The purpose of this manual is instruction on the proper assembly and care of Solberg discharge filters.

### **\*WARNING\***

**This manual must be read and thoroughly understood before using and caring for this discharge filter. Failure to comply could result in explosion, product/system contamination or personal injury.**

This manual should be used as a supplement to the user's understanding of the proper care needed to maintain a safe and dependable discharge filter. It is the responsibility of the user to interpret and explain all instructions to persons who do not read or understand English BEFORE they are allowed to maintain and use this filter.

This manual should be readily available to all operators responsible for operation and maintenance of the oil mist discharge filters.

We thank you for selecting products from Solberg Manufacturing, Inc. We are confident that our superior filter designs will meet your application requirements.

## Section B

### **GENERAL INFORMATION**

#### **1. Identification of Solberg Discharge Filters.**

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

**Assembly Model #  
Replacement Element #**

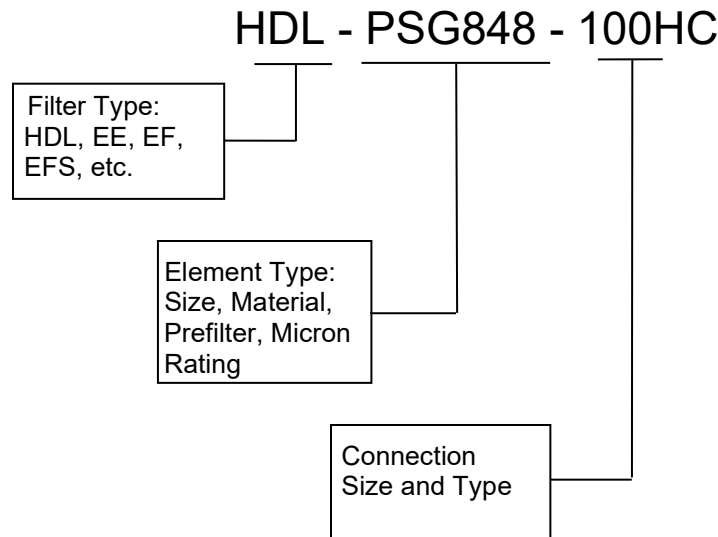
(The exception is OEM supplied units. In this case, please enter the OEM part numbers in Table 1.)

Fill in the actual nameplate data from your new Solberg discharge filter(s) below:

No.	Filter Model Number	Replacement Element	Initial Delta P Readings
1			
2			
3			
4			
5			

Table 1

The model number designates the filter type, the original element configuration and housing connection size. For example, the following part number identifies the filter as being a 'HDL' design filter with a PSG848 element and 1" FPT connection:



## 2. Filtration Rules of Thumb

**General:** For peak output performance from a compressor, blower, vacuum pump, engine, or any other machine that consumes air, one must have clean, unrestricted air. Proper filtration can help stabilize the working environment within rotating equipment even when the external conditions may be quite severe. A critical component in creating the right working conditions is filter sizing. With the properly sized filter, equipment will run smoothly over its entire expected operating life.

A major factor in filtration and filter sizing is air velocity through the filter media. Generally, the slower the velocity of air through a media the higher the filter efficiency and, conversely, the lower the pressure drop. Therefore, the primary goal in filter sizing is to optimize the velocity of air through the media (sometimes called face velocity).

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

**Rule of Thumb #1:** Forget all that you know about air/oil separators for Compressed Air Systems, as such systems repeatedly fail in vacuum pump applications. The first consideration is to determine the type of vacuum pump or machine 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 industry. The primary pump technologies in need of air/oil separation are rotary vane, rotary screw, rotary piston, liquid ring, and reciprocating. 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.

**Rule of Thumb #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.

**Rule of Thumb #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.

**Rule of Thumb #4:** Determine 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.

**Rule of Thumb #5:** Note the horsepower of the pump, the outlet connection, and the nominal capacity.

**Rule of Thumb #6:** 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.

**Rule of Thumb #7:** In the case where an existing discharge filter (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.

Once as much information as possible is obtained, send the data to Solberg Manufacturing, Inc. for our review and/or review our data sheets in the Product-by-Product Line section of our web page. You'll find our data sheets under "Oil Mist Eliminators".

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Airflow	
1/4"	6 CFM	10m <sup>3</sup> /h	1 1/2"	80 CFM	136m <sup>3</sup> /h	6"	1,100 CFM	1870m <sup>3</sup> /h
3/8"	8 CFM	14m <sup>3</sup> /h	2"	135 CFM	230m <sup>3</sup> /h	8"	1,800 CFM	3060m <sup>3</sup> /h
1/2"	10 CFM	17m <sup>3</sup> /h	2 1/2"	195 CFM	332m <sup>3</sup> /h	10"	3,300 CFM	5610m <sup>3</sup> /h
3/4"	20 CFM	34m <sup>3</sup> /h	3"	300 CFM	510m <sup>3</sup> /h	12"	4,700 CFM	7990m <sup>3</sup> /h
1"	35 CFM	60m <sup>3</sup> /h	4"	520 CFM	884m <sup>3</sup> /h	14"	6,000 CFM	10200m <sup>3</sup> /h
1 1/4"	60 CFM	102m <sup>3</sup> /h	5"	800 CFM	1360m <sup>3</sup> /h			

Table 3 \*Note: This information is for general use only. A qualified engineer must properly design each system.

