A&N CORPORATION

VACUUM TRAPS & FILTERS

VacuShield Traps and Filters

A&N Corporation

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Vacuum TRAPS & FILTERS

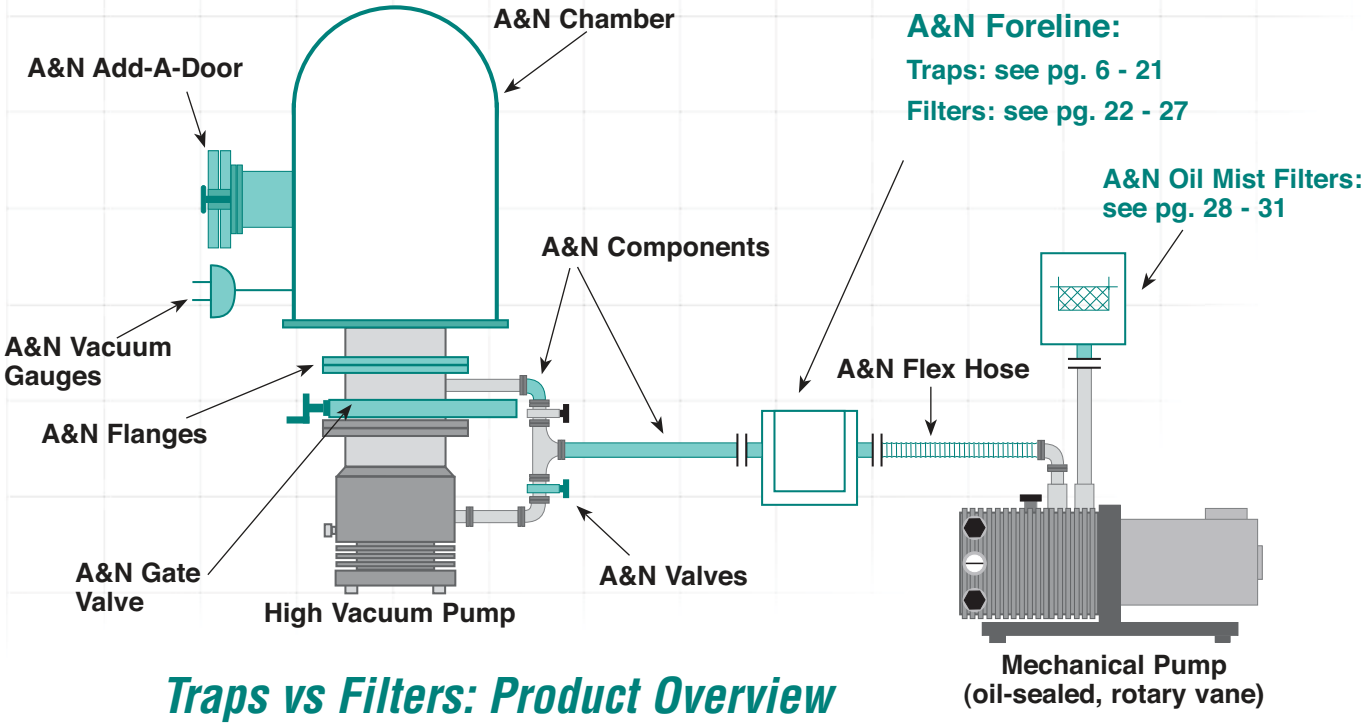
What is the difference between a trap and a filter?

Traps vs Filters

Trap: A trap is a device that is designed to capture vapors and gases.

Filter: A filter is a device that is designed to capture or reduce particulates, dust, smoke, and aerosols. In a high vacuum context, they operate at different pressures and have different functions.

A&N VacuShield Products



Traps vs Filters: Product Overview

In a high vacuum setting, traps and filters may be installed on a vacuum foreline, but each has a different function:

Traps: A trap is a device that is designed to capture vapors and gases.

Filters: A filter is a device that is designed to capture or reduce particulates, dust, smoke, and aerosols. A common filter function, for example, is to capture the oil mist (an aerosol) that is discharged from the outlet of an oil-sealed rotary vane mechanical pump.

Selection Criteria: When selecting a trap or a filter, there are three selection criteria: body style, port terminations, and media.

Body style: A trap or filter's body style incorporates the geometry of the plumbing (i.e., coaxial, in-line, or right angle), body volume, and, in a few instances, the choice between a sealed and a rechargeable housing. The choice between a coaxial or an in-line body style is based on the geometry of your foreline and your system's available footprint. The decision on body volume is determined from your anticipated gas loads. Typically, larger gas loads require larger body volumes. Larger body volumes provide a higher conductance and a lower frequency of media change-outs. The choice between a sealed and a rechargeable trap is based on system runtime (continuous vs. intermittent) and cost. Sealed traps are discarded after the media has been consumed and are ideal for light gas loads or intermittent use. With rechargeable traps, the housing is reused and only the media is replaced. Because a clamp, gasket, and two additional vacuum flanges are required to gain access to the media, rechargeable traps typically cost more than sealed traps. Rechargeable traps are ideal for high gas loads and continuous use.

Port terminations: Port selection is based on ultimate base pressure. Systems with a base pressure of 10^{-3} Torr or higher can employ tube end terminations. Systems with base pressures between 10^{-3} Torr and 10^{-8} Torr can employ elastomeric seals and terminations (ISO-QF and ISO-LF). Systems with base pressures less than 10^{-8} Torr require metal seals (CF, ULRIC®).

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Media: Media selection is entirely dependent on the trap or filter's intended function. The following six categories summarize the universe of trap and filter applications:

1. Prevention of pump lubricant backstreaming;
2. Capturing process gases;
3. Capturing moisture and/or process condensibles;
4. Capturing process particulates;
5. Capturing mechanical pump discharge; and
6. Reduction of system base pressure via cryopumping.

Each of these applications and their respective impact on trap, filter, and media selection is further explained in the introductory sections on pages 6, 7 & 22. Please contact an A&N factory engineer or account representative with any questions regarding media selection.

Application Matrix

	VacuShield: / Application:	Sealed VSSC pg. 8-9	Recharge-able VSRC pg. 10-14	Molecular Sieve VSMI pg. 16-17	LN2 VSCI pg. 18-19	Dry Ice VSDI pg. 20-21	VacuView VVRI pg. 23	Small Particles VSPC VSPI pg. 24-25	Large Particles (> 100 µ) VSPS pg. 25	Oil Mist Filters VSHE, VSOE, VCEC, VCEA pg. 26-29
1.	Backstreaming	X	X	X						
2.	Process Gases		X	X			X			
3.	Moisture and/or Condensibles				X	X				
4.	Process Particulates							X	X	
5.	Mechanical Pump Discharge									X
6.	Cryopumping				X					

The following table summarizes the media that are available with the various trap and filter styles.

Trap and Filter Media Matrix

	VacuShield: / Media:	Sealed VSSC pg. 8-9	Recharge-able VSRC pg. 10-14	Molecular Sieve VSMI pg. 16-17	LN2 VSCI pg. 18-19	Dry Ice VSDI pg. 20-21	VacuView VVRI pg. 23	Small Particles VSPC VSPI pg. 24-25	Large Particles (> 100 µ) VSPS pg. 25	Oil Mist Filters VSHE, VSOE, VCEC, VCEA pg. 26-29
1.	Alumina		X				X			
2.	Borosilicate Fibers									X
3.	Caustic Soda						X			
4.	Charcoal		X				X			
5.	Copper	X	X							
6.	Dry Ice & Isopropanol					X				
7.	Gravity								X	
8.	Liquid Nitrogen				X					
9.	Molecular Sieve Zeolite			X						
10.	Paper							X		
11.	Polyester							X		
12.	Stainless Steel	X	X							

Vacuum Traps

Foreline Vacuum Traps: Product Overview

Foreline vacuum traps are installed between the mechanical pump and the high vacuum pump in a vacuum system. Foreline traps can perform three distinct functions within your vacuum system:

1. Protect your high vacuum pump and/or chamber from pump oil "backstreaming" from the mechanical pump.

Solution 1:

Trapping with copper or stainless steel media – A&N VacuShield foreline traps employ a two-stage trapping system. In the first stage, rogue hydrocarbons are blocked by a baffle that is attached near the trap's inlet. Hydrocarbons and other pump oils coalesce here and drip harmlessly back into the pump. In the second stage, vaporized pump oil is trapped by the trap's copper or stainless steel media which prevent line-of-sight travel between the inlet and outlet of the trap. It is impossible for the hydrocarbon molecules to pass through the trap without colliding many thousands of times with the trap media and the trap's inner walls. Eventually, more than 99% of the pump's oil is captured and retained within the trap. A&N's VacuShield foreline traps come in two models: sealed and rechargeable. Sealed traps are replaced after the media becomes saturated or is used up. Sealed traps are an economical solution for applications with intermittent use or continuous use with light gas loads. Rechargeable traps reuse the trap's housing and require only the trap's media to be replaced.

