



# Hydraulic and Lube Filtration Products

Catalog 2300-18



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# PRODUCT CATALOG

## Hydraulic & Fuel Filtration Division

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*Supersedes: 2300-17, Dated: April 2017*

### **SAFETY WARNING**

**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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Please consult factory for the latest brochure of Parker's fluid analysis and fluid condition monitoring products.



# 12AT/50AT Series

Spin-On Filters

# 80AT/80UT Series

Dual Spin-On Filters



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# 12AT/50AT 80AT/80UT Series

## Spin-On Filters

### Applications for Spin-On Filters

- Mobile Equipment
- Hydrostatic Drives
- Industrial Power Units
- Reservoir Breathers



Parker's latest range of Spin-On filter technology provides users with reliable performance in a lightweight, compact and cost effective package. These solutions provide protection to critical system components in a variety of low pressure applications.

In addition to increased flow rates, Parker has expanded the product family to include new filter head configurations and flanged porting along with consistency in filter element condition options.

Recognized as a leader in product quality, Parker applies the latest in design and manufacturing techniques to deliver on our promise.

#### Mounting

- 2 or 6 hole pattern for flexibility

#### Ports

- Both NPT and SAE straight thread connections available. SAE Code 61 Flange on 80AT.

#### Interchangeability

- Parker canisters fit many competitors' heads. Contact Hydraulic & Fuel Filtration Division.



#### Color Indicating Gauges/Switches

- Identifies element condition during operation

#### Disposable Canister

- No mess, oil is contained inside
- Easy to handle
- Single and double length filters for longer life

Spin-On filters can be used in suction and return line filter applications with pressures to 150 psi (10.3 bar).

Improving system fluid cleanliness levels, providing better cold start performance and meeting service interval expectations are the primary objectives in the AT/UT series design. Parker filters utilize several types of filtration media to meet the demanding requirements of today's applications.

#### • Cellulose Media

The original and most common media is made of natural fibers. These twisted fibers are larger and more irregular than synthetic fibers - creating more resistance to flow or pressure drop.

#### • Synthetic Media

These man-made glass fibers are very uniform in size and shape - creating the least possible resistance to flow and providing improved efficiency to protect sensitive controls.

#### • Par-Gel Media

A highly absorbent copolymer laminate with an affinity for water - allows hydraulic or lubrication fluid to pass freely but water is bonded to the media and forever removed from the system.

# 12AT/50AT/80AT/80UT Series

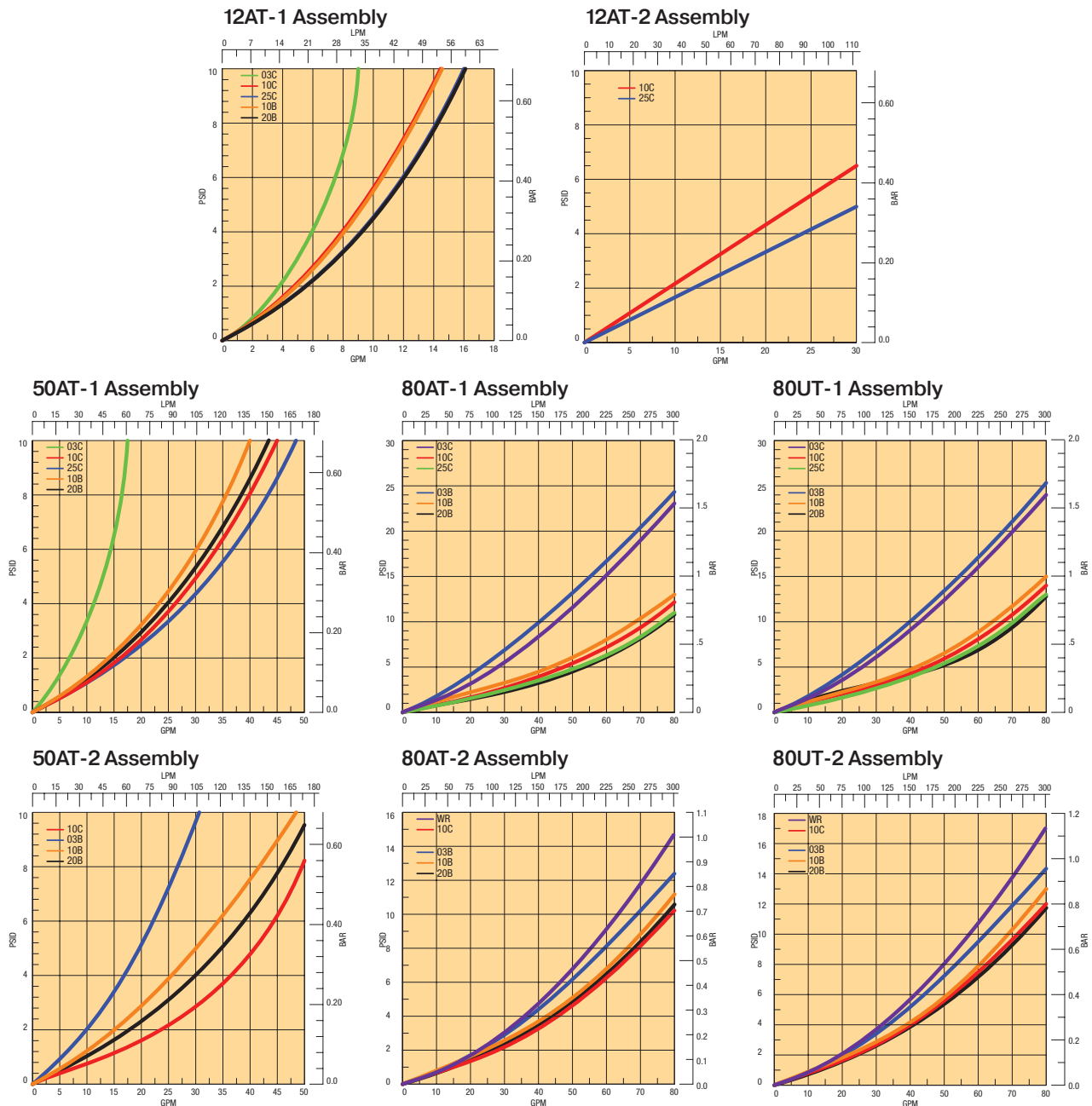
## Performance

Media Code	Filter Media	Beta Ratios	Particle Size/Efficiency
03B	Microglass	$\beta_3=75$	3 / 98.7%
10B	Microglass	$\beta_{10}=75$	10 / 98.7%
20B	Microglass	$\beta_{20}=75$	20 / 98.7%
03C	Cellulose	$\beta_3=2$	3 / 50%
10C	Cellulose	$\beta_{10}=2$	10 / 50%
25C	Cellulose	$\beta_{25}=2$	25 / 50%
WR	Water Removal	$\beta_{20}=2$	20 / 50%

Beta Rating	Efficiency at (X) Particle Size
$\beta_x = 2$	50.0%
$\beta_x = 20$	95.0%
$\beta_x = 75$	98.7%
$\beta_x = 200$	99.5%
$\beta_x = 1000$	99.99%

Actual results are dependent on system flow rates, fluid viscosities, and other parameters.

### Flow vs. Pressure Loss



# 12AT Series

## Spin-On Filters

### Installation and Specification Data

**Pressure Rating:**

Maximum Allowable  
Operating Pressure (MAOP):  
150 psi (10.3 bar)

**Design Safety Factor:** 2.5:1

**Operating Temperatures:**

-40°F to 225°F (-40°C to 107°C)

**Canister Collapse Rating:**

100 psid minimum

**Canister Condition Indicators:**

Gauge: Color coded 15/25 psig

Gauge: Color coded vacuum

Pressure Switch: Normally open

20 +/- 2 psig  
5 Amps @ 24 VDC

Vacuum Switch: Normally open

5" +/- 1" Hg  
1.0 Amp @ 120 VAC

**Filter Material:**

Head: Aluminum

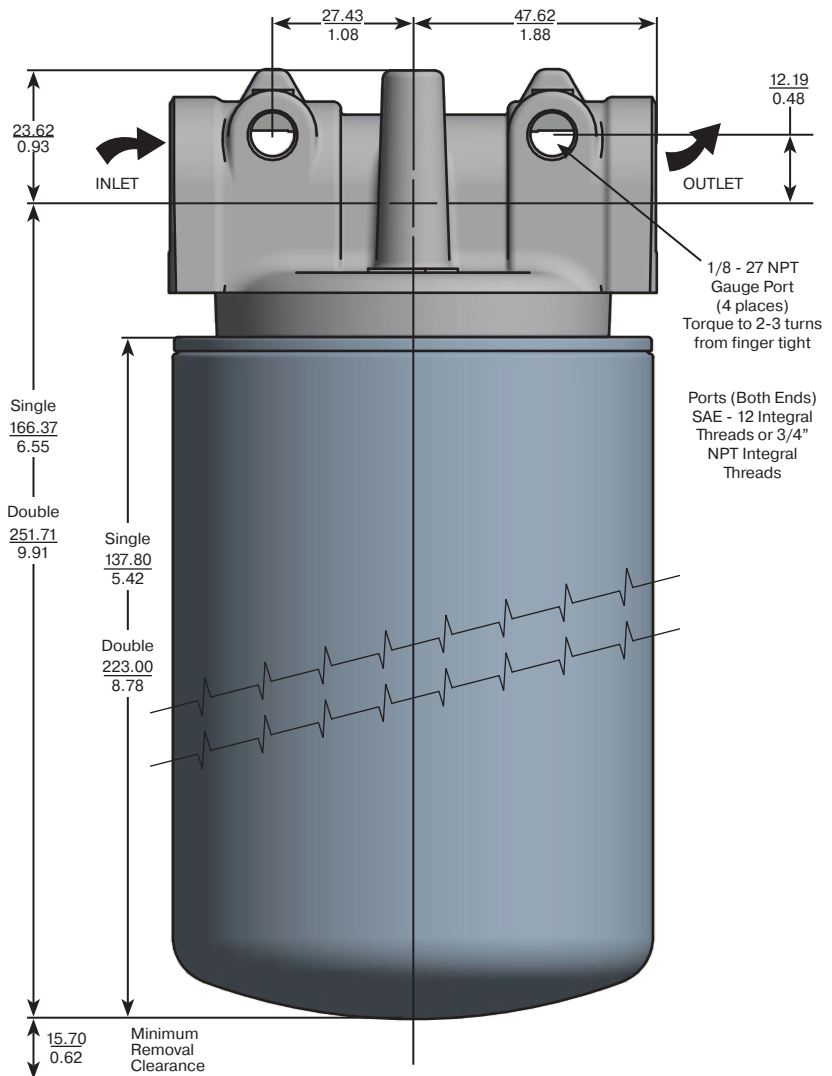
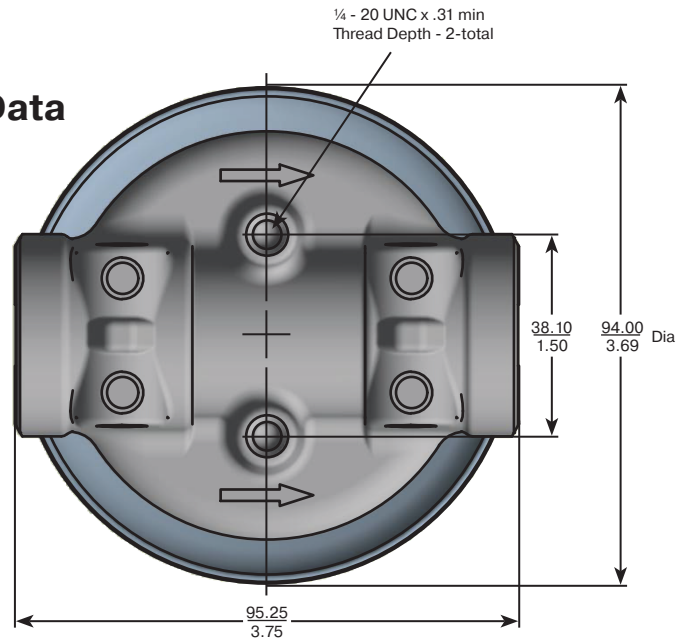
Canister: Low Carbon Steel

**Shipping Weights**

**(approximate):**

Single length: 1.6 lbs.

Double length: 2.7 lbs.



Linear Measure:  $\frac{\text{millimeter}}{\text{inch}}$

Drawings are for reference only.  
Contact factory for current version.

# 50AT Series

## Spin-On Filters

### Installation and Specification

#### Data

##### Pressure Rating:

Maximum Allowable  
Operating Pressure (MAOP):  
150 psi (10.3 bar)

**Design Safety Factor:** 2.5:1

##### Operating Temperatures:

-40°F to 225°F (-40°C to 107°C)

##### Canister Collapse Rating:

100 psid minimum

##### Canister Condition Indicators:

Gauge: Color coded 15/25 psig

Gauge: Color coded vacuum

Pressure Switch: Normally open  
20 +/- 2 psig  
5 Amps @ 24 VDC

Vacuum Switch: Normally open  
5" +/- 1" Hg  
1.0 Amp @ 120 VAC

##### Filter Material:

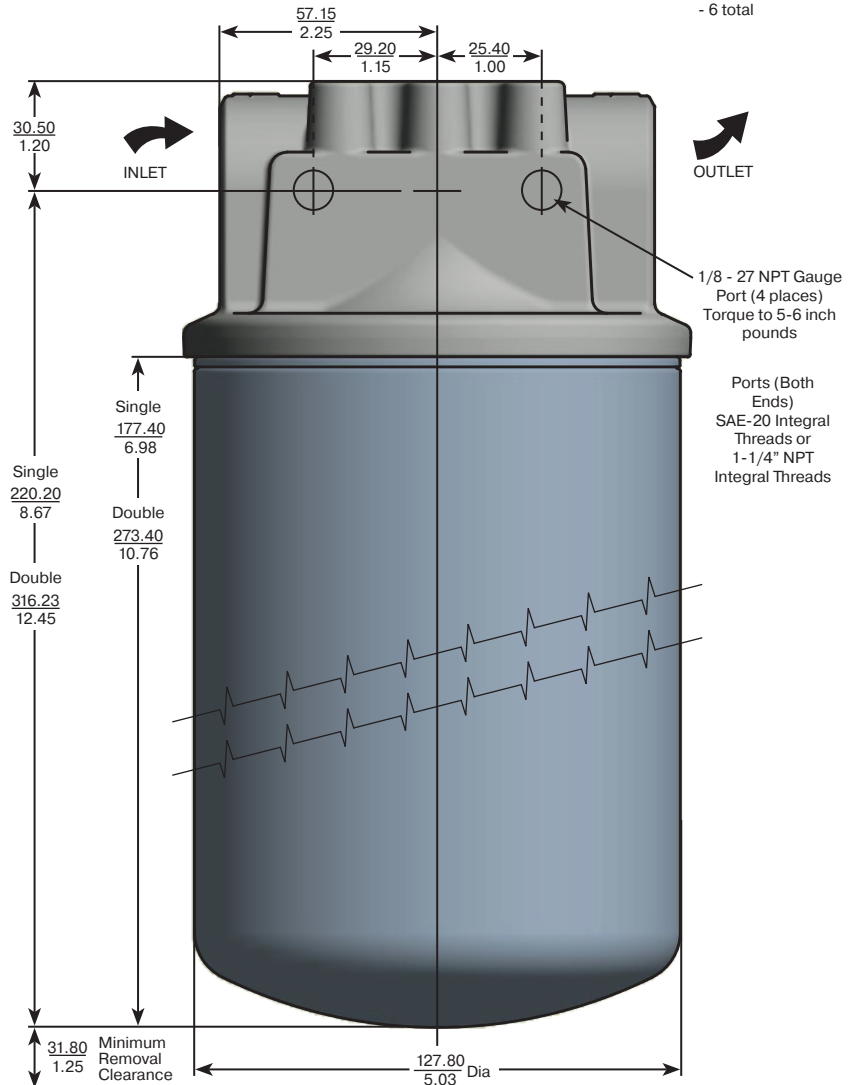
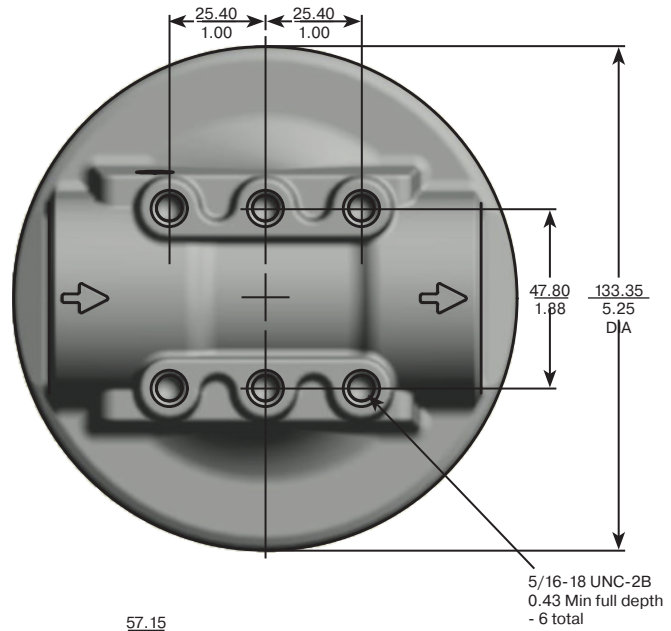
Head: Aluminum

Canister: Low Carbon Steel

##### Shipping Weights (approximate):

Single length: 3.9 lbs.

Double length: 4.8 lbs.



Linear Measure:  $\frac{\text{millimeter}}{\text{inch}}$

Drawings are for reference only.  
Contact factory for current version.

# 80AT Series

## Dual Spin-On Filters

### Installation and Specification Data

**Pressure Rating:**

Maximum Allowable  
Operating Pressure (MAOP):  
150 psi (10.3 bar)

**Design Safety Factor:** 2.5:1

**Operating Temperatures:**

-40°F to 225°F (-40°C to 107°C)

**Canister Collapse Rating:**

100 psid minimum

**Canister Condition Indicators:**

Gauge: Color coded 15/25 psig

Gauge: Color coded vacuum

Pressure Switch: Normally open  
20 +/- 2 psig  
5 Amps @ 24 VDC

Vacuum Switch: Normally open  
5" +/- 1" Hg  
1.0 Amp @ 120 VAC

**Filter Material:**

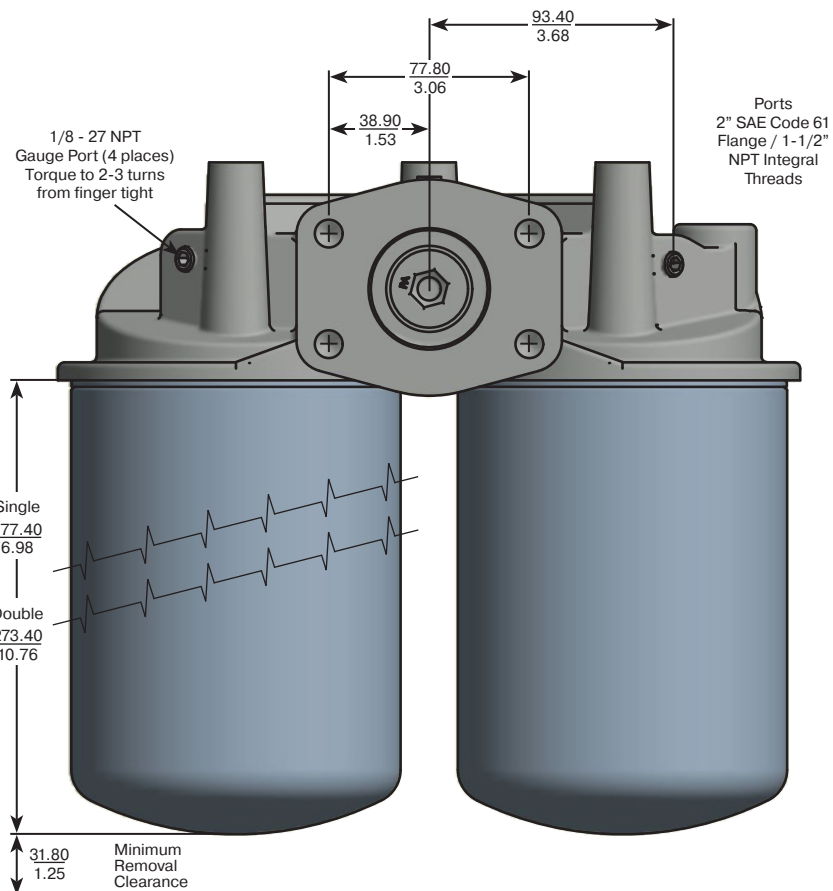
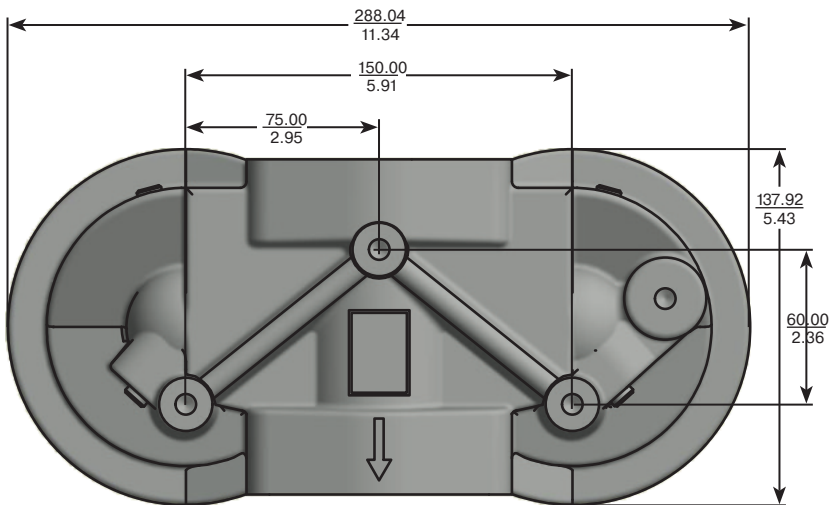
Head: Aluminum

Canister: Low Carbon Steel

**Shipping Weights (approximate):**

Single length: 11.3 lbs.

Double length: 13.0 lbs.



Linear Measure:  $\frac{\text{millimeter}}{\text{inch}}$

Drawings are for reference only.  
Contact factory for current version.

# 80UT Series

## Over/Under Spin-On Filters Installation and Specification Data

### Pressure Rating:

Maximum Allowable  
Operating Pressure (MAOP):  
150 psi (10.3 bar)

**Design Safety Factor:** 2.5:1

### Operating Temperatures:

-40°F to 225°F (-40°C to 107°C)

### Canister Collapse Rating:

100 psid minimum

### Canister Condition Indicators:

Gauge: Color coded 15/25 psig  
Gauge: Color coded vacuum

Pressure Switch: Normally open  
20 +/- 2 psi  
5 Amps @ 24 VDC

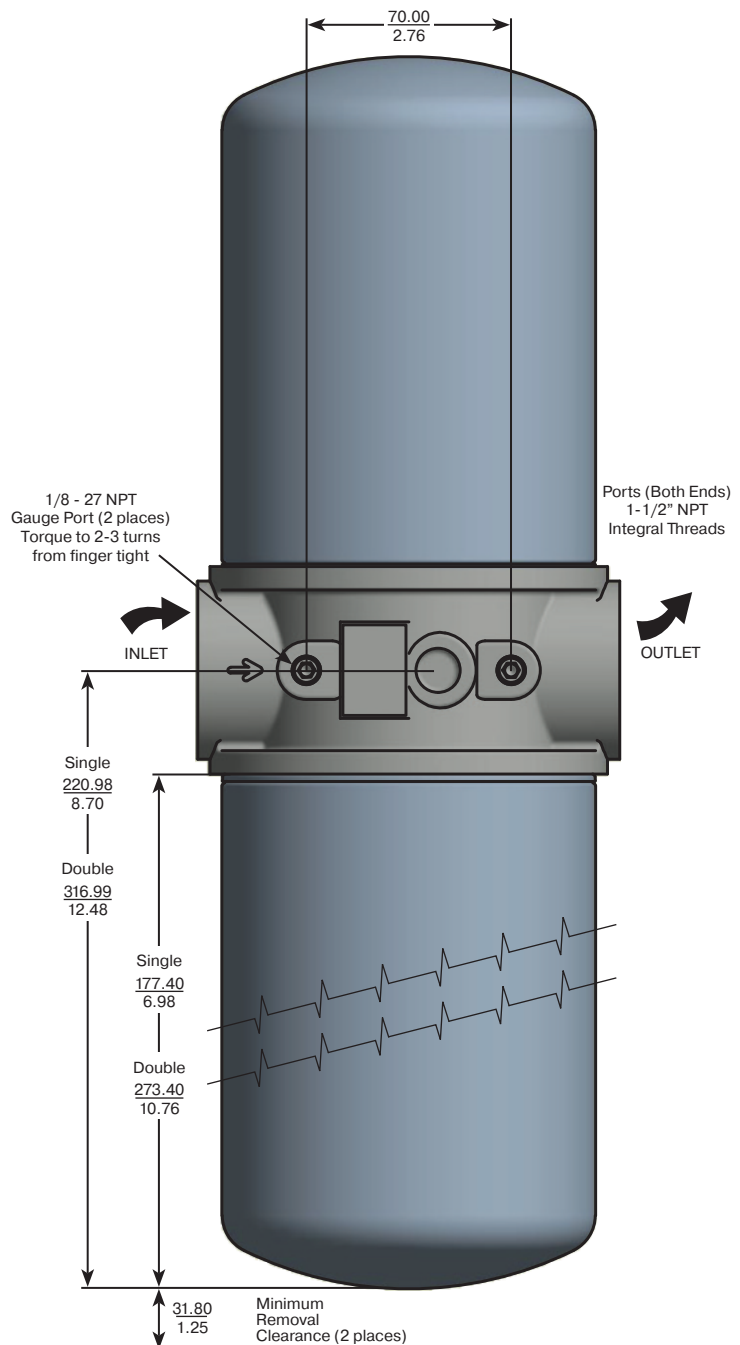
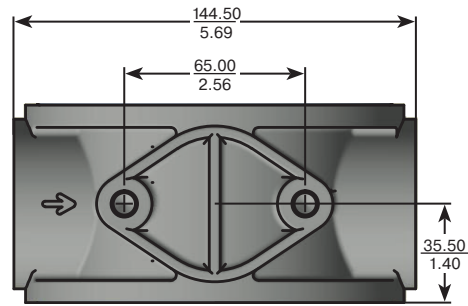
Vacuum Switch: Normally open  
5" +/- 1" Hg  
1.0 Amp @ 120 VAC

### Filter Material:

Head: Aluminum  
Canister: Low Carbon Steel

### Shipping Weights (approximate):

Single length: 6.9 lbs.  
Double length: 8.6 lbs.



Linear Measure:  $\frac{\text{millimeter}}{\text{inch}}$

Drawings are for reference only.  
Contact factory for current version.