### 3. Element Specifications

#### A. HDL Series

Media: PSG

Efficiency: 99.97% @ 0.3 micron

Typical Element Operating Pressure: 0 – 5 psig / 0 – 0.36 BAR

Filter Change-Out Differential: 2.5 psig / 0.17 BAR over initial back pressure of the saturated element

#### B. EE Series

Media: PSG, GL

Efficiency: 99.97% @ 0.3 micron

Typical Element Operating Pressure: 0 – 5 psig / 0 – 0.36 BAR

Filter Change-Out Differential: 2.5 psig / 0.17 BAR over initial back pressure of the saturated element

#### C. EF Series

Media: FG

Efficiency: 99.97% @ 0.3 micron

Typical Element Operating Pressure: 0 – 5 psig / 0 – 0.36 BAR

Filter Change-Out Differential: 2.5 psig / 0.17 BAR over initial back pressure of the saturated element



## D. EFS Series

Media: Polyester

Efficiency: 99+% @ 10 micron

Filter Change-Out Differential: 0.36 – 0.54 psig / 0.025 – 0.037 BAR over initial Delta P of the element

## 4. Element Cleaning

With many types of equipment, the maximum pressure drop allowed will be dictated by the ability of the equipment to perform to its rated capacity. Under all circumstances, the operator should avoid exceeding the manufacturer's recommended maximum pressure drop for their specific equipment.

### A. Media: PSG, FG, and GL

Cleaning is not recommended. Once saturation and particulate entrainment occur, it is very difficult to restore elements to their original condition. It is recommended that once maximum differential pressure is reached new elements should be installed.

**IMPORTANT:** Used elements can't be recycled. They should be disposed immediately after removal. Since the elements are saturated with oil, please dispose in accordance with local regulations. These can't be cleaned. No attempt should be made to clean or recycle these cartridges.

### B. Media: Polyester

Polyester elements should be cleaned or replaced, once the pressure drop reaches 0.36 – 0.54 psig / 0.025 – 0.037 BAR above the initial pressure drop of the installation.

The decision to clean the element rather than replace it is left to the discretion of the operator. Any damage which results from by-pass or additional pressure drop created by element cleaning is the sole responsibility of the operator.

## **\*WARNING\***

The overall performance of a filter element is altered once cleaned.

The initial pressure drop after cleaning will be greater than the original, clean pressure drop of the element.

After each subsequent cleaning, the initial pressure drop will continue to increase.

Under all circumstances, the initial pressure drop of the polyester element needs to be maintained at less than 0.72 – psig / 0.050 BAR

Cleaned polyester elements that exceed 0.72 – psig / 0.050 BAR at start-up should be replaced with new elements.

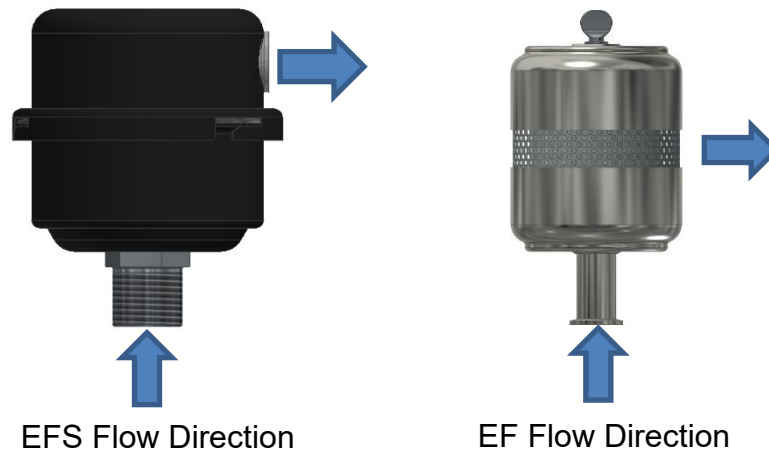
The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed.

Spare parts such as gaskets, wing nuts and washers can be supplied upon request.

### **5. Installation.**

- A. The drawing of the filter should be referenced before installation in order to ensure the unit is installed properly. The inlet and outlet should be identified on the unit as a label or as a physical design feature of the unit.

