

# Guardian Membrane Separators



Our Guardian Membrane Separators and Spin Clean filters offer superb protection with easy field maintenance. The Guardian Membranes are ideal for protecting GC's, O<sub>2</sub> Analyzers, and moisture analyzers, by removing entrained water, submicron sulfuric acid aerosol and ultra fine particulate. The membranes' microscopic pores allow gas or vapor to pass unchanged, while blocking the smallest liquid molecules in normal operating conditions.

Our Spin Clean series is manufactured on the same principle design, but is constructed to spin heavily contaminated liquid samples, thus flushing them clean and providing longer service intervals. Typically the SP series is followed by a finer point-of use filter.

Both products are contained within this bulletin since they share the same design platform.



**United Filtration Systems, Inc.**  
T (586) 802-5561 • [www.unitedfiltration.com](http://www.unitedfiltration.com)



Partner of Headline Filters

**GS100-2**

# GUARDIAN MEMBRANE SEPARATORS

## Features:

- Integral Porting And Mounting Bracket
- 316L Stainless Steel Standard: NACE MR-01-75 Compliant
- Up To 70 LPM Flow (2.5 SCFM)
- 1500 PSIG Maximum Pressure Rating On All Stainless Steel Units
- Liquid / Liquid Separation With SML Model

## Applications:

- Protect On-Line Analyzers
- CNG Sampling Systems
- Moisture Barrier On Critical Monitoring Probes



Many sample systems require zero liquid entrainment, and demand the sample not to be altered. To obtain this goal a membrane filter should be used. A porous PTFE membrane, supported by a sintered stainless steel disc is at the heart of this unit. As a wet sample enters, the membrane only allows gas or vapor molecules to pass through while all liquids are stopped. Our series of

membrane filters are uniquely designed to allow the operator quick and easy membrane service while providing high performance filtration. The body contains an integral mounting bracket along with the inlet, outlet, drain, and bypass connections. The threaded cap is user friendly with knurls and flats for optimum infield serviceability. No connections are broken to service the membrane disc.

The porous membranes are produced from pure PTFE; they are extremely inert and have very low absorption levels. There are two standard grades available for use in low to high flow applications. The M1 (0.1 micron) is a low flow type membrane suitable for most liquids and the M2 (0.8 micron) is a high flow type recommended for higher surface tension liquids.

### STANDARD MEMBRANE MODELS

Stainless Steel Housing Model	SM015.111	SM100.221	SM105.111	SM105.221
<b>PTFE Model (1)</b>	N/A	N/A	FM105.111	FM105.221
<b>Polypropylene Model (1)</b>	N/A	N/A	PM105.111	PM105.221
Port Size (NPT)	1/8"	1/4"	1/8"	1/4"
Drain & Gauge Port (NPT)	1/8"	1/4"	1/8"	1/4"
Maximum Pressure (psig)	1500	1500	1500	1500
Maximum Temperature (°F)	212	212	212	212
Internal Volume	3	3	6	6
Principle Dimensions: (inch)				
Center of Port to Back	0.28	0.39	0.40	0.40
Body Diameter	1.50	2.20	2.48	2.48
Body Depth	1.26	2.05	1.75	1.75
Space Required to Remove Cap	0.90	0.90	0.90	0.90
Membrane Code (2)	MT.19.□	MT.33.□	MT.33.□	MT.33.□
Materials Of Construction: (3)				
Head, Bowl & Internals	316LSS	316LSS	316LSS	316LSS
Seals	Viton	Viton	Viton	Viton
Accessories:				
Buna-N Seal Set	BNSM015	BNSM100	BNSM105	BNSM105
EPDM Seal Set	GESM015	GESM100	GESM105	GESM105
Kalrez Seal Set	KZSM015	KZSM100	KZSM105	KZSM105
Viton Seal Set	GVSM015	GVSM100	GVSM105	GVSM105
Mounting Bracket	MBSM015	MBSM100	MBSM105	MBSM105

- Notes: (1) PTFE and Polypropylene only have a maximum pressure of 100 PSIG  
 (2) Replace the "□" with the grade required. e.g. MT.19.M1 or MT.33.M2  
 (3) Material abbreviations: 316L=316L Stainless Steel