# 12AT/50AT/80AT/80UT Series

## Spin-On Filters

### Installation Instructions

- 1. DANGER!** Read and follow all safety instructions. Failure to do so could result in serious bodily injury or death.
- Turn off power supply to pumping unit.
- Tag pumping unit out of service for filter change.
- Remove the old filter, while collecting all spilled fluid. Dispose of the old filter in accordance with local, state or federal regulations.
- Apply a thin film of lubricating oil to the gasket of the new filter.
- Thread new filter on the flow adapter or manifold until the gasket makes contact. Tighten according to filter label.
- Turn on fluid supply.
- Pressurize the system and check for leaks.

### Operation Instructions

- 1. WARNING!** A pressure differential indicator must be installed for any system capable of generating more than 25 psid across the filter.
- Filter unit must be installed using a suitable mounting device or rigid piping.
- Filter unit must be installed with flow in proper direction.
- Filter should be inspected every six months and changed annually when slow flow occurs.
- Water absorbing filters - when the differential pressure reaches 20-25 psid the filter could be plugged with water and should be immediately replaced. Failure to replace could result in internal filter rupture resulting in water down stream.

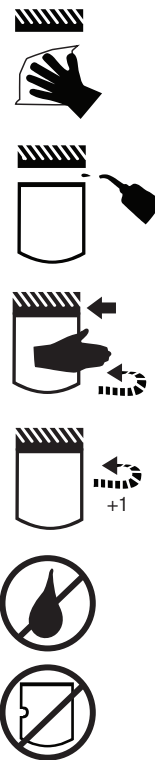
- If water stoppage is suspected, remove the water absorbing filter and pour the contents in a jar. If fluid is cloudy or water separates in the jar, the filter is most likely plugged with water. If water is excessive in the jar it may be necessary to have the tank cleaned or drained prior to further use.

### Return Line Applications

- 25 lb bypass in flow adapter recommended.
- Filter unit must be installed in the circuit just before the reservoir. DO NOT use a shutoff valve in the return line for the filter that is being changed. A check valve is acceptable.
- Filter unit must be sized to accept the total flow during discharging from the cylinders and actuators.

### Suction Side Applications

- 3-5 lb bypass in flow adapter recommended to prevent pump cavitation.
- A vacuum gauge is recommended to monitor filter condition.
- Cavitation of the pump can be a problem with the filter on the suction line. Always try to minimize restriction by oversizing the filter, or by using a microglass media.



# 12AT/50AT/80AT/80UT Series

## Spin-On Filters

### Accessory Parts List

Description	Part Number
Gauge - 15 psig	936911
Gauge - 25 psig	936912
Vacuum gauge	926909
Vacuum switch	936949
Pressure switch - 25 psig	926923

Indicating Pressure Gauge (15 PSIG)



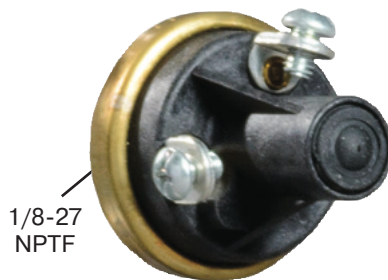
Indicating Pressure Gauge (25 PSIG)



Indicating Vacuum Gauge



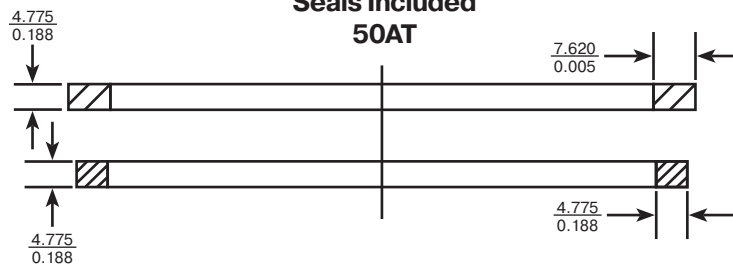
Vacuum Switch



Pressure Switch



### Seals Included 50AT



Linear Measure: millimeter  
inch

# 12AT/50AT/80AT/80UT Series

## Spin-On Filters

### Reservoir Breather

#### Sizing

Select the proper size canister for the maximum rate of reservoir draw down or air exchange rate. As a rule of thumb, clean pressure drop should be limited to 0.18 psid (5" H<sub>2</sub>O).

A pipe flange, weld collar, etc. may be used to connect the adapter kit to the reservoir. Make sure that air is not able to leak around the adapter. When mounting on the side of the reservoir, make sure the installation is above the surface of the fluid.

Recommended canister change out is after 500 hours of operation. More frequent replacement may be required when operated in heavily contaminated areas such as grinding operations, primary metal mills, and on mobile equipment. Under such conditions, increase replacement frequency to every 250 hours.

Model	Air Rating*	Canister	Adapter Kit
12AT-03C	1 micron	926543	926876
12AT-10C	2 micron	921999	926876
12AT-25C	5 micron	925023	926876
50AT-03C	1 micron	926541	926875
50AT-10C	2 micron	926169	926875
50AT-25C	5 micron	926170	926875

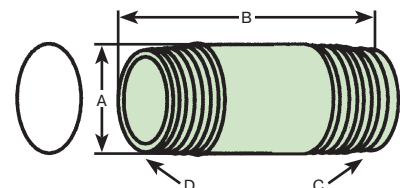
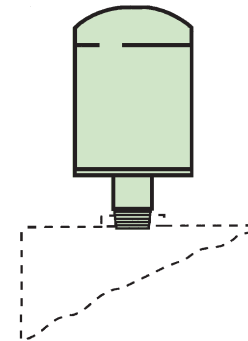
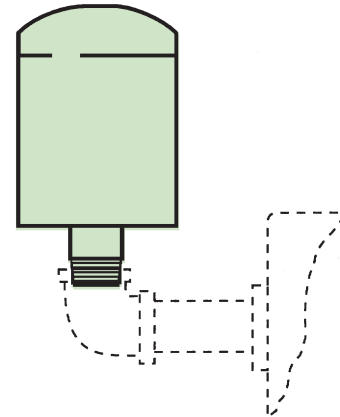
\* 99% Removal efficiency for particles larger than the stated size in air.

Graphs are for 03C canisters only. Total pressure drop across canister, adapter, and pipe may be found by adding pressure drops below:

- + 1.5% for each inch of 12AT adapter or 3/4" pipe used.
- + 3.0% for each 3/4" elbow used.
- + 1.0% for each inch of 50AT adapter or 1-1/4" pipe used.
- + 2.0% for each 1-1/4" elbow used.



#### Typical Installations mounted on side or top of reservoir



	12AT	50AT
PN	926876	926875
A	26.70(1.05)	42.70(1.66)
B	66.80(2.63)	85.10(3.35)
C	3/4" NPT	1-1/4" NPT
D	1"-12 UN	1-1/2"-16 UN

Allow 1.25" for canister removal clearance

Linear Measure: millimeter  
inch

# 12AT/50AT/80AT/80UT Series<sup>1</sup>

## Spin-On Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
12AT	1	10C	B	P	G	S12	H

BOX 1: Filter Series <sup>2,3</sup>	
Symbol	Description
12AT	20 GPM Nominal
50AT	50 GPM Nominal
80AT	80 GPM Nominal-Dual
80UT	80 GPM Nominal-Dual

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double

BOX 3: Media Code	
Symbol	Description
<b>12AT-1</b>	
10B	Microglass, 10 micron
20B	Microglass, 20 micron
03C	Cellulose, 3 micron
10C	Cellulose, 10 micron
25C	Cellulose, 25 micron
<b>12AT-2</b>	
10C	Cellulose, 10 micron
25C	Cellulose, 25 micron
<b>50AT/80AT/80UT-1</b>	
03B	Microglass, 3 micron
10B	Microglass, 10 micron
20B	Microglass, 20 micron
03C	Cellulose, 3 micron
10C	Cellulose, 10 micron
25C	Cellulose, 25 micron
<b>50AT/80AT/80UT-2</b>	
03B	Microglass, 3 micron
10B	Microglass, 20 micron
20B	Microglass, 20 micron
10C	Cellulose, 10 micron
WR	Water Removal

BOX 4: Seal Material	
Symbol	Description
B	Nitrile

BOX 5: Indicator	
Symbol	Description
P	Gauge Ports Plugged

BOX 6: Bypass	
Symbol	Description
G	25 psid (1.7 bar)
C	15 psid (1.03 bar)
P	3 psid (0.2 bar)
X	No bypass

BOX 7: Ports	
Symbol	Description
<b>12AT</b>	
S12	SAE-12 Integral Threads
N12	3/4" NPT Integral Threads
<b>50AT</b>	
S20	SAE-20 Integral Threads
N20	1-1/4" NPT Integral Threads
<b>80AT</b>	
Y32	2" SAE Code 61 Flange / 1-1/2" NPT Integral Threads
<b>80UT</b>	
N24	1-1/2" NPT Integral Threads

BOX 8: Gauge Port	
Symbol	Description
N	None
H	Inlet & Outlet, both sides (all ports drilled & tapped)

#### Notes:

- The filter includes the element you select already installed.
- Selecting 80AT or 80UT in Box 1 requires the selection of "G" in Box 6 and "H" in box 8.
- Nominal flow rates for single length filters: 12AT - 12GPM; 50AT - 35 GPM; 80AT/80UT - 55 GPM.

### Replacement Canisters

Media	12AT-1	12AT-2	50AT/80AT/80UT-1	50AT/80AT/80UT-2
03B	N/A	N/A	934200	932073
10B	928763	N/A	928766	929445
20B	928764	N/A	928767	929446
03C	926543	N/A	926541	N/A
10C	921999	946785	926169	927736
25C	925023	946784	926170	N/A
WR	N/A	N/A	N/A	FA511-10W



Hydraulic & Fuel Filtration Division

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Last updated August 4th, 2023

Parker's willingness to conduct business with Buyer is expressly conditioned on Buyer's assent to Parker's Offer of Sale. [www.parker.com/saleterms](http://www.parker.com/saleterms)



# PT Series

Tank Top Filters



ENGINEERING YOUR SUCCESS.

# PT Series

## Applications

The PT series filter is available in two diameters and three lengths for flow ranges from 5-50 gpm. The PT2 and PT4 filter cartridges utilize the latest in microglass media in 2, 5, 10 and 20 microns for the industry's best particle removal efficiency and retention.

This unique design simply threads into a ported weld ring or flange, which can be bolted to a metal reservoir.

The disposable filter cartridge is a single-piece construction, which incorporates the nylon cover and integral 25 psi bypass valve. The flow path is inside-out and requires no special tools for service.

This concept assures minimal installation costs with the least space requirements for return line applications.



### Typical Applications

- Turf Maintenance
- Material Handling
- Aerial Lifts
- Fan Drive

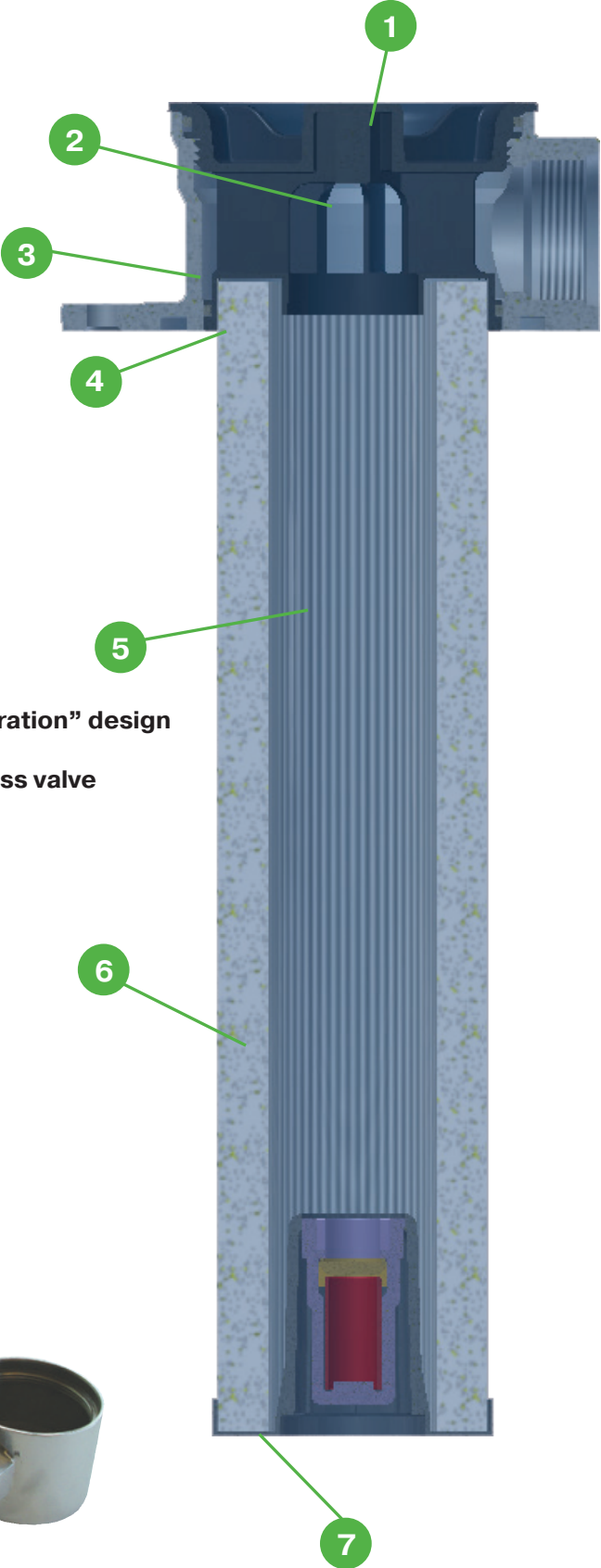


The PT Series filter combines high efficiency microfiber filtration with low cost installation.

# PT Series

## Features

- 1 Easy element assembly removal
- 2 Unique high flow top end cap
- 3 Lightweight cast aluminum head
- 4 Filter element assembly
- 5 Bowl-less, inside-out flow
- 6 Downstream element support with “no aeration” design
- 7 Solid bottom endcap with integrated bypass valve
- 8 Low profile tank top design



# PT Series

**Filter Element**  
Premium original equipment performance every time

**Tank Top, Bowl-Less Design**  
Reduces weight  
Significant cost savings over filters with bowls

**Bottom Endcap Integrated Bypass Valve**  
New bypass valve with every element change  
Insures reliable performance

**Inside-Out Element Flow Path**  
Contamination contained within the element  
No system contamination during element servicing

**No Aeration Design**  
Oil cascades down the perforated outer support core  
No system aeration

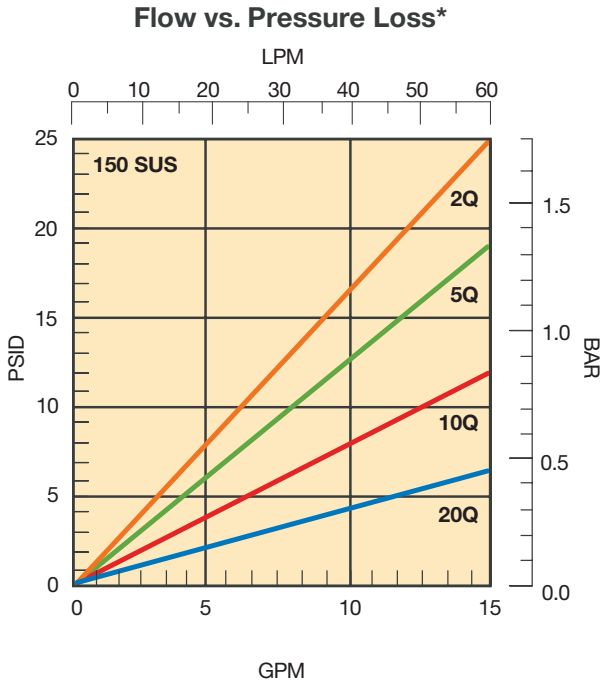
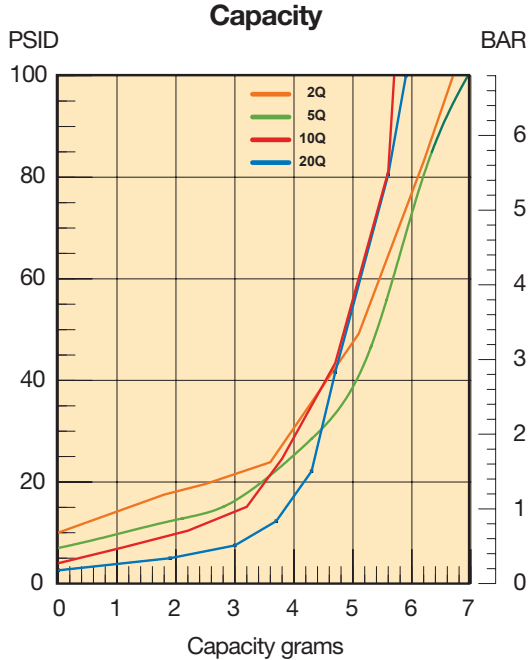
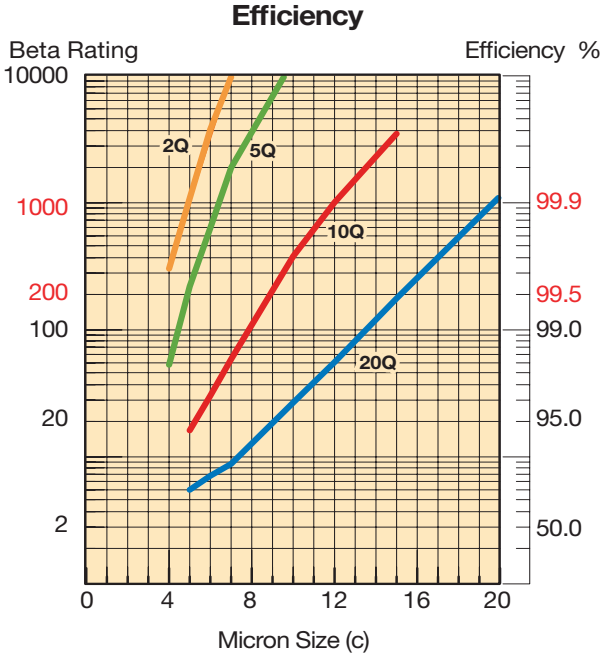
**High Flow, Low Pressure Drop Top Endcap Design**  
Long element life  
Lower maintenance costs

**Premium Microglass Media**  
Superior dirt holding capacity and efficiency  
Less maintenance and downtime



# PT Series

## PT2-1 Element Performance

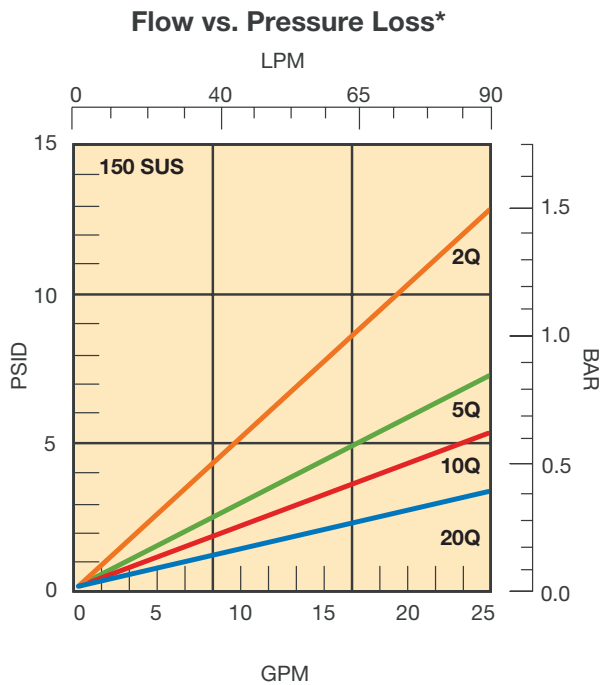
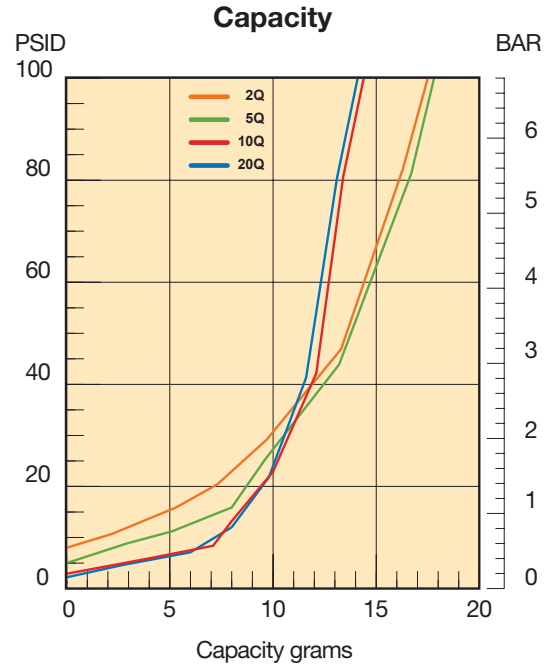
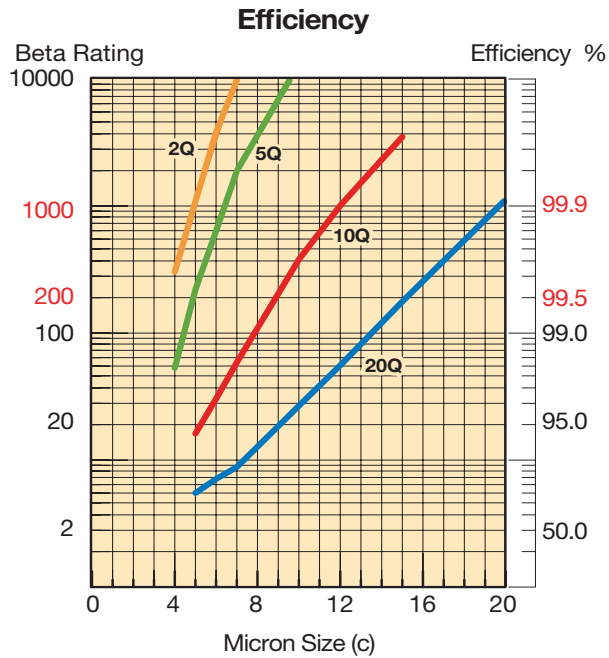


Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 100 psid terminal - 10 mg/L BUGL. Refer to Appendix for relationship to test standard ISO 4572.

\*Note: Pressure drop calculations are based on SAE-12 porting.

# PT Series

## PT2-2 Element Performance

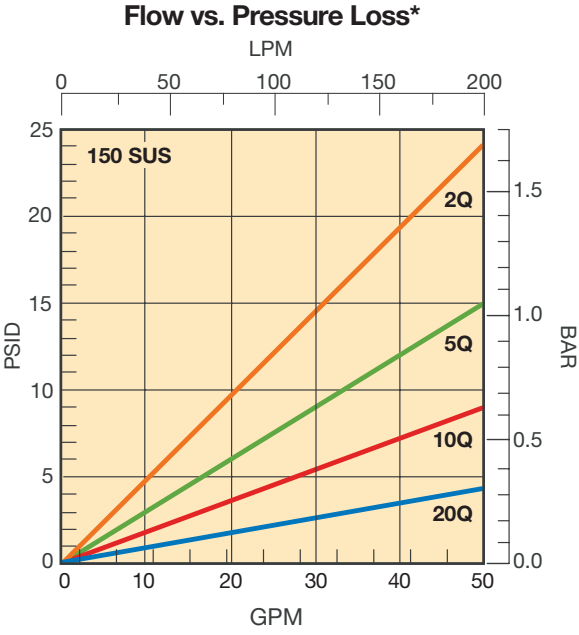
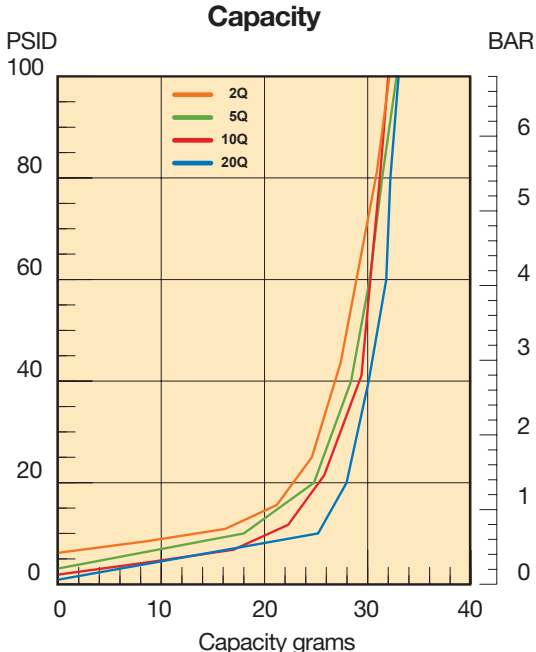
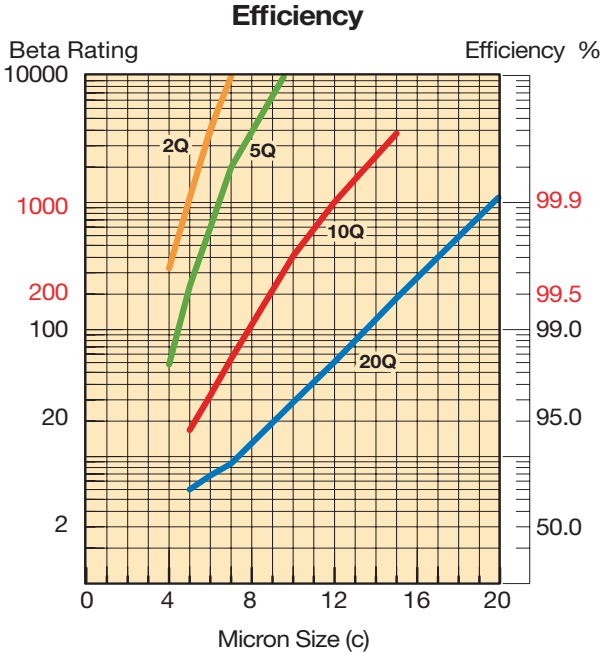


Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL. Refer to Appendix for relationship to test standard ISO 4572.

\*Note: Pressure drop calculations are based on SAE-12 porting.