Solution 2:

Molecular Sieve trapping – The A&N molecular sieve trap employs synthetic zeolites (molecular sieve 13X) as an adsorbent. The large surface area provided by the numerous molecular-sized pores of the zeolite sieve provides excellent adsorbtion of water vapor, oil vapor, and other gas molecules. Additionally, the zeolite sieve can be regenerated once it has become saturated with water vapor. This is accomplished through a bake-out cycle performed with the included, self-regulating heaters. The molecular sieve trap is a multi-purpose trap. It is useful for the prevention of pump oil backstreaming as well as the reduction of the base vacuum through the removal of water vapor from the system.

2. Protect your mechanical pump from process gasses and vapors:

This is the most challenging application because of the wide range of toxic and corrosive chemicals used in today's vacuum applications. While no means an exhaustive list, the following provides a brief guide to the more common applications.

Solution 1:

Rechargeable traps – A&N's rechargeable traps may be purchased with a wide range of media including copper, stainless steel, activated alumina, and activated charcoal. Copper and stainless steel media are used exclusively to minimize backstreaming of mechanical pump oils. A detailed explanation of these media may be found on pages 11-14. Activated alumina and activated charcoal are both effective moisture getters. That is, they are quite hydrophilic. However, they do become quickly saturated with moisture and must be replaced. As a result, cold reservoirs are the preferred method for moisture trapping. Activated alumina is also an excellent trap for many acids. Activated charcoal is also an excellent trap for many heavy metals (such as mercury) and organic solvents.

Solution 2:

Molecular Sieve Zeolite – A&N's zeolite traps provide protection against a wide range of gases and vapors. In addition to being excellent mechanical pump oil getters, they are also excellent moisture traps. That is, zeolites are very hydrophilic. Although zeolites saturate rapidly with moisture (as do activated charcoal and activated alumina), the onboard heaters allow this media to be periodically refreshed ("regenerated") by driving off most of the water.

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Solution 3:

VacuView – A&N's VacuView traps are designed with clear (see-through) polycarbonate housings that provide a means to observe the surface of the media in-situ. The most common media for these traps is caustic soda for the trapping of hydrous acids. Activated alumina and activated charcoal media are also available.

3. Protect your rough vacuum pump from or reduce system pressure by eliminating water and other condensible or solvent vapors produced upstream within the vacuum system:

Solution 1:

Cold trapping – The A&N VacuShield cold trap removes condensible vapor from the vacuum system before it can enter the pump. It also protects the system from lubricants that may backstream from the pump. A secondary benefit of cold trapping is a reduction in base pressure as the trapping process also serves as a form of vacuum cryopump. The VacuShield cold trap utilizes the surface area of a cooled stainless steel Dewar to trap water and other condensible vapors. The reservoir is cooled by either liquid nitrogen or a dry ice and alcohol mixture. All surfaces of the trap are electropolished to ease cleaning and deflect heat. The liquid nitrogen unit includes a vented stopper to reduce liquid nitrogen evaporation and assist in the maintenance of a stable temperature within the Dewar.

Solution 2:

Adsorption trapping with alumina or charcoal – The A&N VacuShield adsorption traps utilize a two stage trapping system. This system protects the pump from water and condensible vapor and protects the vacuum system from lubricants that may backstream from the pump. The first stage is a baffle welded to the lower containment screen within the trap. Condensibles from the pump coalesce here and are either trapped or drip harmlessly back into the pump. In the second stage, all flow within the trap is directed through the tortuous porous trapping media. There are two options: activated alumina for acids and water vapor and activated charcoal for organics and heavy metals.

Solution 3:

Molecular Sieve trapping – The A&N molecular sieve trap employs synthetic zeolite (molecular sieve 13X) as an adsorbent. The large surface area of the numerous molecular-sized pores of the zeolite sieve provides excellent adsorption of water vapor, oil vapor, and other gas molecules. This trap operates at room temperature which reduces maintenance and cost as compared with the use of cold traps. Additionally, the zeolite sieve can be regenerated once it has become saturated with oil and water vapor. This is accomplished through a bake-out cycle performed with the integrated, self-regulating heaters. The molecular sieve trap is a multi-purpose trap. It is useful for the prevention of pump oil backstreaming as well as the reduction of the base vacuum through the removal of water vapor from the system.

The following table provides a quick reference for media selection. Please contact an A&N factory engineer or account representative with any questions regarding media selection.

Trap and Filter Media

	PUMP OIL BACKSTREAMING	WATER VAPOR	PARTICULATE	ACID	ORGANICS	OTHER CONDENSIBLE VAPOR
Metallic (copper, stainless steel)	X					
Alumina		X		X		
Charcoal					X	
Cold Reservoir		X				
Molecular Sieve (zeolite)	X	X				
Caustic Soda				X		

Model VSSC: Sealed Coaxial Vacuum Traps

- Trapping medias: copper or stainless steel
- Low cost system protection from pump oil backstreaming
- 2-stage trapping system

  Stage 1: stainless steel baffle – extends the life of the media

  Stage 2: coalescing metal media
- Simple, one-piece body design
- Electropolished body: increases corrosion resistance
- 304 stainless steel body, flanges and baffle
- Multiple connection options (ISO-QF, tube end, others on request)

Description:

The VSSC series foreline trap provides a low cost, non-rechargeable shield for your vacuum system from the effects of pump fluid backstreaming. The trapping medias are durable, dense copper or stainless steel held in place by recessed stainless steel screens. The housing is electropolished 304 stainless steel. Service by replacing the contaminated trap.

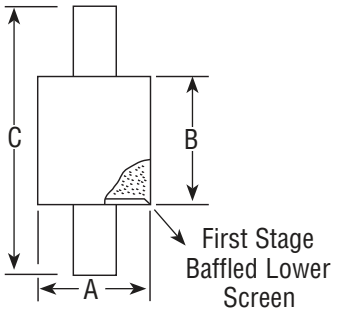
Sealed Traps: Hose Connection

Materials:

- Body: 304 stainless steel electropolished
- Trapping media: copper or stainless steel

Product Notes

- Trapping mechanics: adsorption



PART NUMBER	REFERENCE NUMBER	CONNECTION	TRAPPING MEDIA	HOUSING DIA A	BODY HGT B	OAL C
7500001	VSSC-250-075-C	Tube End 0.75	Copper	2.50	3.05	6.05
7500002	VSSC-250-075-S	Tube End 0.75	Stainless Steel	2.50	3.05	6.05
7500031	VSSC-250-100-C	Tube End 1.0	Copper	2.50	3.05	6.05
7500032	VSSC-250-100-S	Tube End 1.0	Stainless Steel	2.50	3.05	6.05
7500007	VSSC-400-075-C	Tube End 0.75	Copper	4.00	4.55	8.55
7500008	VSSC-400-075-S	Tube End 0.75	Stainless Steel	4.00	4.55	8.55
7500009	VSSC-400-100-C	Tube End 1.0	Copper	4.00	4.55	8.55
7500010	VSSC-400-100-S	Tube End 1.0	Stainless Steel	4.00	4.55	8.55
7500011	VSSC-400-150-C	Tube End 1.5	Copper	4.00	4.55	8.55
7500012	VSSC-400-150-S	Tube End 1.5	Stainless Steel	4.00	4.55	8.55
7500013	VSSC-400-200-C	Tube End 2.0	Copper	4.00	4.55	8.55
7500014	VSSC-400-200-S	Tube End 2.0	Stainless Steel	4.00	4.55	8.55

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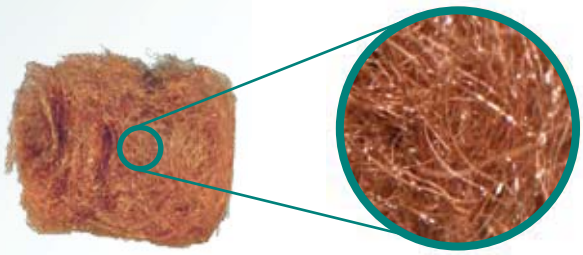
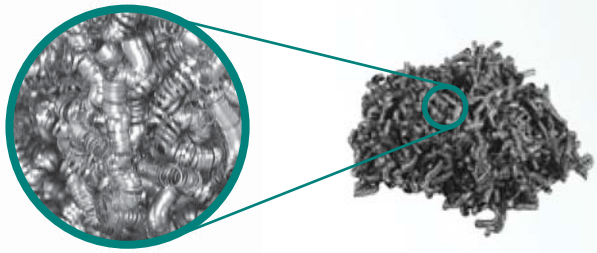
Which trap media is best for my application?