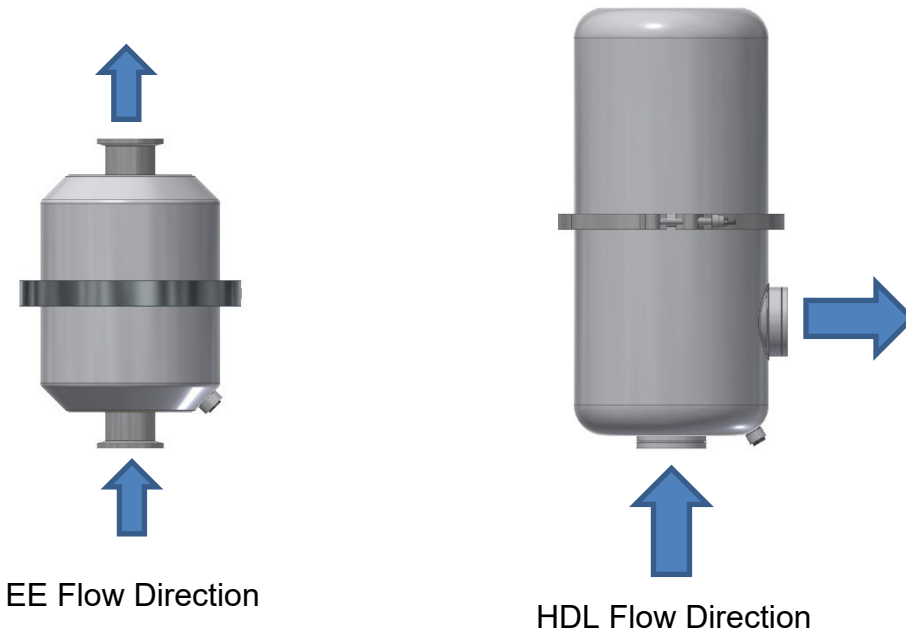


Page 8

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA  
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com







## **\*WARNING\***

**Before installing any Solberg filter, it is essential that all packing materials be removed properly, prior to start up, to avoid risk of injury.**

- B. Maximum operating temperature for most Solberg discharge filter products is 180°F / 80°C. Temperatures in excess of this could cause damage to elements, media and elastomers. High temperature products are available.
- C. Direction of flow is typically from the inside of the element to the outside of the element. Most products have arrows indicating direction of flow on the inlet and outlet ports.
- D. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.
- E. Mounting orientation is typically top-up vertical so draining can occur.
- F. Each Solberg Discharge Filter is equipped with a plugged drain port on the bottom side of the filter canister. Before operating, please ensure that the port is unplugged and a drain line is added for oil recovery. If the plug is not removed and a drain line is not added, oil will collect in the filter canister and will eventually carryover through the canister outlet. The result is visible oil mist contamination into the surrounding atmosphere.

- G. If a drip leg and valve is included, the valve will need to be opened periodically to drain the oil. If the valve is not opened oil will collect in the filter canister and will eventually carryover through the canister outlet. The result is visible oil mist contamination into the surrounding atmosphere. Please call Solberg Manufacturing, Inc. with any installation questions.

## Section C

### **MAINTENANCE RECOMMENDATIONS**

1. Pressure drop readings are recommended to have an effective discharge filter. Always document initial pressure drop during start-up when element is clean.

For PSG, GL, and FG, a replacement cartridge is needed when system experiences 2.5 psig / 0.17 BAR higher pressure drop above the initial saturated reading.

For polyester a replacement cartridge is needed when system experiences 0.36 – 0.54 psig / 0.025 – 0.037 BAR pressure drop above the initial reading.

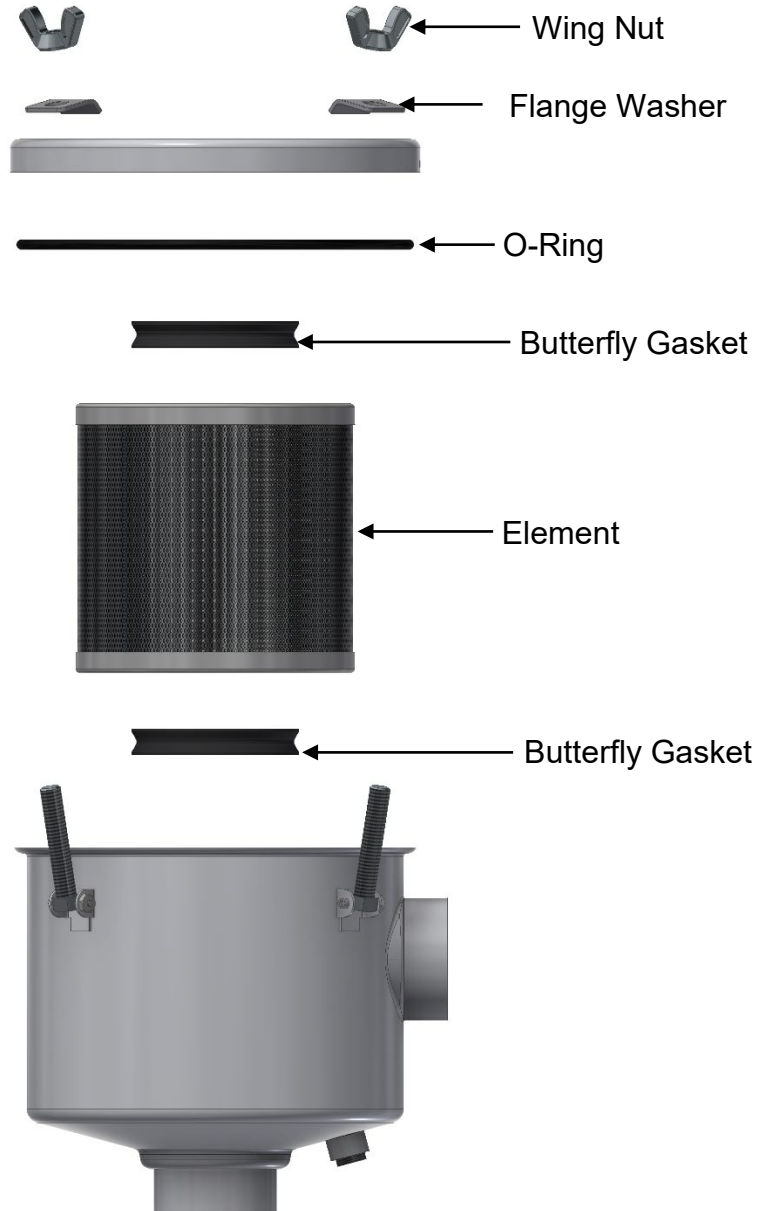
Refer to page 4 for instructions.

