

Inline Straight Through Vacuum Filters

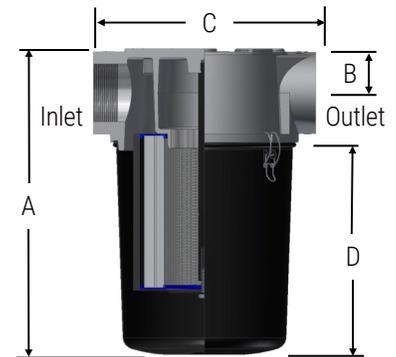
CT Series 3/4" - 6"

Features

- Compact design for space restrictions; min. service area
- Inlet above element for extended element life & maintenance intervals
- Corrosive resistant cast aluminum top with machined connections and integrated baffle design
- T-style design minimizes piping requirements
- Black powder coat carbon steel drop down bucket

Technical Specifications

- Vacuum Rating: medium vacuum service
- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20" H₂O over initial ΔP
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron



Inlet / Outlet		Assembly SCFM Rating	Assembly Part Number		Dimensions (inches)				Suggested Service Height	Approx. Weight (lbs)
Size	Type		Polyester	Paper	A	B	C	D		
3/4"	NPSC	25	CT-8451-075C	CT-8450-075C	8.45	1.00	5.00	5.96	5"	3.5
1"	NPSC	40	CT-897-100C	CT-896-100C	13.24	1.52	7.00	10.16	9"	12
1 1/4"	NPSC	60	CT-897-125C	CT-896-125C	13.24	1.52	7.00	10.16	9"	12
1 1/2"	NPSC	80	CT-897-150C	CT-896-150C	13.24	1.52	7.00	10.16	9"	11
2"	NPSC	175	CT-851-200C	CT-850-200C	12.77	1.98	9.00	8.97	9"	16
2 1/2"	FNPT	210	CT-851-250C	CT-850-250C	12.77	1.98	9.36	8.97	9"	15
3"	FNPT	300	CT-235P-300C	CT-234P-300C	18.60	2.70	13.50	12.92	10"	30
4"	FNPT	520	CT-235P-400C	CT-234P-400C	18.60	2.70	13.50	12.92	10"	26
6"	FNPT	1100	CT-275P-600C	CT-274P-600C	18.20	3.89	19.00	9.82	10"	45

Note: CT 2" & 2 1/2" models: element seals on the base of the housing.

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Inline See-Through Vacuum Filters

ST Series 3/4" - 6"

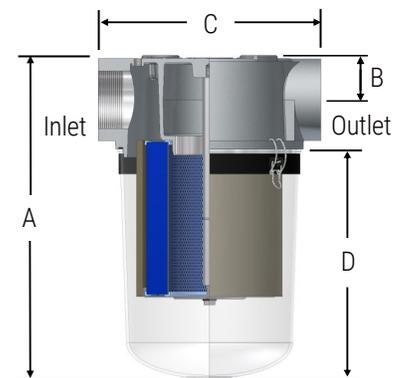
Solberg's ST Series is designed to offer exceptional performance across a broad range of vacuum applications. The transparent housing offers users the ability to inspect filter elements without disassembling the unit. Ideal for rough-medium vacuum service, this compact design offers a smaller service footprint, allowing for easy access and quick maintenance in tight spaces. Multiple filter element media options offer superior protection and longevity for the vacuum system.

Features

- Easy maintenance due to see-through bucket
- Compact design for space restrictions; min. service area
- Inlet above element for extended element life & maintenance intervals
- Corrosive resistant cast aluminum construction
- T-style design minimizes piping requirements
- Shatter-resistant polycarbonate drop down bucket

Technical Specifications

- Vacuum Rating: medium vacuum service
- Temp (continuous): min -15°F (-26°C) max 220°F (104°C)
- Filter change out differential: 15-20" H2O over initial ΔP
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron



Inlet / Outlet		Assembly SCFM Rating	Assembly Part Number		Dimensions (inches)				Suggested Service Height	Approx. Weight (lbs)
Size	Type		Polyester	Paper	A	B	C	D		
3/4"	NPSC	25	ST-8451-075C	ST-8450-075C	8.38	1.00	5.00	6.13	5"	3
1"	NPSC	40	ST-897-100C	ST-896-100C	13.45	1.52	7.00	10.38	9"	11
1 1/4"	NPSC	60	ST-897-125C	ST-896-125C	13.45	1.52	7.00	10.38	9"	11
1 1/2"	NPSC	80	ST-897-150C	ST-896-150C	13.45	1.52	7.00	10.38	9"	10
2"	NPSC	175	ST-851/1-200C	ST-850/1-200C	16.22	1.98	9.00	12.42	9"	15
2 1/2"	FNPT	210	ST-851/1-250C	ST-850/1-250C	16.22	1.98	9.36	12.42	9"	14
3"	FNPT	300	ST-235P-300C	ST-234P-300C	19.73	2.70	13.50	14.04	10"	29
4"	FNPT	520	ST-235P-400C	ST-234P-400C	19.73	2.70	13.50	14.04	10"	25
6"	FNPT	1100	ST-275P-600C	ST-274P-600C	28.87	3.90	19.00	21.25	10"	72
6"	FNPT	1100	ST-375P-600C	ST-374P-600C	28.87	3.90	19.00	21.25	15"	75

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Inline Straight Through Vacuum Filters

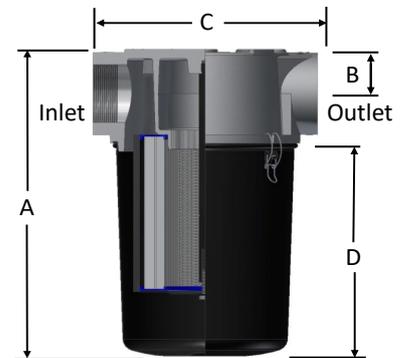
CT Series 3/4" - 6"

Features

- Compact design for space restrictions; min. service area
- Inlet above element for extended element life & maintenance intervals
- Corrosive resistant cast aluminum top with machined connections and integrated baffle design
- T-style design minimizes piping requirements
- Black powder coat carbon steel drop down bucket

Technical Specifications

- Vacuum Rating: medium vacuum service*
- Temp (continuous): min -26°C (-15°F) max 104°C (220°F)
- Filter change out differential: 37-50 mbar over initial ΔP
- Polyester: 99%+ removal efficiency standard to 5 micron
- Paper: 99%+ removal efficiency standard to 2 micron



Inlet / Outlet		Assembly m ³ /hr Rating	Assembly Part Number		Dimensions (mm)				Suggested Service Height (mm)	Approx. Weight (kg)
Size	Type		Polyester	Paper	A	B	C	D		
3/4"	BSPP	43	CT-8451-076C	CT-8450-076C	209	25	127	151	127	1.6
1"	BSPP	68	CT-897-101C	CT-896-101C	336	39	178	258	229	5.4
1 1/4"	BSPP	102	CT-897-126C	CT-896-126C	336	39	178	258	229	5.2
1 1/2"	BSPP	136	CT-897-151C	CT-896-151C	336	39	178	258	229	5.1
2"	BSPP	298	CT-851-201C	CT-850-201C	324	50	229	229	229	7.2
2 1/2"	BSPP	357	CT-851-251C	CT-850-251C	324	50	238	229	229	6.8
3"	BSPP	510	CT-235P-301C	CT-234P-301C	473	69	343	328	254	14
4"	BSPP	884	CT-235P-401C	CT-234P-401C	473	69	343	328	254	12
6"	BSPP	1869	CT-275P-601C	CT-274P-601C	462	99	483	249	254	20
6"	BSPP	2549	CT-374P-601C	CT-375P-601C	740	99	483	527	381	21

Note: CT 2" & 2 1/2" models: element seals on the base of the housing.

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Inline See-Through Vacuum Filters

ST Series 3/4" - 6"

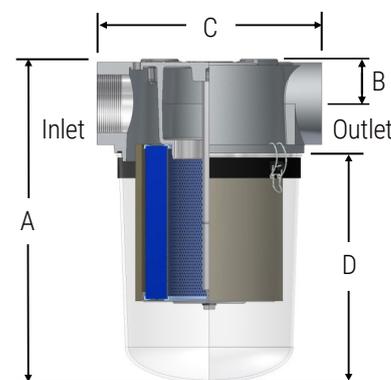
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Features

- Easy maintenance due to see-through bucket
- Compact design for space restrictions; min. service area
- Inlet above element for extended element life & maintenance intervals
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- T-style design minimizes piping requirements
- Shatter-resistant polycarbonate drop down bucket

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Inlet / Outlet		Assembly m ³ /hr Rating	Assembly Part Number		Dimensions (mm)				Suggested Service Ht. (mm)	Approx. Weight (kg)
Size	Type		Polyester	Paper	A	B	C	D		
3/4"	BSPP	43	ST-8451-076C	ST-8450-076C	213	25	127	165	140	1.4
1"	BSPP	68	ST-897-101C	ST-896-101C	340	37	178	264	228	5.0
1 1/4"	BSPP	102	ST-897-126C	ST-896-126C	340	37	178	264	228	4.7
1 1/2"	BSPP	136	ST-897-151C	ST-896-151C	342	39	178	264	228	4.6
2"	BSPP	298	ST-851/1-201C	ST-850/1-201C	412	50	229	315	228	7.2
2 1/2"	BSPP	357	ST-851/1-251C	ST-850/1-251C	412	50	229	315	228	6.8
3"	BSPP	510	ST-235P-301C	ST-234P-301C	501	69	343	357	254	13
4"	BSPP	884	ST-235P-401C	ST-234P-401C	501	69	343	357	254	11
6"	BSPP	1869	ST-275P-601C	ST-274P-601C	759	99	483	540	254	33
6"	BSPP	1869	ST-375P-601C	ST-374P-601C	759	99	483	540	381	34

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Accessories for CT/ST Series

PRODUCT#	ELEMENT	PREFILTER	ELEMENT			BUTTERFLY	ELEMENT		CASTING			
			TOP	WASHER	WING NUT	GASKET	GASKET	O-RING	O-RING/GASKET	BOLT	BUCKET	FASTENER
CT-234P	234P	PF234	1030700+10	5010445	X	X	X	X	X	5011330	200-1051800+10	5080110+36
CT-235P	235P	PF234	1030700+10	5010445	X	X	X	X	X	5011330	200-1051800+10	5080110+36
CT-274P	274P	PF274	1031000+10	5010445	5030600	X	9110200	9241700	X	5070285	200-1071725-1-10	300-1060110
CT-275P	275P	PF274	1031000+10	5010445	5030600	X	9110200	9241700	X	5070285	200-1071725-1+10	300-1060110
CT-850	850	X	X	X	X	9111100	9111200	X	9241260	X	200-1050800+10	5080110+36
CT-851	851	X	X	X	X	9111100	9111200	X	9241260	X	200-1050800+10	5080110+36
CT-896	896	X	X	X	X	9110900	X	9240030	9262K375	5060250	300-1050241+10	5080110+36
CT-897	897	X	X	X	X	9110900	X	9240030	9262K375	5060250	300-1050241+10	5080110+36
ST-234P	234P	PF234	1030700+10	5010445	X	X	X	X	X	5011330	1051850	5080110+36
ST-235P	235P	PF234	1030700+10	5010445	X	X	X	X	X	5011330	1051850	5080110+36
ST-850/1	850/1	X	X	X	X	9111100	9111200	5010445	9241260	5010410	1050810	5080110+36
ST-851/1	851/1	X	X	X	X	9111100	9111200	5010445	9241260	5010410	1050810	5080110+36
ST-896	896	X	X	X	X	9110900	X	9240030	9262K375	5060250	1050250	5080110+36
ST-897	897	X	X	X	X	9110900	X	9240030	9262K375	5060250	1050250	5080110+36



Inlet Vacuum Filters

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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 Web: www.solbergmfg.com

Maintenance Manual

Inlet Vacuum Filters

CONTENTS

Section A

Introduction pg. 3

Section B

General Information

1. Identification of Solberg Inlet Vacuum 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. 9

Section D

Replacement Parts List

1. CSL Series pg.10
2. WL Series pg.16
2. CT Series pg. 21
4. ST Series pg. 29

**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 inlet vacuum filters.

WARNING

This manual must be read and thoroughly understood before using and caring for this vacuum 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 vacuum 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 inlet vacuum 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 Inlet Vacuum Filters

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

**Assembly Model #
Replacement Element #**

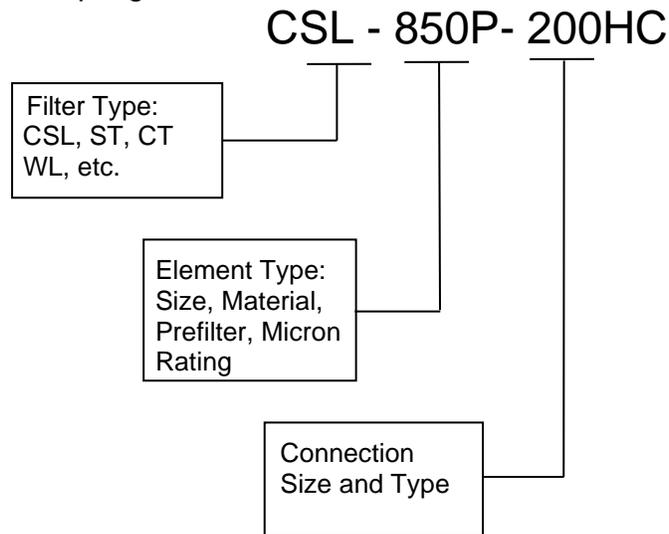
(The exception is OEM supplied units. In this case, please enter the OEM part numbers in Table 1.)