Copper vs Stainless Steel

Copper: A&N's fine mesh copper wool media provides a dense physical barrier against backstreaming pump lubricants. Copper, however, is a reactive metal that may not be compatible with all process effluents.





Stainless Steel: A&N's coarse stainless steel media (we call it "scrubble") is an excellent physical barrier to back-streaming pump lubricants. Scrubble, however, is slightly less dense than fine mesh wool. On the other hand, the advantage of stainless steel is its high level of corrosion resistance to many aggressive process environments. If your process requires PFPE type pump oils, then stainless steel is the recommended metallic media.

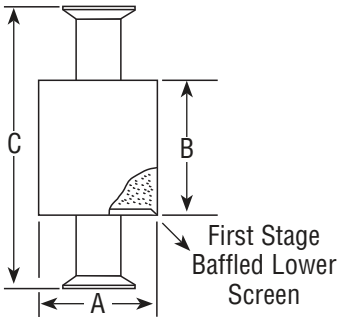
Sealed Traps: ISO-QF Connection

Materials:

- Body: 304 stainless steel electropolished
- Trapping media: copper or stainless steel

Product Notes

- Trapping mechanics: adsorption
- Connection to system: ISO-QF flanges



PART NUMBER	REFERENCE NUMBER	CONNECTION	TRAPPING MEDIA	HOUSING DIA A	BODY HGT B	OAL C
7500003	VSSC-250-QF16-C	QF16 Flange	Copper	2.50	3.05	6.30
7500004	VSSC-250-QF16-S	QF16 Flange	Stainless Steel	2.50	3.05	6.30
7500005	VSSC-250-QF25-C	QF25 Flange	Copper	2.50	3.05	6.30
7500006	VSSC-250-QF25-S	QF25 Flange	Stainless Steel	2.50	3.05	6.30
7500015	VSSC-400-QF16-C	QF16 Flange	Copper	4.00	4.55	8.80
7500016	VSSC-400-QF16-S	QF16 Flange	Stainless Steel	4.00	4.55	8.80
7500017	VSSC-400-QF25-C	QF25 Flange	Copper	4.00	4.55	8.80
7500018	VSSC-400-QF25-S	QF25 Flange	Stainless Steel	4.00	4.55	8.80
7500019	VSSC-400-QF40-C	QF40 Flange	Copper	4.00	4.55	8.80
7500020	VSSC-400-QF40-S	QF40 Flange	Stainless Steel	4.00	4.55	8.80
7500021	VSSC-400-QF50-C	QF50 Flange	Copper	4.00	4.55	8.80
7500022	VSSC-400-QF50-S	QF50 Flange	Stainless Steel	4.00	4.55	8.80

Model VSRC: Rechargeable Vacuum Traps

- Trapping media: copper, stainless steel, activated alumina, activated charcoal
- System protection from pump oil backstreaming
- Pump protection from water, particulates, organic condensibles, and acids
- 2-stage trapping system
  - Stage 1: stainless steel baffle – extends the life of the media
  - Stage 2: adsorbent or coalescing media
- Simple, clamped two piece body design
- Electropolished body: eases cleaning and reduces iron concentration on trap surfaces; increases corrosion resistance
- ISO-QF connection (other options on request)

Description:

The VSRC series foreline trap provides a rechargeable shield within your vacuum system. These traps can protect your system from backstreaming pump oil and/or your pump from contaminates created upstream within your system. The design of the rechargeable VacuShield traps allows multiple trapping media to be used with the same body. The VSRC traps have a coaxial port design for installation and a simple 2-piece clamped body design for easy media recharging and trap cleaning. A rechargeable trap is recommended for applications that experience heavy gas loads or continuous use.

With the exception of cold traps, A&N traps are sold fully charged with the desired media. Replacement media is available and listed below each trap line.

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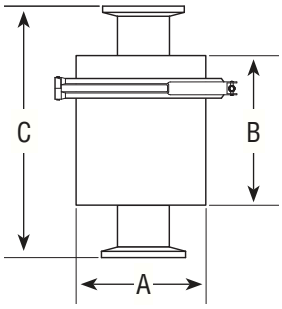


Rechargeable Traps: with Copper ISO-QF & LF Connection

Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N
- Fully charged: replacement media is listed below.

Product Notes

- Trapping media: **COPPER**. Provides protection from pump fluid backstreaming.
- Flanged body connection for large body diameter to ease assembly and ensure consistent seals.
- 2-stage trapping system

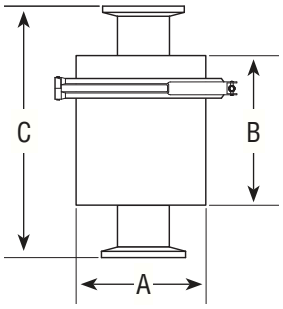
  Stage 1: stainless steel baffle – extends the life of the media

  Stage 2: coalescing media

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING A	BODY B	OAL C
7500101	VSRC-200-QF16-C	QF16 Flange	2.00	3.8	5.9
7500111	VSRC-250-QF16-C	QF16 Flange	2.50	3.8	5.9
7500115	VSRC-250-QF25-C	QF25 Flange	2.50	3.8	5.9
7500121	VSRC-300-QF25-C	QF25 Flange	3.00	4.8	6.9
7500125	VSRC-300-QF40-C	QF40 Flange	3.00	4.8	6.9
7500131	VSRC-400-QF16-C	QF16 Flange	4.00	5.0	7.0
7500135	VSRC-400-QF25-C	QF25 Flange	4.00	5.0	7.0
7500139	VSRC-400-QF40-C	QF40 Flange	4.00	5.0	7.0
7500143	VSRC-400-QF50-C	QF50 Flange	4.00	5.0	8.0
7500151	VSRC-600-QF40-C	QF40 Flange	6.00	7.3	9.4
7500155	VSRC-600-QF50-C	QF50 Flange	6.00	7.3	10.4
7500159	VSRC-600-LF63-C	LF63 Flange	6.00	7.3	10.4
7500163	VSRC-600-LF80-C	LF80 Flange	6.00	7.3	10.4
7500171	VSRC-800-LF63-C	LF63 Flange	8.00	7.3	10.4
7500175	VSRC-800-LF80-C	LF80 Flange	8.00	7.3	10.4
7500179	VSRC-800-LF100-C	LF100 Flange	8.00	7.3	10.4

Rechargeable Trap Replacement Media: Copper

PART NUMBER	REFERENCE NUMBER	HOUSING SIZE	TRAPPING MEDIA
7501001	VSR-200-C	2.00	Copper
7501011	VSR-250-C	2.50	Copper
7501021	VSR-300-C	3.00	Copper
7501031	VSR-400-C	4.00	Copper
7501051	VSR-600-C	6.00	Copper
7501071	VSR-800-C	8.00	Copper



Rechargeable Traps: with Stainless Steel ISO-QF & LF Connection

Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N
- Fully charged: replacement media is listed below.