2. Always check replacement cartridge gaskets to ensure they are adhered uniformly along the end caps during handling. If not, contact Solberg Manufacturing, Inc. immediately. Do not modify or change from Solberg specified parts!
3. Always check inlets/outlets, element base and its components when replacing element to ensure cleanliness. Wipe clean if necessary.
4. Operate only when a proper seal exists.
5. Never operate without absolute assurance that V-band is secured correctly along entire diameter of canisters. Check along V-band for wear. Replace if any distortion occurs due to handling and usage.

# Section D

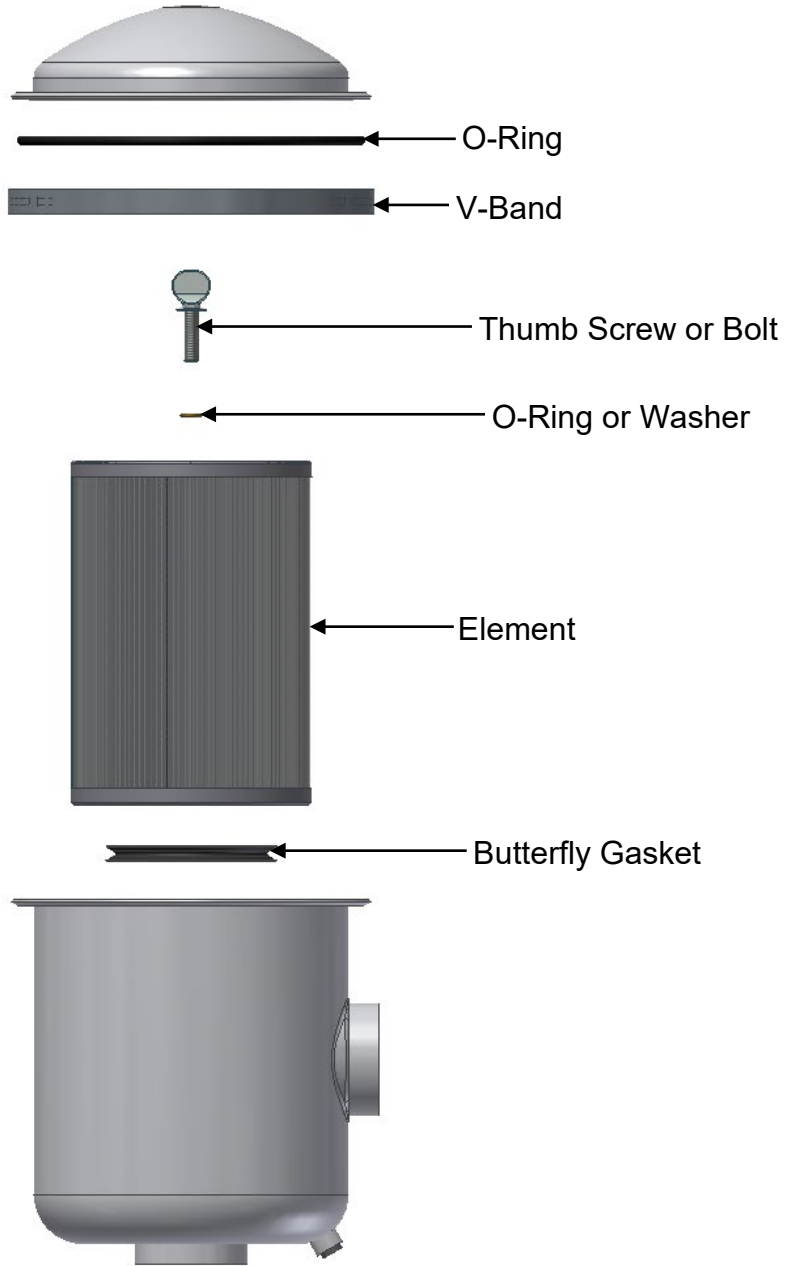
## REPLACEMENT PARTS LIST:

### 1. HDL Series



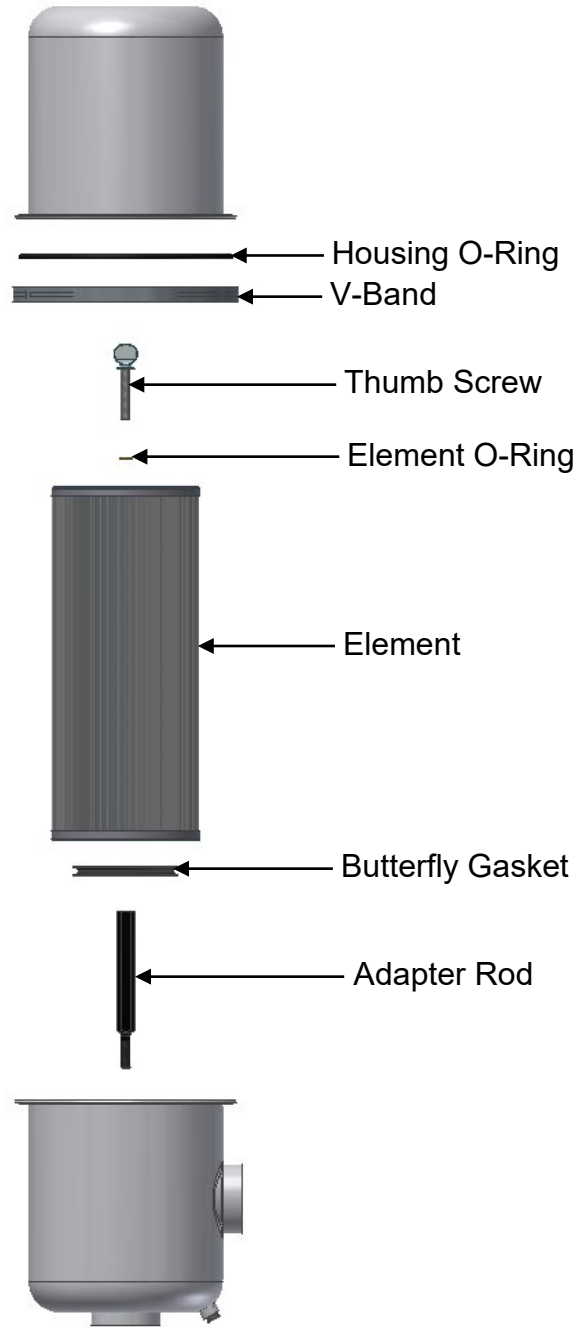
HDL 848 Oil Mist Discharge Filter  
Available Replacement Parts

Available Replacement Part by Product Number					
Product #	Element	Butterfly Gasket	O-Ring	Wing Nut	Washer
HDL-PSG848-XXX	PSG848	9111000	9241250	5030300	5041020



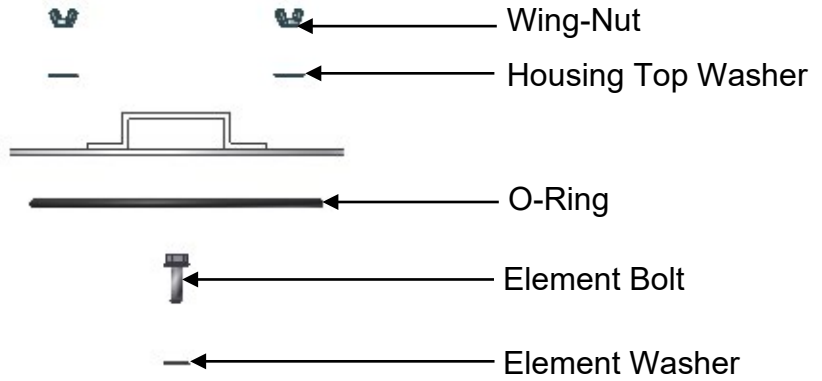
HDL 850/1 & 244/2 Oil Mist Discharge Filter  
Available Replacement Parts

Available Replacement Part by Product Number						
Product #	Element	Butterfly Gasket	V-Band	O-Ring	Thumb Screw or Bolt	O-Ring or Washer
HDL-PSG850/1-XXX	PSG850/1	9111100	5050100	9241400	5060300	9240110
HDL-PSG244/2-XXX	PSG244/2	9111150	5050400	9241610	5010650	5020200