Fill in the actual nameplate data from your new Solberg inlet vacuum filter(s):

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 'CSL' design filter with an 850 element with prefilter and 2" NPSC half coupling 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).



Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.

Rule of Thumb #2: Always ask or specify a filter based on a micron rating **with filtration efficiencies**. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99%+ efficiency)	Environmental Conditions	Air to Media Ratio	
<i>Industrial Grade 2-micron Paper</i>	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft ²	(549m ³ /h)/m ²
	Severe Duty (workshop, factory-like)	15 CFM/ft ²	(274.5m ³ /h)/m ²
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft ²	(183m ³ /h)/m ²
<i>Industrial Grade 5-micron Polyester</i>	Industrial Duty (clean, office/warehouse-like)	65 CFM/ft ²	(1189.5m ³ /h)/m ²
	Severe Duty (workshop, factory-like)	40 CFM/ft ²	(732m ³ /h)/m ²
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft ²	(457.5m ³ /h)/m ²
<i>Industrial Grade 1-micron Polyester</i>	Severe Duty (Foundry, Construction-like)	25 CFM/ft ²	(457.5m ³ /h)/m ²
<i>Industrial Grade 0.3-micron HEPA Glass @ 99.97% Efficiency</i>	Industrial Duty (Pre-filtered Applications)	9 CFM/ft ²	(164.7m ³ /h)/m ²
	Severe Duty (workshop, factory-like)	7 CFM/ft ²	(128m ³ /h)/m ²
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft ²	(91.5m ³ /h)/m ²

Table 2



Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10" to 15" / 250-280mm H₂O over the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m³/h) or less is suggested through the outlet pipe. The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow	
1/2"	10 CFM	17m ³ /h	2 1/2"	195 CFM	332m ³ /h
3/4"	20 CFM	34m ³ /h	3"	300 CFM	510m ³ /h
1"	35 CFM	60m ³ /h	4"	520 CFM	884m ³ /h
1 1/4"	60 CFM	102m ³ /h	5"	800 CFM	1360m ³ /h
1 1/2"	80 CFM	136m ³ /h	6"	1,100 CFM	1870m ³ /h
2"	135 CFM	230m ³ /h			

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

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C

Filter Change-Out Differential: 10" to 15" / 250-380mm H₂O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
"S" Series Wire Mesh	Epoxy Coated Wire Mesh
"Z" Series Polyester	99+% @ 1 micron
"HE" Series HEPA	99.97% @ 0.3 microns
"U" Series Polyester	99+% @ 25 micron
"W" Series Polyester	99+% @ 100 micron
"S2" Series	Stainless Steel Wire Mesh
"AC" & "ACP" Series	N/A
"Y" Series Polypropylene	99+% @ 10 micron

Table 4

Temperature Range: -15° to 385°F / -26° to 196°C

Filter Change-Out Differential: 10" to 15" / 250-380mm H₂O Over Initial Delta P

Media	Micron Rating
"MX" & "MXD" Series – Nomex Cloth	99+% @ 10 micron

Table 5



4. Element Cleaning - Inlet Filtration

Solberg elements should be cleaned or replaced, once the pressure drop reaches 10 to 15-inches water column (250 - 380mm WC) 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 element needs to be maintained at less than 15-inches water column (380mm WC).

Cleaned elements that exceed 15-inches water column (380mm WC) at start-up should be replaced with new elements.

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.

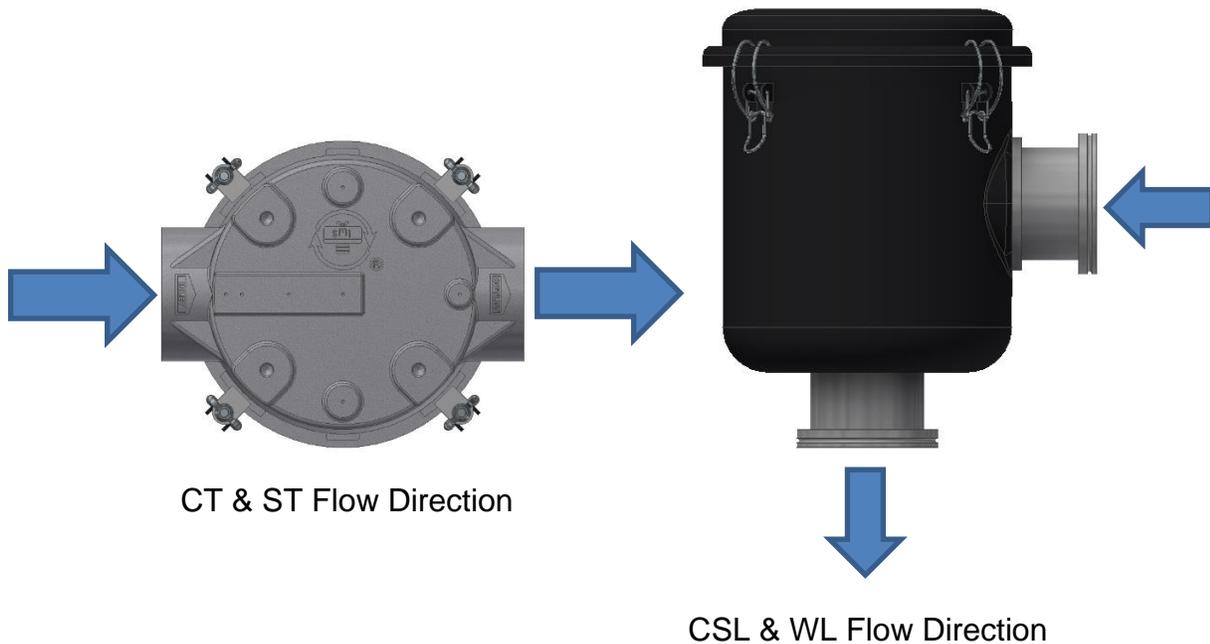
- A. **Polyester Element.** The polyester element may be washed in warm soapy water, vacuumed, gently blown out or replaced. The element should be dry before reinstallation. The element should be replaced after a maximum of three cleanings.
- B. **Paper Element.** The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.

- C. **Polyurethane Prefilter:** The prefilter may be washed as a sponge or replaced to give the element a longer service life.
- D. **Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements:** Cleaning instructions similar to polyester, except mild solvents may be used.
- E. **Activated Carbon Element:** Not cleanable
- F. **Polypropylene Element:** Cleaning instructions similar to polyester
- G. **Nomex Cloth Element:** Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.

5. Installation.

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.



Section C

MAINTENANCE RECOMMENDATIONS

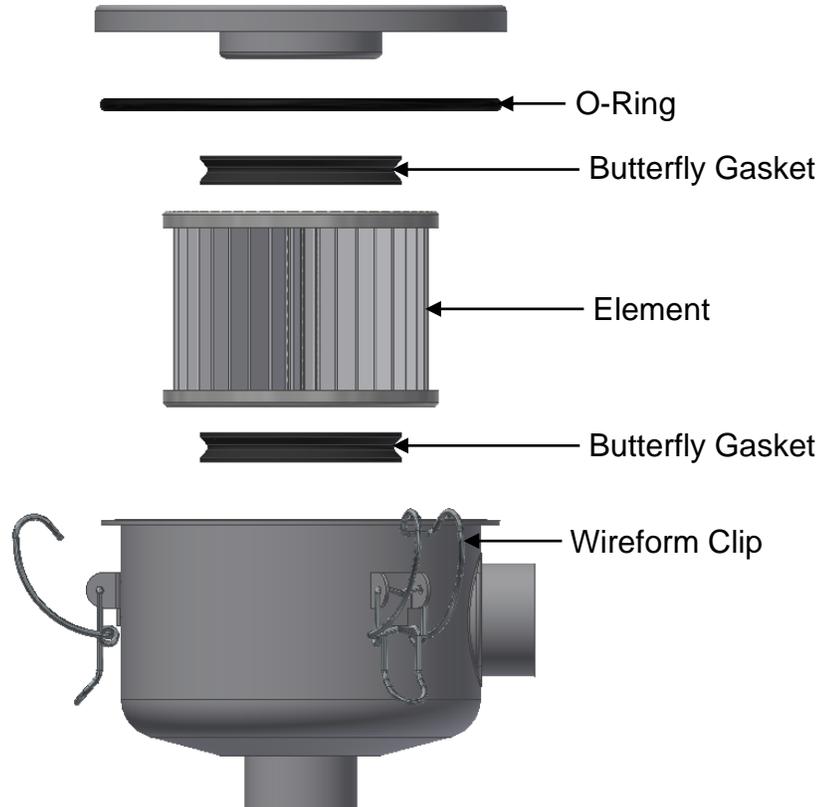
1. Pressure drop readings are recommended to have an effective vacuum filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10" to 15" / 250-380mm H₂O higher pressure drop above the initial reading.
2. Always check 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.



Section D

REPLACEMENT PARTS LIST

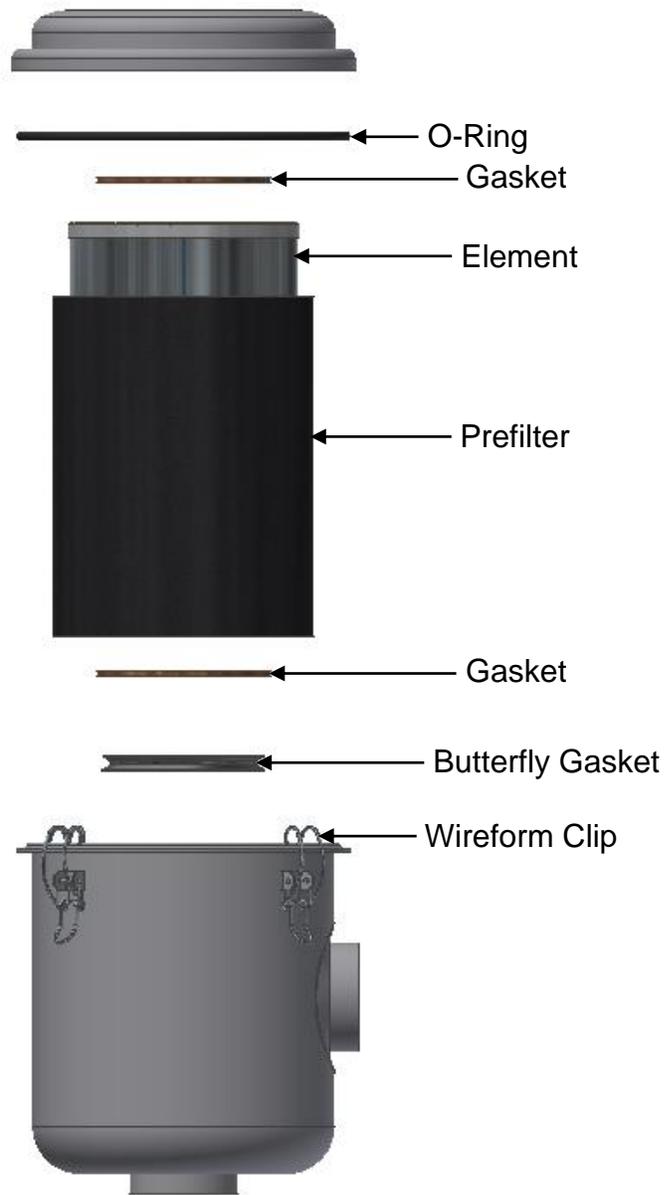
1. CSL Series



CSL Series 3/8" – 1 1/2" Compact "L" Style Vacuum Filter
Available Replacement Parts

Available Replacement Part by Product Number					
Product #	Element**	Prefilter	O-Ring	Butterfly Gasket	Wire-form Clip
CSL-824-XXX	824	N/A	9240825	9110810	5080110+36
CSL-825-XXX	825	N/A	9240825	9110810	5080110+36
CSL-842-XXX	842	N/A	9241050	9110900	5080110+36
CSL-843-XXX	843	N/A	9241050	9110900	5080110+36
CSL-848-XXX	848	9010400	9241250	9111000	5080110+36
CSL-849-XXX	849	9010400	9241250	9111000	5080110+36