# PT Series

## PT4-1 Element Performance

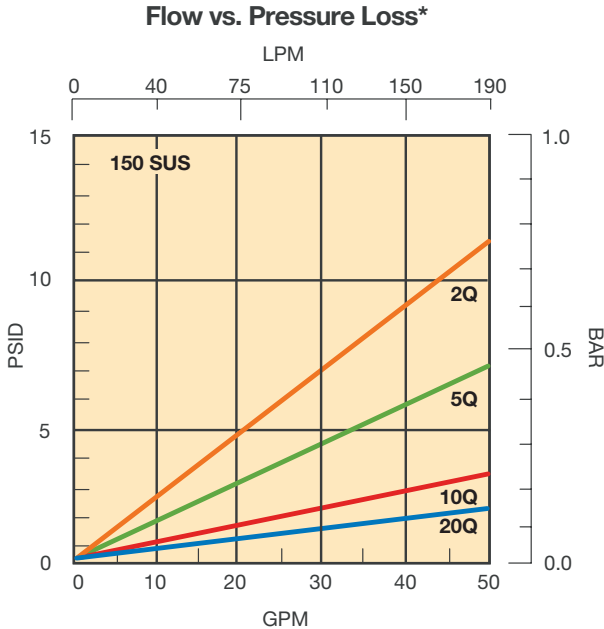
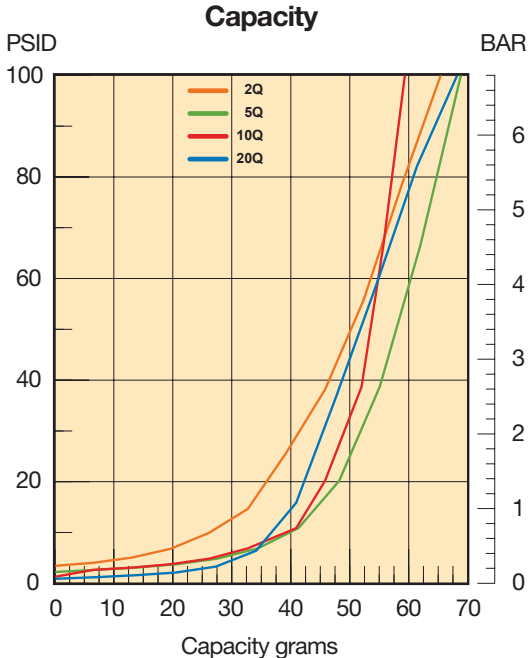
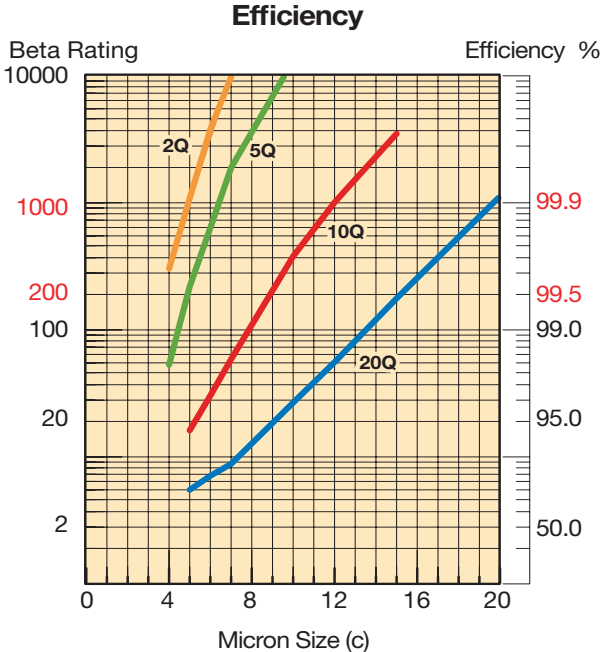


Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL. Refer to Appendix for relationship to test standard ISO 4572.

\*Note: Pressure drop calculations are based on SAE-16 porting.

# PT Series

## PT4-2 Element Performance

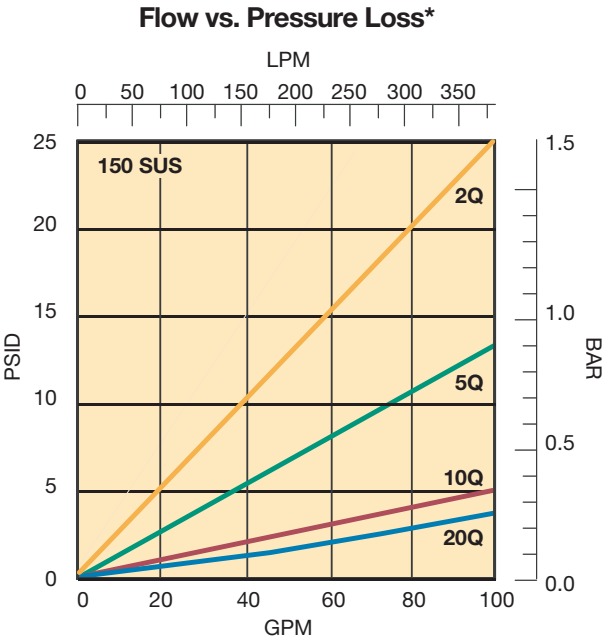
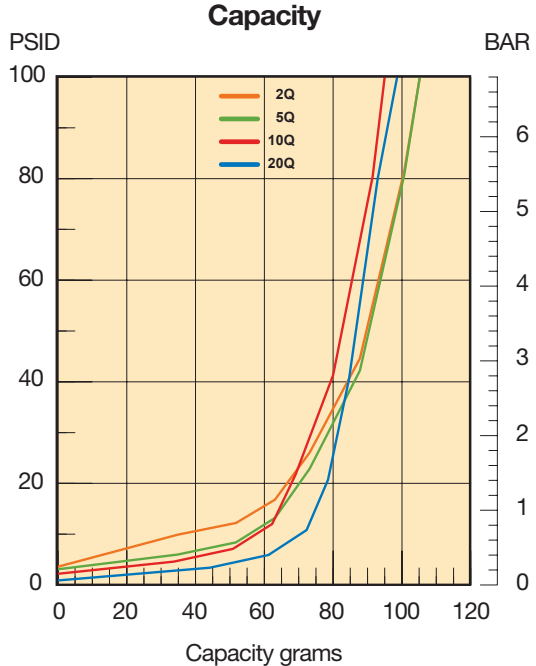
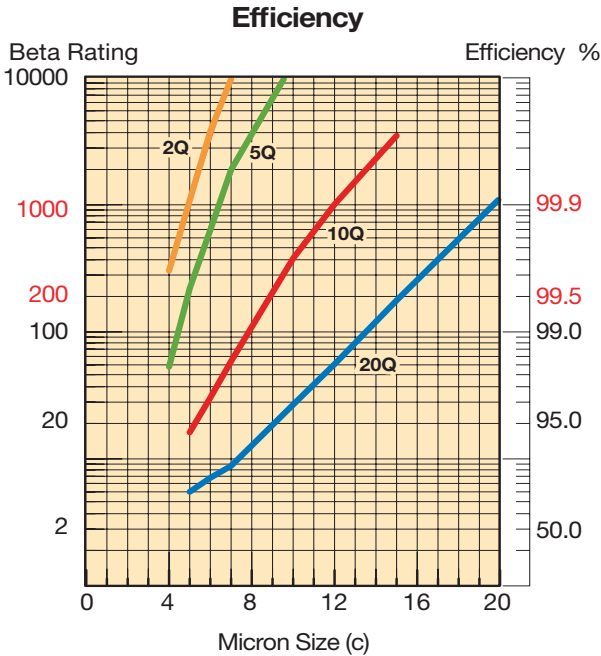


Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 100 psid terminal - 10 mg/L BUGL. Refer to Appendix for relationship to test standard ISO 4572.

\*Note: Pressure drop calculations are based on SAE-16 porting.

# PT Series

## PT4-3 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 100 psid terminal - 10 mg/L BUGL. Refer to Appendix for relationship to test standard ISO 4572.

\*Note: Pressure drop calculations are based on SAE-16 porting.

# PT Series

## Specifications - PT2

**Pressure Rating:**

Maximum Allowable Operating Pressure (MAOP): 150 psi ( 10.3 bar)

**Element Burst Rating:** 150 psid

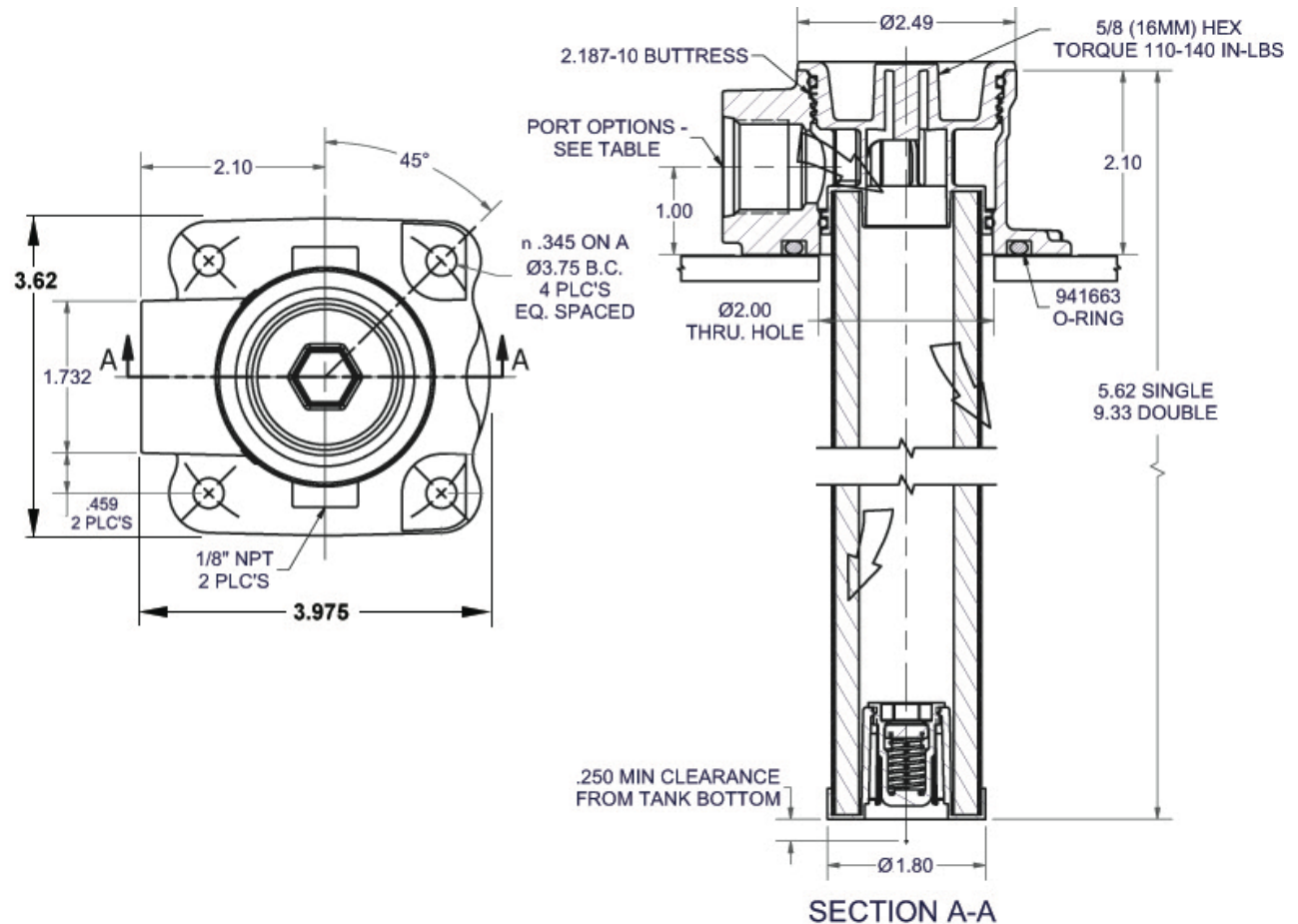
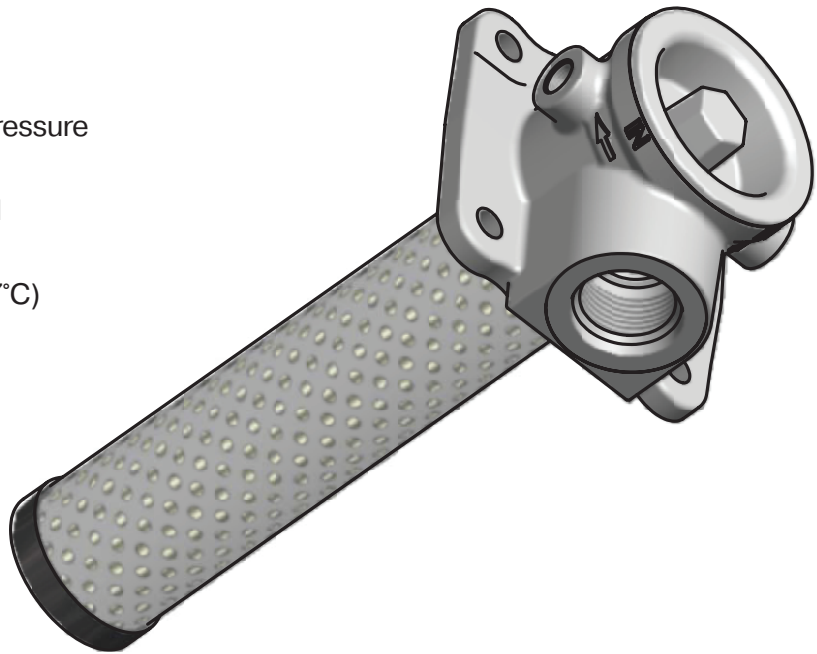
**Operating Temperatures:**

Buna: -40°F (-40°C) to 225°F (107°C)

**Materials:**

Tank Flange: aluminum

Endcaps: nylon



Drawings are for reference only.  
Contact factory for current version.

# PT Series

## Specifications - PT4

**Pressure Rating:**

Maximum Allowable Operating Pressure (MAOP): 150 psi ( 10.3 bar)

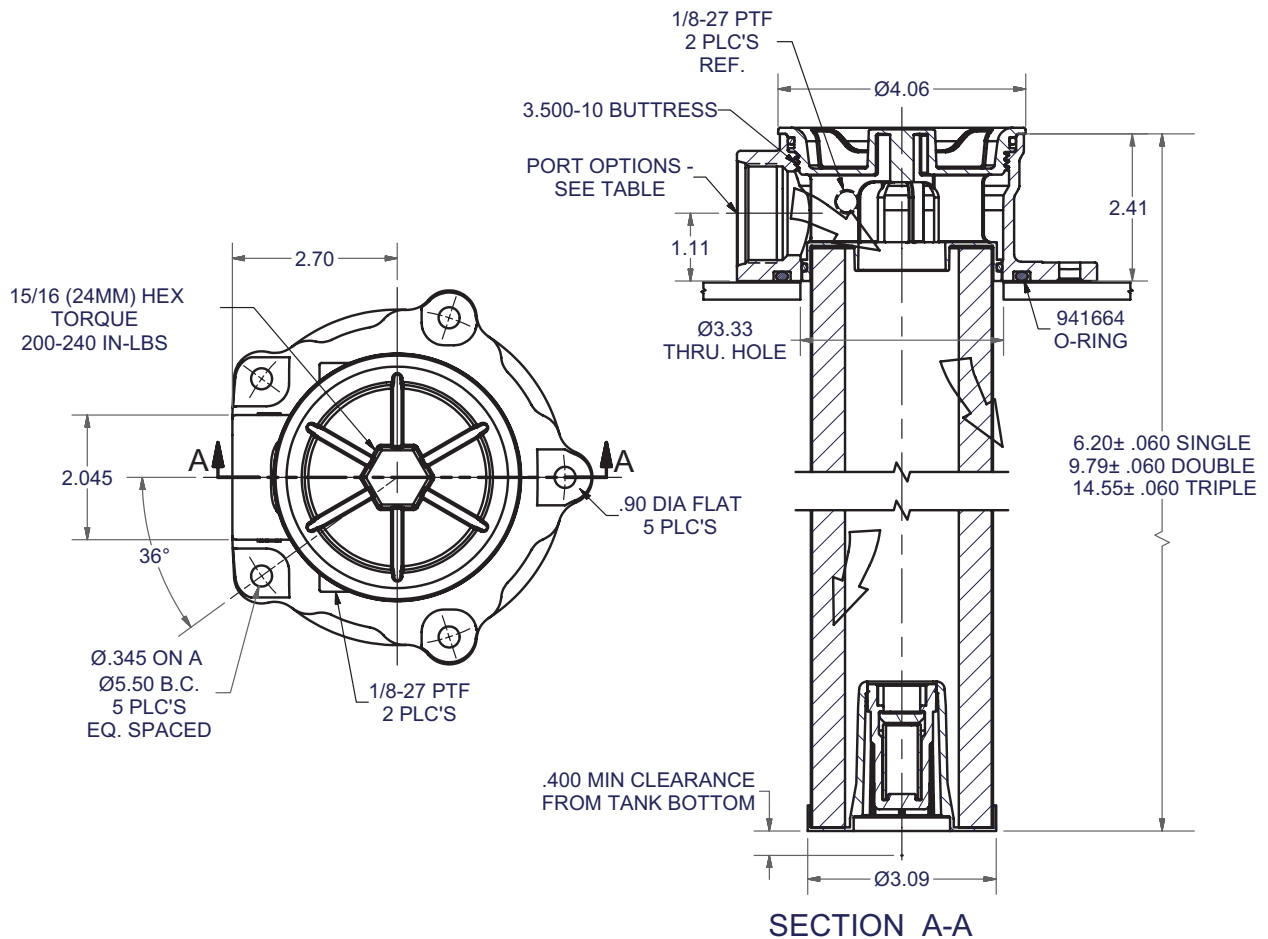
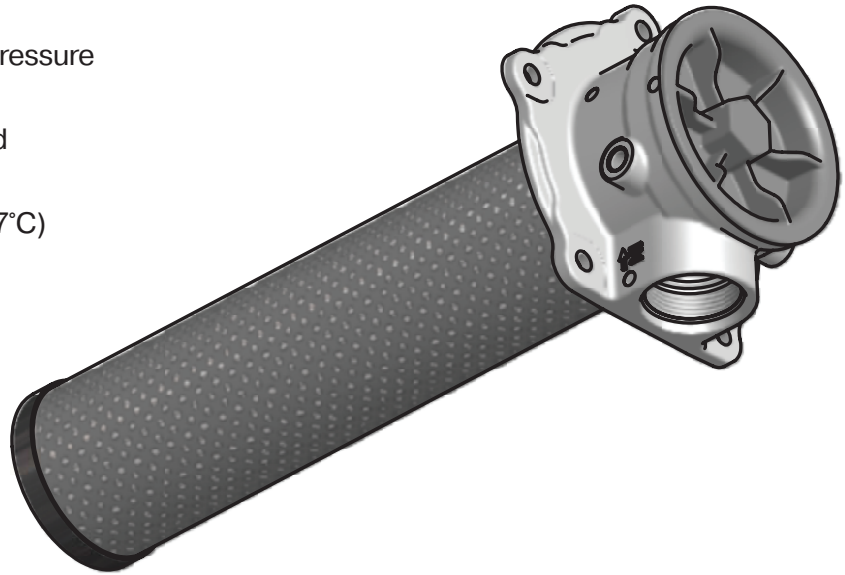
**Element Burst Rating:** 150 psid

**Operating Temperatures:**

Buna: -40°F (-40°C) to 225°F (107°C)

**Materials:**

Tank Flange: aluminum  
Endcaps: nylon

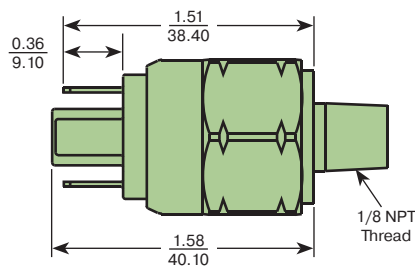
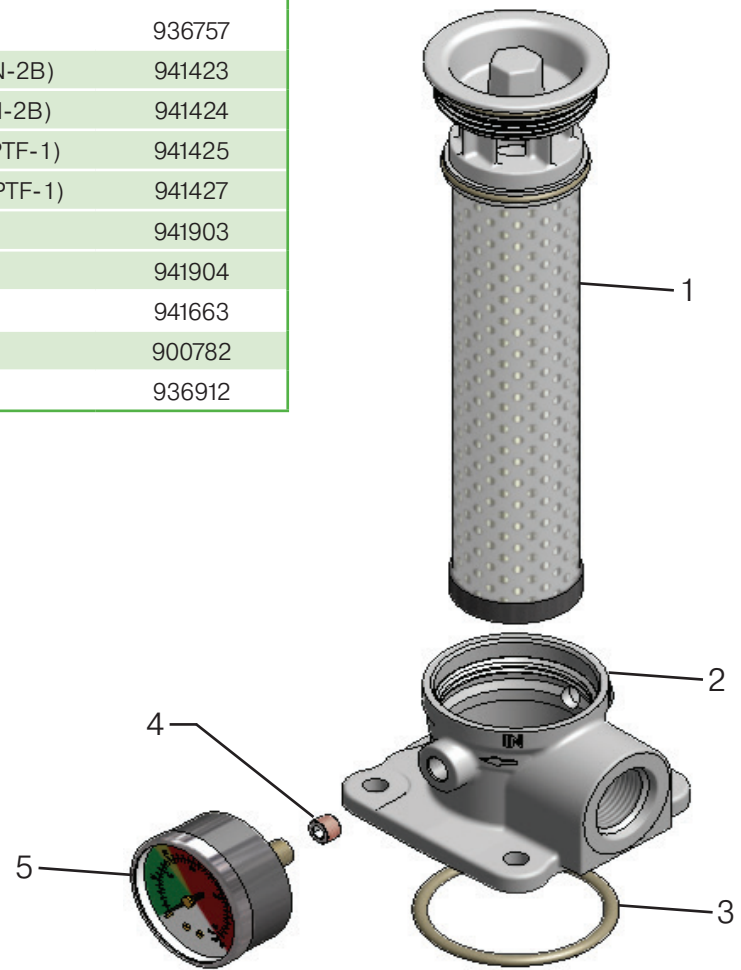


Drawings are for reference only.  
Contact factory for current version.

# PT Series

## PT2 Parts List

INDEX	PART DESCRIPTION	PART NUMBER
1	PT2-1-02Q-25 psid bypass	936750
	PT2-1-05Q-25 psid bypass	936751
	PT2-1-10Q-25 psid bypass	936752
	PT2-1-20Q-25 psid bypass	936753
	PT2-2-02Q-25 psid bypass	936754
	PT2-2-05Q-25 psid bypass	936755
	PT2-2-10Q-25 psid bypass	936756
	PT2-2-20Q-25 psid bypass	936757
2	PT2 DIE CAST SAE-12 (1.062-12 UN-2B)	941423
	PT2 DIE CAST SAE-16 (1.312-12 UN-2B)	941424
	PT2 DIE CAST 3/4" NPT (.750-14 NPTF-1)	941425
	PT2 DIE CAST 1" NPT (1.000-11.5 NPTF-1)	941427
	PT2 DIE CAST G3/4" BSPF	941903
	PT2 DIE CAST G1" BSPF	941904
	3	O-RING
4	1/8-27 PIPE PLUG	900782
5	1/8-27 PRESSURE GAUGE	936912

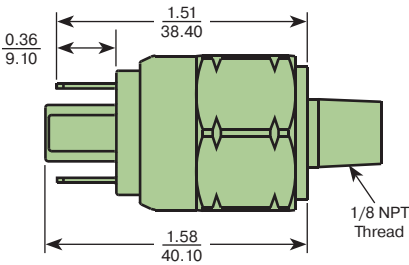
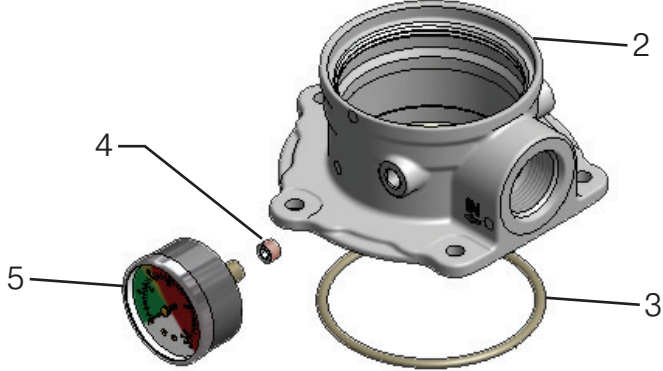
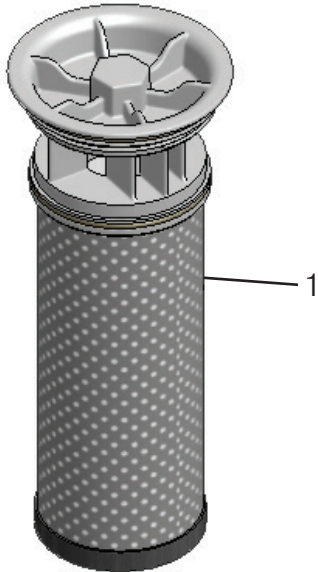


926923  
2-pin normally open switch

# PT Series

## PT4 Parts List

INDEX	PART DESCRIPTION	PART NUMBER
1	PT4-1-02Q-25 psid bypass	936742
	PT4-1-05Q-25 psid bypass	936743
	PT4-1-10Q-25 psid bypass	936744
	PT4-1-20Q-25 psid bypass	936745
	PT4-2-02Q-25 psid bypass	936746
	PT4-2-05Q-25 psid bypass	936747
	PT4-2-10Q-25 psid bypass	936748
	PT4-2-20Q-25 psid bypass	936749
	PT4-3-02Q-25 psid bypass	936876
	PT4-3-05Q-25 psid bypass	936877
	PT4-3-10Q-25 psid bypass	936878
	PT4-3-20Q-25 psid bypass	936879
	2	PT4 DIE CAST SAE-16 (1.312-12 UN-2B)
PT4 DIE CAST SAE-20 (1.625-12 UN-2B)		941448
PT4 DIE CAST 1" NPT (1.000-11.5 NPTF-1)		941449
PT4 DIE CAST 1 1/4" NPT (1.250-11.5 NPTF-1)		941450
PT4 DIE CAST G1" BSPF		941905
PT4 DIE CAST G1 1/4" BSPF		941906
3	O-RING	941664
4	1/8-27 PIPE PLUG	900782
5	1/8-27 PRESSURE GAUGE	936912



926923  
2-pin normally open switch

# PT Series<sup>1</sup>

## Tank top filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
PT2	1	10Q	B	G	G	S16	1

BOX 1: Filter Series	
Symbol	Description
PT2	Basic Model, 25 gpm
PT4	Basic Model, 50 gpm

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double
3	Triple (PT4 only)

BOX 3: Media Code <sup>1</sup>	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
V	Fluorocarbon

BOX 5: Indicator	
Symbol	Description
P	1/8" NPT Gauge Ports (2) Plugged
G	Pressure Gauge
S	Pressure switch

BOX 6: Bypass	
Symbol	Description
G	25 psid (1.7 bar)

BOX 7: Ports	
Symbol	Description
<b>PT2</b>	
S12	SAE-12 integral threads
S16	SAE-16 integral threads
<b>PT4</b>	
S16	SAE-16 integral threads
S20	SAE-20 integral threads

BOX 7: Options	
Symbol	Description
1	No options
W <sup>2</sup>	Steel weld ring

#### Notes:

- Filters include the element you select already installed.
- When "W" is selected in Box 8, the PT2 port options are "N12" and "S12"; the PT4 port option is "S16".



Hydraulic & Fuel Filtration Division  
www.parker.com/emhff

Last updated August 4th, 2023

Parker's willingness to conduct business with Buyer is expressly conditioned on Buyer's assent to Parker's Offer of Sale. www.parker.com/saleterms



# GLF Series

Low Pressure Tank Top Return Line Filters



ENGINEERING YOUR SUCCESS.



## Preventive

- fights costly equipment maintenance
- reduces system downtime
- controls solid contaminants
- protects fluid & system components

## GLF Series

The Parker GLF low pressure return line filter is engineered to deliver efficient contamination control and performance in today's demanding hydraulic circuits. The Parker GLF is designed to maximize capacity and element life while maintaining low pressure drop, even in cold start conditions. The optional two port design provides the user installation flexibility and reduces installed cost. The inside-to-outside flow path confines contaminant during element service and minimizes contaminant exposure to the reservoir. The GLF offers pressure gauge and pressure switch ports for visual or electrical switch monitoring of the installed element.