HDL 860/1 Oil Mist Discharge Filter  
Available Replacement Parts

Available Replacement Part by Product Number							
Product #	Element	Butterfly Gasket	V-Band	Housing O-Ring	Thumb Screw	Element O-Ring	Adapter Rod
HDL-PSG860/1-XXX	PSG860/1	9111100	5050100	9241400	5060400	9240110	2511701+30



HDL 344/2, 474/2, & 476 Oil Mist Discharge Filter  
Available Replacement Parts

Page 14

Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA  
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com



**Available Replacement Part by Product Number**

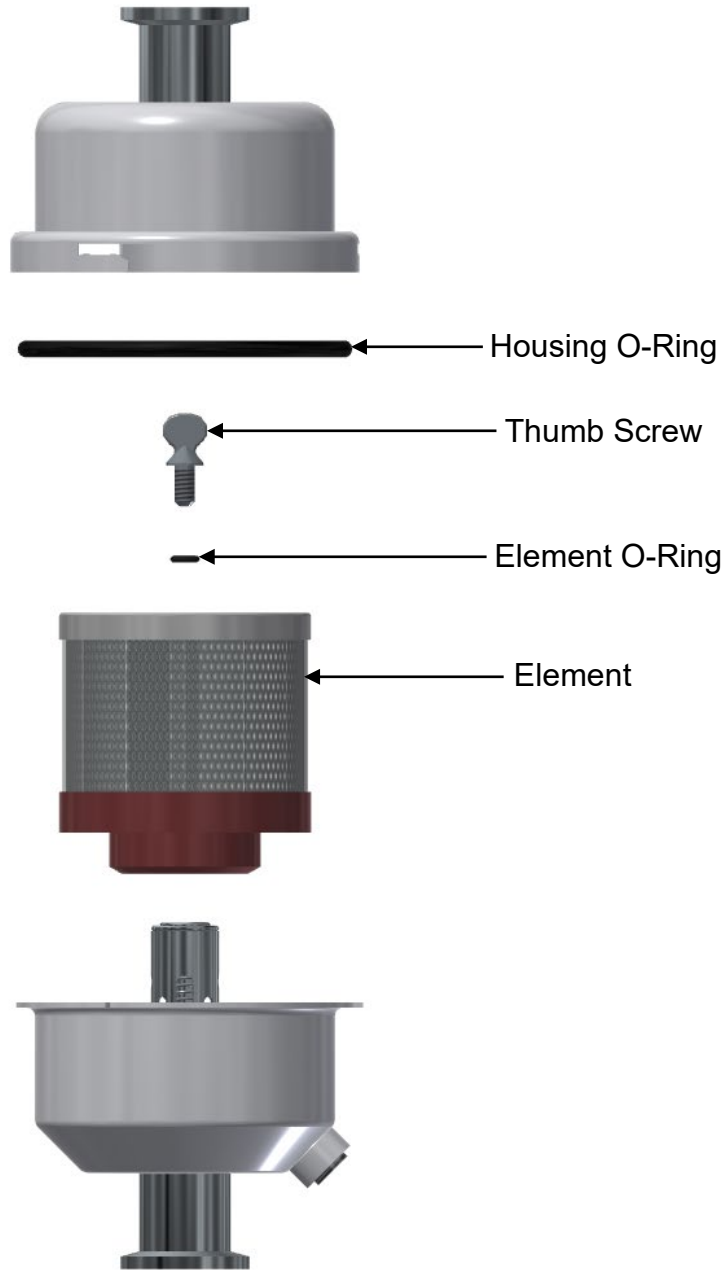
<b>Product #</b>	<b>Element</b>	<b>Gasket/O-Ring</b>	<b>O-Ring</b>	<b>Element Washer</b>
<b>HDL-PSG344/2-XXX</b>	PSG344/2	9111150	9241500	5041400
<b>HDL-PSG474/2-XXX</b>	PSG474/2	9241258	9241750	5041400
<b>HDL-PSG476-XXX</b>	PSG476	9241400	9241900	5041400

**Available Replacement Part by Product Number Continued**

<b>Product #</b>	<b>Element Bolt</b>	<b>T-Bolt</b>	<b>Housing Top Washer</b>	<b>Wing-Nut</b>
<b>HDL-PSG344/2-XXX</b>	5010650	5011725	5040350	5030600
<b>HDL-PSG474/2-XXX</b>	5010650	5011725	5040350	5030600
<b>HDL-PSG476-XXX</b>	5010650	5011725	5040350	5030600