Product Notes

- Trapping media: **STAINLESS STEEL**. Provides protection from pump fluid backstreaming.
- Flanged body connection for large body diameter to ease assembly and ensure consistent seals.
- 2-stage trapping system

  Stage 1: stainless steel baffle – extends the life of the media

  Stage 2: coalescing media

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING A	BODY B	OAL C
7500102	VSRC-200-QF16-S	QF16 Flange	2.00	3.8	5.9
7500112	VSRC-250-QF16-S	QF16 Flange	2.50	3.8	5.9
7500116	VSRC-250-QF25-S	QF25 Flange	2.50	3.8	5.9
7500122	VSRC-300-QF25-S	QF25 Flange	3.00	4.8	6.9
7500126	VSRC-300-QF40-S	QF40 Flange	3.00	4.8	6.9
7500132	VSRC-400-QF16-S	QF16 Flange	4.00	5.0	7.0
7500136	VSRC-400-QF25-S	QF25 Flange	4.00	5.0	7.0
7500140	VSRC-400-QF40-S	QF40 Flange	4.00	5.0	7.0
7500144	VSRC-400-QF50-S	QF50 Flange	4.00	5.0	8.0
7500152	VSRC-600-QF40-S	QF40 Flange	6.00	7.3	9.4
7500156	VSRC-600-QF50-S	QF50 Flange	6.00	7.3	10.4
7500160	VSRC-600-LF63-S	LF63 Flange	6.00	7.3	10.4
7500164	VSRC-600-LF80-S	LF80 Flange	6.00	7.3	10.4
7500172	VSRC-800-LF63-S	LF63 Flange	8.00	7.3	10.4
7500176	VSRC-800-LF80-S	LF80 Flange	8.00	7.3	10.4
7500180	VSRC-800-LF100-S	LF100 Flange	8.00	7.3	10.4

Rechargeable Trap Replacement Media: Stainless Steel

PART NUMBER	REFERENCE NUMBER	HOUSING SIZE	TRAPPING MEDIA
7501002	VSR-200-S	2.00	Stainless Steel
7501012	VSR-250-S	2.50	Stainless Steel
7501022	VSR-300-S	3.00	Stainless Steel
7501032	VSR-400-S	4.00	Stainless Steel
7501052	VSR-600-S	6.00	Stainless Steel
7501072	VSR-800-S	8.00	Stainless Steel

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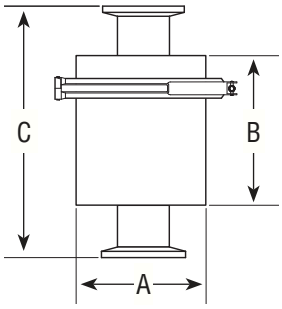


Rechargeable Traps: with Activated Alumina ISO-QF & LF Connection

Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N
- Fully charged: replacement media is listed below.

Product Notes

- Trapping media: **ACTIVATED ALUMINA**. Provides protection from pump fluid backstreaming.
- Flanged body connection for large body diameter to ease assembly and ensure consistent seals.
- 2-stage trapping system

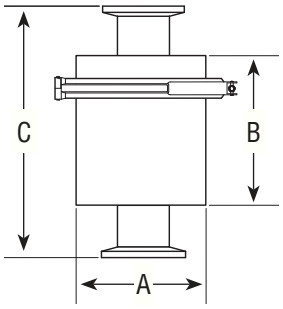
  Stage 1: stainless steel baffle – extends the life of the media

  Stage 2: coalescing media

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING A	BODY B	OAL C
7500103	VSRC-200-QF16-A	QF16 Flange	2.00	3.8	5.9
7500113	VSRC-250-QF16-A	QF16 Flange	2.50	3.8	5.9
7500117	VSRC-250-QF25-A	QF25 Flange	2.50	3.8	5.9
7500123	VSRC-300-QF25-A	QF25 Flange	3.00	4.8	6.9
7500127	VSRC-300-QF40-A	QF40 Flange	3.00	4.8	6.9
7500133	VSRC-400-QF16-A	QF16 Flange	4.00	5.0	7.0
7500137	VSRC-400-QF25-A	QF25 Flange	4.00	5.0	7.0
7500141	VSRC-400-QF40-A	QF40 Flange	4.00	5.0	7.0
7500145	VSRC-400-QF50-A	QF50 Flange	4.00	5.0	8.0
7500153	VSRC-600-QF40-A	QF40 Flange	6.00	7.3	9.4
7500157	VSRC-600-QF50-A	QF50 Flange	6.00	7.3	10.4
7500161	VSRC-600-LF63-A	LF63 Flange	6.00	7.3	10.4
7500165	VSRC-600-LF80-A	LF80 Flange	6.00	7.3	10.4
7500173	VSRC-800-LF63-A	LF63 Flange	8.00	7.3	10.4
7500177	VSRC-800-LF80-A	LF80 Flange	8.00	7.3	10.4
7500181	VSRC-800-LF100-A	LF100 Flange	8.00	7.3	10.4

Rechargeable Trap Replacement Media: Activated Alumina

PART NUMBER	REFERENCE NUMBER	HOUSING SIZE	TRAPPING MEDIA
7501003	VSR-200-A	2.00	Activated Alumina
7501013	VSR-250-A	2.50	Activated Alumina
7501023	VSR-300-A	3.00	Activated Alumina
7501033	VSR-400-A	4.00	Activated Alumina
7501053	VSR-600-A	6.00	Activated Alumina
7501073	VSR-800-A	8.00	Activated Alumina



Rechargeable Traps: with Activated Charcoal ISO-QF & LF Connection

Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N
- Fully charged: replacement media is listed below.

Product Notes

- Trapping media: **ACTIVATED CHARCOAL**. Provides protection from pump fluid backstreaming.
- Flanged body connection for large body diameter to ease assembly and ensure consistent seals.
- 2-stage trapping system

  Stage 1: stainless steel baffle – extends the life of the media

  Stage 2: coalescing media

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING A	BODY B	OAL C
7500104	VSRC-200-QF16-O	QF16 Flange	2.00	3.8	5.9
7500114	VSRC-250-QF16-O	QF16 Flange	2.50	3.8	5.9
7500118	VSRC-250-QF25-O	QF25 Flange	2.50	3.8	5.9
7500124	VSRC-300-QF25-O	QF25 Flange	3.00	4.8	6.9
7500128	VSRC-300-QF40-O	QF40 Flange	3.00	4.8	6.9
7500134	VSRC-400-QF16-O	QF16 Flange	4.00	5.0	7.0
7500138	VSRC-400-QF25-O	QF25 Flange	4.00	5.0	7.0
7500142	VSRC-400-QF40-O	QF40 Flange	4.00	5.0	7.0
7500146	VSRC-400-QF50-O	QF50 Flange	4.00	5.0	8.0
7500154	VSRC-600-QF40-O	QF40 Flange	6.00	7.3	9.4
7500158	VSRC-600-QF50-O	QF50 Flange	6.00	7.3	10.4
7500162	VSRC-600-LF63-O	LF63 Flange	6.00	7.3	10.4
7500166	VSRC-600-LF80-O	LF80 Flange	6.00	7.3	10.4
7500174	VSRC-800-LF63-O	LF63 Flange	8.00	7.3	10.4
7500178	VSRC-800-LF80-O	LF80 Flange	8.00	7.3	10.4
7500182	VSRC-800-LF100-O	LF100 Flange	8.00	7.3	10.4

Rechargeable Trap Replacement Media: Activated Alumina

PART NUMBER	REFERENCE NUMBER	HOUSING SIZE	TRAPPING MEDIA
7501004	VSR-200-O	2.00	Activated Charcoal
7501014	VSR-250-O	2.50	Activated Charcoal
7501024	VSR-300-O	3.00	Activated Charcoal
7501034	VSR-400-O	4.00	Activated Charcoal
7501054	VSR-600-O	6.00	Activated Charcoal
7501074	VSR-800-O	8.00	Activated Charcoal

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Model VSMI: Molecular Sieve Vacuum Traps

- Trapping media: molecular sieve (SYNTHETIC ZEOLITE)
- System protection from pump oil backstreaming
- Pump protection from water
- 2-stage trapping system
  - Stage 1: stainless steel baffle – extends the life of the media
  - Stage 2: adsorbent media
- Electropolished body: eases cleaning and reduces iron concentration on trap surfaces, which increases corrosion resistance
- Rechargeable media – refresh saturated synthetic zeolite by baking with the included heater element or replace with fresh synthetic zeolite
- Connection options (ISO-QF, tube end, others on request)

Description:

The VSMI series foreline trap provides a rechargeable and regenerable shield within your vacuum system. These traps can protect your system from backstreaming pump oil and/or your pump from water created upstream within your system. The design of the VacuShield Molecular Sieve traps includes a heating element that allows the trapping media to be refreshed once the synthetic zeolite has become saturated with water. The VSMI traps have an in-line port design for easy installation and a simple threaded fill port design to facilitate synthetic zeolite recharge.