# GLF Series

## Typical Applications

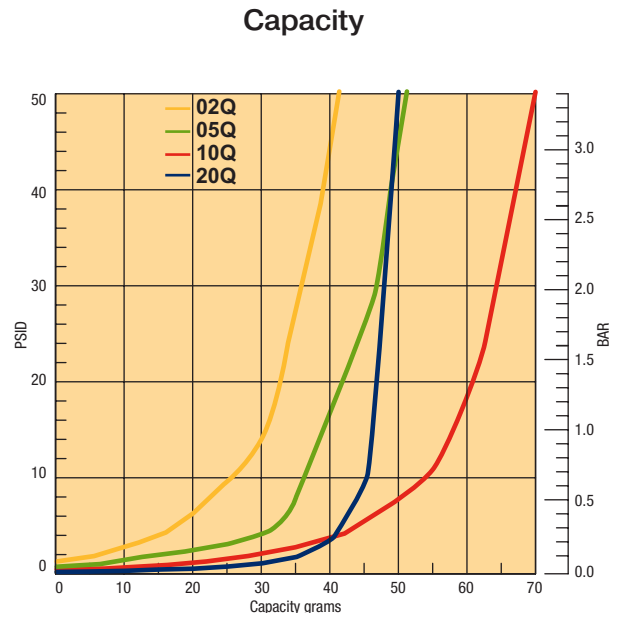
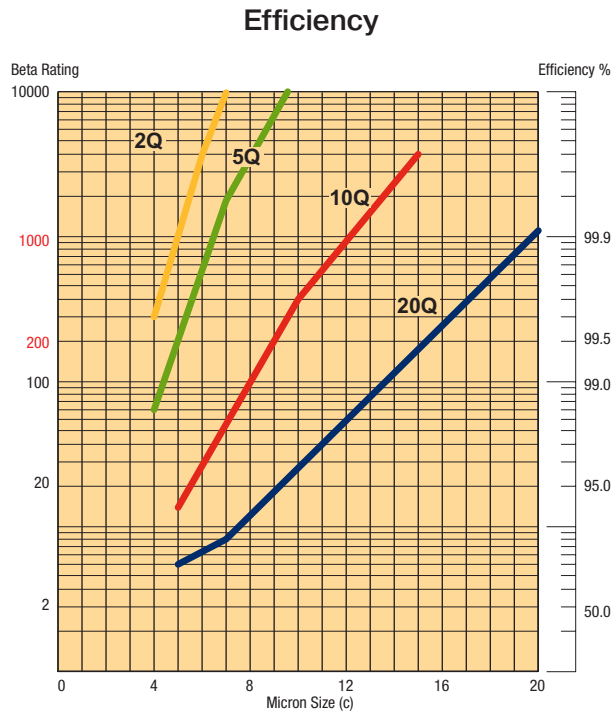
- Deck and Mobile cranes
- Fire fighting equipment
- Forwarders
- Hydraulic presses
- Marine steering units
- Power packs
- Excavators
- Harvesters
- Waste balers
- Reachstackers
- Wheel loaders
- Drilling equipment
- Industrial Power units
- Telehandlers
- Aerial Equipment
- Waste management, dump and fork lift trucks

## Features and Benefits

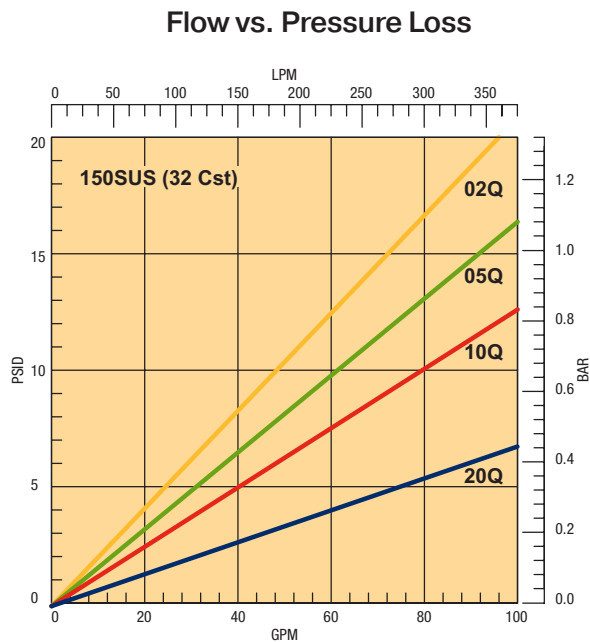
Feature	Advantage	Benefit
Filter design and element construction with perforated metal outer wrap	<ul style="list-style-type: none"> <li>• Provides excellent flow diffusing, controlling aeration</li> <li>• No bowl required</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced cost and assembly weight</li> <li>• Optimized performance</li> </ul>
High efficiency Microglass media maximizing filtration area	<ul style="list-style-type: none"> <li>• Combines high particle capture efficiency with high dirt holding capacity and lower <math>\Delta P</math></li> </ul>	<ul style="list-style-type: none"> <li>• Cleaner fluids, longer lasting with fewer service intervals</li> <li>• Continuous filtration in cold start conditions</li> <li>• Lower operating costs</li> </ul>
Element design includes integral bypass valve with closed bottom end cap	<ul style="list-style-type: none"> <li>• New bypass with each element change</li> <li>• Ensures captured contaminants are removed with each element change</li> </ul>	<ul style="list-style-type: none"> <li>• Ensures reliable bypass performance</li> <li>• Reduced risk for contamination during service</li> </ul>
Optional Magnetic prefiltration	<ul style="list-style-type: none"> <li>• Removes large ferrous contaminants</li> </ul>	<ul style="list-style-type: none"> <li>• Extends element life</li> <li>• Visual indication of component wear</li> </ul>
Patented filter element	<ul style="list-style-type: none"> <li>• Promotes genuine service parts</li> </ul>	<ul style="list-style-type: none"> <li>• Guaranteed quality of filtration</li> </ul>
Inside-to-Outside filtration	<ul style="list-style-type: none"> <li>• All captured contamination retained inside the element</li> </ul>	<ul style="list-style-type: none"> <li>• No recontamination of system during the change of the element</li> </ul>
Service friendly product design	<ul style="list-style-type: none"> <li>• Easy servicing by simple element change</li> <li>• End cap Bridge grip for easy element removal</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces service time for filter</li> </ul>
Visual or Electrical indicators	<ul style="list-style-type: none"> <li>• Know exactly when to service the element</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces downtime with scheduled service</li> </ul>
Top access element service	<ul style="list-style-type: none"> <li>• Oil remains in housing</li> <li>• Quicker element change</li> </ul>	<ul style="list-style-type: none"> <li>• No spills</li> <li>• Reduced maintenance costs</li> </ul>
Head with 2 Inlet Ports	<ul style="list-style-type: none"> <li>• Can be used as a fill port</li> <li>• Offers installation flexibility</li> </ul>	<ul style="list-style-type: none"> <li>• All added oil is filtered</li> <li>• Reduced connections</li> </ul>

# GLF2 Series

## GLF2-1 Element Performance

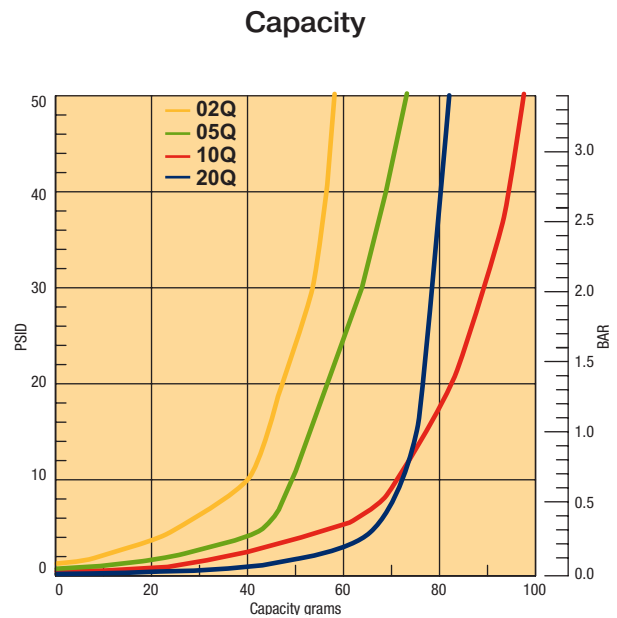
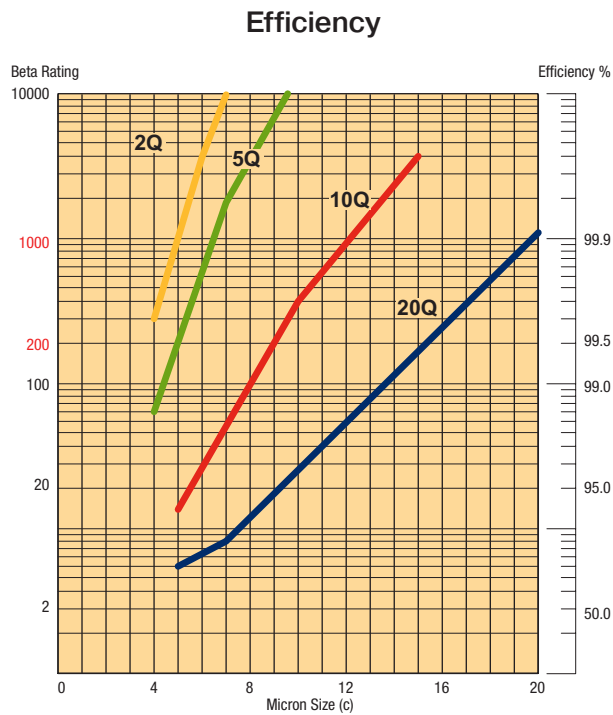
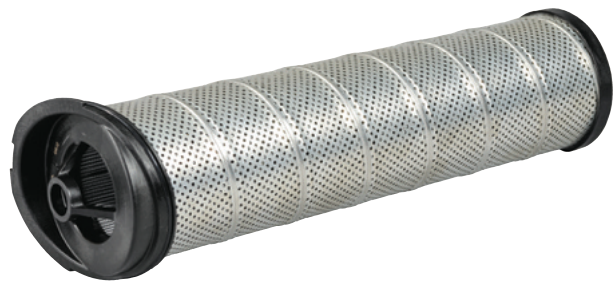


Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 50 psid terminal - 10 mg/L BUGL

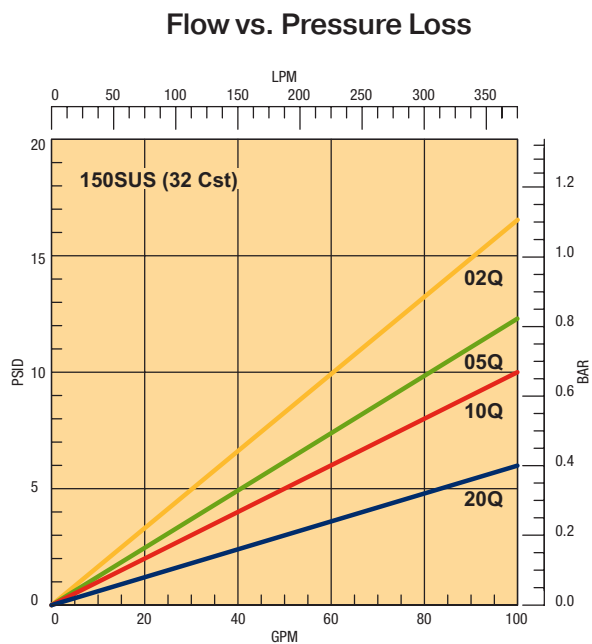


# GLF2 Series

## GLF2-2 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 50 psid terminal - 10 mg/L BUGL

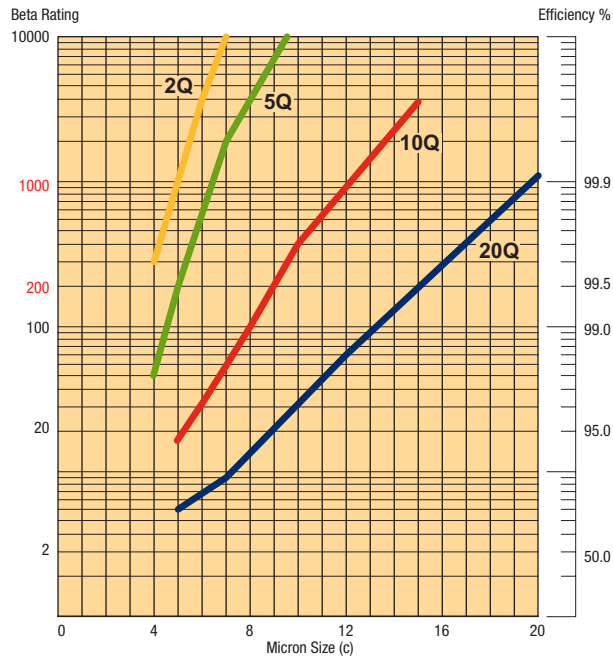


# GLF3 Series

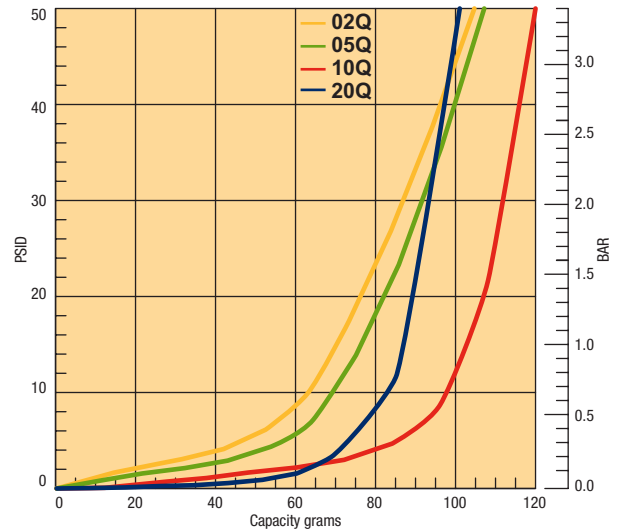
## GLF3-1 Element Performance



Efficiency

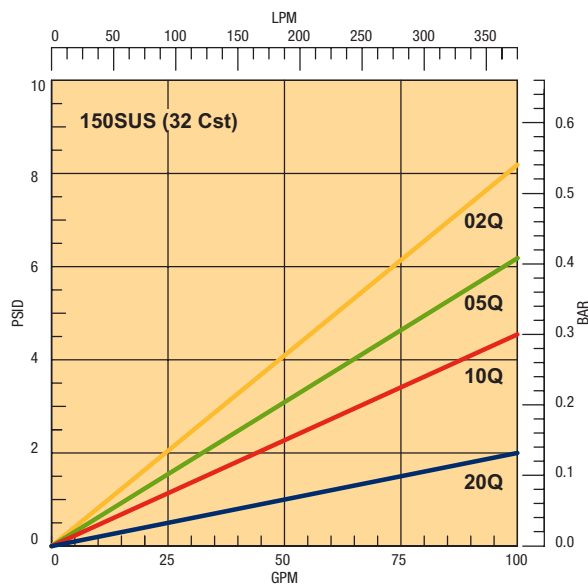


Capacity



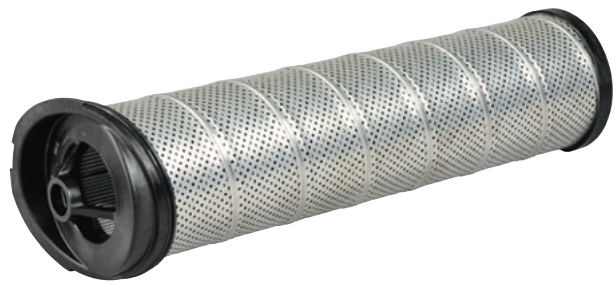
Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 50 psid terminal - 10 mg/L BUGL

Flow vs. Pressure Loss

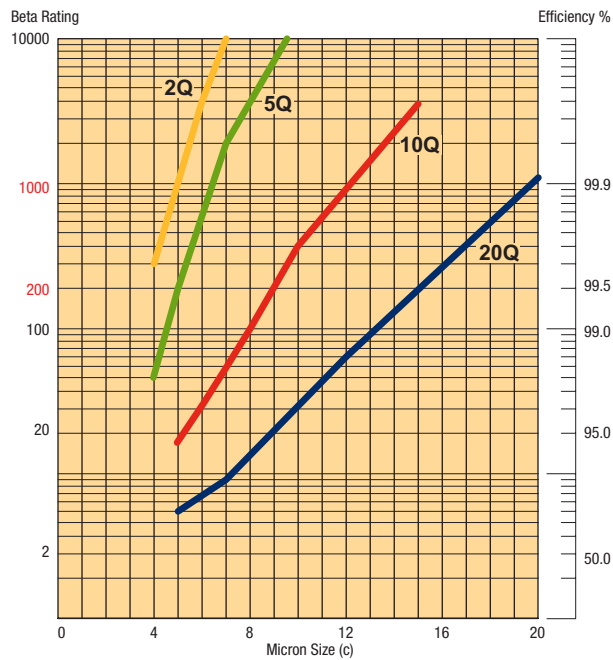


# GLF3 Series

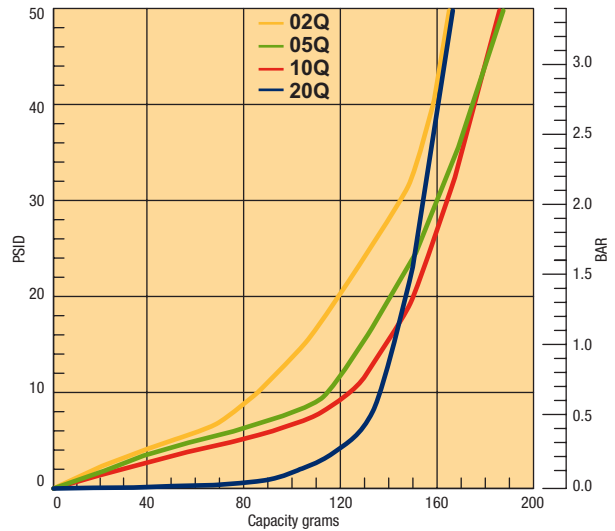
## GLF3-2 Element Performance



**Efficiency**

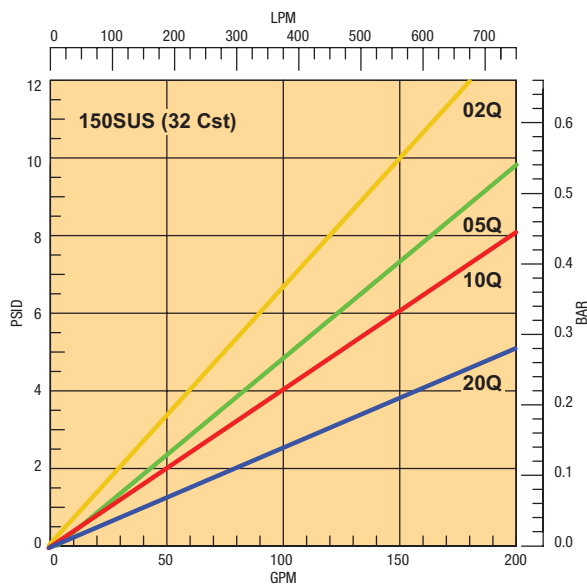


**Capacity**



Results typical from Multi-pass tests run per test standard ISO 16889 @ 70 gpm to 50 psid terminal - 10 mg/L BUGL

**Flow vs. Pressure Loss**

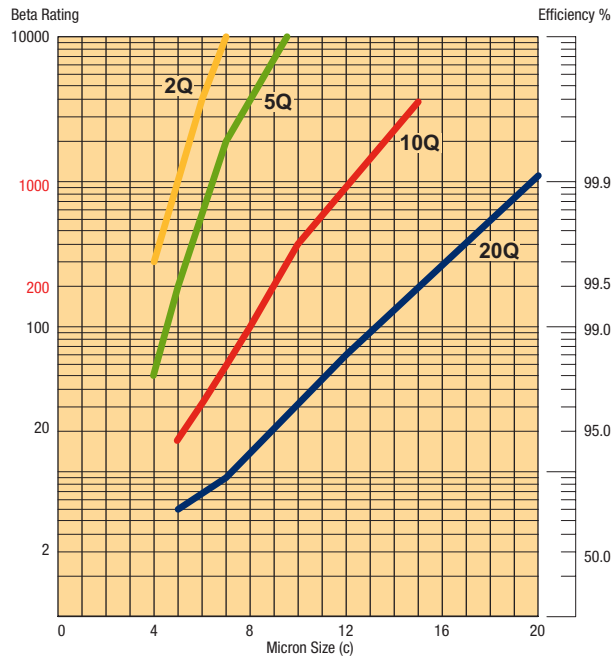


# GLF4 Series

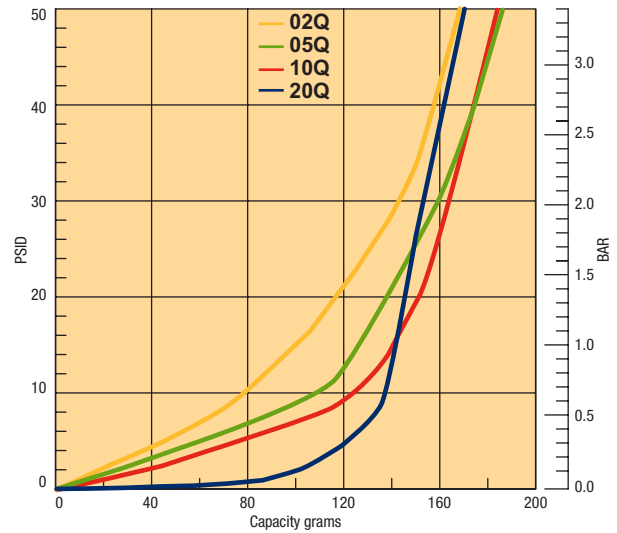
## GLF4-1 Element Performance



Efficiency

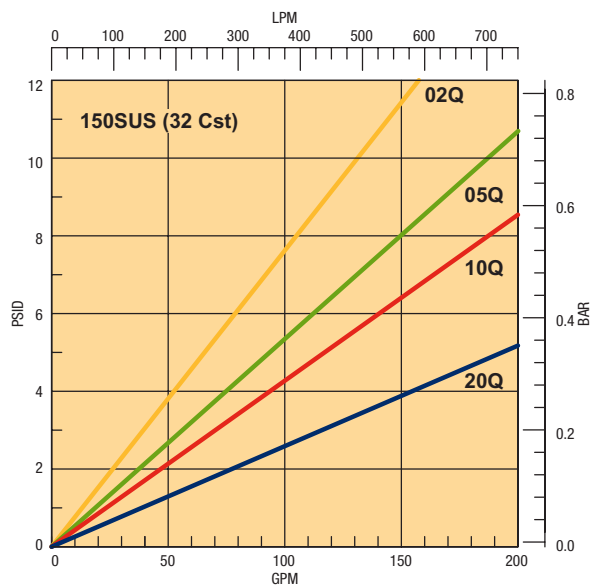


Capacity



Results typical from Multi-pass tests run per test standard ISO 16889 @ 70 gpm to 50 psid terminal - 10 mg/L BUGL

Flow vs. Pressure Loss

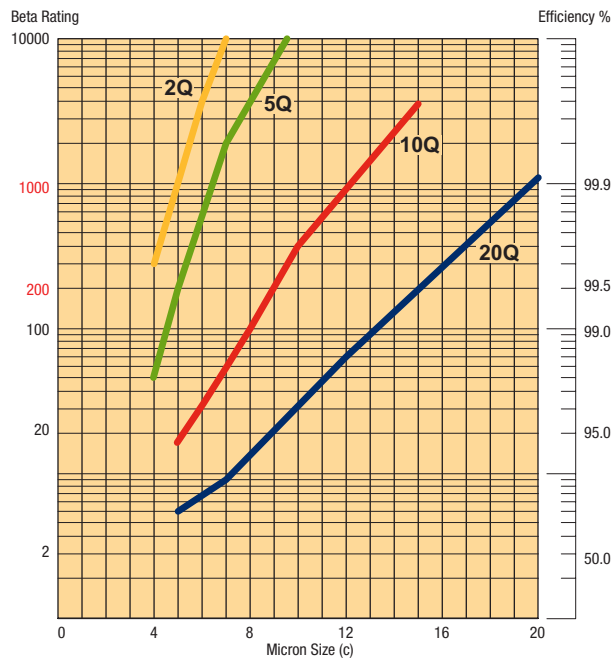


# GLF4 Series

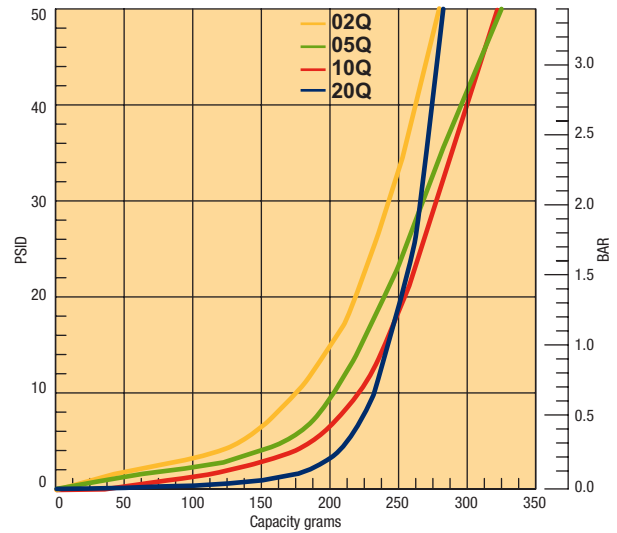
## GLF4-2 Element Performance



Efficiency

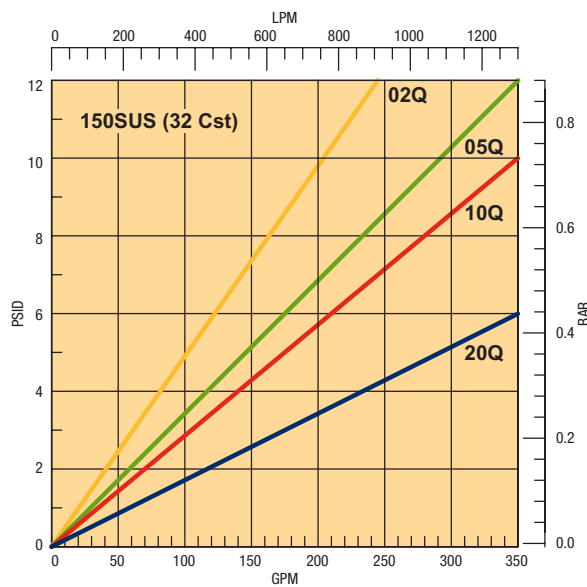


Capacity



Results typical from Multi-pass tests run per test standard ISO 16889 @ 70 gpm to 50 psid terminal - 10 mg/L BUGL