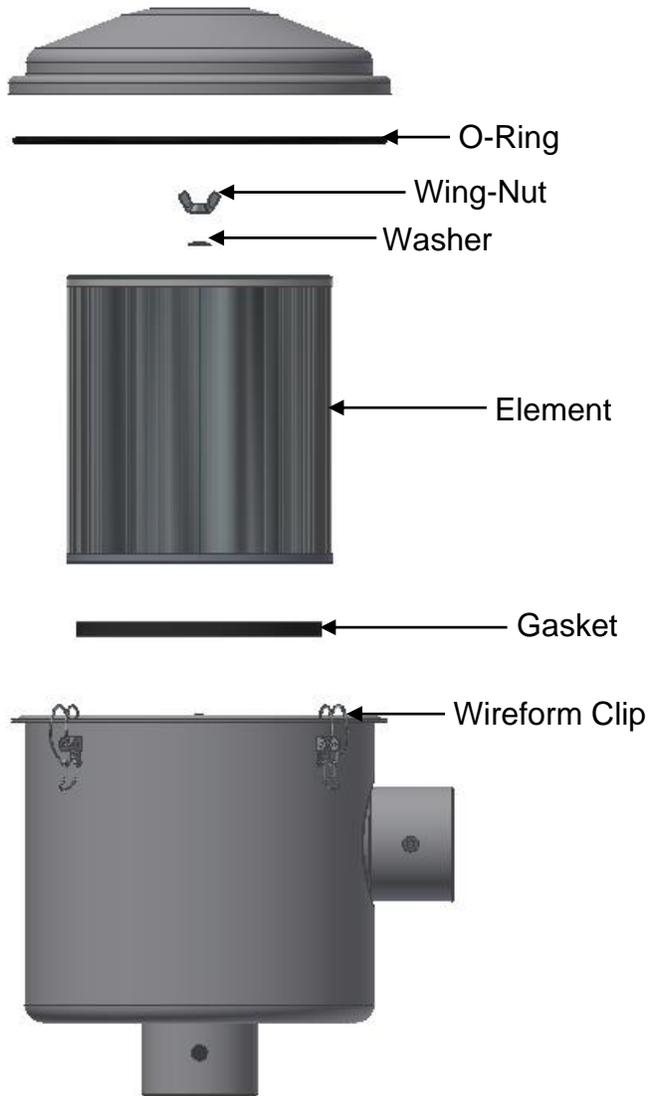
**Note: *Even element numbers are Paper elements and odd element numbers are Polyester elements.*



CSL Series 2" – 2 1/2" Compact "L" Style Vacuum Filter
Available Replacement Parts

Available Replacement Part by Product Number						
Product #	Element**	Prefilter	Gasket	O-Ring	Butterfly Gasket	Wire-form Clip
CSL-850-XXX	850	9011560	9111200	9241400	9111100	5080110+36
CSL-851-XXX	851	9011560	9111200	9241400	9111100	5080110+36

**Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.

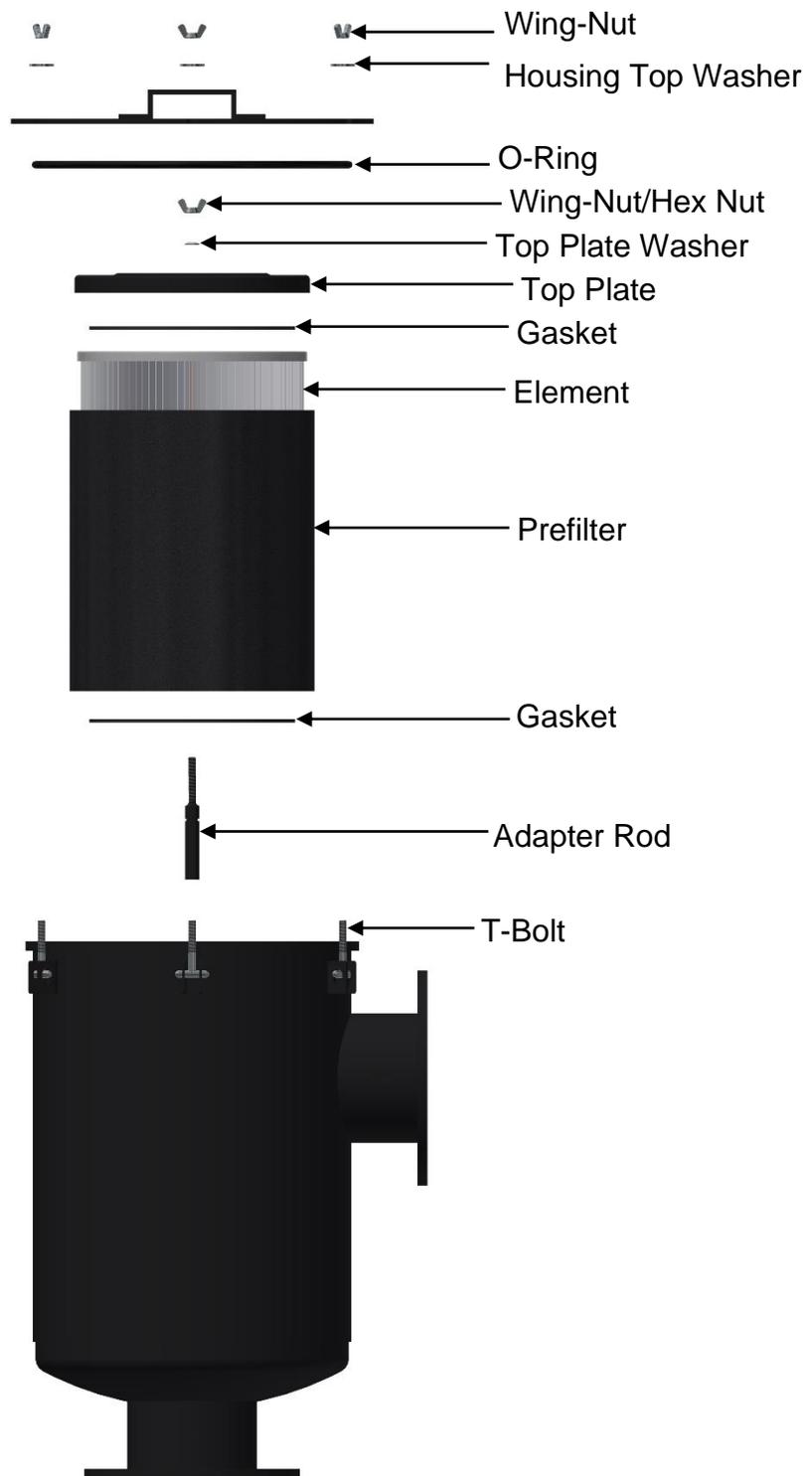


CSL Series 3" – 4" Compact "L" Style Vacuum Filter
Available Replacement Parts

Available Replacement Part by Product Number							
Product #	Element**	Prefilter	Gasket	Washer	Wing-Nut	O-Ring	Wire-form Clip
CSL-238-XXX	238	***	9110155	5020150	5030600	9241610	5080110+36
CSL-239-XXX	239	***	9110155	5020150	5030600	9241610	5080110+36

****Note:** Even element numbers are Paper elements and odd element numbers are Polyester elements.

*****Consult Solberg Manufacturing regarding prefilter information for the 238 and 239 elements.**



CSL Series "L" Style Vacuum Filter
 Available Replacement Parts

Page 13

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Available Replacement Part by Product Number					
Product #	Element**	Prefilter	Gasket	O-Ring	Top Plate
CSL-234P-XXX	234	9010800	N/A	9241500	1030700+10
CSL-235P-XXX	235	9010800	N/A	9241500	1030700+10
CSL-334P-XXX	334	9011150	N/A	9241500	1030700+10
CSL-335P-XXX	335	9011150	N/A	9241500	1030700+10
CSL-244P-XXX	244	9010900	N/A	9241750	1030900+10
CSL-245P-XXX	245	9010900	9110100	9241750	1030900+10
CSL-274P-XXX	274	9011000	9110200	9241750	1031000+10
CSL-275P-XXX	275	9011000	9110200	9241750	1031000+10
CSL-374P-XXX	374	9011100	9110200	9241750	1031000+10
CSL-375P-XXX	375	9011100	9110200	9241750	1031000+10
CSL-376P-XXX	376	9011200	9110400	9241900	1031100+10
CSL-377P-XXX	377	9011200	9110400	9241900	1031100+10
CSL-384P(2)-XXX	384(2)	9011300	9110500	9242000	1031300+10
CSL-685P-XXX	685	9011500	9110500	9242000	1031300+10
CSL-484P(2)-XXX	484(2)	9011400	9110500	9242000	1031300+10
CSL-485P(2)-XXX	485(2)	9011400	9110500	9242000	1031300+10

****Note:** Even element numbers are Paper elements and odd element numbers are Polyester elements.

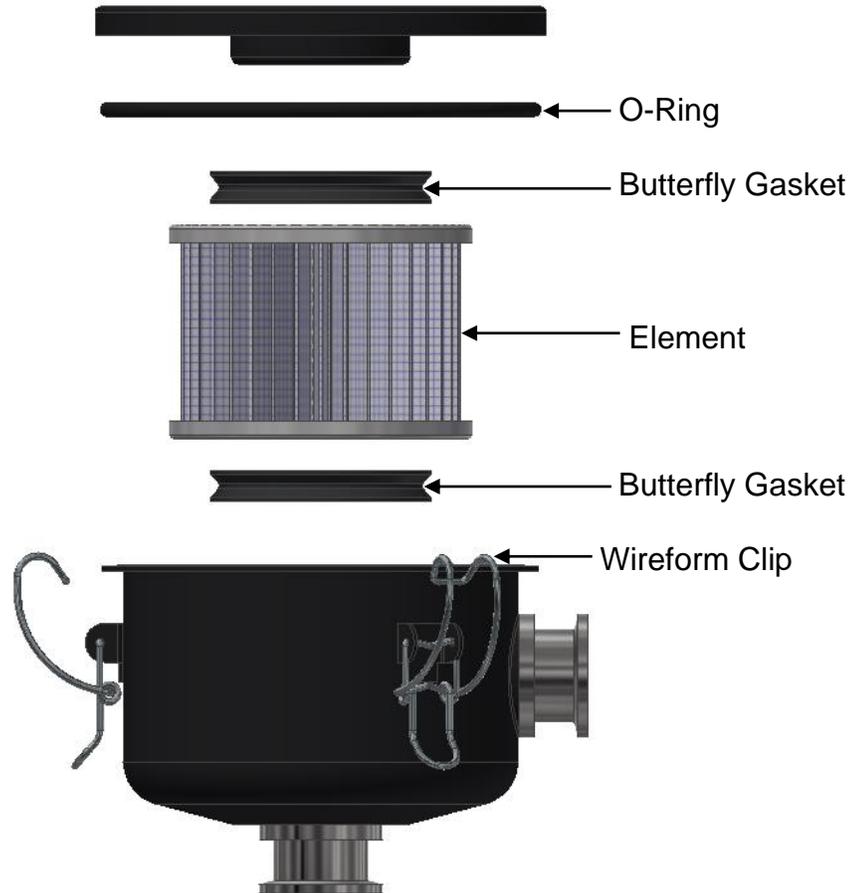


Available Replacement Part by Product Number Continued

Product #	Adapter Rod	Housing Top Washer	Top Plate Washer	Wing-Nut	T-Bolt	Hex Nut
CSL-234P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
CSL-235P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
CSL-334P-XXX	2511701+30	5040350	5020150	5030600	5011725	N/A
CSL-335P-XXX	2511701+30	5040350	5020150	5030600	5011725	N/A
CSL-244P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
CSL-245P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
CSL-274P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
CSL-275P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
CSL-374P-XXX	2511701+30	5040350	5020150	5030600	5011725	N/A
CSL-375P-XXX	2511701+30	5040350	5020150	5030600	5011725	N/A
CSL-376P-XXX	N/A	5040350	5020200	5030600	5011725	5011401
CSL-377P-XXX	N/A	5040350	5020200	5030600	5011725	5011401
CSL-384P(2)-XXX	N/A	5040350	5020200	5030600	5011725	5011401
CSL-685P-XXX	N/A	5040350	5020200	5030600	5011725	5011401
CSL-484P(2)-XXX	N/A	5040350	5020200	5030600	5011725	5011401
CSL-485P(2)-XXX	N/A	5040350	5020200	5030600	5011725	5011401