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Stainless Steel Housing Model	SM200.221*	SM205.221	SM205.441
<b>PTFE Model (1)</b>	N/A	FM205.221	FM205.441
<b>Polypropylene Model (1)</b>	N/A	PM205.221	PM205.441
Port Size (NPT)	1/4"	1/4"	1/2"
Drain & Gauge Port (NPT)	1/4"	1/4"	1/2"
Maximum Pressure (psig)	1500	1500	1500
Maximum Temperature (°F)	212	212	212
Internal Volume	29	29	29
Principle Dimensions: (inch)			
Center of Port to Back	0.60	0.60	0.60
Body Diameter	3.75	4.00	4.00
Body Depth	2.00	2.50	2.50
Space Required to Remove Cap	1.30	1.30	1.30
Membrane Code (2)	MT.61.□	MT.61.□	MT.61.□
Materials Of Construction: (3)			
Head, Bowl & Internals	316LSS	316LSS	316LSS
Seals	Viton	Viton	Viton
Accessories:			
Buna-N Seal Set	BNSM200	BNSM205	BNSM205
EPDM Seal Set	GESM200	GESM205	GESM205
Kalrez Seal Set	KZSM200	KZSM205	KZSM205
Viton Seal Set	GVSM200	GVSM205	GVSM205
Mounting Bracket	MBSM200	MBSM205	MBSM205

- Notes: (1) PTFE and Polypropylene only have a maximum pressure of 100 PSIG  
 (2) Replace the "□" with the grade required. e.g. MT.61.M1 or MT.61.M2  
 (3) Material abbreviations: 316L=316L Stainless Steel  
 (\*) Preliminary Data

Guardian Membranes are also offered with integral coalescing pre-filters. A 50C grade element is mounted before the membrane to remove most liquids and solids, thus providing longer membrane life. This integral package minimizes dead volume, panel space, and leak points. The combo units accept the same membrane kits as our standard Guardian units. Part numbers are specified at the bottom of the attached chart.

## MEMBRANES WITH INTEGRAL COALESCING FILTER

Stainless Steel Housing Model	SM125.111	SM125.221	SM225.221	SM225.441
Port Size (NPT)	1/8"	1/4"	1/4"	1/2"
Drain & Gauge Port (NPT)	1/8"	1/4"	1/4"	1/2"
Maximum Pressure (psig)	1500	1500	1500	1500
Maximum Temperature (°F)	212	212	212	212
Internal Volume	30	30	110	110
Principle Dimensions: (inch)				
Body Diameter	1.96	1.96	2.95	2.95
Overall Length	5.26	5.26	6.75	6.75
Space Required to Coalescing Element	3.30	3.30	3.95	3.95
Coalescing Element	12-57-50C	12-57-50C	25-64-50C	25-64-50C
Membrane Code (1)	MT.33.□	MT.33.□	MT.61.□	MT.61.□
Materials Of Construction: (2)				
Head, Bowl & Internals	316LSS	316LSS	316LSS	316LSS
Seals	Viton	Viton	Viton	Viton
Accessories:				
Buna-N Seal Set	BNSM125	BNSM125	BNSM225	BNSM225
EPDM Seal Set	GESM125	GESM125	GESM225	GESM225
Kalrez Seal Set	KZSM125	KZSM125	KZSM225	KZSM225
Viton Seal Set	GVSM125	GVSM125	GVSM225	GVSM225
Mounting Bracket	MBSM125	MBSM125	N/A	N/A

- Notes: (1) Replace the "□" with the grade required. e.g. MT.33.M1 or MT.61.M2  
 (2) Material abbreviations: 316L=316L Stainless Steel

	MT.33.M1	MT.33.M2	MT.61.M1	MT.61.M2
Membrane Type	Low Flow	High Flow	Low Flow	High Flow
Material	PTFE	PTFE	PTFE	PTFE
Diameter (mm)	33	33	61	61
Thickness (µm)	150	150	150	150
Maximum Temperature (°F)	212	212	212	212
Recommended Flow Rate (LPM)	0.35	10	1.0	70
Membrane Micron Size	0.1	0.8	0.1	0.8

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## Applications:

- CNG Sampling Systems
- Protect Liquid Analyzers
- Separate Water From Liquid Hydrocarbon Streams

The SML.205.221.M3 is designed to remove water from liquid hydrocarbon streams. The membrane is constructed with a special support layer to increase pressure drop. Hydrocarbon liquids pass through the M3 microscopic passages while water and other high surface tension liquids are blocked.