Flow vs. Pressure Loss



# GLF2 Series

## Specifications & Dimensions

### Pressure Ratings:

**Maximum Allowable Operating Pressure (MAOP):**

150 psi (10.3 bar)

### Operating Temperatures:

Nitrile: -40°F (-40°C) to 225°F (107°C)

Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Element Burst Rating:

150 psid (10.3 bar)

### Filtration Media Grade:

2, 5, 10 & 20Q

### Element Condition Indicators:

Gauge: 0-60 psi color coded

Switch: 30 psi SPDT 5A, 12/24

VDC and 125/250 VAC, 3-pin

Deutsch DT04-3P

### Materials:

Head: Cast Aluminum Alloy

Cover: GF Nylon

Bypass Valve: GF Nylon, Music wire

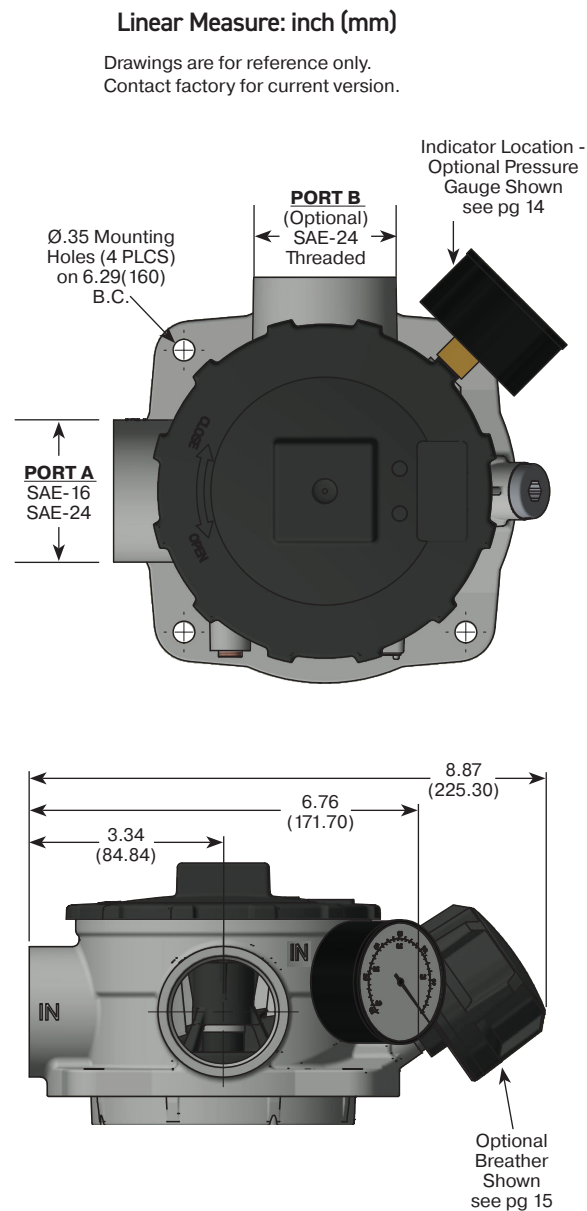
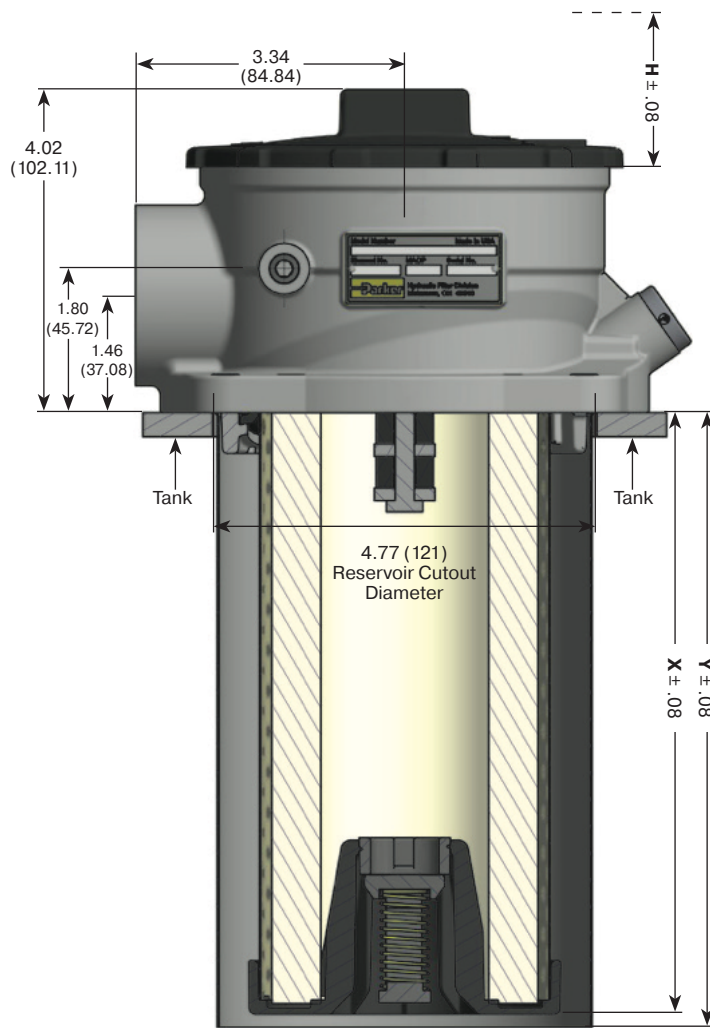
Filter Media: Microglass composite

Element End Caps: GF Nylon

### Weights (approximate):

GLF2-1 . . . . . 4 lbs. (1.81 kg)

GLF2-2 . . . . . 5 lbs. (2.27 kg)



### Linear Measure: inch (mm)

Drawings are for reference only.  
Contact factory for current version.

Model	X Element Depth	Y Drop Tube	H Element Removal Clearance
GLF2-1	7.49 (190.2)	7.65 (194.31)	9.04 (229.6)
GLF2-2	11.26 (286.0)	11.45 (290.8)	12.81 (325.4)

# GLF3 Series

## Specifications & Dimensions

### Pressure Ratings:

**Maximum Allowable Operating Pressure (MAOP):**

150 psi (10.3 bar)

### Operating Temperatures:

Nitrile: -40°F (-40°C) to 225°F (107°C)

Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Element Burst Rating:

150 psid (10.3 bar)

### Filtration Media Grade:

2, 5, 10 & 20Q

### Element Condition Indicators:

Gauge: 0-60 psi color coded  
Switch: 30 psi SPDT 5A, 12/24 VDC and 125/250 VAC, 3-pin Deutsch DT04-3P

### Materials:

Head & Cover: Cast Aluminum Alloy

Bypass Valve: GF Nylon, Music wire

Filter Media: Microglass composite

Element End Caps: GF Nylon

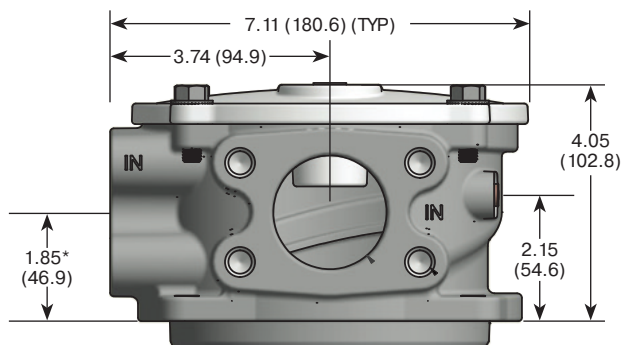
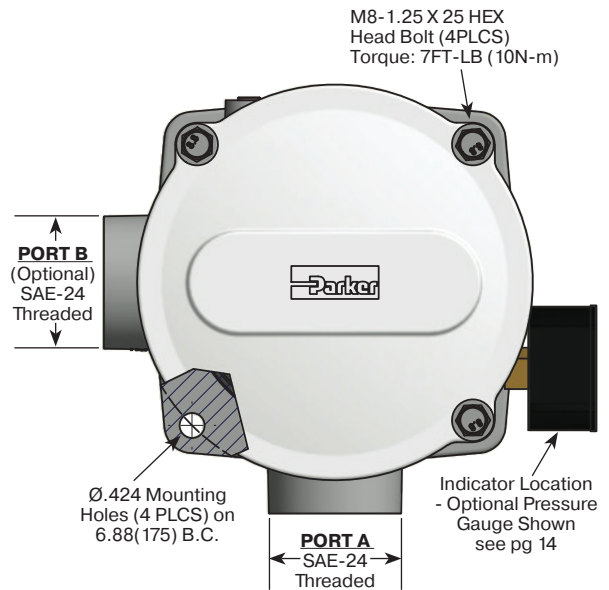
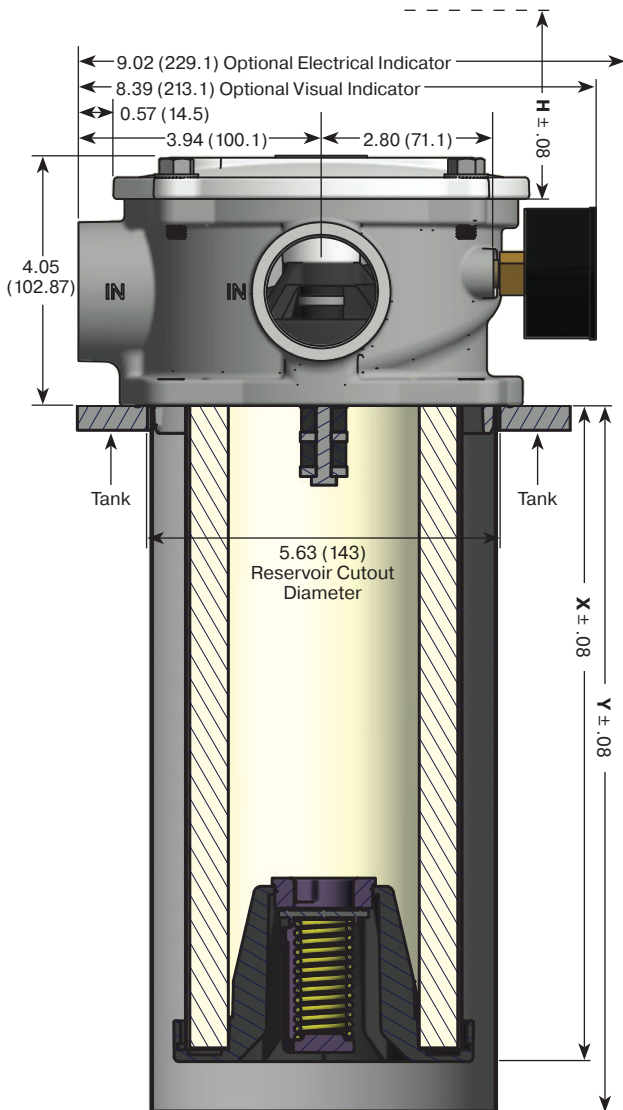
### Weights (approximate):

GLF3-1 . . . . . 7 lbs. (3.18 kg)

GLF3-2 . . . . . 8 lbs. (3.63 kg)

### Linear Measure: inch (mm)

Drawings are for reference only.  
Contact factory for current version.



Model	X Element Depth	Y Drop Tube	H Element Removal Clearance
GLF3-1	10.48 (266.2)	11.65 (295.9)	12.8 (325.1)
GLF3-2	16.68 (423.7)	17.48 (443.9)	19.00 (482.6)

\*Check to ensure flange clearance. Weld plate or low profile flange kit may be required.

Dual 2" SAE Code 61  
Flange Face Option  
See Typical Flange  
Dimensions pg 12

# GLF4 Series

## Specifications & Dimensions

### Pressure Ratings:

**Maximum Allowable Operating Pressure (MAOP):**  
150 psi (10.3 bar)

### Operating Temperatures:

Nitrile: -40°F (-40°C) to 225°F (107°C)  
Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Element Burst Rating:

150 psid (10.3 bar)

### Filtration Media Grade:

2, 5, 10 & 20Q

### Element Condition Indicators:

Gauge: 0-60 psi color coded  
Switch: 30 psi SPDT 5A, 12/24 VDC and 125/250 VAC, 3-pin Deutsch DT04-3P

### Materials:

Head & Cover: Cast Aluminum Alloy

Bypass Valve: GF Nylon, Music wire

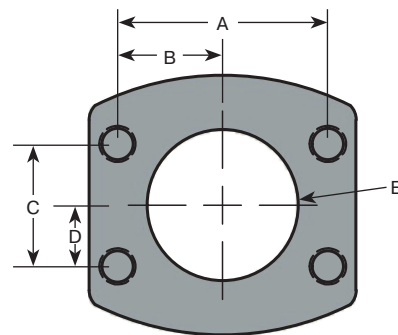
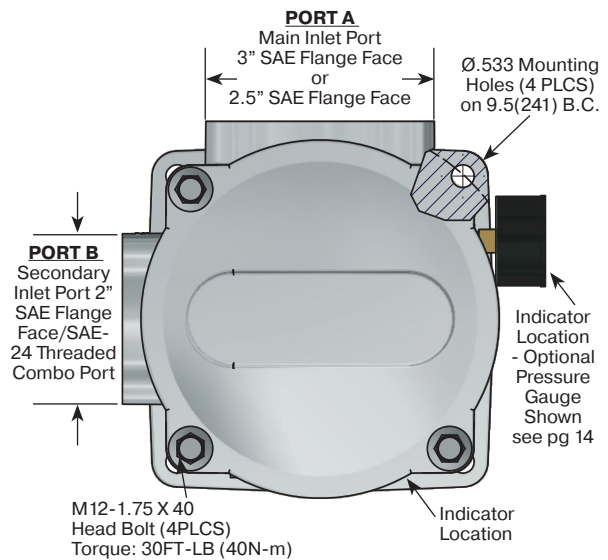
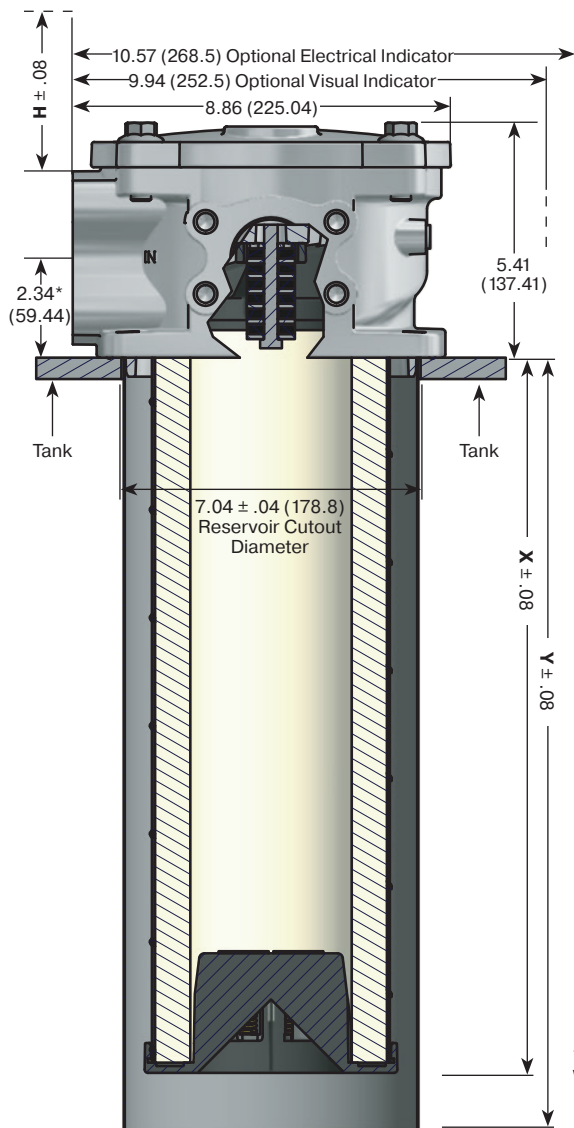
Filter Media: Microglass composite

Element End Caps: GF Nylon

### Weights (approximate):

GLF4-1 . . . . . 9 lbs. (4.08 kg)

GLF4-2 . . . . . 10 lbs. (4.54 kg)



Typical Flange Dimensions Reference SAE J518

Port	A	B	C	D	E (Ø)	Thread
2"	3.06 (77.7)	1.53 (38.86)	1.69 (42.93)	.84 (21.33)	2 (50.8)	1/2-13 UNC
2.5"	3.50 (88.9)	1.75 (44.45)	2.00 (50.8)	1.0 (25.4)	2.5 (63.5)	1/2-13 UNC
3"	4.19 (106.7)	2.09 (53.09)	2.44 (61.97)	1.22 (30.99)	3 (76.2)	5/8-11

Model	X Element Depth	Y Drop Tube	H Element Removal Clearance
GLF4-1	10.56 (268)	11.83 (300.5)	12.8 (325.1)
GLF4-2	16.78 (426)	18.04 (458.2)	19.00 (482.6)

\*Check to ensure flange clearance. Weld plate or low profile flange kit may be required.

### Linear Measure: inch (mm)

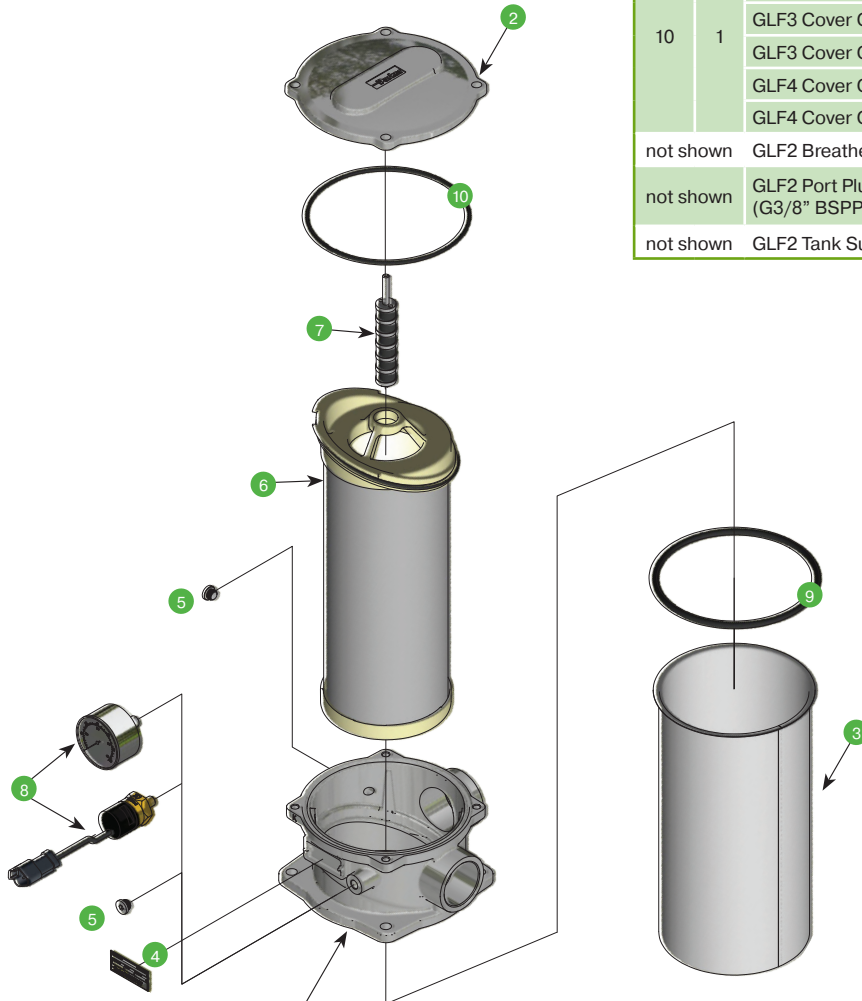
Drawings are for reference only. Contact factory for current version.

# GLF Series

## Parts List

Item	Qty	Description	Part Number
1	1	Head GLF2, SAE-16 inlet port	946902
		Head GLF2, SAE-24 inlet port	946903
		Head GLF2, 2 x SAE-24 inlet ports	946319
		Head GLF3, SAE-24 inlet port	945848
		Head GLF3, 2 x SAE-24 inlet ports	945852
		Head GLF3, 2x2" SAE Code 61 Flange Face Inlet Ports	946317
		Head GLF4, 1x2.5", 1x2" SAE Code 61 flange face inlet ports	946270
		Head GLF4, 1x3", 1x2" SAE Code 61 flange face inlet ports	946285
2	1	GLF2 cover	84.21.471.52
		GLF3 cover	945858
		GLF4 cover	946289
3	1	Drop tube GLF2-1	85.01.016.121*
		Drop tube GLF2-2	85.01.016.122*
		Drop tube GLF3-1	85.01.016.132*
		Drop tube GLF3-2	945891*
		Drop tube GLF4-1	946564*
		Drop tube GLF4-2	946565*

Item	Qty	Description	Part Number
4	1	Name plate	920928
5	2	1/8 - 27 pipe plug	900782
not shown		GLF3 M8 - 1.25 x 25 grade 8.8 bolt serrated flange	946559
not shown		GLF4 M12 - 1.75 x 40 grade 8.8 bolt serrated flange	946581
6	1	Replacement elements	See table on pg 16
7	1	GLF2 Magnet assembly	90.14.086.32*
		GLF3 Magnet assembly	90.14.086.33*
		GLF4 Magnet assembly	946455*
8	1	Pressure gauge	946326*
		Pressure switch	946367*
9	1	GLF2 Base Gasket nitrile	81.05.150.32
		GLF2 Base Gasket fluorocarbon	81.05.152.32*
		GLF3 Base Gasket nitrile	81.05.159.33
		GLF3 Base Gasket fluorocarbon	81.05.161.33*
		GLF4 Base Gasket nitrile	81.05.159.34
GLF4 Base Gasket fluorocarbon	81.05.161.34*		
10	1	GLF2 Cover O-ring nitrile	N72246
		GLF2 Cover O-ring fluorocarbon	V72246*
		GLF3 Cover O-ring nitrile	N72256
		GLF3 Cover O-ring fluorocarbon	V72256*
		GLF4 Cover O-ring nitrile	N72263
GLF4 Cover O-ring fluorocarbon	V72263*		
not shown		GLF2 Breather	AB685101*
not shown		GLF2 Port Plug, Airbreather (G3/8" BSPP)	VSTI3/8EDCF
not shown		GLF2 Tank Support Ring	84.71.471.22

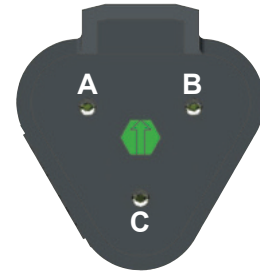
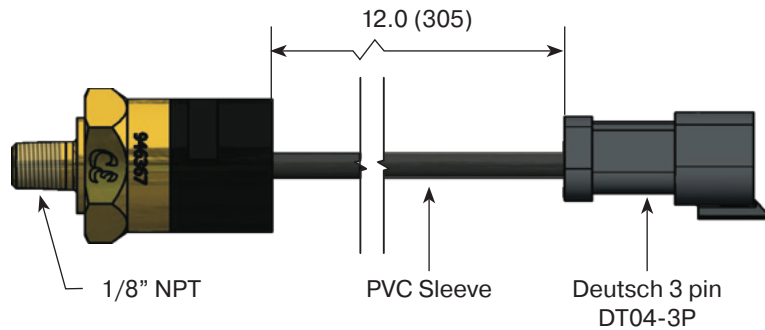


\* options

# GLF Series

## Options and Accessories

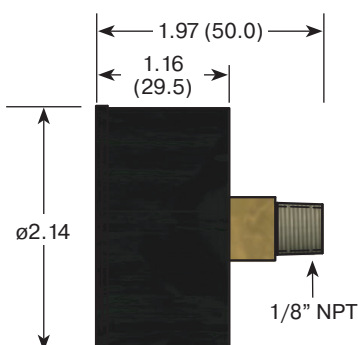
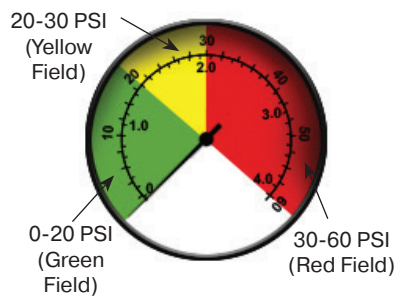
### Electrical Switch (30 psi) PN 946367



#### Wiring Code

Switch Contact	Receptacle
Common	Socket A
Normally Closed	Socket B
Normally Open	Socket C

### Pressure Gauge PN 946326



### 2 inch Flange Adapter Kits (flange, 4 bolts, o-ring)

Size	Part Number	
	Nitrile	Fluorocarbon
3/4 inch NPTF	924788	926013
1 inch NPTF	924787	926012
1 1/4 inch NPTF	924912	926004
1 1/2 inch NPTF	924786	926011
2 inch NPTF	924785	926010
SAE - 12	924784	926009
SAE - 16	924783	926008
SAE - 20	924913	926005
SAE - 24	924782	926007
Flange blank	924781	926006

#### Low Profile Split Flange Kit (nitrile)

2"	947097
3"	947098

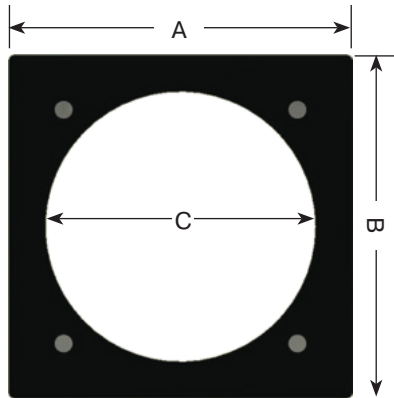
Linear Measure: inch (mm)

Drawings are for reference only.  
Contact factory for current version.