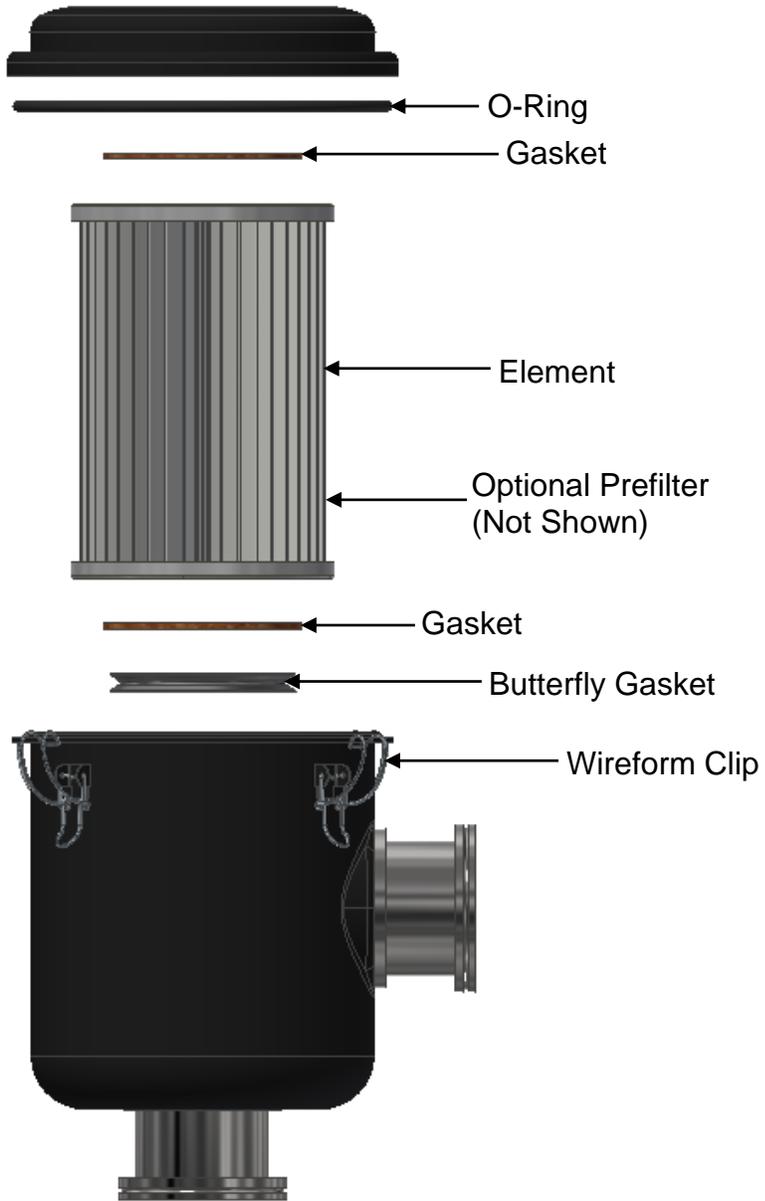
2. WL Series



WL Series 824, 825, 842, 843, 848, and 849 Compact "L" Style Vacuum Filter
Available Replacement Parts

Available Replacement Part by Product Number					
Product #	Element**	Prefilter	O-Ring	Butterfly Gasket	Wire-form Clip
WL-824-XXX	824	N/A	9240825	9110810	5080110+36
WL-825-XXX	825	N/A	9240825	9110810	5080110+36
WL-842-XXX	842	N/A	9241050	9110900	5080110+36
WL-843-XXX	843	N/A	9241050	9110900	5080110+36
WL-848-XXX	848	9010400	9241250	9111000	5080110+36
WL-849-XXX	849	9010400	9241250	9111000	5080110+36

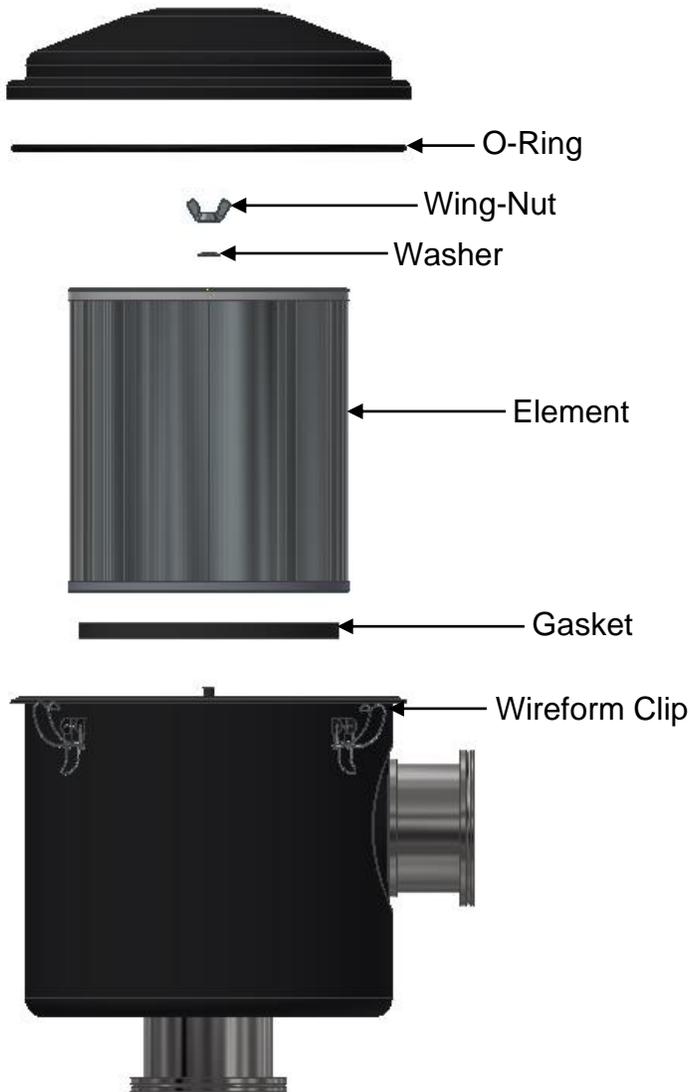
**Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.



WL Series 850 & 851 Compact "L" Style Vacuum Filter
Available Replacement Parts

Available Replacement Part by Product Number						
Product #	Element**	Prefilter	Gasket	O-Ring	Butterfly Gasket	Wire-form Clip
WL-850-XXX	850	9011560	9111200	9241400	9111100	5080110+36
WL-851-XXX	851	9011560	9111200	9241400	9111100	5080110+36

****Note:** *Even element numbers are Paper elements and odd element numbers are Polyester elements.*

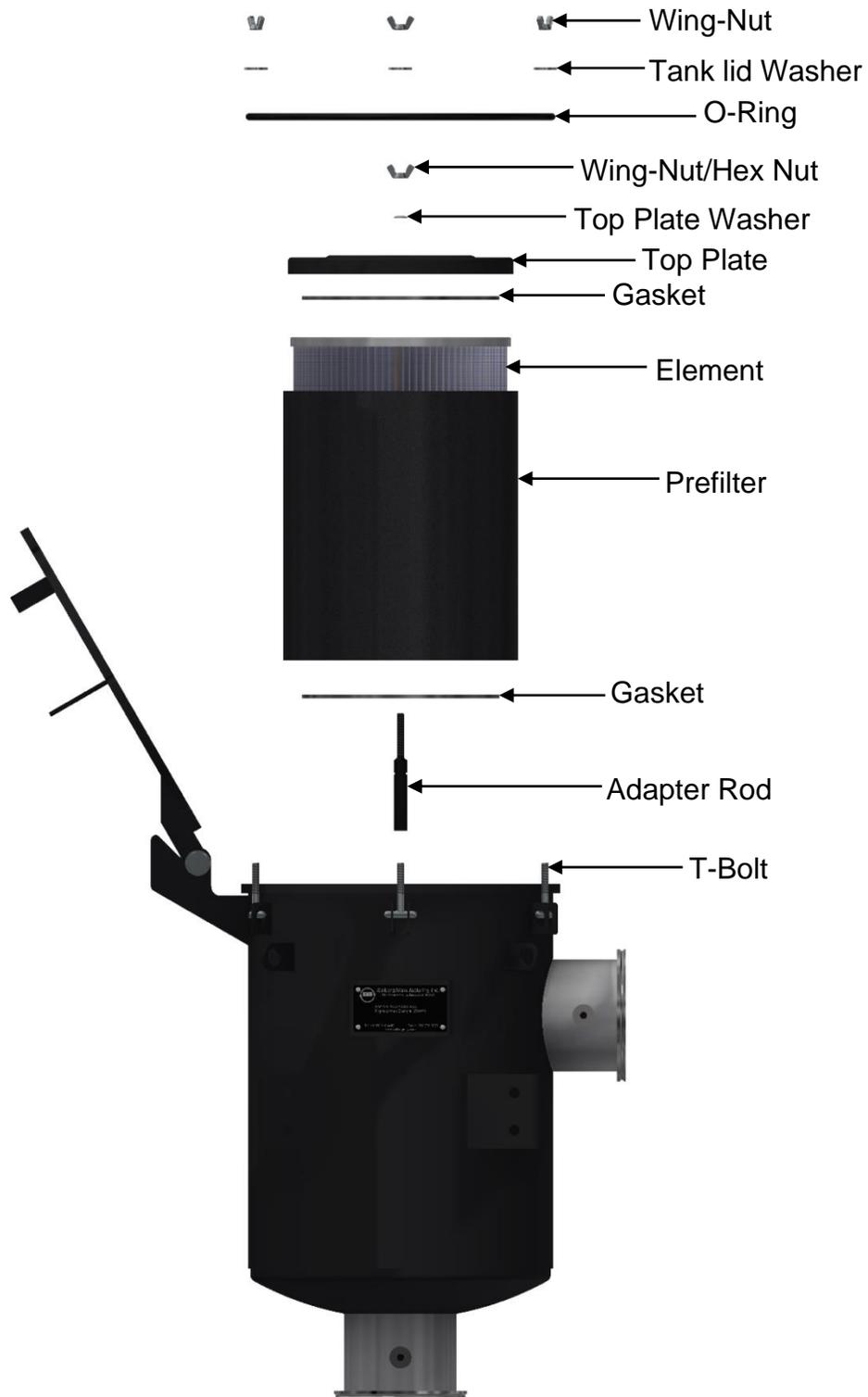


WL Series 238 & 239 Compact "L" Style Vacuum Filter
Available Replacement Parts

Available Replacement Part by Product Number							
Product #	Element**	Prefilter	Gasket	Washer	Wing-Nut	O-Ring	Wire-form Clip
WL-238-XXX	238	***	9110155	5020150	5030600	9241610	0003453+36
WL-239-XXX	239	***	9110155	5020150	5030600	9241610	0003453+36

****Note:** Even element numbers are Paper elements and odd element numbers are Polyester elements.

*****Consult Solberg Manufacturing regarding prefilter information for the 238 and 239 elements.**



WL Series "L" Style Vacuum Filter
 Available Replacement Parts

Page 19

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Available Replacement Part by Product Number

Product #	Element**	Prefilter	Gasket	O-Ring	Top Plate
WL-274P-XXX	274	9011000	9110200	9241750	1031000+10
WL-275P-XXX	275	9011000	9110200	9241750	1031000+10
WL-374P-XXX	374	9011100	9110200	9241750	1031000+10
WL-375P-XXX	375	9011100	9110200	9241750	1031000+10
WL-376P-XXX	376	9011200	9110400	9241900	1031100+10
WL-377P-XXX	377	9011200	9110400	9241900	1031100+10
WL-384P-XXX	384	9011300	9110500	9242000	1031300+10
WL-385P-XXX	385	9011300	9110500	9242000	1031300+10

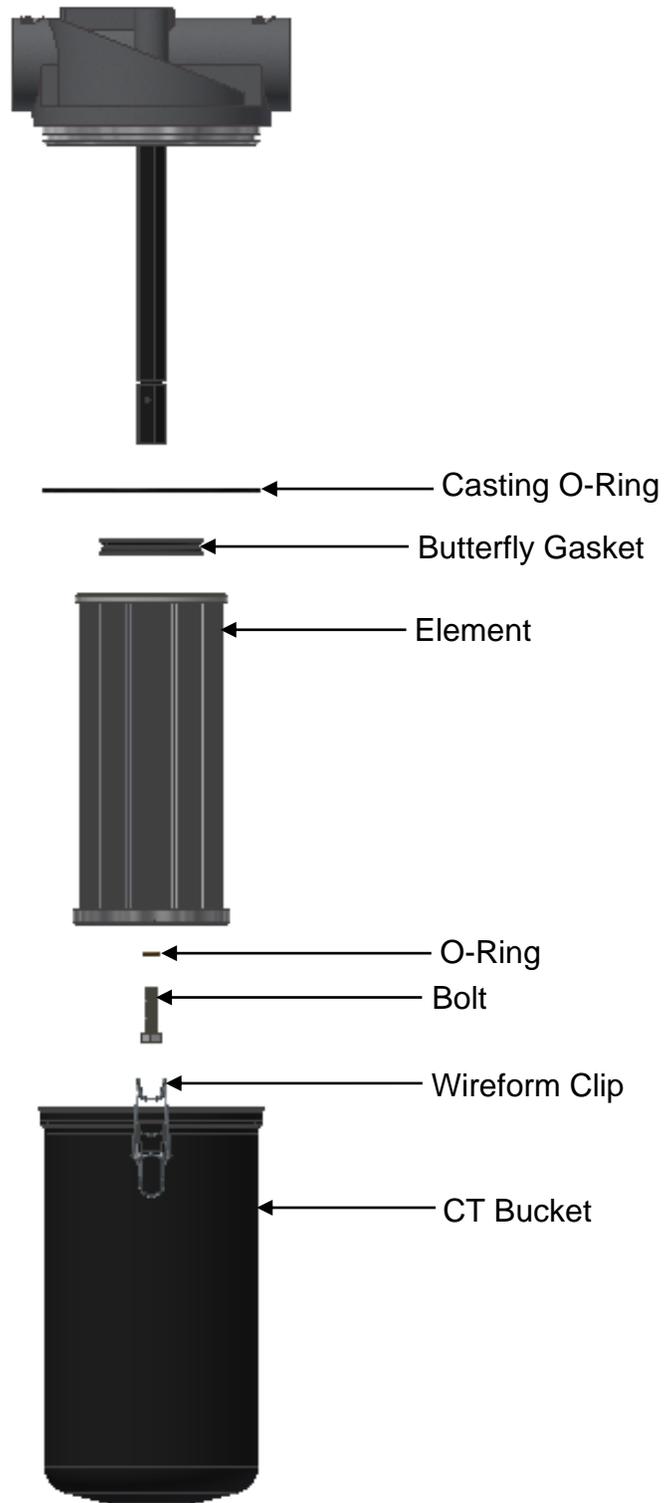
***Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number Continued