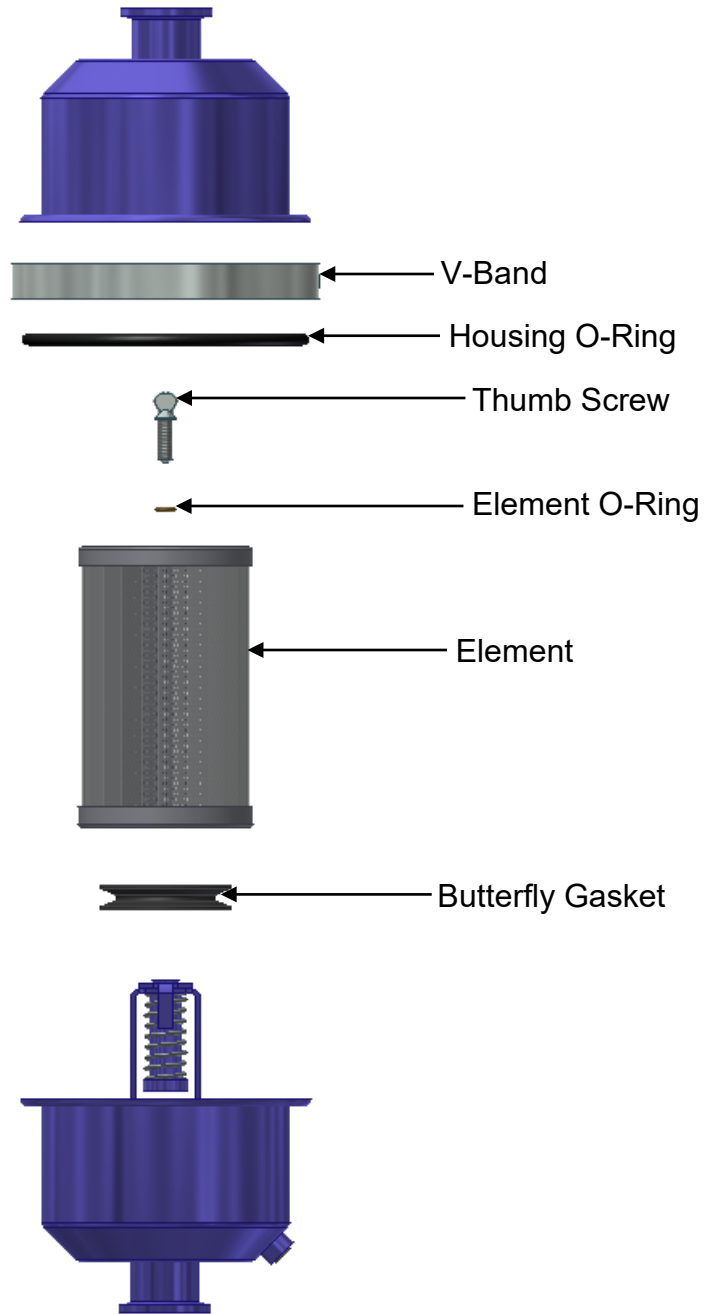
## 2. EE Series



EE Series 915 Compact Closed Oil Mist Discharge Filter  
Available Replacement Parts

Available Replacement Part by Product Number				
Product #	Element	Element O-Ring	Thumb Screw	Housing O-Ring
EE-GL915-XXX	GL915	9240005	5060600	9240776