Fine immiscible liquid droplets are removed from the stream while allowing the unaltered hydrocarbon liquid to pass.

### MEMBRANES FOR LIQUID / LIQUID SEPARATION

Stainless Steel Housing Model	SML205.221.M3	SML205.421.M3	SML205.441.M3
Port Size (NPT)	1/4"	1/4"	1/2"
Sample Port (NPT)	1/4"	1/2"	1/2"
Maximum Pressure (psig)	1500	1500	1500
Maximum Temperature (°F)	212	212	212
Internal Volume	35	35	35
Principle Dimensions: (inch)			
Center of Port to Back	0.58	0.58	0.58
Body Diameter	3.95	3.95	3.95
Body Depth	2.60	2.60	2.60
Space Required to Remove Cap	1.35	1.35	1.35
Membrane Code	MT.61.M3	MT.61.M3	MT.61.M3
Materials Of Construction: (1)			
Head, Bowl & Internals	316LSS	316LSS	316LSS
Seals	Viton	Viton	Viton
Accessories:			
Buna-N Seal Set	BNSM205	BNSM205	BNSM205
EPDM Seal Set	GESM205	GESM205	GESM205
Kalrez Seal Set	KZSM205	KZSM205	KZSM205
Viton Seal Set	GVSM205	GVSM205	GVSM205
Mounting Bracket	MBSM205	MBSM205	MBSM205

Notes: (1) Material abbreviations: 316L=316L Stainless Steel

Stream	1.5 PSID	15 PSID
Gasoline	65 CC / Minute	650 CC / Minute
Kerosene	29 CC / Minute	290 CC / Minute
Diesel	22 CC / Minute	220 CC / Minute

Flow Rate In CC / Minute At 1.5 PSID And 15 PSID Across M3 Liquid / Liquid Membrane.  
Note The Differential Must Be Lower Than Stream Pressure  
For Best Results Do Not Exceed 15 PSIG Differential To Eliminate Water Breakthrough On Membrane.

	MT.33.M3	MT.61.M3
Membrane Type	H2O / HC	H2O / HC
Material	PTFE	PTFE
Diameter (mm)	33	61
Thickness (µm)	150	150
Maximum Temperature (°F)	212	212
Membrane Micron Size	0.8	0.8



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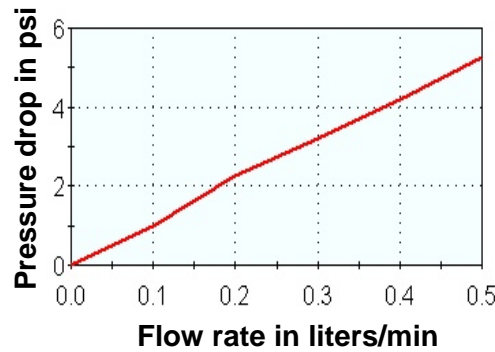
# GUARDIAN MEMBRANE SEPARATORS

## Features:

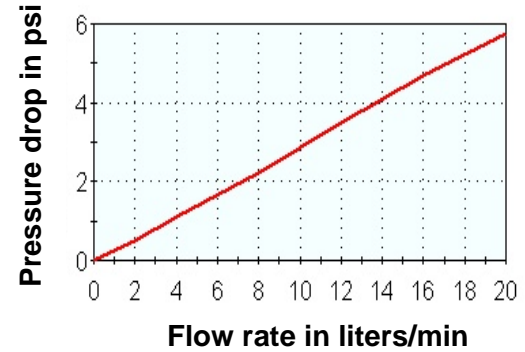
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Membrane Part #	MT.33.M1	MT.33.M2	MT.61.M1	MT.61.M2
Flow Characteristic	Low Flow	High Flow	Low Flow	High Flow
Material	PTFE	PTFE	PTFE	PTFE
Diameter (mm)	33	33	61	61
Thickness - $\mu\text{m}$ (micron)	150	150	150	150
Recommended Flow Rate	0.35	10	1.0	70