Product #	Adapter Rod	Tank lid Washer	Top Plate Washer	Wing-Nut	T-Bolt	Hex Nut
WL-274P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
WL-275P-XXX	N/A	5040350	5020150	5030600	5011725	N/A
WL-374P-XXX	2511701+30	5040350	5020150	5030600	5011725	N/A
WL-375P-XXX	2511701+30	5040350	5020150	5030600	5011725	N/A
WL-376P-XXX	N/A	5040350	5020200	5030600	5011702	5011401
WL-377P-XXX	N/A	5040350	5020200	5030600	5011702	5011401
WL-384P-XXX	N/A	5040350	5020200	5030600	5011725	5011401
WL-385P-XXX	N/A	5040350	5020200	5030600	5011725	5011401



3. CT Series



CT Series 1" – 1 1/2" "T" Style Vacuum Filter
Available Replacement Parts

Page 21

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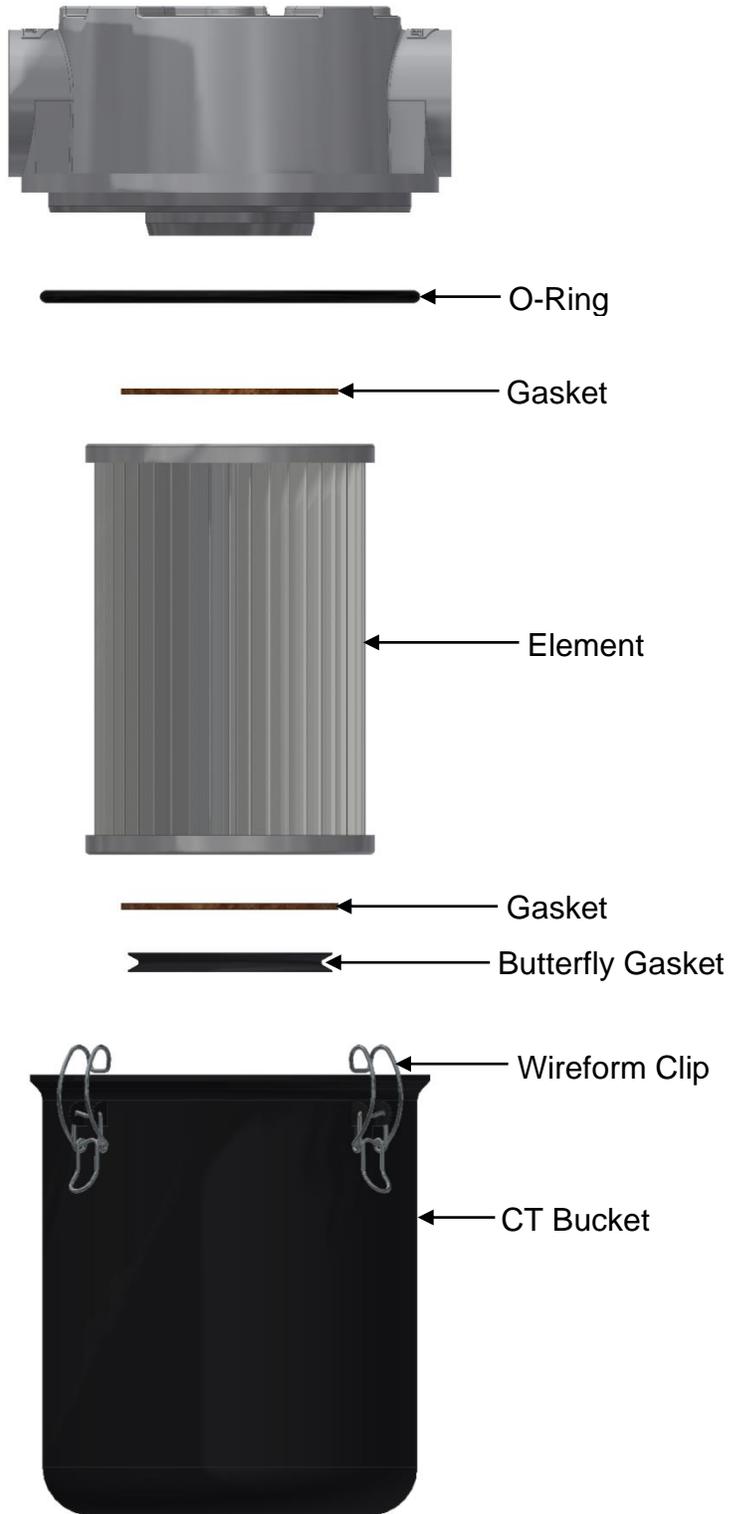


Available Replacement Part by Product Number				
Product #	Element**	Butterfly Gasket	O-Ring	Bolt
CT-896-XXX	896	9110900	9240030	5060250
CT-897-XXX	897	9110900	9240030	5060250

***Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number			
Product #	Casting O-Ring	CT Bucket	Wireform Clip
CT-896-XXX	9262K375	300-1050241+10	5080110+36
CT-897-XXX	9262K375	300-1050241+10	5080110+36





CT Series 2" – 2 1/2" "T" Style Vacuum Filter
 Available Replacement Parts

Page 23

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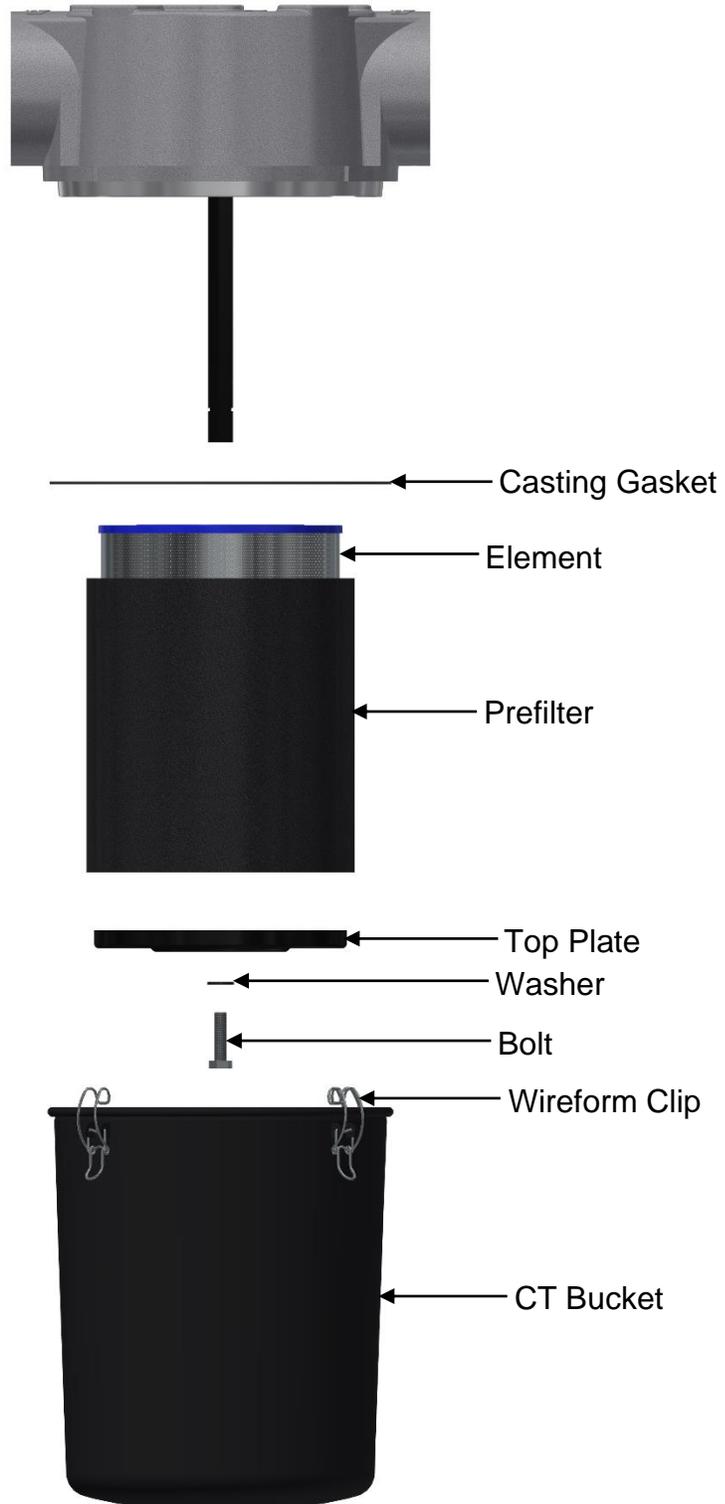
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Available Replacement Part by Product Number			
Product #	Element**	Gasket	Butterfly Gasket
CT-850-XXX	850	9111200	9111100
CT-851-XXX	851	9111200	9111100

****Note:** *Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number			
Product #	Casting O-Ring	CT Bucket	Wireform Clip
CT-850-XXX	9241260	200-1050800+10	5080110+36
CT-851-XXX	9241260	200-1050800+10	5080110+36





CT Series 3" – 4" "T" Style Vacuum Filter
Available Replacement Parts

Page 25

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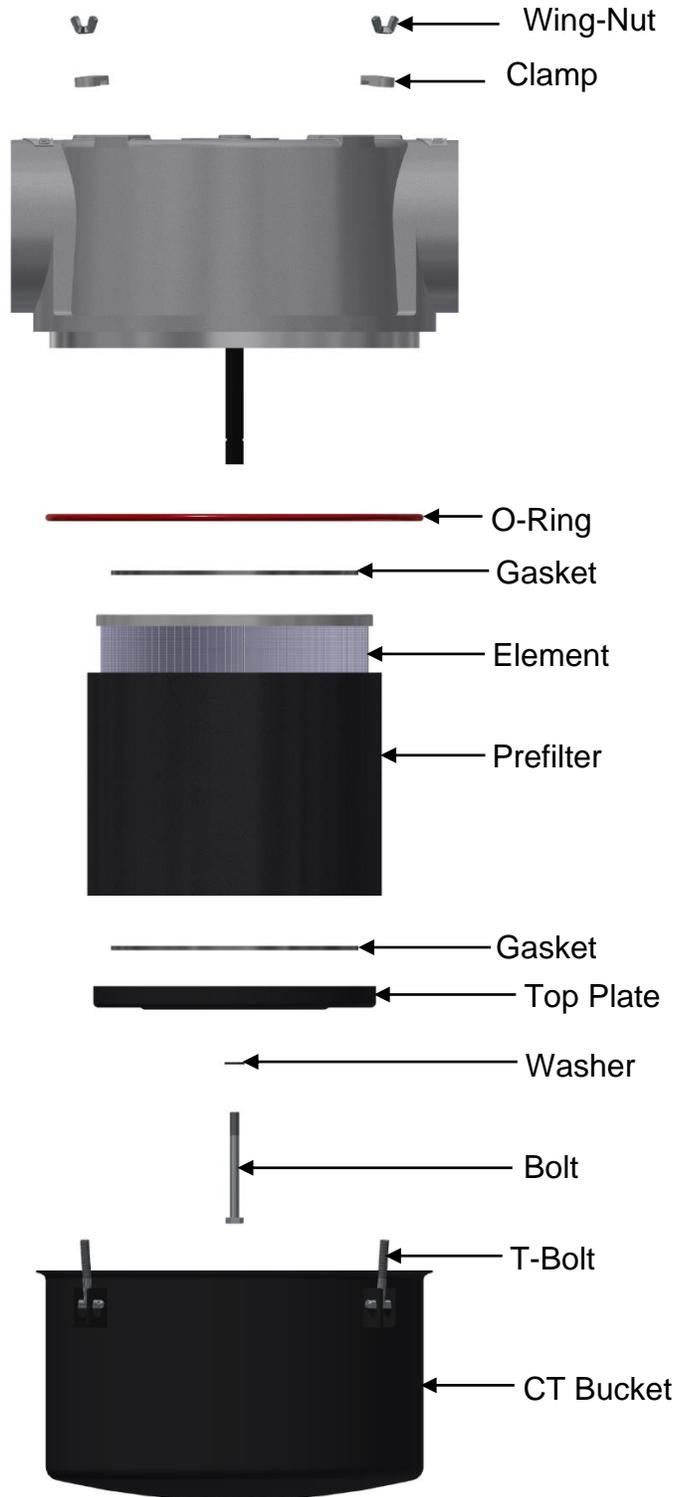