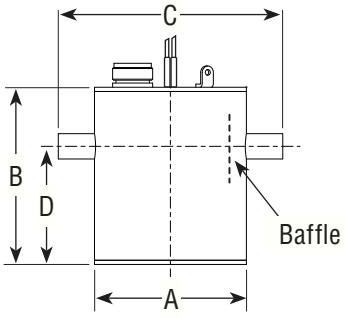
Molecular Sieve Traps: Hose Connection

Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N

Product Notes

- Trapping mechanics: adsorption
- Trapping media: **SYNTHETIC ZEOLITE**.
- Connection to system: tube ends



PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING DIA A	BODY HGT B	PORT C/L LGT C	PORT C/L HGT D
7500321	VSMI-450-075-120	Tube End 3/4 in.	4.50	5.25	6.70	3.50
7500331	VSMI-450-075-220	Tube End 3/4 in.	4.50	5.25	6.70	3.50
7500322	VSMI-450-100-120	Tube End 1 in.	4.50	5.25	6.70	3.50
7500332	VSMI-450-100-220	Tube End 1 in.	4.50	5.25	6.70	3.50
7500323	VSMI-450-150-120	Tube End 1 1/2 in.	4.50	8.00	6.70	5.50
7500333	VSMI-450-150-220	Tube End 1 1/2 in.	4.50	8.00	6.70	5.50
7500324	VSMI-450-200-120	Tube End 2 in.	4.50	8.00	6.70	5.50
7500334	VSMI-450-200-220	Tube End 2 in.	4.50	8.00	6.70	5.50

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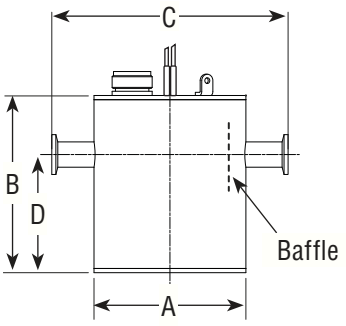
Molecular Sieve Traps: ISO-QF Connection



Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N

Product Notes

- Trapping mechanics: adsorption
- Trapping media: **SYNTHETIC ZEOLITE**.
- Connection to system: ISO-QF flanges

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING DIA A	BODY HGT B	PORT C/L LGT C	PORT C/L HGT D
7500301	VSMI-450-QF16-120	QF16 Flange	4.50	5.25	7.00	3.50
7500311	VSMI-450-QF16-220	QF16 Flange	4.50	5.25	7.00	3.50
7500302	VSMI-450-QF25-120	QF25 Flange	4.50	5.25	7.00	3.50
7500312	VSMI-450-QF25-220	QF25 Flange	4.50	5.25	7.00	3.50
7500303	VSMI-450-QF40-120	QF40 Flange	4.50	8.00	7.00	5.50
7500313	VSMI-450-QF40-220	QF40 Flange	4.50	8.00	7.00	5.50
7500304	VSMI-450-QF50-120	QF50 Flange	4.50	8.00	7.00	5.50
7500314	VSMI-450-QF50-220	QF50 Flange	4.50	8.00	7.00	5.50

Molecular Sieve Replacement Media

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING DIA A	BODY HGT B
7510020	VSM-450-5-M	Synthetic Zeolite	4.50	5.25
7510021	VSM-450-8-M	Synthetic Zeolite	4.50	8.00

Molecular Sieve Replacement Parts

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7510350	VSM-H75-120	Molecular Sieve Trap Heater - 75 Watts, 120VAC
7510352	VSM-H75-220	Molecular Sieve Trap Heater - 75 Watts, 220VAC
7510354	VSM-H125-120	Molecular Sieve Trap Heater - 125 Watts, 120VAC
7510356	VSM-H125-220	Molecular Sieve Trap Heater - 125 Watts, 220VAC

Molecular Sieve Accessories

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7510358	VSM-HEC	Electrical Connection for Trap Heater - Hubble 7464-7465 Set

Model VSCI and VSDI: Cold Vacuum Traps

- Trapping element: cold Dewar
- Pump protection from water and condensible vapor
- Multi-option trapping system

  Option 1: liquid nitrogen for high vacuum trapping of condensible vapors

  Option 2: mixture of dry ice and alcohol to trap condensible vapors in low vacuum or during initial evacuation of your vacuum system
- Simple, clamped two piece body design – eases cleaning, assembly and provides a consistent seal
- Electropolished body: eases cleaning, deflects heat and reduces iron concentration on trap surfaces which increases corrosion resistance
- Cap handles included to ease handling of trap
- Large fill port
- Port stopper included - reduces liquid nitrogen evaporation and assists in the maintenance of a stable temperature within the Dewar
- Connection options (ISO-QF, others on request)

Description:

The VacuShield cold trap is capable of working with two different cooling agents. For high vacuum application, liquid nitrogen is the preferred agent and provides better trapping results. At low vacuum levels or during system pump down, a dry ice and alcohol mixture can be used. The trap is electropolished inside and out, has cap handles, and has a vented stopper all included standard. The VSCI traps have an in-line port design for installation and a simple 2-piece clamped body design to ease trap cleaning.

Recommended Options:

A third port is included on all LN_2 traps except the 0.8 liter trap. This third port is intended to serve as a vacuum break or vent. Without some means to break vacuum on this line, the liquid nitrogen Dewar will be difficult to disassemble for cleaning or servicing. **Under no circumstances should a screwdriver or similar tool be used to separate the liquid nitrogen Dewar from its stainless steel, vacuum jacketed housing.** The most common configuration for this port is to include a tee (pg. 10.12) with the appropriate ISO-QF terminations. On one side of the tee an up-to-air valve (pg. 11.9) is attached and, on the other side of the tee, a vacuum gauge (typically a thermocouple, pg. 14.3-14.16 or Pirani) is attached. The up-to-air valve allows the system to be safely vented and the vacuum gauge provides an additional check on the trap's base pressure to ensure vacuum integrity. Note: If a separate up-to-air valve is not employed or the vent port is sealed ("blanked off") during use, some means of venting or breaking vacuum must be included in the inlet or outlet pumping lines.

Liquid Nitrogen or Dry Ice?

Water trapping is an excellent application for cold reservoirs and illustrates the choice between liquid nitrogen and dry ice traps. When molecules collide with a cold surface, they can surrender some of their (kinetic) energy to that surface. The colder the surface, the less energetic (i.e. slower) the particles will become. The temperature of liquid nitrogen is 77 K (-196^0 C) and a dry ice/isopropanol slurry is about 194 K (-79^0 C). The vapor pressure of water at 77 K is about 10^{-12} Torr. Therefore, water is effectively removed ("cryopumped") from a vacuum system with a liquid nitrogen trap. Alternatively, the vapor pressure of water at 194 K is about 10^{-3} Torr. That is, a vacuum system trapping moisture with dry ice trap should expect a base pressure no better than about 1 milliTorr (or the highest vapor pressure of the condensibles being pumped).

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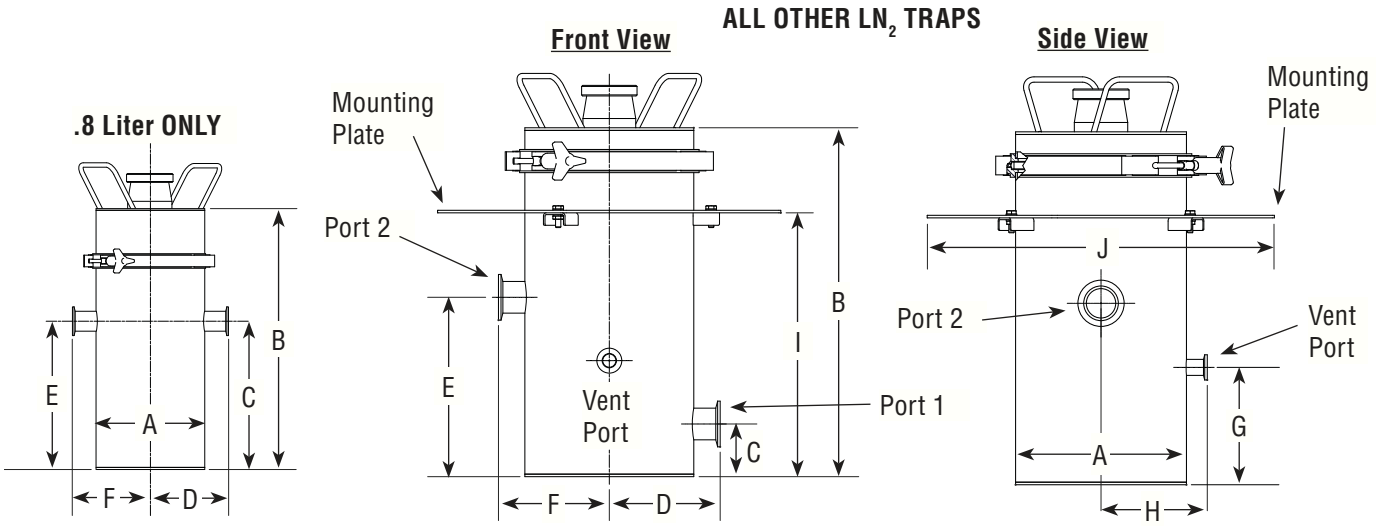
Cold Traps: LN2 ISO-QF Connection