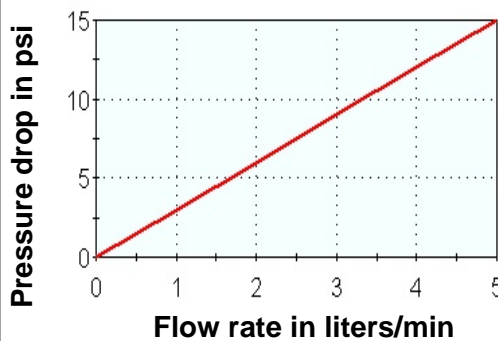
Flow vs. PSID for MT.31.M1



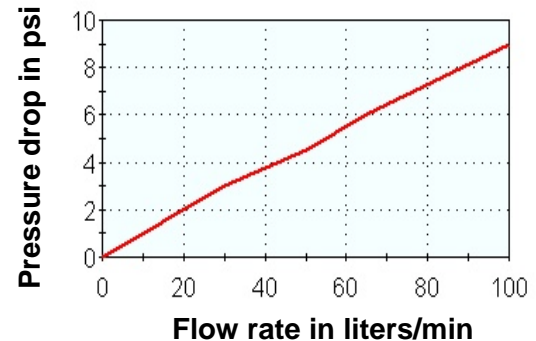
Flow vs. PSID for MT.31.M2



Flow vs. PSID for MT.61.M1



Flow vs. PSID for MT.61.M2



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**\*\* Consult United Filtration Systems for other membranes\*\***



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# GUARDIAN SPIN CLEAN

## Features:

- 316L Stainless Steel
- 1/4" And 1/2" Ports Available
- Maximum Pressure 1500 PSIG

## Applications:

- Protect Liquid And Vapor Analyzers From Small Particles
- Remove Iron Sulfide Particles
- Ideal For Control Sample Applications



The Guardian Spin Clean is based upon our proprietary design of the Guardian Membrane Series. This user friendly design makes infield serviceability a snap.

Since all of the connections are on one side of the filter, no fittings need to be removed to replace the stainless steel disc. The inlet port is angled to create the spinning action which helps extend the life between change out. Six different grades of filtration are available: 0.5, 2, 5, 10, 25, 50 micron.

### STANDARD MEMBRANE MODELS

Stainless Steel Housing Model	SC207.221.□	SC207.421.□	SC207.441.□
Port Size (NPT)	1/4"	1/2"	1/2"
Drain & Gauge Port (NPT)	1/4"	1/4"	1/2"
Maximum Pressure (psig)	1500	1500	1500
Maximum Temperature (°F)	410	410	410
Internal Volume	20	20	20
Principle Dimensions: (inch)			
Center of Port to Back	0.63	0.63	0.63
Body Diameter	3.94	3.94	3.94
Body Depth	2.02	2.02	2.02
Space Required to Remove Cap	1.70	1.70	1.70
Stainless Steel Disc (1)	FDSC207.□	FDSC207.□	FDSC207.□
Materials Of Construction: (2)			
Head, Bowl & Internals	316LSS	316LSS	316LSS
Seals (Standard)	Viton	Viton	Viton
Accessories:			
Buna-N Seal Set	BNSC207	BNSC207	BNSC207
EPDM Seal Set	GESC207	GESC207	GESC207
Kalrez Seal Set	KZSC207	KZSC207	KZSC207
Viton Seal Set (Standard)	GVSC207	GVSC207	GVSC207
Mounting Bracket	MBSC207	MBSC207	MBSC207

Notes: (1) Add micron rating required, e.g. FDSC207-02, FDSC207-10, FDSC207-25, and FDSC207-50  
 (2) Material abbreviations-316L=316L Stainless Steel

SC207 Flow Rates	Inlet Flow (LPM) (Port 1)	Outlet Sample Flow (LPM) (Port 2)	Bypass Flow (LPM) (Port 3)	Filter Differential Pressure Across Ports 1 and 2 (PSID)
Empty Housing	3.78	1.89	1.89	0.22
	11.17	5.68	5.49	1.82
	18.56	9.46	9.10	4.32
5 Micron	3.84	1.89	1.95	0.27
	11.40	5.68	5.72	2.14
	18.97	9.46	9.51	5.60
50 Micron	3.86	1.89	1.97	0.26
	11.43	5.68	5.75	2.07
	19.04	9.46	9.58	5.40

### Stamped Ports

- Inlet
- Sample / Clean
- Drain

### Number

- 1
- 2
- 3



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# MEMBRANE SP76 PLATFORM HOUSINGS

## Features:

- All 316L Stainless Steel
- Membrane Protection
- SP76 / NPT Ports
- Low Internal Volume
- Quick Element Service

## Applications:

- SP76 Platform Modular Sample Systems
- Plug & Play



The SUB15 series SP76 membrane housings are designed for SP76 complaint modular sample systems. The housings use a porous PTFE membrane which is supported by a sintered stainless steel disc on the outlet side. The wet sample gas enters through the inlet port and because the membrane will only allow molecules of gas or vapor to pass through to the outlet all liquid is stopped.