Available Replacement Part by Product Number				
Product #	Element**	Prefilter	Top Plate	Washer
CT-234-XXX	234	9010800	1030700+10	5010445
CT-235-XXX	235	9010800	1030700+10	5010445

***Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number				
Product #	Bolt	Casting Gasket	CT Bucket	Wireform Clip
CT-234-XXX	5011330	9112900	200-1051800+10	5080110+36
CT-235-XXX	5011330	9112900	200-1051800+10	5080110+36





CT Series 6" "T" Style Vacuum Filter
Available Replacement Parts

Page 27

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Available Replacement Part by Product Number

Product #	Element**	Prefilter	Gasket	Top Plate	Washer	Bolt
CT-274-XXX	274	9011000	9110200	1031000+10	5010445	5070285
CT-275-XXX	275	9011000	9110200	1031000+10	5010445	5070285

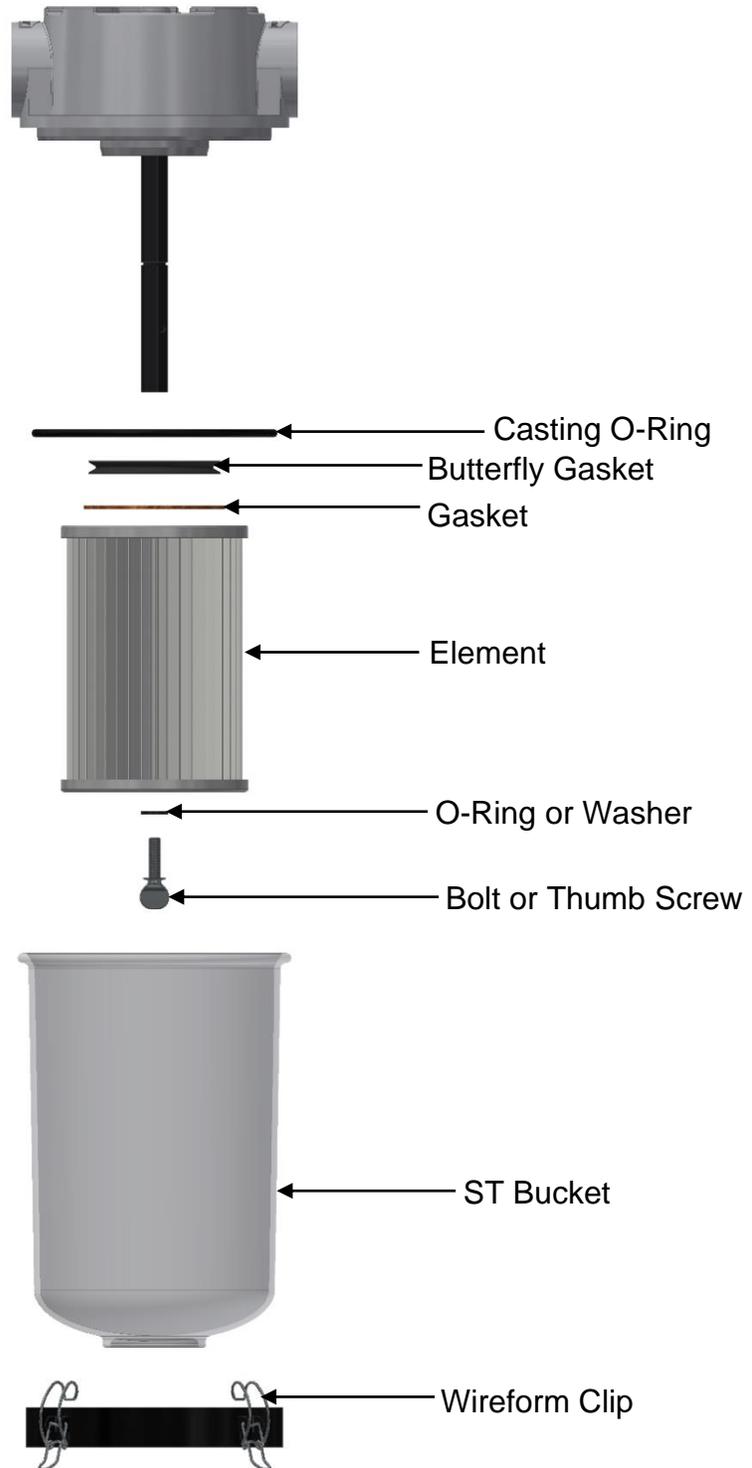
***Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number

Product #	O-Ring	CT Bucket	T-Bolt	Clamp	Wing-Nut
CT-274-XXX	9241700	200-1071725-1+10	5011725	5081500	5030600
CT-275-XXX	9241700	200-1071725-1+10	5011725	5081500	5030600



4. ST Series



ST Series 1" – 2 1/2" "T" Style Vacuum Filter
Available Replacement Parts

Page 29

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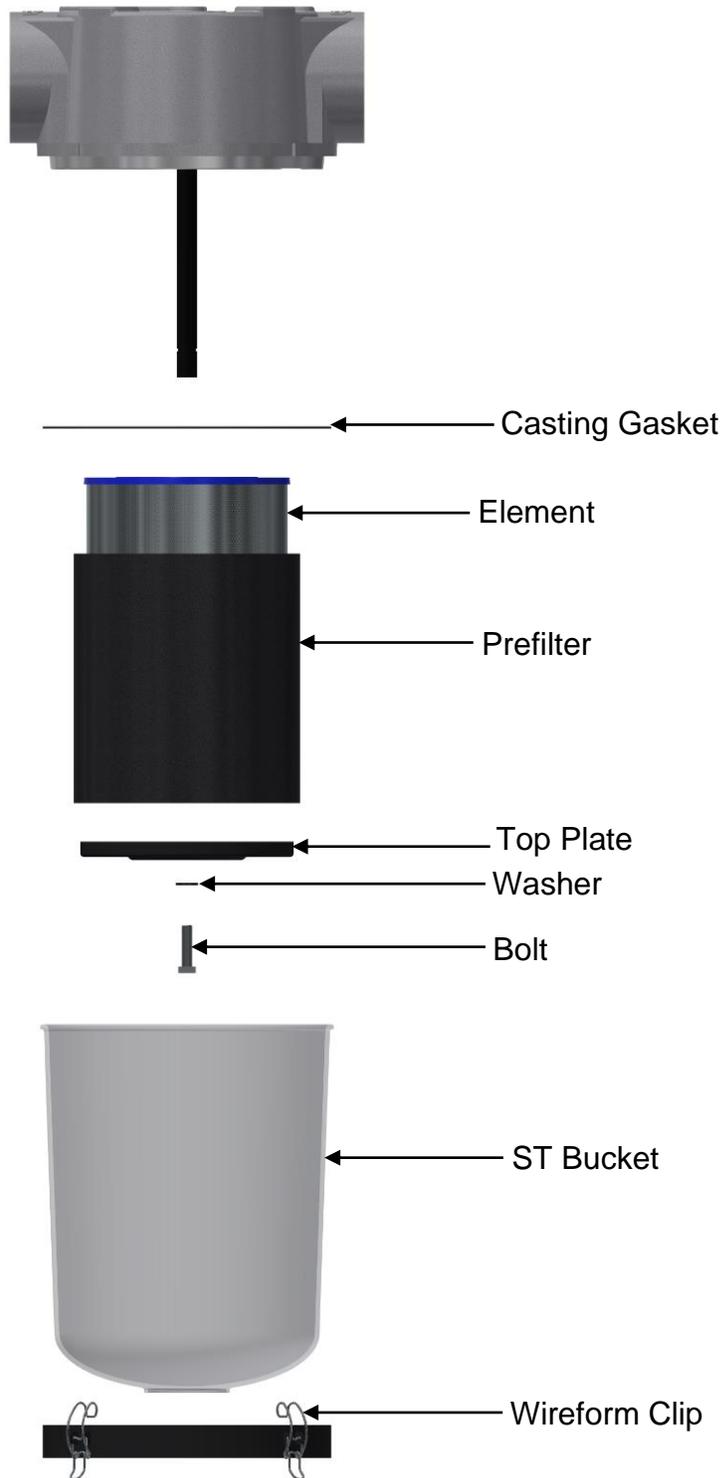


Available Replacement Part by Product Number				
Product #	Element**	Butterfly Gasket	O-Ring or Washer	Bolt or Thumb Screw
ST-896-XXX	896	9110900	9240030	5060250
ST-897-XXX	897	9110900	9240030	5060250
ST-850/1-XXX	850/1	9111100	5010445	5060300
ST-851/1-XXX	851/1	9111100	5010445	5060300

****Note:** *Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number				
Product #	Gasket	Casting O-Ring	ST Bucket	Wireform Clip
ST-896-XXX	N/A	9262K375	1050250	5080110+36
ST-897-XXX	N/A	9262K375	1050250	5080110+36
ST-850/1-XXX	9111200	9241260	1050810	5080110+36
ST-851/1-XXX	9111200	9241260	1050810	5080110+36





ST Series 3" – 4" "T" Style Vacuum Filter
Available Replacement Parts

Page 31

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Available Replacement Part by Product Number				
Product #	Element**	Prefilter	Top Plate	Washer
ST-234-XXX	234	9010800	1030700+10	5010445
ST-235-XXX	235	9010800	1030700+10	5010445

***Note: Even element numbers are Paper elements and odd element numbers are Polyester elements.*

Available Replacement Part by Product Number				
Product #	Bolt	Casting Gasket	ST Bucket	Wireform Clip
ST-234-XXX	5011330	9112900	1051850	5080110+36
ST-235-XXX	5011330	9112900	1051850	5080110+36





“T” Style Vacuum Filters ST Series 1” – 4” BSPP

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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.

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Maintenance Manual

“T” Style Vacuum Filters

ST Series 1” – 4” BSPP

CONTENTS

Section A

Introduction.....	pg. 3
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Section B

General Information

1. Identification of Solberg Inlet Vacuum Filters.....	pg. 3
2. Filtration Rules of Thumb	pg. 4
3. Element Specifications.	pg. 6
4. Element Cleaning	pg. 6

Section C

Procedures

1. Installation	pg. 8
2. Disconnecting Bucket from Casting.....	pg. 9
3. Removing Element for Service/Maintenance.....	pg. 11
4. Securing Element	pg. 12
5. Securing Bucket to Casting	pg. 13
6. Equipment Startup.....	pg. 15

Section D

Maintenance Recommendations

1. General.....	pg. 16
2. Replacement Parts List.....	pg. 17

****For Further Information Please Call: +1-630-616-4900***



Section A

INTRODUCTION

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

WARNING

This manual must be read and thoroughly understood before using and caring for this vacuum 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 vacuum 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 inlet vacuum 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 Inlet Vacuum Filters.

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

**Assembly Model #
Replacement Element #**

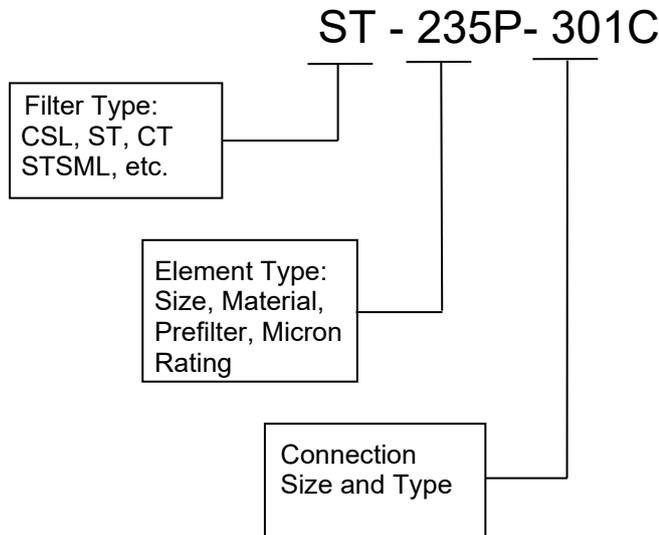
(The exception is OEM supplied units. In this case, please enter the OEM part numbers in Table 1.)