Materials:

- Body, flanges and baffle: 304 stainless steel electropolished
- Seal: Buna-N

Product Notes

- Trapping mechanics: condensation
- Connection to system: ISO-QF flanges
- No mounting plate or exhaust vent on .8 liter



PART NUMBER	REFERENCE NUMBER	CONNECTION	VOL (L)	A	B	C	D	E	F	G	H	I	J
7500404	VSCI-800-QF16	QF16 Flange	0.8	4.00	10.0	5.50	2.75	5.50	2.75	N/A	N/A	N/A	N/A
7500405	VSCI-800-QF25	QF25 Flange	0.8	4.00	10.0	5.50	2.75	5.50	2.75	N/A	N/A	N/A	N/A
7500406	VSCI-800-QF40	QF40 Flange	0.8	4.00	10.0	5.50	2.75	5.50	2.75	N/A	N/A	N/A	N/A
7500411	VSCI-1000-QF25	QF25 Flange	1.0	4.00	14.5	2.50	2.75	7.50	2.75	5.00	2.98	10.2	7.0
7500412	VSCI-1000-QF40	QF40 Flange	1.0	4.00	14.5	2.50	2.75	7.50	2.75	5.00	2.98	10.2	7.0
7500425	VSCI-2000-QF25	QF25 Flange	2.0	6.00	15.5	2.50	4.25	8.50	4.25	5.50	3.98	11.4	10.0
7500426	VSCI-2000-QF40	QF40 Flange	2.0	6.00	15.5	2.50	4.25	8.50	4.25	5.50	3.98	11.4	10.0
7500427	VSCI-2000-QF50	QF50 Flange	2.0	6.00	15.5	2.50	4.25	8.50	4.25	5.50	3.98	11.4	10.0
7500431	VSCI-5000-QF25	QF25 Flange	5.0	8.00	16.5	2.50	5.25	8.50	5.25	5.50	4.98	12.5	12.0
7500432	VSCI-5000-QF40	QF40 Flange	5.0	8.00	16.5	2.50	5.25	8.50	5.25	5.50	4.98	12.5	12.0
7500433	VSCI-5000-QF50	QF50 Flange	5.0	8.00	16.5	2.50	5.25	8.50	5.25	5.50	4.98	12.5	12.0

LN_2 Replacement Parts

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7510450	VSC-800-D	DEWAR Kit for 8 Liter - includes DEWAR and Plug
7510451	VSC-1000-D	DEWAR Kit for 1.0 Liter - includes DEWAR and Plug
7510452	VSC-2000-D	DEWAR Kit for 2.0 Liter - includes DEWAR and Plug
7510453	VSC-5000-D	DEWAR Kit for 5.0 Liter - includes DEWAR and Plug
7510475	VSC-DPK-S	DEWAR Plug Kit for - Sizes .8, 1.0, and 2.0 Liters
7510476	VSC-DPK-L	DEWAR Plug Kit for - Size 5.0 Liter

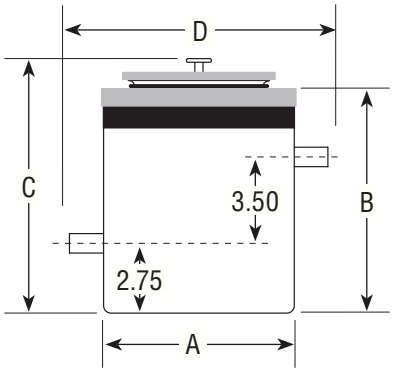
Cold Traps: Dry Ice Tube Port Connection

Materials:

- Electropolished wetted surfaces: facilitates cleaning and servicing, promotes system cleanliness, and deflects heat to minimize frequency of media change-outs.
- Clear, loose fitting lid: see through design allows a quick check on condition of cold media. Loose fitting lid provides a simple vent for sublimating carbon dioxide and prevents “unsafe” pressure build up.
- Clear view ring: see through design allows a quick visual check on condition of cold surface. Visually determine when cold surface needs to be cleaned due to ice bridges and pump lubricant deposition.

Product Notes

- Port terminations: tube end
- Media: use dry ice and isopropanol slurry for maximum cold trapping effect



PART NUMBER	REFERENCE NUMBER	CONNECTION	TRAPPING MEDIA	HOUSING DIA A	BODY HGT B	OAL C	PORT OAL D
7500420	VSDI-800-050	1/2 in. Tube Ports	Dry Ice	7.88	9.0	10.5	10.70
7500421	VSDI-800-075	3/4 in. Tube Ports	Dry Ice	7.88	9.0	10.5	10.70

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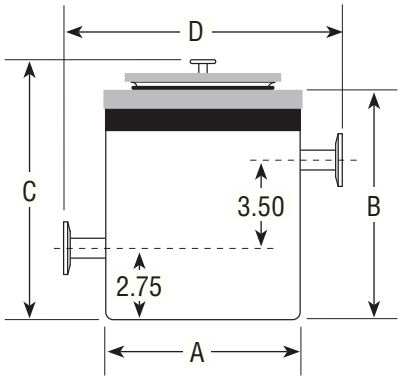
Cold Traps: Dry Ice ISO-QF Connection

Materials:

- Electropolished wetted surfaces: facilitates cleaning and servicing, promotes system cleanliness, and deflects heat to minimize frequency of media change-outs.
- Clear, loose fitting lid: see through design allows a quick check on condition of cold media. Loose fitting lid provides a simple vent for sublimating carbon dioxide and prevents “unsafe” pressure build up.
- Clear view ring: see through design allows a quick visual check on condition of cold surface. Visually determine when cold surface needs to be cleaned due to ice bridges and pump lubricant deposition.

Product Notes

- Port terminations: ISO-QF
- Media: use dry ice and isopropanol slurry for maximum cold trapping effect



PART NUMBER	REFERENCE NUMBER	CONNECTION	TRAPPING MEDIA	HOUSING DIA A	BODY HGT B	OAL C	PORT OAL D
7500422	VSDI-800-QF16	QF16 Flanges	Dry Ice	7.88	9.0	10.5	11.00
7500423	VSDI-800-QF25	QF25 Flanges	Dry Ice	7.88	9.0	10.5	11.00
7500424	VSDI-800-QF40	QF40 Flanges	Dry Ice	7.88	9.0	10.5	11.00

Dry Ice Replacement Parts

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7510400	VSDI-800-BSK	Replacement Seal Kit - Buna
7510401	VSDI-800-VSK	Replacement Seal Kit - Viton®
8751421	VSDI-800-ESK	Replacement Seal Kit - EPDM
7510410	VSDI-800-VR	Replacement Acrylic Viewing Ring
7510403	VSDI-800-LA	Replacement Acrylic Lid
7510415	VSDI-800-W	Replacement Stainless Steel Well

Vacuum Filters

Foreline Vacuum Filters: Product Overview

Foreline filters are installed between the mechanical pump and the high vacuum pump in a vacuum system. Oil mist filters are installed on the outlet of an oil-sealed rotary vane mechanical pump. Each serves a unique function:

1. Protect your mechanical pump from dust and particulates generated upstream within the vacuum system:

Solution 1:

Particulate filtration – For particulates between 10 and 100 microns in size, A&N particulate filters (VSPC and VSPI, pg. 24 and 25) are an excellent solution. Particulate filters may be configured with either paper (VSPC, pg. 24) or polyester (VSPI, pg. 25) media. Paper is the low cost option and is the more common choice. Paper filters, however, are unsuitable for "wet" applications and are disposable. Polyester filters may be reused after being cleaned with a "shop vacuum" or rinsed with soap and water and dried or both.

Solution 2:

Particulate filtration – For particulates greater than 100 microns, A&N particulate separators (VSPS, pg. 25) are an excellent choice. Particulate filters use gravity and a series of baffles (a "tortuous path") to separate large particles from their gaseous carriers.

2. Protect your working environment from mechanical pump oil discharge:

Solution 1:

Open exhaust filters – A&N's VSOE (pg. 27) filters are a low cost solution to mechanical pump lubricant discharge. While retaining over 99% of the discharged pump oil, these filters do allow the pumped gasses to pass through into the surrounding environment. Therefore, this filter is suitable for vacuum applications based on breathable air.