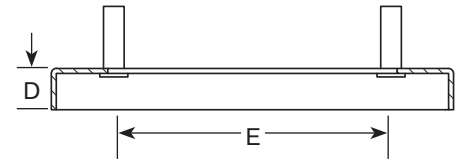
# GLF Series

## Options and Accessories

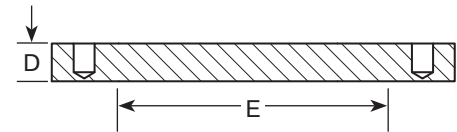
### Weld Plates



GLF3 - PN 946567



GLF4 - PN 946765



Model inch/mm	A	B	C	D	E - Hole in Reservoir	Thread
<b>GLF3</b>	7.15 (182)	7.15 (182)	5.63 (143)	1 (25)	5.75-6.25 (146-159)	3/8-16 UNC-2A
<b>GLF4</b>	8.00 (203)	8.00 (203)	7.01 (178)	.75 (19)	7.1-7.25 (180-184)	1/2-13 UNC-2B

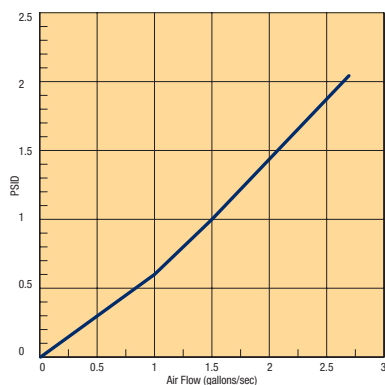
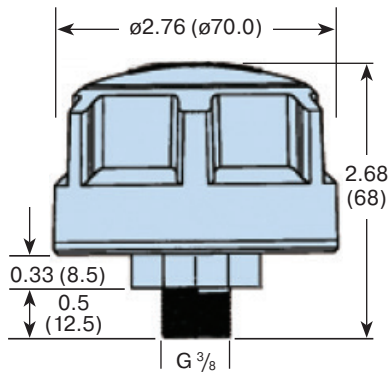
### GLF2 Breather

PN AB.685101

**Construction:** GF nylon and glass coupled polypropylene.

**Element:** Expanded Polyurethane foam, 10 micron absolute.

**Seal:** Nitrile.

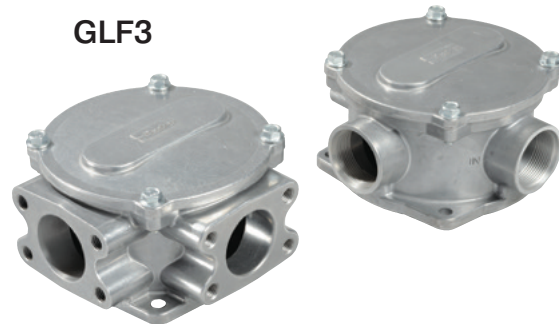


### Inlet Port Options

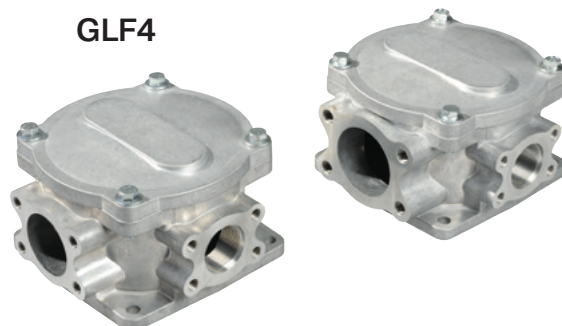
GLF2



GLF3



GLF4



# GLF Series

## Operating and Maintenance Instructions

### A. Start-Up

1. Check for and eliminate leaks upon system start-up.
2. Check differential pressure indicator, if installed, to monitor element condition.

### B. Service

1. An element must be serviced when the indicator indicates service is required.

**NOTE:** If the filter is not equipped with an indicator, the element should be serviced according to machine manufacturer's instructions.

### C. Servicing Dirty Element

1. Shut system down to assure that there is **NO PRESSURE OR FLOW** into the filter housing.
2. Remove the filter cover.
3. Remove and discard the contaminated element cartridge.

### D. Before Installing a New Element Cartridge

1. Clean the magnetic core, if fitted, with a lint-free cloth.
2. Check all seals and replace if necessary.

### E. To Install a New Element Cartridge

1. Lubricate all seals.
2. Align filter element end cap with guide posts located in head.
3. Mount new filter cartridge.
4. Re-install the cover.
5. Torque the cover bolts per drawing.

# GLF Series<sup>1</sup>

## Low pressure filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
GLF3	2	10Q	B	P	I	S24	1

BOX 1: Filter Series	
Symbol	Description
GLF2	Tank Top Return Line Filter
GLF3	Tank Top Return Line Filter
GLF4	Tank Top Return Line Filter

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double

BOX 3: Media Code	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron

BOX 4: Seal Material	
Symbol	Description
B	Nitrile (NBR)
V	Fluorocarbon (FKM)

BOX 5: Indicator	
Symbol	Description
P	Plugged Ports
G	Pressure Gauge (Tri-color)
S	Pressure Switch

BOX 6: Bypass	
Symbol	Description
I	35 psid (2.4 bar)

BOX 7: Ports	
Symbol	Description
<b>GLF2</b>	
S16	SAE-16 Inlet Port
S24	SAE-24 Inlet Port
2S24	Dual SAE-24 Inlet Ports
<b>GLF3</b> <sup>2,3</sup>	
S24	SAE-24 Inlet Port
2S24	Dual SAE-24 Inlet Ports
2Y32	Dual SAE 2" Code 61 Flange Face Ports (1/2" - 13 UNC)
<b>GLF4</b> <sup>2,3</sup>	
2Y40	Dual SAE Code 61 Flange Face Ports (1x2 1/2", 1x2")
2Y48	Dual SAE Code 61 Flange Face Ports (1x3", 1x2")

BOX 8: Options	
Symbol	Description
1	None
M	Magnets
D	Drop Tube
MD	Magnets and Drop Tube

#### Notes:

- The filter includes the element you select already installed.
- A single SAE flange port connection can be achieved as follows: GLF3: Select "2Y32" at Box 7 and install a separately purchased flange blank kit; GLF4: Select "2Y40" or "2Y48" at Box 7 and install a separately purchased flange blank kit.
- Flange blank kit (2") part numbers are 924781 (nitrile), 926006 (fluorocarbon).

### Replacement Elements

Media	GLF2			
	Single Length		Double Length	
	Nitrile	Fluorocarbon	Nitrile	Fluorocarbon
02Q	946849Q	946841Q	946853Q	946845Q
05Q	946850Q	946842Q	946854Q	946846Q
10Q	946851Q	946843Q	946855Q	946847Q
20Q	946852Q	946844Q	946856Q	946848Q

Media	GLF3			
	Single Length		Double Length	
	Nitrile	Fluorocarbon	Nitrile	Fluorocarbon
02Q	945894Q	945906Q	945898Q	945910Q
05Q	945895Q	945907Q	945899Q	945911Q
10Q	945896Q	945908Q	945900Q	945912Q
20Q	945897Q	945909Q	945901Q	945913Q

Media	GLF4			
	Single Length		Double Length	
	Nitrile	Fluorocarbon	Nitrile	Fluorocarbon
02Q	946431Q	946456Q	946435Q	946460Q
05Q	946432Q	946457Q	946436Q	946461Q
10Q	946433Q	946458Q	946437Q	946462Q
20Q	946434Q	946459Q	946438Q	946463Q



Hydraulic & Fuel Filtration Division

[www.parker.com/emhff](http://www.parker.com/emhff)

Last updated August 4th, 2023



# Moduflow™ *Plus* Series

Low Pressure Filters



Inline



Tank Mounted



ENGINEERING YOUR SUCCESS.

# Moduflow™ *Plus* Series

## Applications

- **Power Unit Fabrication**
- **Off-line Filter Loops**
- **Mobile Equipment**

The Moduflow filter is widely considered the most versatile filter available on the market.

The end cap minimizes turbulence and pressure loss through the filter, improving system performance.

The closed bottom elements for the ILP models insures all contamination remains trapped within the element as the filter is serviced.

A wide variety of visual and electrical indicators allows you to know exactly when the element needs to be serviced. There is even a “no element” indicator that can sense when there is not an element installed in the filter.

From top to bottom, the Moduflow filter series provides the high level of filtration and long term dependability so vital to today’s hydraulic systems.



Parker’s Moduflow element was designed with built-in diverter and bypass valve, to meet your application needs.

# Moduflow™ Plus Series

## Features



### Flanges

- NPT or SAE 3/4" to 2"
- Lightweight aluminum

### Cover

- Slotted for quick release
- Lightweight aluminum

### Indicators

- Visual or electrical
- Mounted on either side
- Standard "no element" indication

### Bowl

- Single or double length
- Durable steel construction

### Bypass

(not visible)

- Integral 35 psi bypass replaced with every element change

### Element

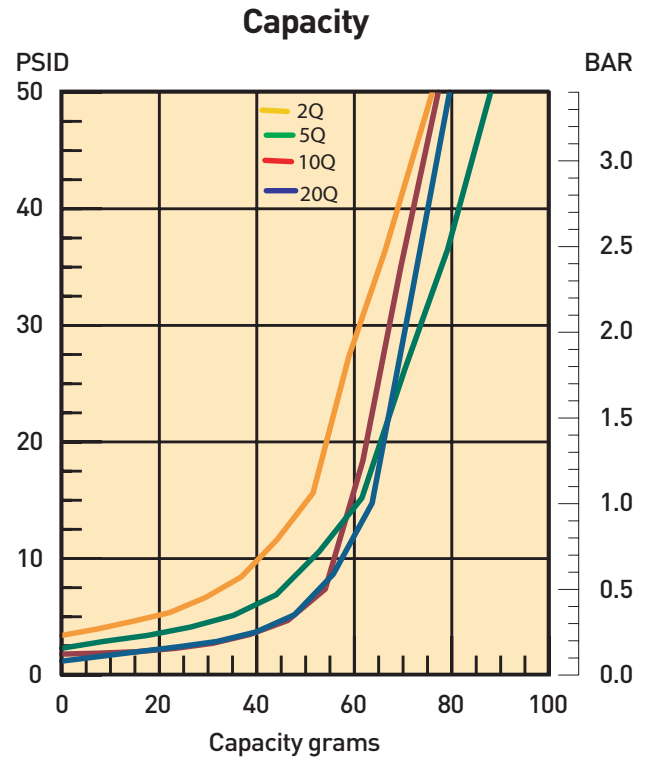
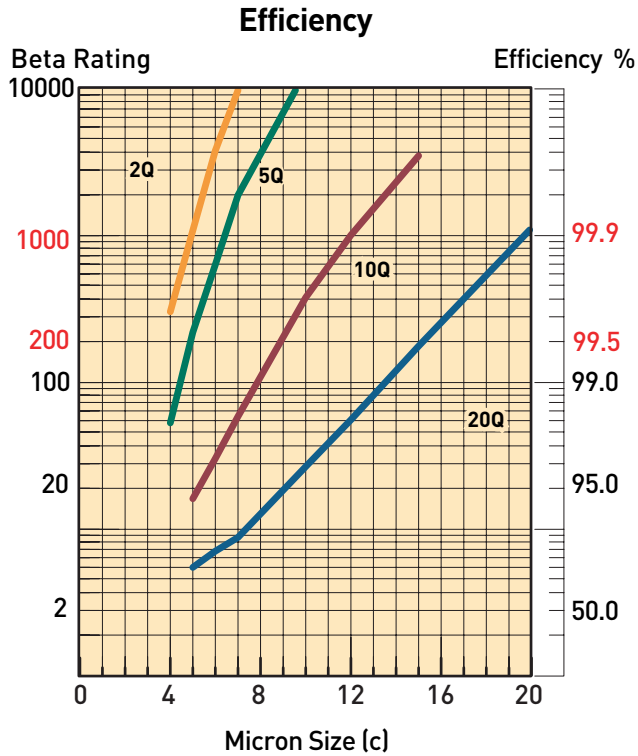
(not visible)

- Available in high performance Microglass media
- Single or double length

Feature	Advantage	Benefit
• Top access element service	• Oil remains in housing • Quicker elements change	• No Spills • Reduced maintenance costs
• Slotted cover	• Quick release cover • Cap screws remain in housing	• Reduced maintenance cost • No loose parts to lose
• Closed bottom elements	• Removes all contaminant during element service	• No downtime contamination from servicing
• Visual or electrical indicators	• Know exactly when to service elements	• Helps prevent bypass condition • No premature disposal
• Flange face ports	• Flexible mounting (3/4" to 2")	• Easy plumbing to your system

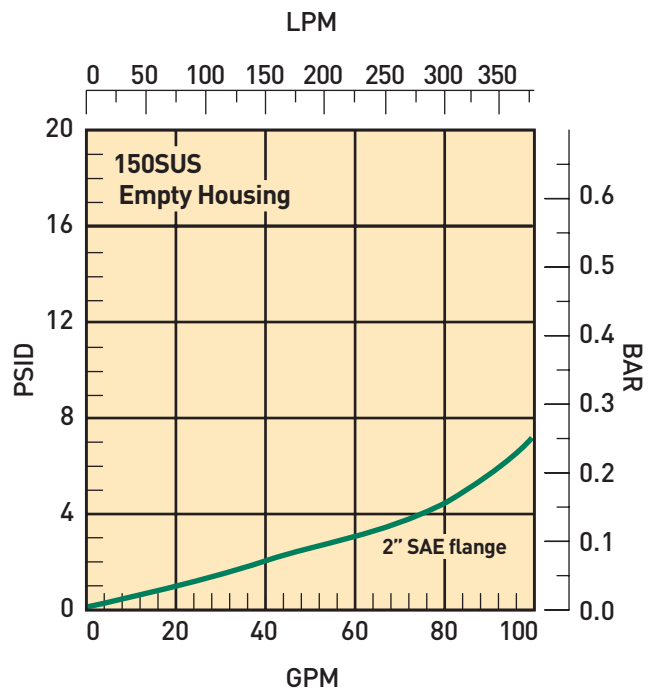
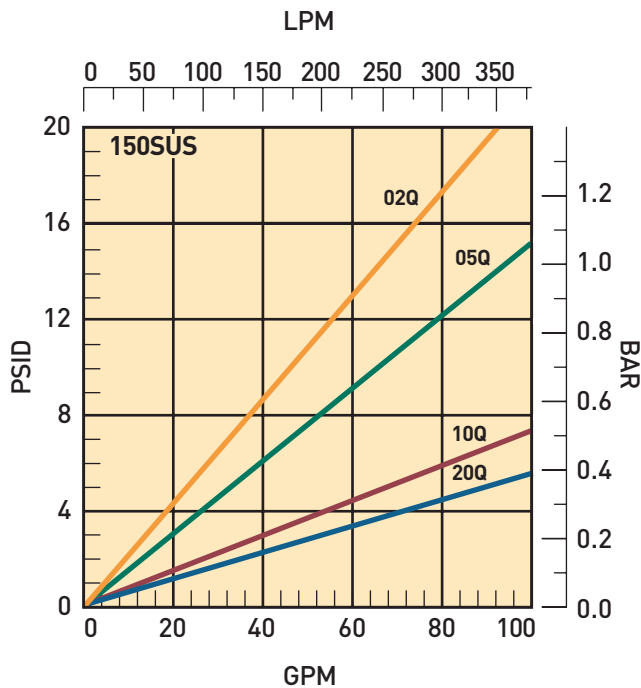
# Moduflow™ Plus Series

## ILP-1 Element Performance



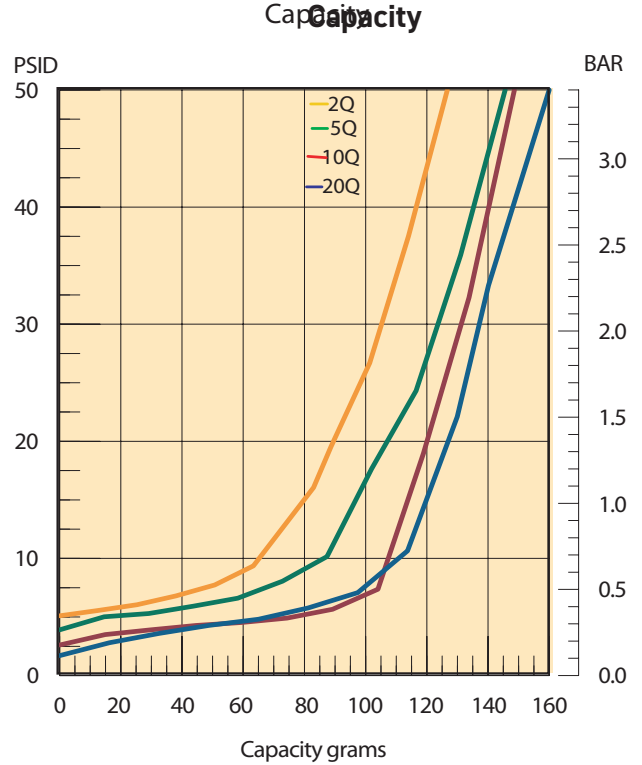
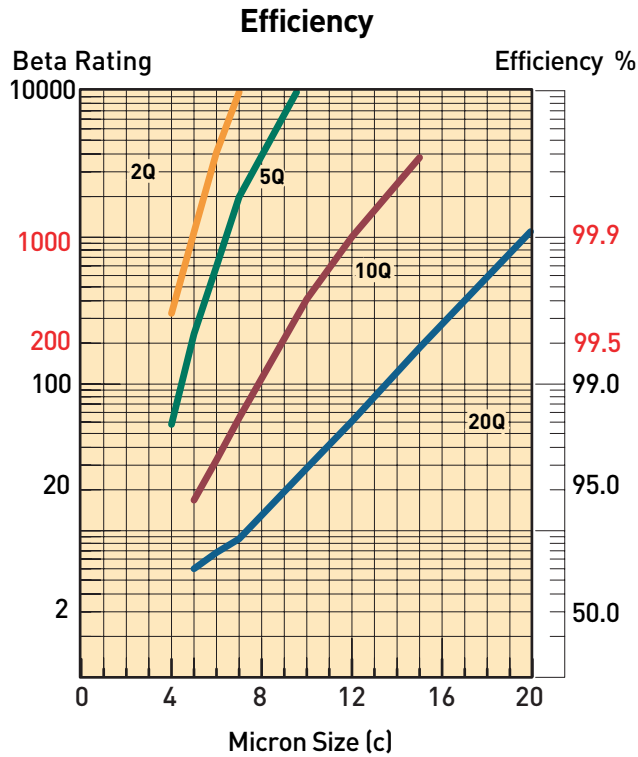
Multipass tests run @ 40 gpm to 50 psid terminal - 5mg/L BUGL

### Flow vs. Pressure Loss



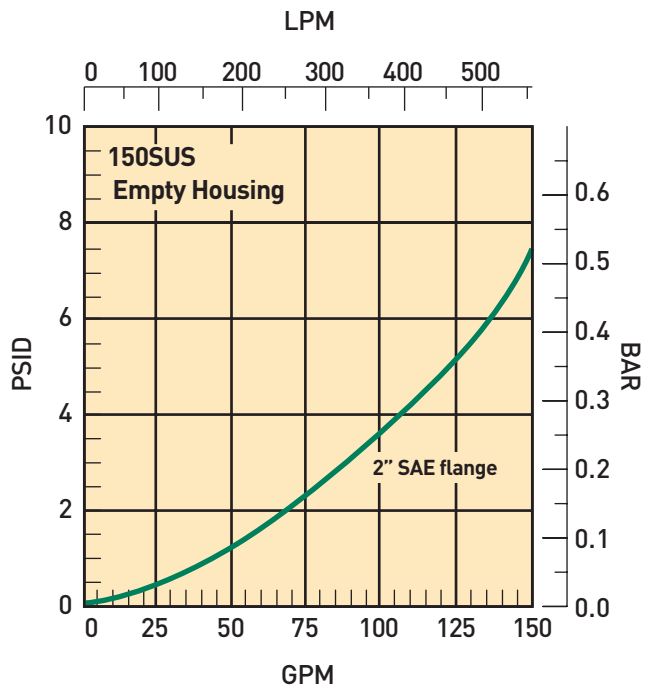
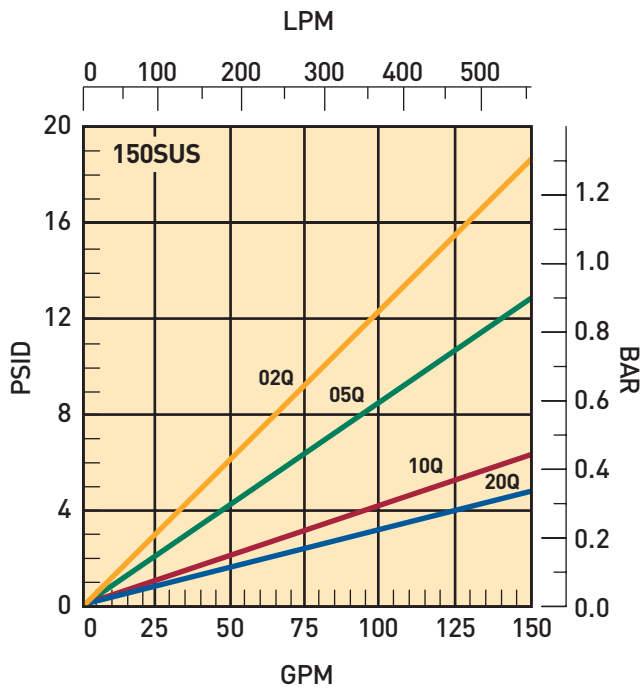
# Moduflow™ Plus Series

## ILP-2 Element Performance



Multipass tests run @ 80 gpm to 50 psid terminal - 5mg/L BUGL

### Flow vs. Pressure Loss



# Moduflow™ Plus Series

## Specifications

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 200 psi (13.8 bar)  
 Design Safety Factor: 2:1  
 Rated Fatigue Pressure: 150 psi (10.3 bar)

**Element Burst Rating:** 70 psid (4.8 bar)

### Filter Materials:

Head, Cover, Flanges: die cast aluminum  
 Bowl: steel

### Operating Temperatures:

Nitrile: -40°F to 225°F (-40°C to 107°C)  
 Fluorocarbon: -15°F to 275°F (-26°C to 135°C)

### Weight (approximate):

Single: 20 lbs. (9.1 kg)  
 Double: 25 lbs. (11.3 kg)

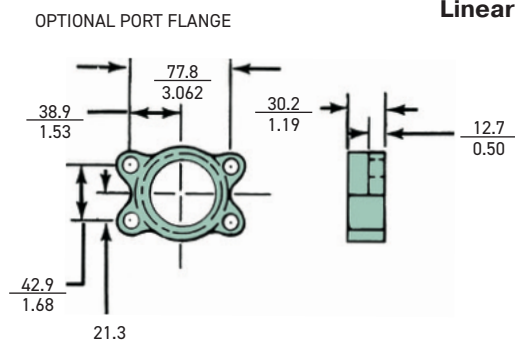
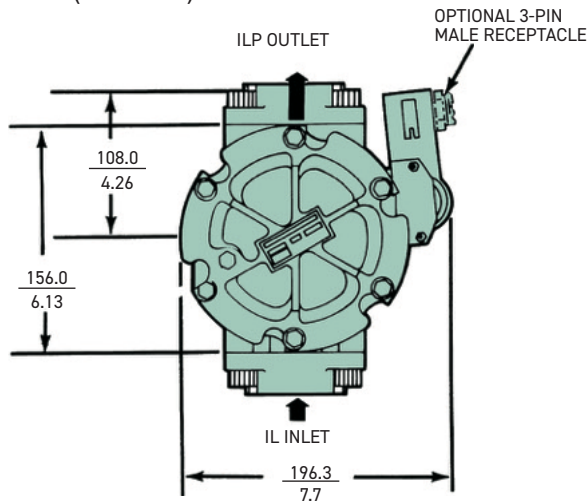
### Indicators:

Visual (optional)  
 Electrical (optional) 15A @ 125VAC / .5A @ 125 VDC  
 Electrical ("D" option) 5A @ 250VAC / 3A @ 28 VDC

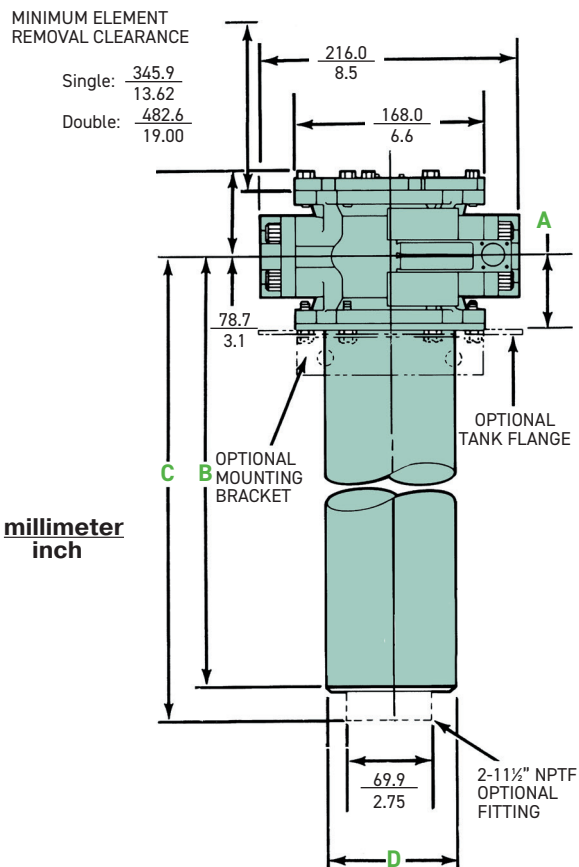
### Color Coding:

White (normally closed)  
 Red (normally open)  
 Black (common)

Model	Dimensions: mm/inch			
	A	B	C	D
ILP-1	65.0 2.56	336.0 13.24	N/A	117.1 4.61
ILP-2	68.3 2.69	618.0 24.32	N/A	117.1 4.61



Linear Measure: **millimeter**  
inch



Drawings are for reference only.  
 Contact factory for current version.

# Moduflow™ Plus Series

Drawings are for reference only.  
Contact factory for current version.