Fill in the actual nameplate data from your new Solberg inlet vacuum filter(s):

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 'ST' design filter with a 235 element with prefilter and 3" BSPF coupling 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).

Rule of Thumb #1: Always begin with the filter cartridge requirements when sizing a filter. Once the appropriate element has been selected then move on to the housing requirements.



Rule of Thumb #2: Always ask or specify a filter based on a micron rating *with filtration efficiencies*. As an example, stating a requirement for a 1-micron filter is misleading because no efficiency rating has been specified. A 1-micron filter at 95% efficiency may be less efficient than a 5-micron filter at 99% efficiency. For proper air system performance in light and industrial duty environments, a filter with a minimum of 99% filtration efficiency at 5 microns is required.

Rule of Thumb #3: Size your filter correctly by understanding the impact air velocity through a media has on efficiency and pressure drop. Maintain the suggested Air-to-Media ratios listed below based on the external environment listings and Filtration efficiency needs.

Filtration Efficiency Requirements (99%+ efficiency)	Environmental Conditions	Air to Media Ratio	
		CFM/ft ²	(m ³ /h)/m ²
<i>Industrial Grade 2-micron Paper</i>	Industrial Duty (clean, office/warehouse-like)	30 CFM/ft ²	(549m ³ /h)/m ²
	Severe Duty (workshop, factory-like)	15 CFM/ft ²	(274.5m ³ /h)/m ²
	Extreme Duty (Foundry, Construction-like)	10 CFM/ft ²	(183m ³ /h)/m ²
<i>Industrial Grade 5-micron Polyester</i>	Industrial Duty (clean, office/warehouse-like)	65 CFM/ft ²	(1189.5m ³ /h)/m ²
	Severe Duty (workshop, factory-like)	40 CFM/ft ²	(732m ³ /h)/m ²
	Extreme Duty (Foundry, Construction-like)	25 CFM/ft ²	(457.5m ³ /h)/m ²
<i>Industrial Grade 1-micron Polyester</i>	Severe Duty (Foundry, Construction-like)	25 CFM/ft ²	(457.5m ³ /h)/m ²
<i>Industrial Grade 0.3-micron HEPA Glass @ 99.97% Efficiency</i>	Industrial Duty (Pre-filtered Applications)	9 CFM/ft ²	(164.7m ³ /h)/m ²
	Severe Duty (workshop, factory-like)	7 CFM/ft ²	(128m ³ /h)/m ²
	Extreme Duty (Foundry, Construction-like)	5 CFM/ft ²	(91.5m ³ /h)/m ²

Table 2

Rule of Thumb #4: Pressure drop is also caused by the dirt holding capacity of the element. As the element fills up with dirt, the pressure drop increases. It is important to document the pressure drop across a given filter when it is new and then clean or replace it when the pressure drop increases by 10" to 15" / 250-280mm H₂O over the original reading.

Rule of Thumb #5: The inlet connection greatly influences the overall pressure drop of the filter system. To minimize the restriction contributed by an inlet filter, a velocity of 6,000 ft/min (10200m³/h) or less is suggested through the outlet pipe.



The table below lists the suggested flows based on pipe size:

Pipe Size (inches)	Max Airflow		Pipe Size (inches)	Max Airflow	
1/2"	10 CFM	17m ³ /h	2 1/2"	195 CFM	332m ³ /h
3/4"	20 CFM	34m ³ /h	3"	300 CFM	510m ³ /h
1"	35 CFM	60m ³ /h	4"	520 CFM	884m ³ /h
1 1/4"	60 CFM	102m ³ /h	5"	800 CFM	1360m ³ /h
1 1/2"	80 CFM	136m ³ /h	6"	1,100 CFM	1870m ³ /h
2"	135 CFM	230m ³ /h			

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

3. Element Specifications

Temperature Range: -15° to 220°F / -26° to 105°C

Filter Change-Out Differential: 10" to 15" / 250-380mm H₂O Over Initial Delta P

Media	Micron Rating
Standard Paper	99+% @ 2 micron
Standard Polyester	99+% @ 5 micron
"S" Series Wire Mesh	Epoxy Coated Wire Mesh
"Z" Series Polyester	99+% @ 1 micron
"HE" Series HEPA	99.97% @ 0.3 microns
"U" Series Polyester	99+% @ 25 micron
"W" Series Polyester	99+% @ 100 micron
"S2" Series	Stainless Steel Wire Mesh
"AC" & "ACP" Series	N/A
"Y" Series Polypropylene	99+% @ 10 micron

Table 4

Temperature Range: -15° to 385°F / -26° to 196°C

Filter Change-Out Differential: 10" to 15" / 250-380mm H₂O Over Initial Delta P

Media	Micron Rating
"MX" & "MXD" Series – Nomex Cloth	99+% @ 5 micron

Table 5

4. Element Cleaning - Inlet Filtration

Solberg elements should be cleaned or replaced, once the pressure drop reaches 10 to 15-inches water column (250 - 380mm WC) 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 element needs to be maintained at less than 15-inches water column (380mm WC).

Cleaned elements that exceed 15-inches water column (380mm WC) at start-up should be replaced with new elements.

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. **Polyester Element:** 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.
- B. **Paper Element:** The paper element may be lightly blown with low pressure air. It is disposable and in most cases should be replaced with a new element.
- C. **Polyurethane Prefilter:** The prefilter may be washed as a sponge or replaced to give the element a longer service life.
- D. **Epoxy Coated Wire Mesh and Stainless Steel Wire Mesh Elements:** Cleaning instructions similar to polyester, except mild solvents may be used.
- E. **Activated Carbon Element:** Not cleanable
- F. **Polypropylene Element:** Cleaning instructions similar to polyester
- G. **Nomex Cloth Element:** Cleaning instructions similar to polyester

If you are not confident that the integrity of the element was maintained during cleaning, it is recommended that a new element be installed. Also, spare parts such as gaskets, wing nuts and washers can be supplied upon request.



Section C

PROCEDURES

1. Installation.

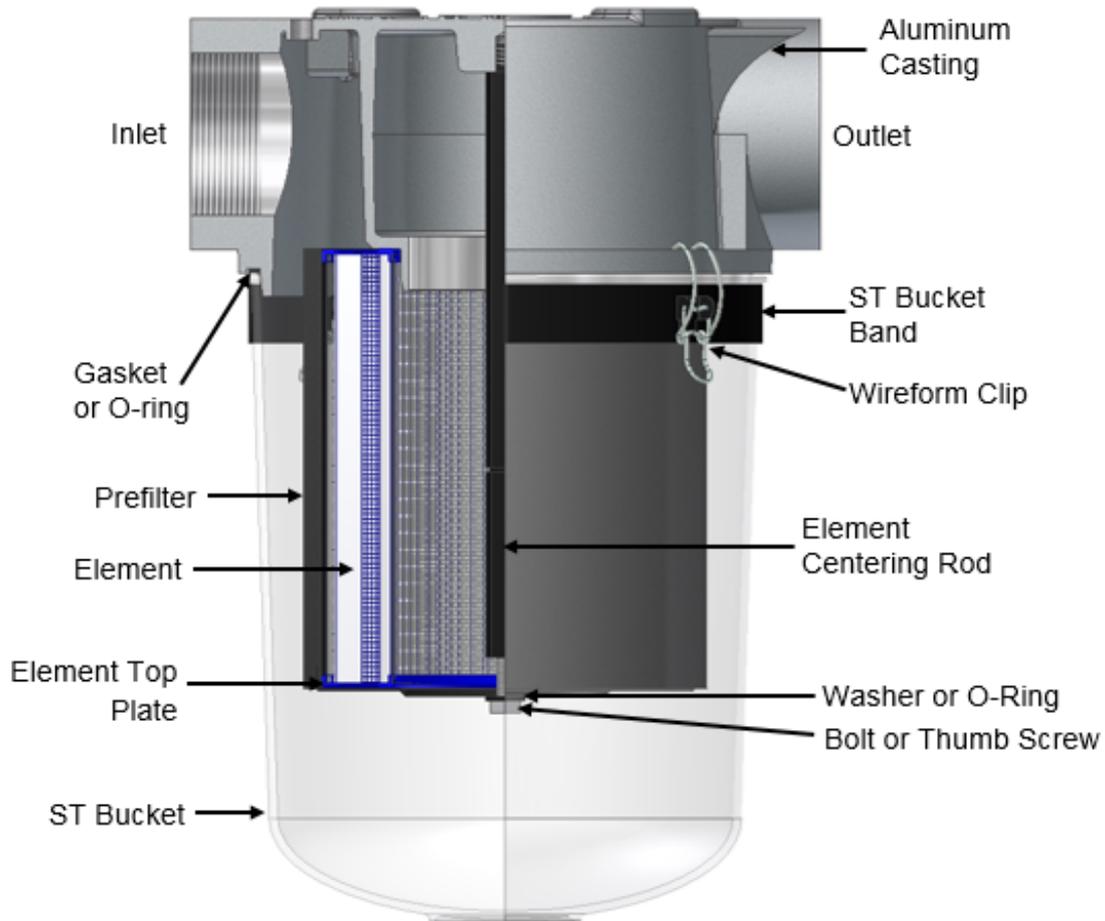


Figure C.1.1: Housing Terms

- A. Maximum operating temperature for most Solberg inlet vacuum filter products is 220°F / 105°C. Temperatures in excess of this could cause damage to elements, media and elastomers. High temperature products are available.
- B. Direction of flow is typically from the outside of the element to the inside of the element. Most products have arrows indicating direction of flow on the inlet and outlet ports.
- C. Ensure that pipe/flange connections are adequately sealed so the potential for leaks is reduced to a minimum.

2. Disconnecting Bucket from Casting.

A. Remove bucket by releasing wireform clips and lifting off.

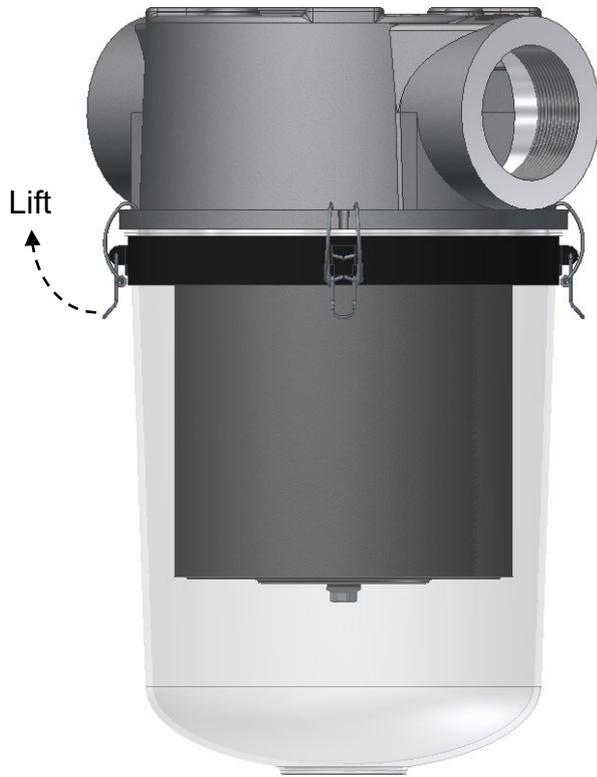


Figure C.2.1: Clip release direction.



Figure C.2.2: Released clip position.



Figure C.2.3: ST bucket removal.

3. Removing Element for Service/Maintenance.

A. Units with 896, 897, 850/1, and 851/1 elements (Figures C.3.1 & C.3.3):

- Remove O-ring/washer and bolt/thumb screw securing the element to the centering rod.
- Carefully lift the element off of the centering rod.

B. Units with 234 and 235 elements (Figures C.3.2 & C.3.4):

- Remove washer and bolt securing element and element top plate.
- Carefully lift the element and element top plate off of the centering rod.



Figure C.3.1: Element removal.



Figure C.3.2: Element and top plate removal.

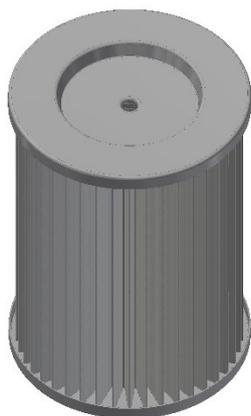


Figure C.3.3: Element with gaskets.

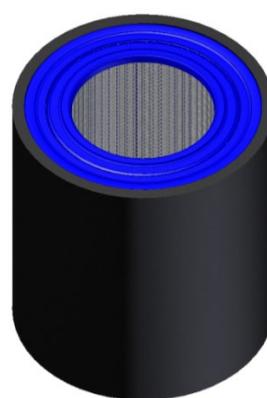


Figure C.3.4: Element with pre-filter.

WARNING

Failure to comply with these instructions may result in system or equipment contamination.