Solution 2:

Closed exhaust filters – A&N's VCEC (pg. 28) and VCEA (pg. 29) filters capture mechanical pump oil discharge and allow the system's gaseous exhaust to be pumped away to a scrubber or an outside exhaust. The filter's body seal, however, is not a standard flanged vacuum seal and therefore is not intended for toxic or corrosive applications.

Solution 3:

Hermetic exhaust filters – A&N's VSHE (pg. 26) filters trap more than 99% of the mechanical pump's lubricants and allow the captured lubricants to be transported back to the pump via a series of internal channels and a one-way valve. In addition, the filter's housing is sealed with a elastomeric high vacuum flange. As a result, chamber gases that are compatible with Buna-N seals may be safely transported to a scrubber or exhaust system.

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Trap and Filter Media

	PUMP OIL BACKSTREAMING	WATER VAPOR	PARTICULATE	ACID	ORGANICS	OTHER CONDENSIBLE VAPOR
Borosilicate Fibers						X
Filter (polyester, paper)			X			X
Gravity			X			
Borosilicate Fibers						X

Table provides a quick reference for media selection. Please contact an A&N factory engineer or account representative with any questions regarding media selection.

What is the difference between a trap and a filter?

Trap vs Filter

Trap: A trap is a device that is designed to capture vapors and gases.

Filter: A filter is a device that is designed to capture or reduce particulates, dust, smoke, and aerosols. In a high vacuum context, they operate at different pressures and have different functions.

Model VSPC, VSPI, and VSPS: Particulate Filters

Large vs. Small Particulate Traps:

Large filters are designed to capture particulates 100 microns or larger. Small filters are designed to capture particulates ranging from 10 to 100 microns -nominally. Large filters (we call these filters "particulate separators") use gravity and stainless steel baffles as a media. Small filters have two media: paper and polyester. Both paper and polyester media have a nominal mesh size of about 10 microns. Paper filters are a low cost, disposable solution for dry applications. Polyester filters can be cleaned and reused.

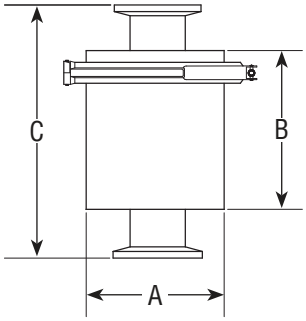
Particulate Foreline Filters: Coaxial Ports Swagelok® and ISO-QF Connection

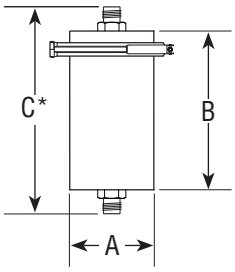
Materials:

- Body: 304 stainless steel
- Seals: Buna N

Product Notes

- Port Terminations: Swagelok® and ISO-QF
  *(On Swagelok® connection: C dimension is from male nut to male nut.)
- Media: paper
- Rechargeable housing: allows rapid, in-situ vacuum gasket servicing and media replacement. Elastomeric gasket and stainless steel clamp suitable for high vacuum applications.





PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING A	BODY B	OAL C
7500501	VSPC-200-25SWG	1/4 in. Swagelok®	2.00	3.8	5.2
7500502	VSPC-200-38SWG	3/8 in. Swagelok®	2.00	3.8	5.2
7500503	VSPC-200-50SWG	1/2 in. Swagelok®	2.00	3.8	5.4
7500510	VSPC-300-QF25	QF25 Port	3.00	3.5	5.5
7500511	VSPC-400-QF40	QF40 Port	4.00	3.5	5.5
7500512	VSPC-400-QF50	QF50 Port	4.00	3.5	6.0

Particulate - Coaxial Replacement Media

PART NUMBER	REFERENCE NUMBER	FILTER BODY SIZE A	FILTER MEDIA
7510501	VSPC-200-F	2.00	Industrial paper filter 2U for 2 in. dia body
7510510	VSPC-300-F	3.00	Industrial paper filter 2U for 3 in. dia body
7510511	VSPC-400-F	4.00	Industrial paper filter 2U for 4 in. dia body

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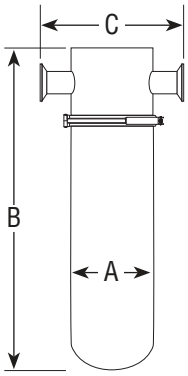
Particulate Foreline Filters: In-Line Ports ISO-QF Connection



Materials:

- Body: 304 stainless steel
- Seals: Buna N

Product Notes

- Port Terminations: ISO-QF
- Media: polyester
- Rechargeable housing: allows rapid, in-situ vacuum gasket servicing and media replacement. Elastomeric gasket and stainless steel clamp suitable for high vacuum applications.

PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING DIA A	BODY HGT B	PORT OAL C
7500525	VSPI-400-QF25	QF25 Port	4.00	15.0	6.00
7500526	VSPI-600-QF40	QF40 Port	6.00	16.5	8.50

Particulate - In-Line Replacement Media

PART NUMBER	REFERENCE NUMBER	FILTER BODY SIZE A	FILTER MEDIA
7510525	VSPI-400-F	4.00	Polyester particulate filter 10U
7510526	VSPI-600-F	6.00	Polyester particulate filter 10U

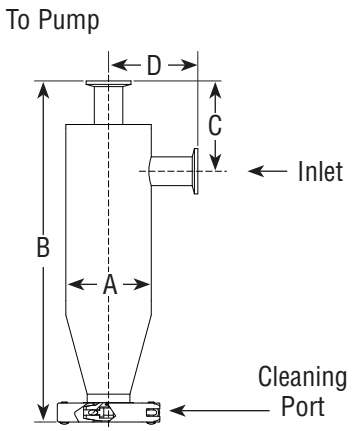
Particulate Separator Filters: ISO-QF Connection

Materials:

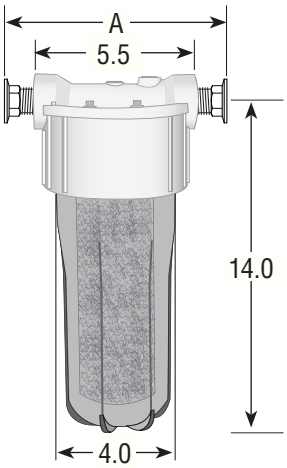
- Body: 304 stainless steel
- Clamp: Aluminum
- Seals: Buna N

Product Notes

- Port Terminations: ISO-QF
- Media: gravity and internal stainless steel baffles
- Electropolished wetted surfaces: facilitates cleaning and servicing and promotes system cleanliness
- Applications: suitable for dusts and particulates greater than 100 microns. Also an excellent solution for back siphoning “accidents”.



PART NUMBER	REFERENCE NUMBER	CONNECTION	HOUSING DIA A	OAL B	C	D
7500601	VSPS-300-QF25	QF25 Port Connections	3.00	12.00	3.14	3.14
7500605	VSPS-400-QF40	QF40 Port Connections	4.00	14.00	3.14	3.52



VacuView Filters: ISO-QF Connection

Materials:

- Clear housing: The see through design allows quick visual check on condition of media and amount of trapped or neutralized contaminants. The clear housing maximizes utility of “outside-in” flow design.

Product Notes

- Port terminations: ISO-QF
- Media: caustic soda (for hydrous acid neutralization), activated alumina, or activated charcoal.
- Dimension A: represents the approximate length between flanges depending on how tightly the ends are screwed in.
- Rechargeable housing: allows in-situ vacuum gasket servicing and media replacement.
- Port labels: Installation orientation is critical for this “outside-in” trap design. “Inlet” and “Pump” are clearly identified on the product labeling.