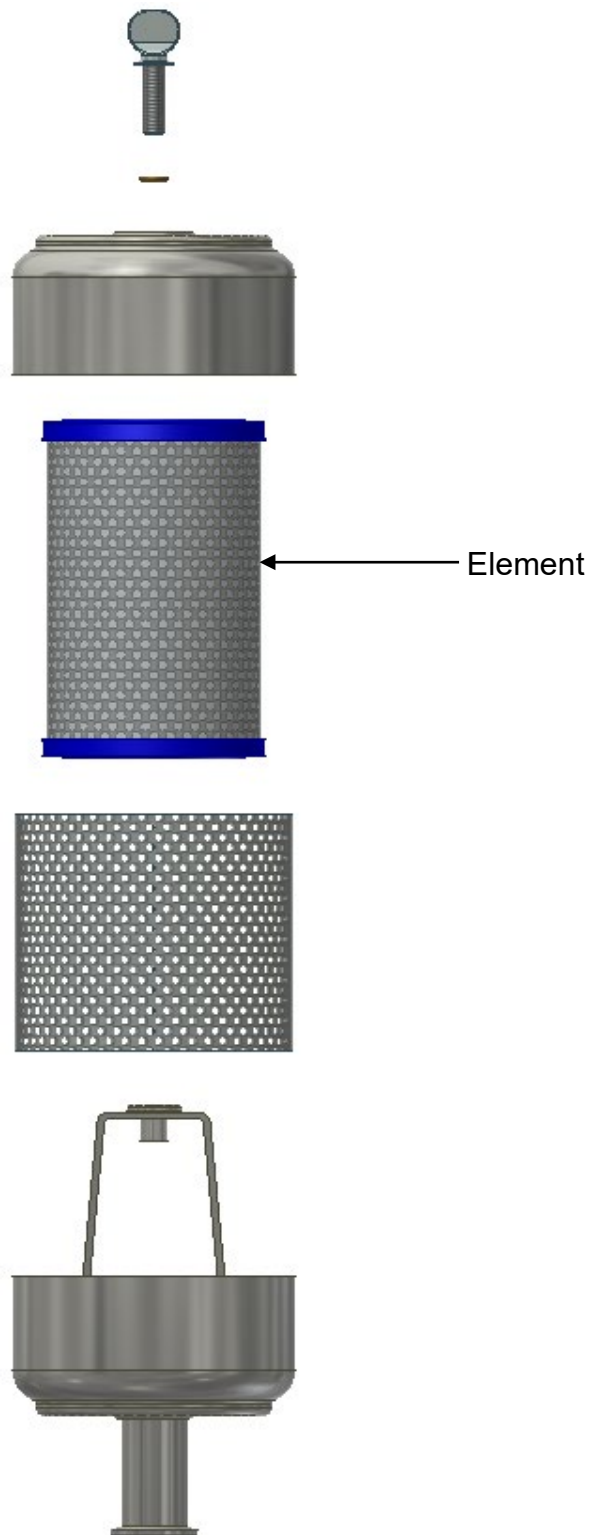




EE Series 925 Compact Closed Oil Mist Discharge Filter  
Available Replacement Parts

Available Replacement Part by Product Number						
Product #	Element	Butterfly Gasket	Element O-Ring	Thumb Screw	Housing O-Ring	V-Band
EE-PSG925-XXX	PSG925	9110810	9240010	5060210	9240860	5060115

### 3. EF Series



EF Series Compact Oil Mist Discharge Filter  
Available Replacement Parts

Page 18

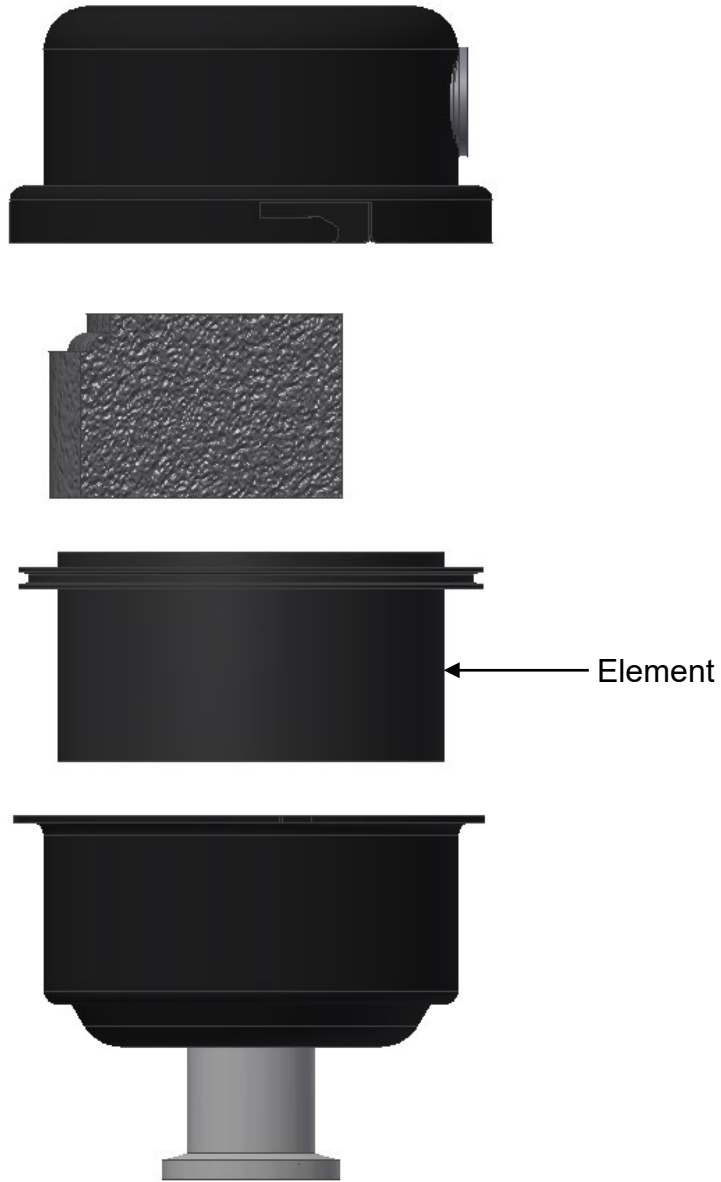
Solberg Manufacturing, Inc., 1151 Ardmore Itasca, IL 60143 USA  
Ph: 630.773.1363 Fax: 630.773.0727 Email: sales@solbergmfg.com Web: www.solbergmfg.com



Available Replacement Part by Product Number	
Product #	Element
EF-FG3-XXX	FG3
EF-FG5-XXX	FG5
EF-FG7-XXX	FG7
EF-FG9-XXX	FG9
EF-FG10-XXX	FG10
EF-FG20-XXX	FG20
EF-FG24-XXX	FG24



#### 4. EFS Series



EFS Series Integrated Discharge Filter Silencer  
Available Replacement Parts

Available Replacement Part by Product Number		
Product Number	Element Type	Replacement Part Number
EFS-05-XXX	Polyester	05
EFS-07-XXX	Polyester	07
EFS-11-XXX	Polyester	11