4. Securing Element.

A. ST units with 896, 897, 850/1, and 851/1 elements:

- Place new or cleaned element evenly in casting on top of butterfly gasket. Be sure element seats properly in the casting and there is no dirt or particulate present on sealing surfaces.
- Align the bolt hole on the end cap with the bolt hole in the centering rod.
- Secure the element with the bolt/thumb screw and O-ring to the centering rod.

B. ST units with 234 and 235 elements:

- Place new or cleaned element evenly in casting. Be sure element seats properly in the casting and there is no dirt or particulate present on sealing surfaces.
- Place the element top plate on the element and align the bolt hole on the end cap with the bolt hole in the centering rod.
- Secure the element with the bolt and washer to the centering rod.



Figure C.4.1: Top plate and centering rod bolt hole alignment.



Figure C.4.2: Element and top plate properly secured to casting.

WARNING

Defective installation may cause system or pump contamination. Use only genuine Solberg replacement parts.

5. Securing Bucket to Casting.

A. Make sure all surfaces are free from dust and other particulate.

B. If the unit has a gasket:

- Casting gasket must rest evenly along casting gasket groove.

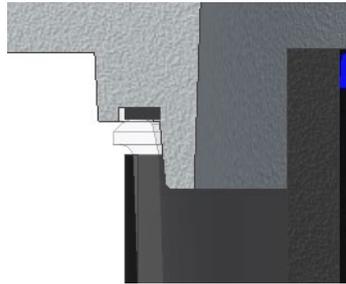


Figure C.5.1: Detail of gasket seated along casting gasket groove.

C. If the unit has an O-ring:

- O-ring must rest evenly on the sealing surface of the casting.



Figure C.5.2: O-ring seated evenly on casting sealing surface.

- D. Place the ST bucket on the casting, on top of the gasket/O-ring. Place the ST bucket band over the bucket. Align the casting slots and wireform clips. Re-fasten wireform clips.

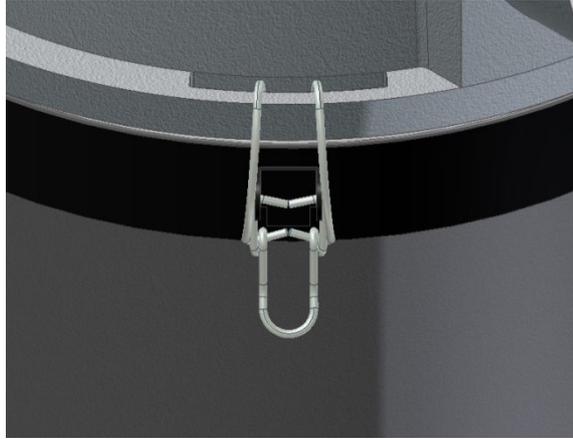


Figure C.5.3: Wireform clip and casting slot alignment.



Figure C.5.4: ST bucket properly secured to the casting.

6. Equipment Startup.

- A. Be sure to read the instructions on installation or element replacement as listed above before starting equipment.

WARNING

If at any time the operator is unable to verify the integrity of the element or any housing feature, the factory or a regional representative should be contacted prior to start-up.

- B. Please check the listed steps prior to startup.

1. Check element to make sure it is seated properly on casting sealing surface.

WARNING

Failure to seat the element properly may result in contaminant by-pass resulting in damage to equipment.

2. Check that the element top is properly secured to the element and centering rod.
3. Check that the casting O-ring/gasket is seated properly on the casting.
4. Check that the bucket is secure with the bucket band and wireform clips.

WARNING

If the air flow is reversed through a Solberg filter unit, be sure to check the element and housing internals for damage. Failure to do so may result in damage to equipment.

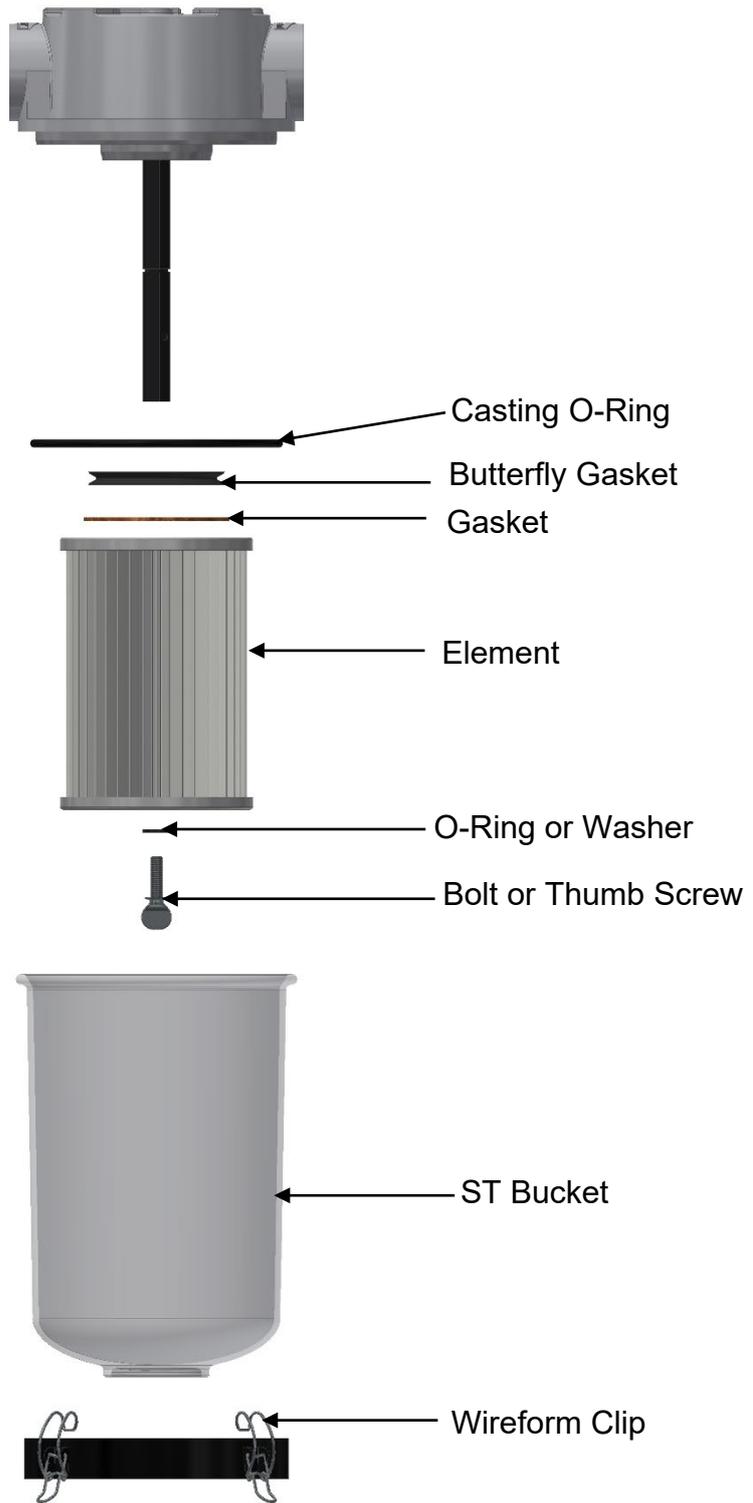
5. Be sure all fasteners and hardware have been tightened.

Section D

MAINTENANCE RECOMMENDATIONS

1. Pressure drop readings are recommended to have an effective vacuum filter. Always document initial pressure drop during start-up when element is clean. Replacement cartridge is needed when system experiences 10" to 15" / 250-380mm H₂O higher pressure drop above the initial reading.
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.





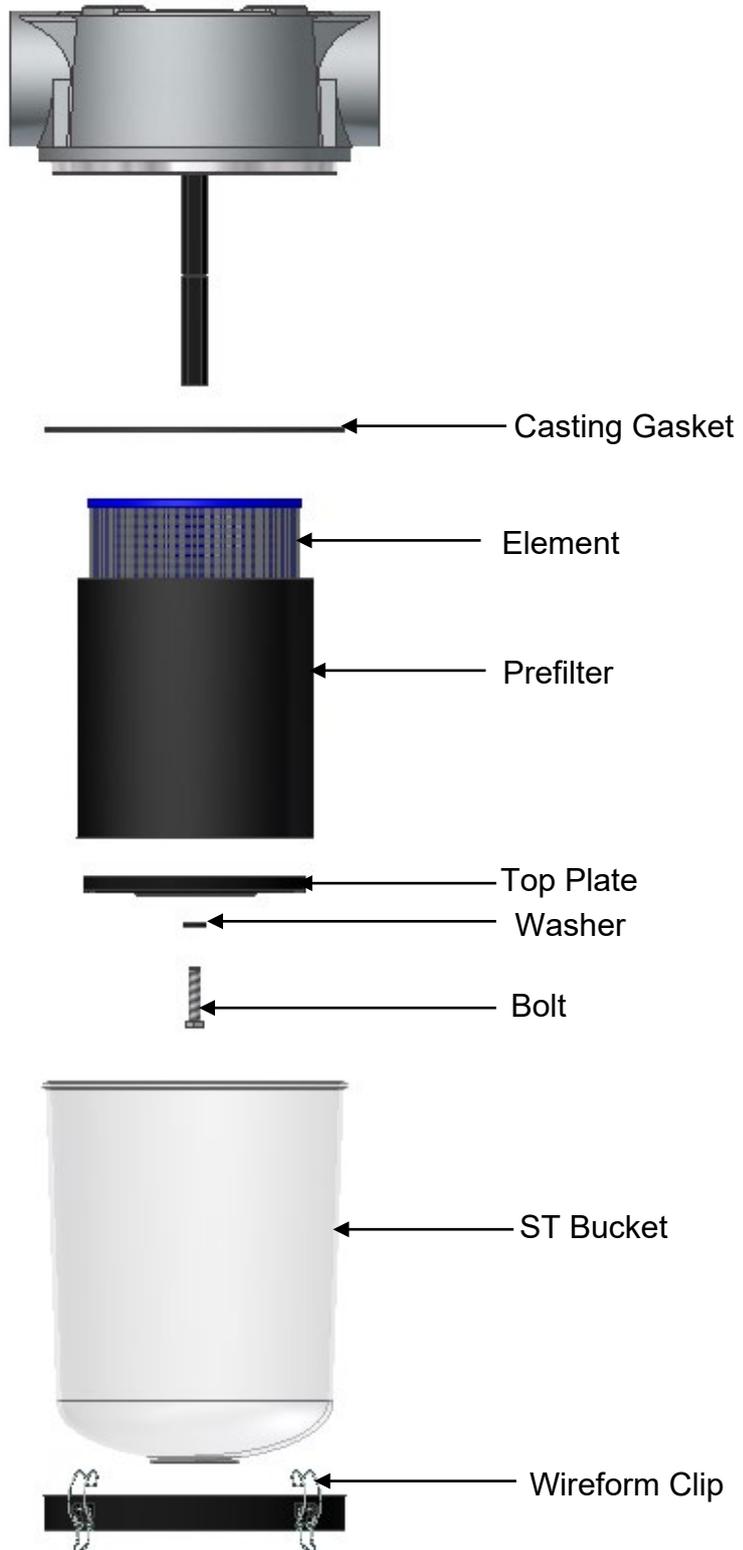
ST "T" Style Vacuum Filter Available Replacement Parts
896, 897, 850/1, and 851/1

Available Replacement Part by Product Number					
Product #	Element**	Prefilter	Butterfly Gasket	O-Ring or Washer	Bolt or Thumb Screw
ST-896-XXX	896	PF896	9110900	9240030	5060250
ST-897-XXX	897	PF896	9110900	9240030	5060250
ST-850/1-XXX	850/1	PF850	9111100	5010445	5060300
ST-851/1-XXX	851/1	PF850	9111100	5010445	5060300

****Note:** Even element numbers are Paper elements and odd element numbers are Polyester elements.

Available Replacement Part by Product Number				
Product #	Gasket	Casting O-Ring	ST Bucket	Wireform Clip
ST-896-XXX	N/A	9262K375	1050250	5080110+36
ST-897-XXX	N/A	9262K375	1050250	5080110+36
ST-850/1-XXX	9111200	9241260	1050810	5080110+36
ST-851/1-XXX	9111200	9241260	1050810	5080110+36





ST "T" Style Vacuum Filter Available Replacement Parts
234 & 235

Available Replacement Part by Product Number				
Product #	Element**	Prefilter	Top Plate	Washer
ST-234-XXX	234	PF234	1030700+10	5020150
ST-235-XXX	235	PF234	1030700+10	5020150

****Note:** Even element numbers are Paper elements and odd element numbers are Polyester elements.

Available Replacement Part by Product Number				
Product #	Bolt	Casting Gasket	ST Bucket	Wireform Clip
ST-234-XXX	5011330	9112900	1051850	5080110+36
ST-235-XXX	5011330	9112900	1051850	5080110+36