Membrane housings should only be used on a substrate that is wall mounted with the drain port at the lowest point below the inlet and outlet ports. In other words, the housing must sit vertical for proper drainage.

The housing design allows a quick change of the membrane as all the line connections are arranged in the body of the housing and the threaded cap means no tools are required for access.

## PRINCIPLE SPECIFICATIONS

Stainless Steel Housing Model	SUB015.L11	SUB015.R11
Inlet & Outlet Connections	SP76	SP76
Drain (NPT)	1/8"	1/8"
Maximum Pressure (psig)	1500	1500
Maximum Temperature (°F)	300	300
Internal Volume	2	2
Principle Dimensions: (inch)		
Center of Port to Bottom	0.85	0.85
Body Diameter	1.50	1.50
Overall Length	2.28	2.28
Membrane Code (1)	MT.19.□	MT.19.□
Materials Of Construction: (2)		
Head, Bowl & Internals	316LSS	316LSS
Seals	Viton	Viton
Accessories:		
Buna-N Seal Set	BNSUB015	BNSUB015
EPDM Seal Set	GESUB015	GESUB015
Kalrez Seal Set	KZSUB015	KZSUB015
Viton Seal Set	GVSUB015	GVSUB015
Mounting:		
Substrate Flow Direction	Left To Right	Right To Left
Substrate Plane	Horizontal	Horizontal
Inlet	Port 2	Port 2
Outlet	Port 3	Port 1

Notes: (1) Replace "□" with grade required, e.g. MT.19.M1  
 (2) Material abbreviations-316L=316L Stainless Steel



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If using just a membrane separator, we recommend installing a coalescing pre-filter upstream to capture dirt particles and provide longer service life. The Model 122 with 12-57-70C and / or Model 170 with 22-37-70C, are ideal for this task. The SM125 and SM225 series already have the coalescing filters built-in to the bodies so there is no need for the addition. The Model 170 is ideal for quick change since no drain connection needs to be broken to replace the element.

**Model 122**



**Model 170**



Housing Model	122
Port Size (NPT)	1/4"
Drain Type (NPT)	1/4"
Maximum Pressure (psig)	5000
Internal Volume (cc)	30
Maximum Temp. -Buna-N (250°F)	BN110
Maximum Temp. -EPDM (300°F)	GE110
Maximum Temp. -Viton (400°F)	GV110
Maximum Temp. -Silicone (450°F)	GS110
Maximum Temp. -Kalrez (600°F)	KZ110
Principle Dimensions: (inches)	
Center Of Port To Head	0.39
Head Diameter	1.42
Overall Length	4.21
Element Removal Clearance	2.36
Filter Element Codes: (1)	
Disposable Coalescing Element	12-57-70C
Materials Of Construction: (2)	
Head & Internals	316LSS
Bowl	316LSS
O-Rings	Viton

Housing Model	170 (Four Port)
Port Size (NPT)	1/4"
Drain / By-Pass	1/4"
Maximum Pressure (psig)	1500
Internal Volume (cc)	42
Maximum Temp. -Buna-N (250°F)	BN170
Maximum Temp. -EPDM (300°F)	GE170
Maximum Temp. -Viton (400°F)	GV170
Maximum Temp. -Silicone (450°F)	GS170
Maximum Temp. -Kalrez (600°F)	KZ170
Principle Dimensions: (inches)	
Center Of Port To Head	0.43
Head	2.12
Overall Length	3.23
Element Removal Clearance	0.98
Filter Element Codes: (1)	
Disposable Coalescing Element	22-37-70C
Materials Of Construction: (2)	
Head	316LSS
Bowls & Internals	316LSS
O-Rings	Viton

If your analyzer conditioning project requires unique product that you have not found within our catalog, please contact us so that we may produce exactly what your system requires. We welcome the opportunity to build to your needs. Whether it is an exotic material, or a new design we have the capability to be your filtration partner.



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