## Specifications: DILP

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 200 psi (13.8 bar)  
Design Safety Factor: 2:1  
Rated Fatigue Pressure: 150 psi (10.3 bar)

**Element Burst Rating:** 70 psid (4.8 bar)

### Filter Materials:

Divertor Valve Assembly: die cast aluminum  
Check Valve Assembly: die cast aluminum  
Filter Assembly: see IL2 specifications

### Operating Temperatures:

Nitrile: -40°F to 225°F (-40°C to 107°C)  
Fluorocarbon: -15°F to 275°F (-26°C to 135°C)

### Weight (approximate):

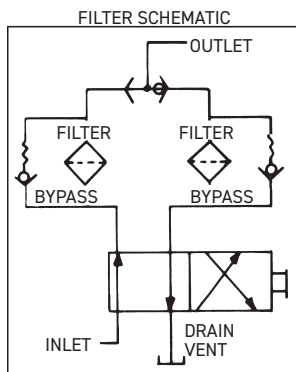
Single: 55 lbs. (24.9 kg) / Double: 65 lbs. (29.5 kg)

### Indicators:

Visual (optional)  
Electrical (optional) 15A @ 250VAC / .5A @ 125 VDC  
Electrical ("D" option) 5A @ 250VAC / 3A @ 28 VDC

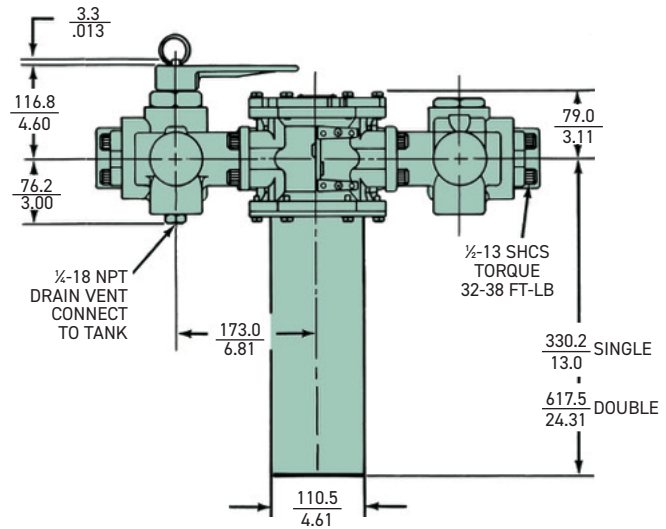
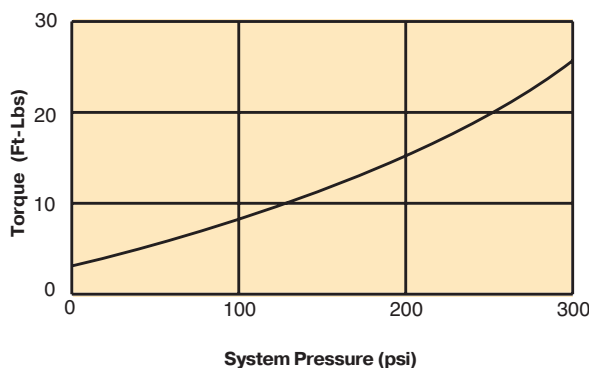
### Color Coding:

White (normally closed)  
Red (normally open)  
Black (common)

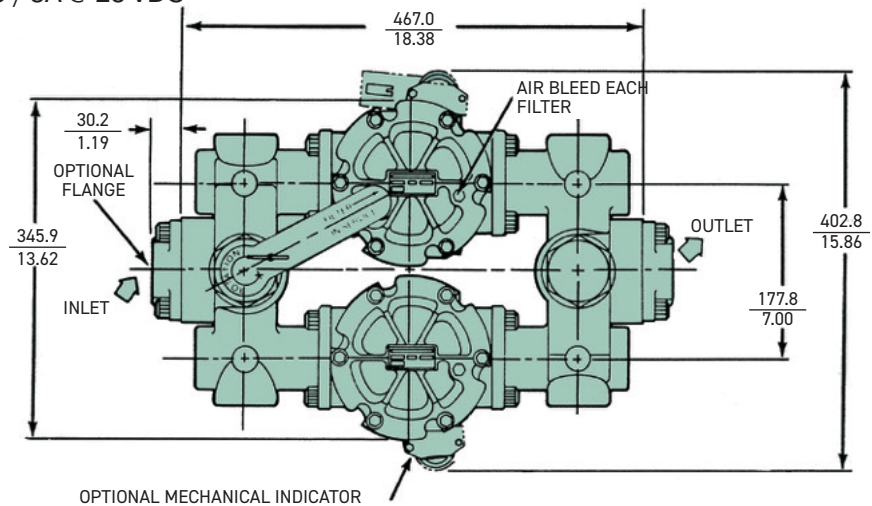


BOTH CHECK VALVES MOVE SAME DIRECTION

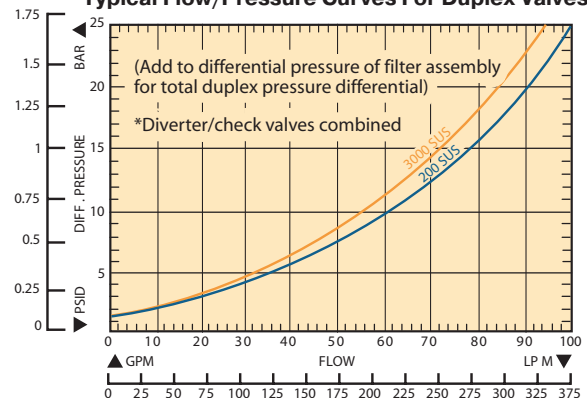
### Approximate handle torque required for changeover.



Linear Measure: millimeter  
inch



### Typical Flow/Pressure Curves For Duplex Valves



# Moduflow™ Plus Series

## Specifications

### Manifold Specifications

**Rated Static Pressure, max.:**

20.7 bar (300 psi)

**Typical Burst Pressure:**

62.1 bar (900 psi)

**Operating Temperature**

**(Nitrile seals):** -40°C to 121°C  
(-40°F to 250°F)

**Housing Material:**

ANSI 356-T6 cast aluminum

**Approximate Shipping Weight:**

3.6 kg (8 lbs)

**Porting:** See Options Below

**Screws & O-Rings Separately:**

Inlet & outlet screws (12 required):  
P/N 900228

Outlet port o-rings (2 required):

Nitrile: P/N N72228

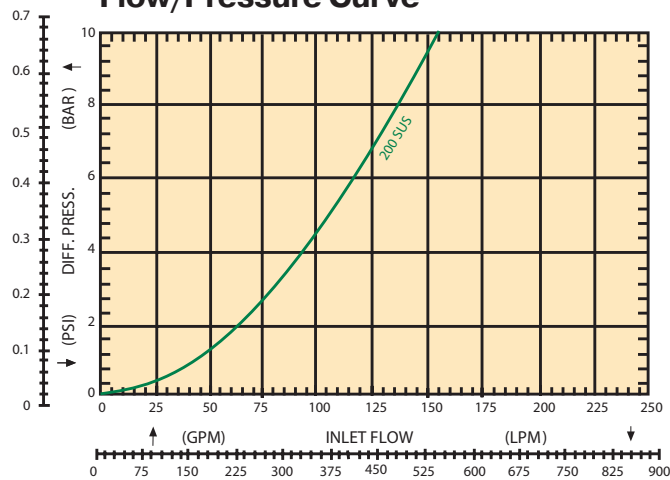
Fluorocarbon: P/N V92228

### High Flows At Low Cost

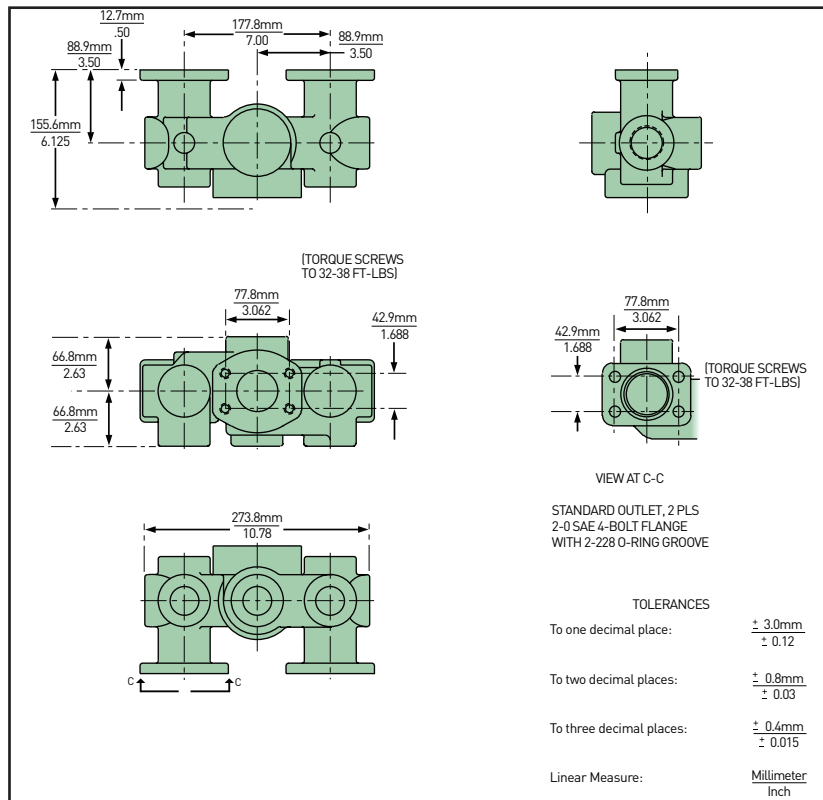
The model MM is designed to extend the flow range of Moduflow™ Filters when operating with 10 Micron and finer filter media. When mounted to a pair of ILP-2 filters, this manifold will allow flows up to 130 gpm in return lines (15 fps velocity).

*Note: The Model MM is not applicable to suction lines due to its pressure drop characteristics.*

### Flow/Pressure Curve



### INSTALLATION DIMENSIONS



### How to order manifolds

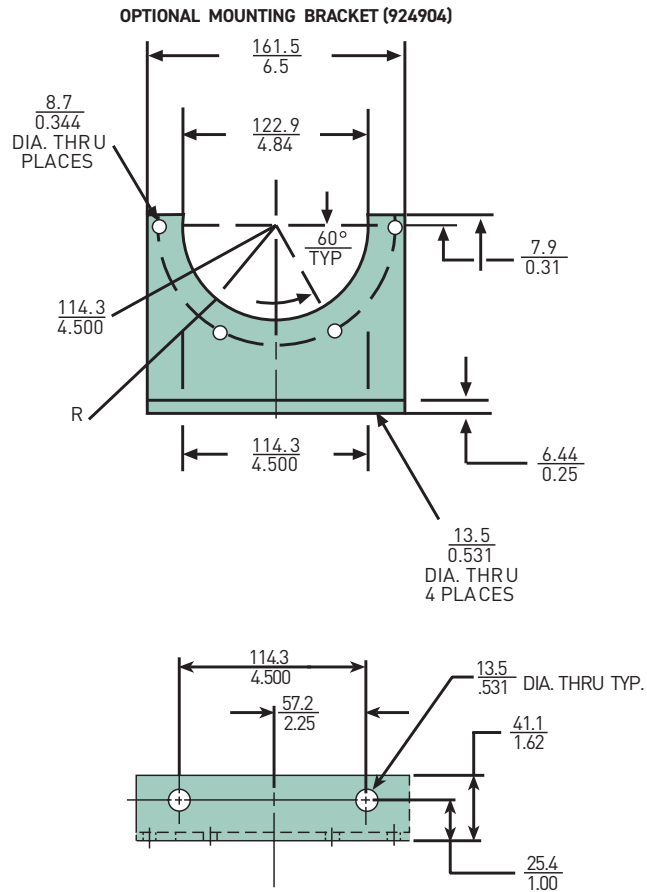
Part Number	Description
926466	Moduflow Manifold (MM)

\* Inline mounted ILP filters will require two manifolds on both inlets and outlets.

Drawings are for reference only.  
Contact factory for current version.

# Moduflow™ Plus Series

## Accessories

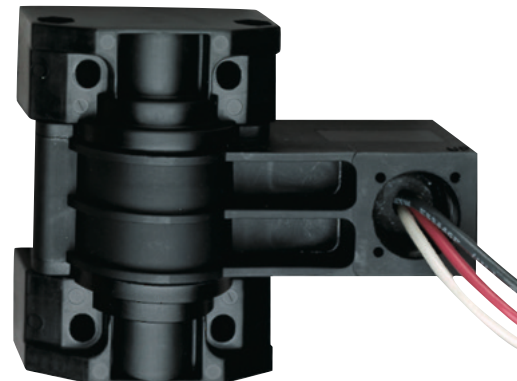


Linear Measure: **millimeter**  
inch

**"M" OPTION-VISUAL INDICATOR,  
NO ELEMENT WARNING**



**"E" OPTION-ELECTRICAL INDICATOR  
926643**



Black - Common  
White - Normally Closed  
Red - Normally Open

## Parts List

### Flange Kits (flange, 4 bolts, o-ring)

Size	Code	Part Number	
		Nitrile	Fluorocarbon
¾ inch NPTF	YB	924788	926013
1 inch NPTF	YC	924787	926012
1¼ inch NPTF	YD	924912	926004
1½ inch NPTF	YE	924786	926011
2 inch NPTF	YF	924785	926010
SAE - 12	YM	924784	926009
SAE - 16	YN	924783	926008
SAE - 20	YO	924913	926005
SAE - 24	YP	924782	926007
BLANK FLANGE	—	924781	926006

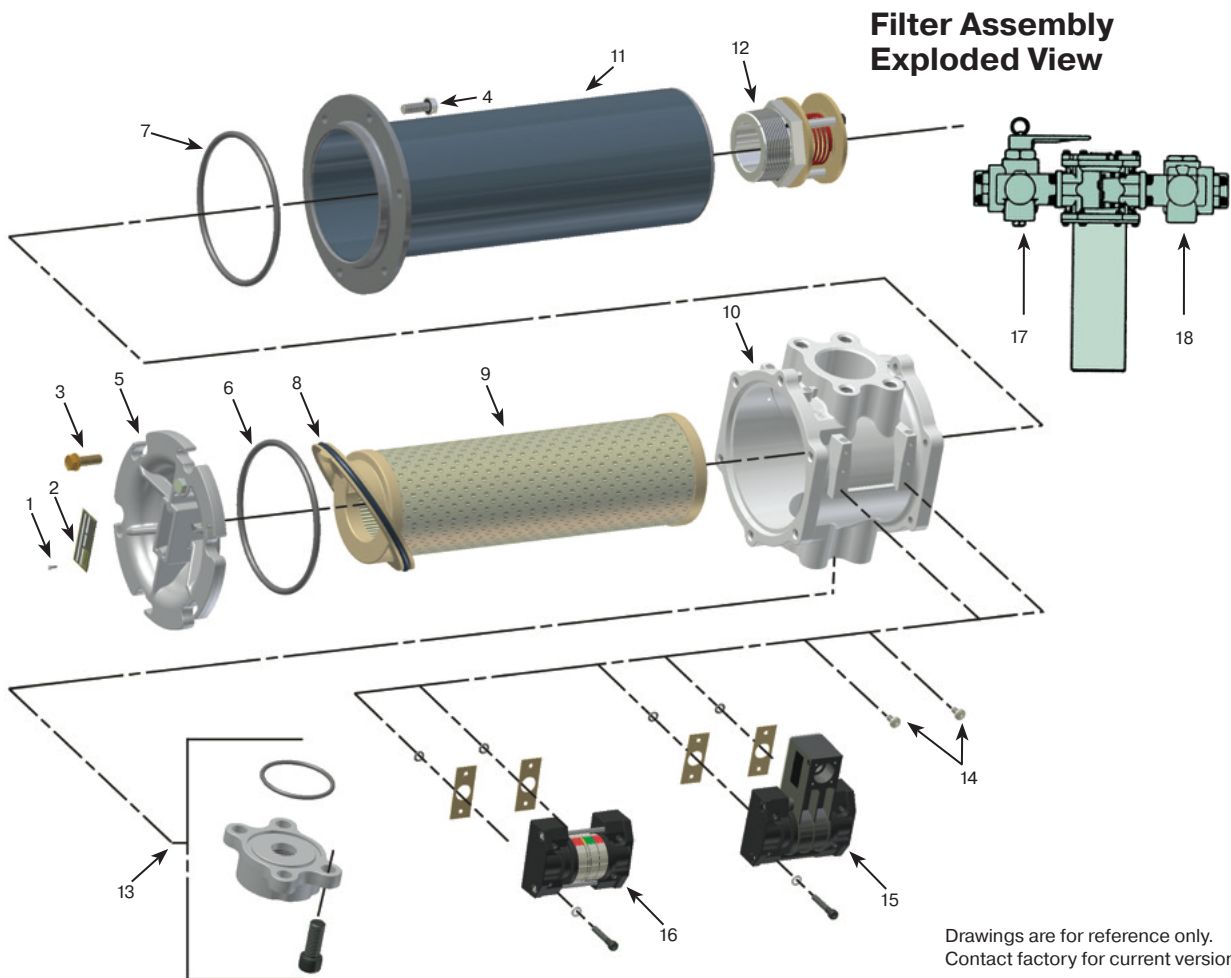
Drawings are for reference only.  
Contact factory for current version.

# Moduflow™ Plus Series

## Parts List

Index	Description	Part No.	Quantity
1	Screws, Nameplate	900028	2
2	Name Plate, Unstamped	920928	1
3	Cover Screws, 5/16-18 UNC x 1"	926633	6
4	Bowl Screws, 5/16-18 UNC x 1"	926633	6
5	Cover, Without nameplate	924634	1
6	Cover O-Ring Nitrile Fluorocarbon	N72350 V72350	1 1
7	Bowl O-Ring Nitrile Fluorocarbon	N72251 V72251	1 1
8	Element Seal Nitrile Fluorocarbon	937410 937411	1 1
9	Element	Refer to Table	1
10	Head, Machined only 2" SAE flange face SAE-24 combination inlet port	941160	1
11	Bowl, Select desired model ILP-1 ILP-2	925916 924816	1 1

Index	Description	Part No.	Quantity
12	Check Valve Assy.	925120	1
13	Flange Kits O-Ring	Refer to Table V72228	1 1
14	Plug Kit, Fastener, self-sealing, O-ring seal included with fastener	925974	2
15	Indicator Electrical 35 psid 35 psid, 3-pin male receptacle Gasket O-Ring	926643 926753 926126 V72010	Optional 2 2
16	Indicator Visual 35 psid 4-band Bracket, Inline mounting Indicator Kit, Remote mount	926748 924904 924894	Optional Optional Optional
17	Changeover Valve Assy., Duplex	926758	Optional
18	Check Valve Assy., Duplex	926757	Optional
Not Shown	Check Valve Assy., Duplex	N72265	1



Drawings are for reference only.  
Contact factory for current version.

# Moduflow™ Plus Series<sup>1</sup>

## Low pressure filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
ILP	1	10Q	B	MP	35	Y9Y9	1

BOX 1: Filter Series	
Symbol	Description
ILP	Inline filter
ILPW	Inline filter anodized for HWCF fluid
DILP	Inline duplex filter
DILPW	Inline duplex filter anodized for HWCF fluid

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double

BOX 3: Media Code	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron
WR	Water Removal

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
E <sup>2</sup>	Ethylene Propylene
V	Fluorocarbon

BOX 5: Indicator <sup>3</sup>	
Symbol	Description
P	Pressure ports drilled/plugged
M	Visual indicator w/ "no element" warning
MM	Visual indicator (DILP)
E	Electrical indicator w/ 12" leads
EE	Electrical indicator (DILP)
D	Electrical indicator w/ 3-pin male quick disconnect
DD	Electrical 3-pin indicator (DILP)

BOX 6: Bypass	
Symbol	Description
35	35 psid (2.4 bar)

BOX 7: Ports <sup>4</sup>		
Symbol	Description	
ILP	Y9Y9	2" SAE Flange Face /SAE-24 combination inlet port
DILP	Y9Y9	2" SAE Flange Face only

BOX 8: Options	
Symbol	Description
1	None

- Filters include the element you select already installed.
- Par-Gel™ Water Removal (WR) elements are not available with EPR seals.
- Two letters are required for the indicator code.
- See Flange Kits table for port flange options. Flange Kits are ordered separately.

### ILP/ DILP Replacement Elements

Media	Nitrile Seals		Fluorocarbon Seals	
	Single	Double	Single	Double
02Q	937393Q	937397Q	937401Q	937405Q
05Q	937394Q	937398Q	937402Q	937406Q
10Q	937395Q	937399Q	937403Q	937407Q
20Q	937396Q	937400Q	937404Q	937408Q
WR	940733	940734	940735	940736



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Last updated August 4th, 2023

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# 12CS/50CS Series

Coreless Medium Pressure Filters



ENGINEERING YOUR SUCCESS.

# 12CS/50CS Series

## Applications

Parker engineers have developed an innovative alternative to the age old spin-on style can. This new design provides all of the benefits of high efficiency, long life Microglass filtration, without the environmental impact.

The new environmentally-friendly 12CS and 50CS hydraulic filters feature a reusable bowl and filter element constructed of reinforced polymer end caps, microglass media, and polymer pleat support. The element core is permanently attached as part of the filter bowl. When replaced, the element reduces costs, eliminates hot drain requirements, can be easily incinerated, and is better-suited for most landfills.

The 500 psi filters are rated up to 50 gpm, with premium elements as standard offerings. The element design also prevents filter operation if the proper element is not in place.

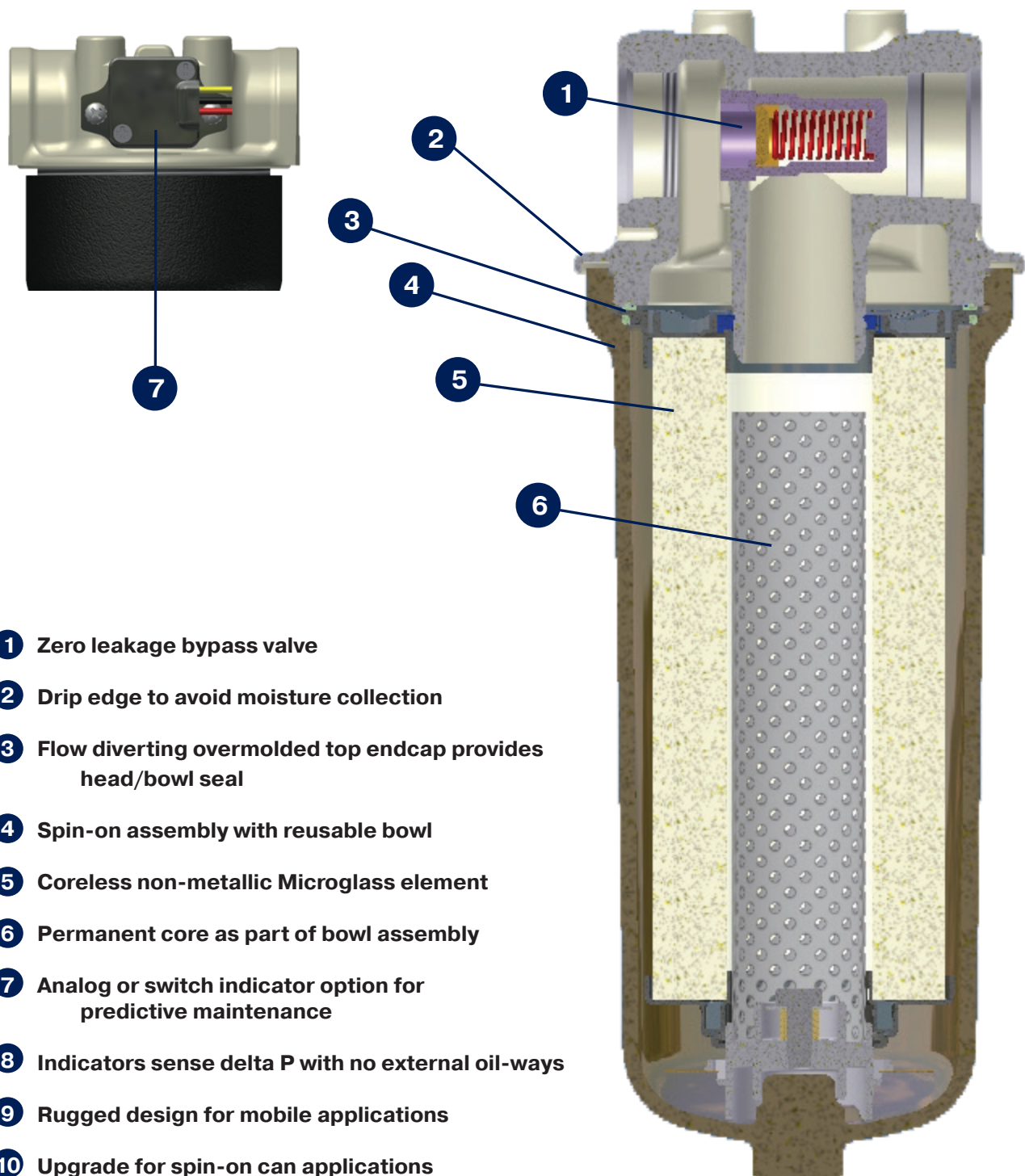
### Typical Applications

- **Mobile Ag**
- **Mobile Construction**
- **Material Handlers**
- **Aerial Lifts**
- **Pilot Lines**
- **Charge Pump Hydrostatic Drives**
- **Industrial Power Units**
- **Machine Tools**
- **Joy Stick Controls**



# 12CS/50CS Series

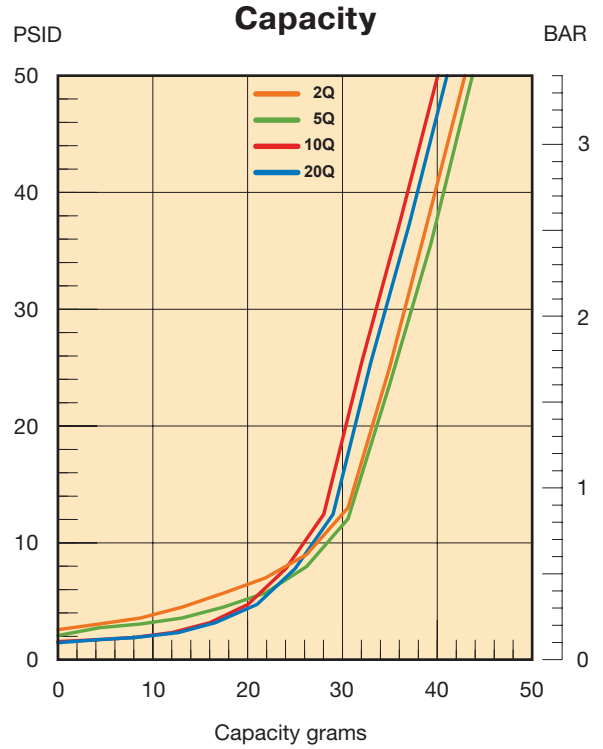
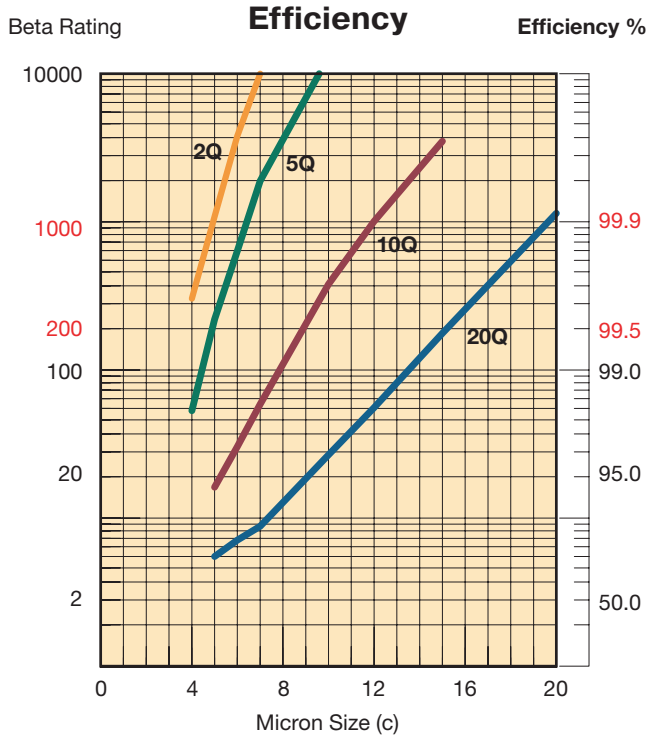
## Features



- 1 Zero leakage bypass valve
- 2 Drip edge to avoid moisture collection
- 3 Flow diverting overmolded top endcap provides head/bowl seal
- 4 Spin-on assembly with reusable bowl
- 5 Coreless non-metallic Microglass element
- 6 Permanent core as part of bowl assembly
- 7 Analog or switch indicator option for predictive maintenance
- 8 Indicators sense delta P with no external oil-ways
- 9 Rugged design for mobile applications
- 10 Upgrade for spin-on can applications
- 11 Low cost manifold mount option available