PART NUMBER	REFERENCE NUMBER	CONNECTION	FILTER MEDIA	A
7500701	VVRI-1000-QF16-CS	QF16	Caustic Soda	7.0
7500702	VVRI-1000-QF25-CS	QF25	Caustic Soda	7.2
7500703	VVRI-1000-QF16-A	QF16	Activated Alumina	7.0
7500704	VVRI-1000-QF25-A	QF25	Activated Alumina	7.2
7500705	VVRI-1000-QF16-O	QF16	Activated Charcoal	7.0
7500706	VVRI-1000-QF25-O	QF25	Activated Charcoal	7.2

VacuView Replacement Media

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7510701	VVR-1000-CS	Caustic Soda Replacement Media
7510702	VVR-1000-A	Activated Alumina Replacement Media
7510703	VVR-1000-O	Activated Charcoal Replacement Media

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VacuView Accessories

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7510730	VVR-MK	Mounting Kit - contains Bracket with 4 Standoffs and Bolts

Model VSHE, VSOE, VCEC and VCEA: Oil Mist Filters

Description:

Oil mist filters are installed on the outlet port of an oil-sealed, rotary vane mechanical vacuum pump. During each exhaust cycle, process chamber gases along with a tiny amount of pump lubricant leave the pump. If left uncorrected, over time, a greasy film of pump lubricant will form around the pump's outlet. Oil mist filters capture this lubricant and, in some instances, return the pump lubricant to the pump's oil reservoir. A&N manufactures three (3) styles of oil mist filters. The VSOE or "open-exhaust" oil mist filter is a low cost solution designed for air only applications. That is, the VSOE captures the pump's lubricants but discharges the process gases into the area surrounding the pump. The VCEC/VCEA or "closed-exhaust" allows the process gases to be piped away to a scrubber or external exhaust line. The VCEC/VCEA's steel housing has an enamel finish and employs integrated body tabs to form the vacuum seal. While suitable for vacuum applications requiring an elastomer seal, this filter is not recommended for aggressive or toxic applications. In addition to allowing the exhaust gases to be piped safely to a scrubber or external exhaust, the VSHE or "hermetic exhaust" filter is equipped with a rechargeable, machined stainless steel housing. The vacuum seal is formed with elastomeric gaskets (i.e. Buna-N) and stainless steel clamps. The VSHE is the best solution for those critical applications requiring high vacuum seals throughout the process piping run. All three oil mist filters use borosilicate glass fiber media.

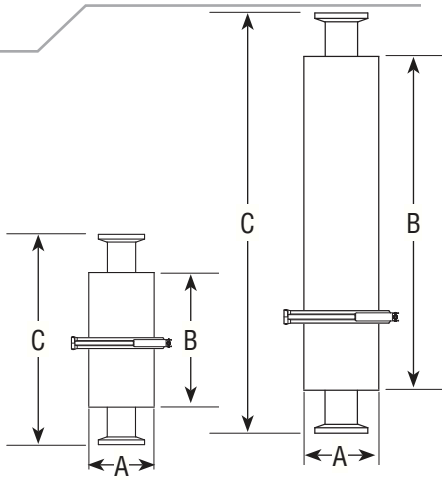
Hermetic Exhaust Filters: ISO-QF Connection

Materials:

- Stainless steel

Product Notes

- Port Terminations: ISO-QF
- Media: borosilicate glass fiber
- Rechargeable, 304 stainless steel housing: allows rapid, in-situ vacuum gasket servicing and media replacement. Elastomeric gasket and stainless steel clamp suitable for high vacuum applications.



PART NUMBER	REFERENCE NUMBER	DESCRIPTION	HOUSING DIA A	BODY HGT B	OAL C
7505001	VSHE-S-QF25	Short Body - QF25 Flange Ports	2.5	4.8	6.9
7505002	VSHE-L-QF25	Long Body - QF25 Flange Ports	2.5	11.3	13.3
7505003	VSHE-L-QF40	Long Body - QF40 Flange Ports	2.5	11.3	13.3

Hermetic Exhaust Replacement Media

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7515001	HE-RF-S	Replacement Filter for Short Body
7515002	HE-RF-L	Replacement Filter for Long Body
7515005	HE-RFK-S	Replacement Filter Kit for Short Body - includes Filter Caps
7515006	HE-RFK-L	Replacement Filter Kit for Long Body - includes Filter Caps

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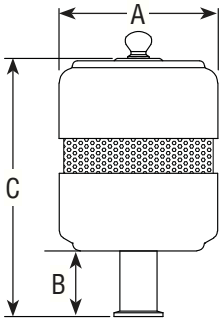
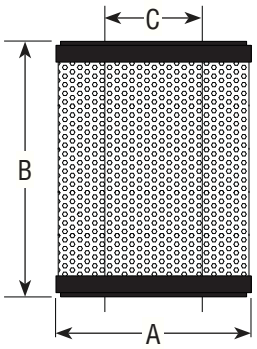
Open Exhaust Filter: ISO-QF and NPT Connection

Product Notes

- Port Terminations: ISO-QF and NPT
- Media: borosilicate glass fiber



PART NUMBER	REFERENCE NUMBER	CONNECTION	CFM	HOUSING A	LGT B	LGT C
7505105	VSOE-5-50NPT	1/2 in. NPT	4.5	2.5	0.9	4.0
7505110	VSOE-5-QF16	QF16	4.5	2.5	0.9	4.0
7505111	VSOE-5-QF25	QF25	4.5	2.5	0.9	4.0
7505112	VSOE-7-QF25	QF25	7	2.5	0.9	5.0
7505120	VSOE-10-QF25	QF25	24	5.1	2.1	8.5



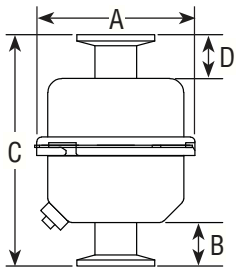
Open Exhaust Replacement Media

PART NUMBER	REFERENCE NUMBER	DESCRIPTION	DIA A	LGT B	DIA C
7515111	VOE-RF5	For VSOE-5-50NPT, -QF16, -QF25	2.25	3	1.25
7515112	VOE-RF7	For VSOE-7-QF25	2.25	4	1.25
7515120	VOE-RF10	For VSOE-10-QF25	4.00	6	3.00

Closed Exhaust Filter: Coaxial ISO-QF Connection

Product Notes

- Port Terminations: ISO-QF
- Media: borosilicate glass fiber
- Rechargeable, enameled steel housing: allows rapid, in-situ vacuum gasket servicing and media replacement.
- Integral oil drain: allows "captured" oil to be safely discarded.



PART NUMBER	REFERENCE NUMBER	CONNECTION	CFM	OUTER DIA A	LGT B	OAL C	LGT D
7505205	VCEC-8-QF16	QF16	8	3.25	.88	4.69	.88
7505206	VCEC-8-QF25	QF25	8	3.25	.88	4.69	.88

Closed Exhaust Replacement Media

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7515205	VCE-RF8	For VCEC-8-QF16 and VCEC-8-QF25

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Closed Exhaust Filter: Angle NPT Connection

Product Notes

- Port Terminations: NPT
- Media: borosilicate glass fiber
- Rechargeable, enameled steel housing: allows rapid, in-situ vacuum gasket servicing and media replacement.
- Integral oil drain: allows "captured" oil to be safely discarded.
- NPT to ISO-QF Hybrid adapter available upon request

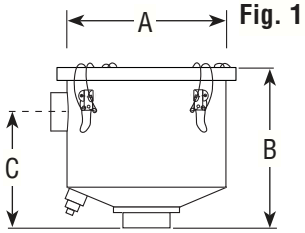

Fig. 1

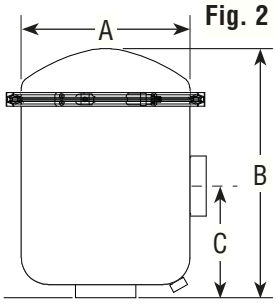

Fig. 2

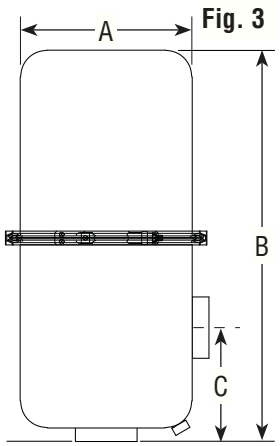

Fig. 3

PART NUMBER	REFERENCE NUMBER	CONNECTION	CFM	FIG	HOUSING DIA A	OAL B	C/L C
7505201	VCEA-50-150NPT	1 1/2 in. Female NPT	50	1	7.32	6.75	4.62
7505210	VCEA-125-200NPT	2 in. Female NPT	125	2	8.75	11.25	5.0
7505211	VCEA-175-200NPT	2 in. Female NPT	175	3	8.75	17.50	5.0

Closed Exhaust Replacement Media

PART NUMBER	REFERENCE NUMBER	DESCRIPTION
7515201	VCE-RF50	For VCEA-50-150NPT
7515210	VCE-RF125	For VCEA-125-200NPT
7515211	VCE-RF175	For VCEA-175-200NPT

Notes

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