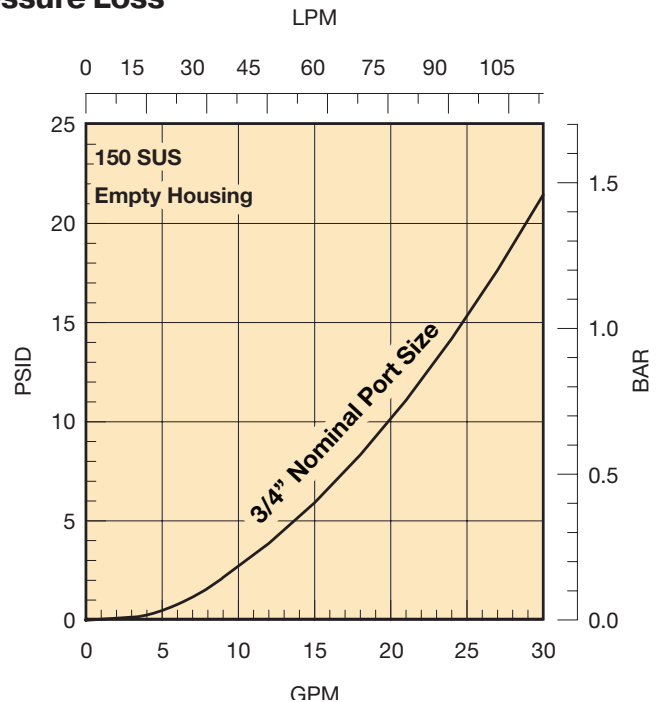
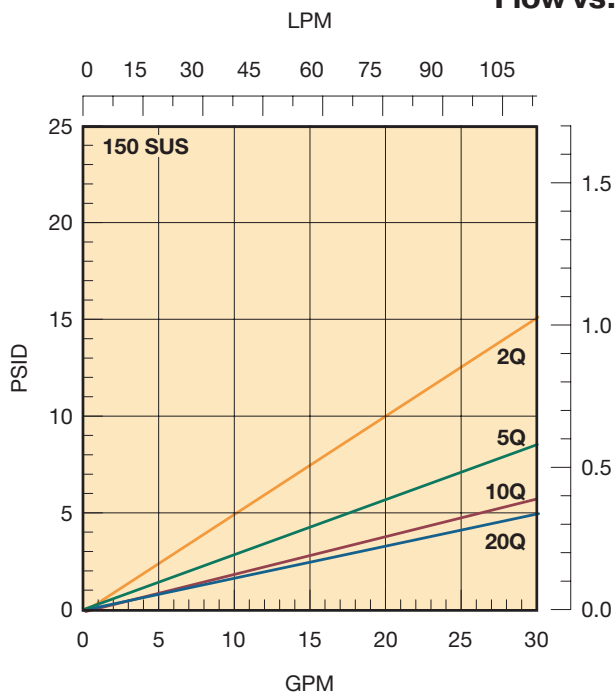
# 12CS Series

## Performance



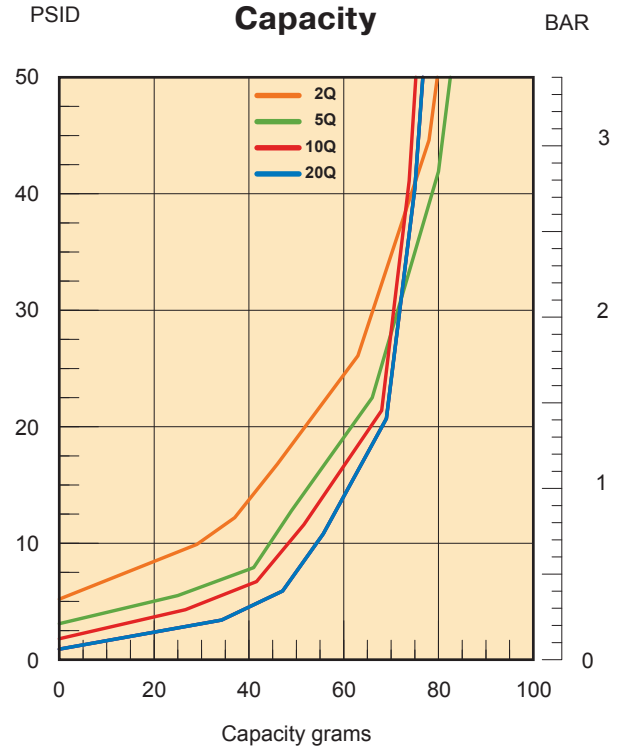
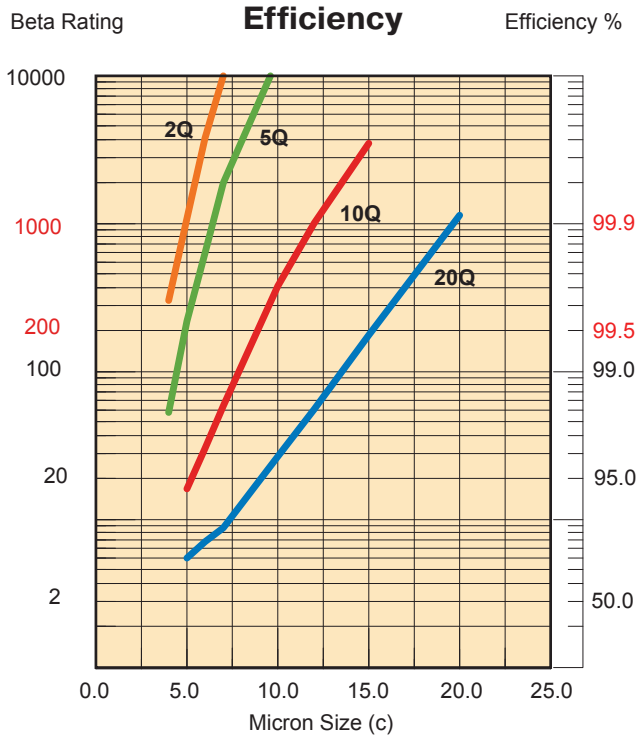
Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 50 psid terminal - 10 mg/L BUGL  
 Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



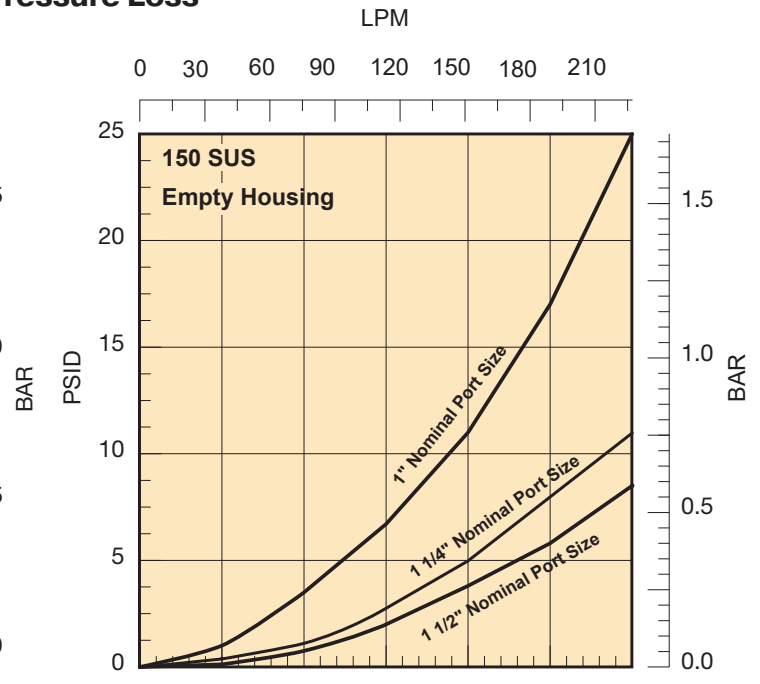
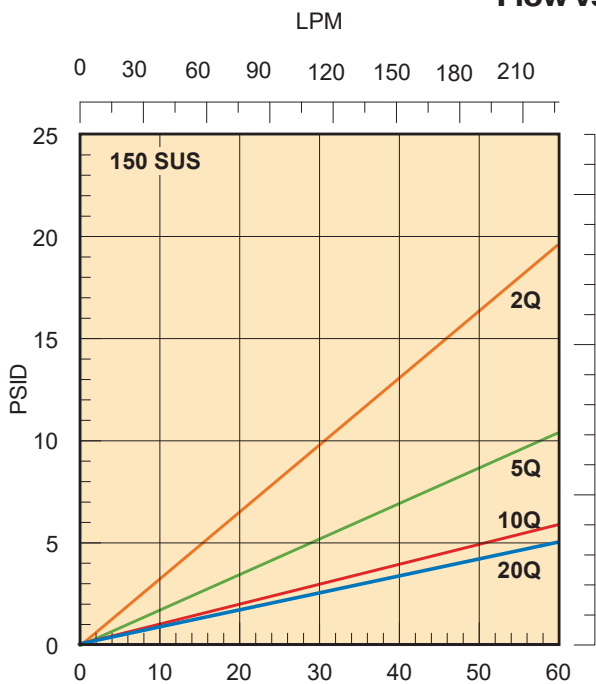
# 50CS Series

## Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 50 psid terminal - 10 mg/L BUGL. Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



# 12CS Series

## Specifications

### Pressure Ratings:

Maximum Allowable  
Operating Pressure (MAOP):  
500 psi (34.5 bar)

Fatigue: 400 psi (27.6 bar)  
1,000,000+ cycles: 0-400 psi

Design Safety Factor: 2.5:1

### Operating Temperatures:

Nitrile: -40°F to 225°F  
(-40°C to 107°C)

Fluorocarbon: -15°F to 225°F  
(-26°C to 107°C)

### Element Collapse Rating:

150 psid (10.3 bar)

### Weights (approximate):

12CS-2.....3 lbs. (1.4 kg)

### Materials:

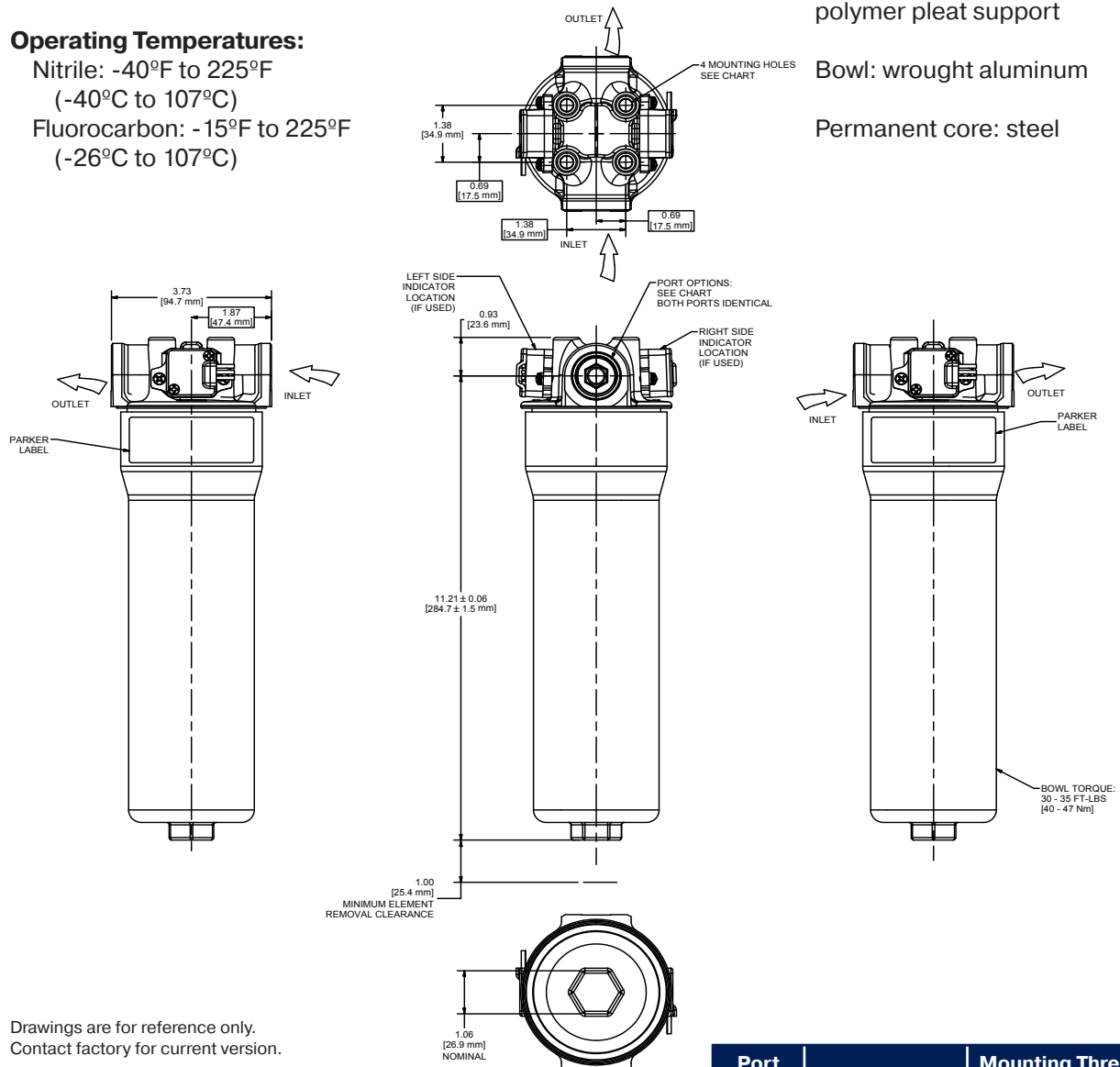
Head: cast aluminum

Bypass valve: nylon with  
steel spring

Filter element: reinforced  
polymer end caps,  
microglass media, and  
polymer pleat support

Bowl: wrought aluminum

Permanent core: steel



Drawings are for reference only.  
Contact factory for current version.

Port Option	Port Thread	Mounting Thread Configuration
S12	1-1/16"-12 UN-2B	3/8" x 16 x 5/8"
N12	3/4"-14 NPTF-1	3/8" x 16 x 5/8"
G12	G3/4" BSPP	3/8" x 16 x 5/8"

# 50CS Series

## Specifications

### Pressure Ratings:

Maximum Allowable  
Operating Pressure (MAOP):  
500 psi (34.5 bar)

Fatigue: 400 psi (27.6 bar)  
1,000,000+ cycles: 0-400 psi

Design Safety Factor: 2.5:1

### Operating Temperatures:

Nitrile: -40°F to 225°F  
(-40°C to 107°C)

Fluorocarbon: -15°F to 225°F  
(-26°C to 107°C)

### Element Collapse Rating:

150 psid (10.3 bar)

### Weights (approximate):

50CS-1.....6 lbs. (2.7 kg)

### Materials:

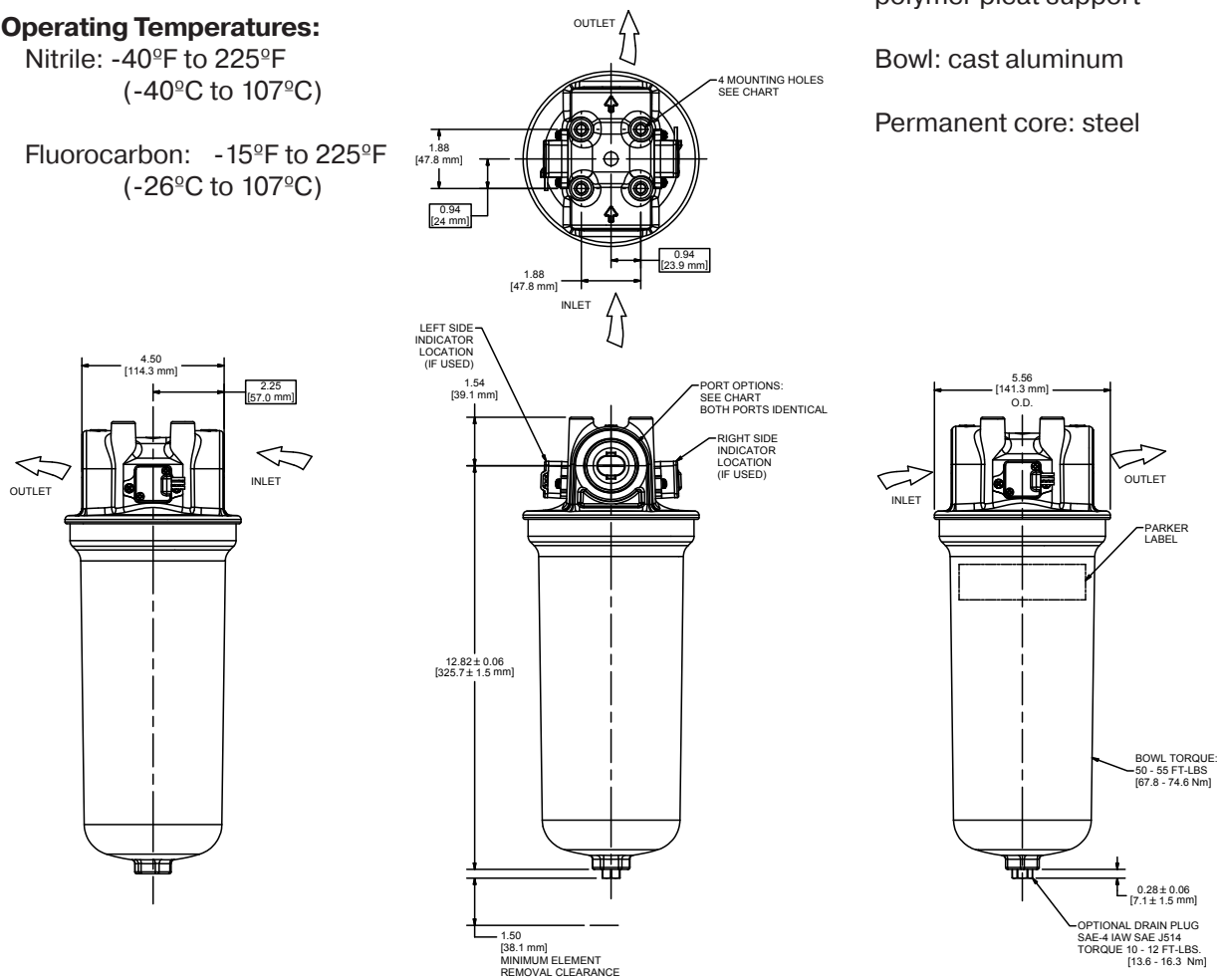
Head: cast aluminum

Bypass valve: nylon with  
steel spring

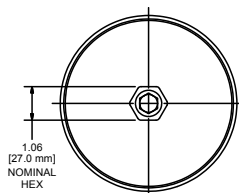
Filter element: reinforced  
polymer end caps,  
microglass media, and  
polymer pleat support

Bowl: cast aluminum

Permanent core: steel



Port Option	Port Thread	Mounting Thread Configuration
S16	1-5/16"-12 UN-2B	3/8" x 16 x 5/8"
S20	1-5/8"-12 UN-2B	3/8" x 16 x 5/8"
S24	1-7/8"-12 UN-2B	3/8" x 16 x 5/8"
N16	1"-11.5 NPT - 1	3/8" x 16 x 5/8"
N20	1-1/4"-11.5 NPTF-1	3/8" x 16 x 5/8"
N24	1-1/2"-11.5 NPTF-1	3/8" x 16 x 5/8"
G20	G1-1/4" BSPP	M10 x 1.5 x 16



Drawings are for reference only.  
Contact factory for current version.

# 12CS/50CS Series

## Element Condition Indicators

### 1. Electrical Switch

- Connector: 12" wire leads, 18 Gauge
- Yellow (NC), black (NO), Red (C)
- Maximum switching voltage: 30V (DC/AC)
- Maximum switching current 0.2A
- Maximum carry current: 0.5A
- Approvals: CE, IP68

### 2. Analog Sensor

- Supply voltage: 4.5 to 5.5 VDC
- Maximum output current: 1 mA
- Output voltage: Ratiometric (see graph)
- Approvals: CE, IP68
- Connector: 12" wire leads, 18 Gauge
  - Yellow (analog out)
  - Black (OV)
  - Red (supply +5 V)

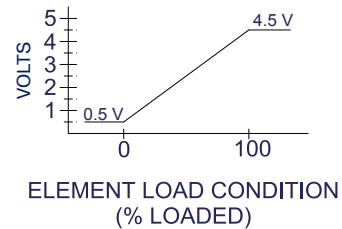
### 3. Visual Indicator

- Push to test
- Battery operated
- Visual LED (red = change element)

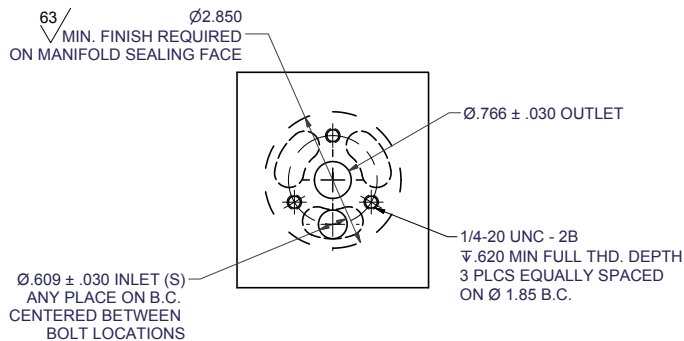


Electrical Switch or Analog Sensor

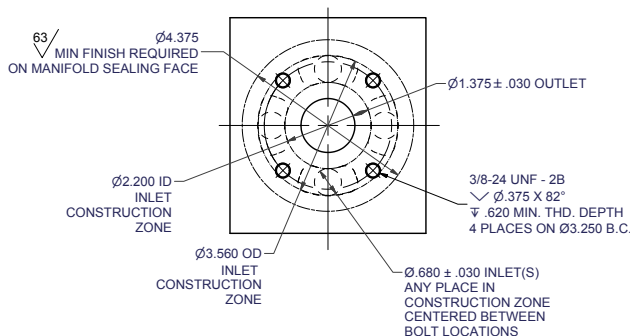
Visual Indicator



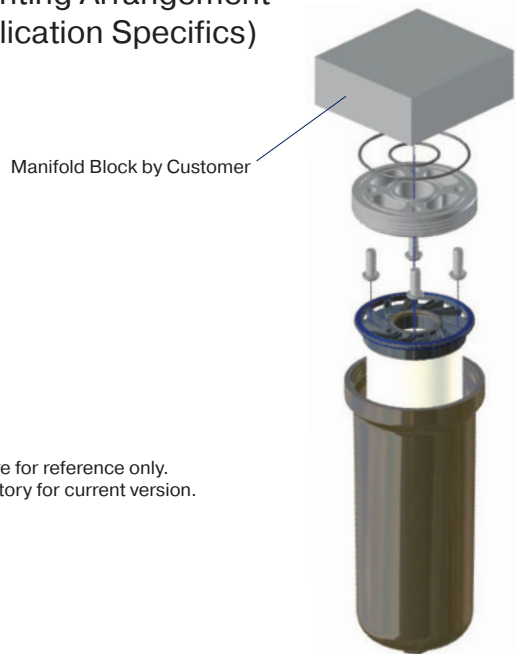
## Suggested Manifold Mounting Arrangement (Consult Factory for Application Specifics)



12CS Adaptor Mounting Arrangement



50CS Adaptor Mounting Arrangement



Drawings are for reference only. Contact factory for current version.

Manifold Adaptor Kits*				
Media	02QE	05QE	10QE	20QE
12CS	942204	942205	942206	942207
50CS	942208	942209	942210	942211

\* Kit includes O-rings, adaptor, mounting screws, element and bowl.

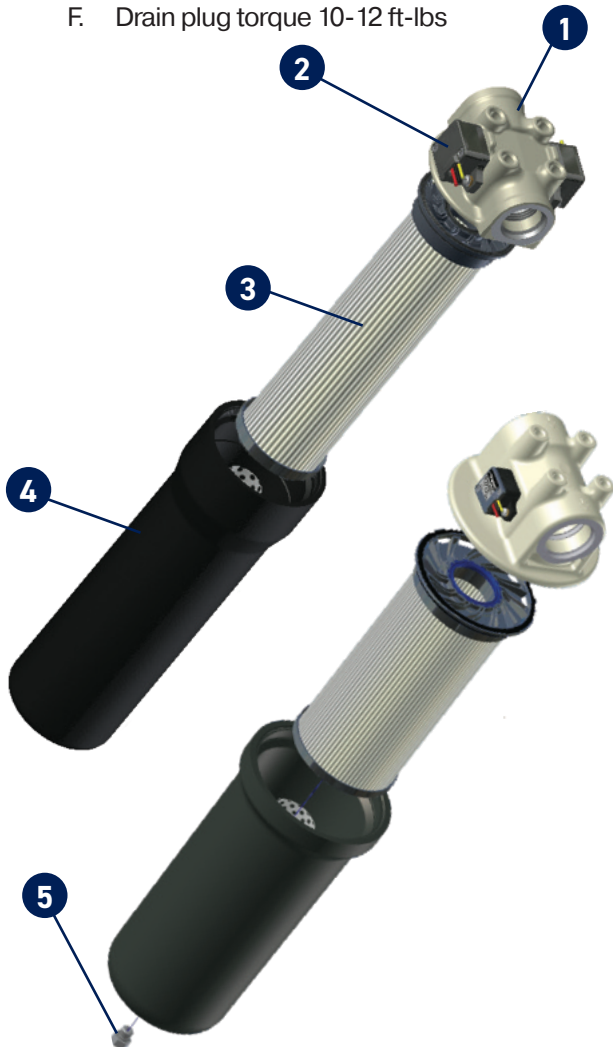
# 12CS/50CS Series

## Service Instructions

Filter element should be replaced as indicated by filter indicator or at specified service intervals recommended by the OEM.

### Replacement element procedure

- A. Shut down system and release pressure in the filter line.
- B. Loosen bowl and remove rotating counterclockwise.
- C. Remove dirty element from filter head and discard.
- D. Lubricate element seals on clean element and install on filter head element locator.
- E. Install reusable bowl onto element and filter head. Tighten to specified torque.
  - 12CS-2 30-35 ft-lbs
  - 50CS-1 50-55 ft-lbs
- F. Drain plug torque 10-12 ft-lbs



### Parts List

Index	Description	12CS	50CS
<b>1</b>	<b>Head Assembly</b> (50 PSI electrical switch indicator ready)		
	SAE-12	942249	N/A
	3/4" NPT	942250	N/A
	G3/4" BSPP	942251	N/A
	SAE-16	N/A	942259
	SAE-20	N/A	942260
	SAE-24	N/A	942261
	1" NPT	N/A	942262
	1 1/4" NPT	N/A	942263
	1 1/2" NPT	N/A	942264
G1 1/4" BSPP	N/A	942265	
<b>2</b>	<b>Indicator</b>		
	Electrical	941814	941814
	Analog	941802	941802
	Mounting Screws	941944	941944
<b>3</b>	<b>Element</b> (see chart on next page)		
<b>4</b>	<b>Bowl Assembly</b>		
	Single - no drain	N/A	942011
	Single - w/ drain	N/A	942012
	Double - no drain	942220	N/A
<b>5</b>	<b>Drain Plug SAE-4</b>		
	Nitrile	N/A	921088
	Fluorocarbon	N/A	928882
<b>6</b>	<b>Bypass (not shown)</b>		
	50 psid	928981	933424
<b>7</b>	<b>Manifold Adaptor Kit</b> (see drawing on previous page)		
	<b>O-Ring (I.D.)</b>	V92020	V72135
	<b>O-Ring (O.D.)</b>	V92038	V72155
	<b>Manifold Adaptor</b>	941811	941986
	<b>Mounting Screws</b>	975689	942174
	<b>Element</b>	see chart on page 85	
	<b>Bowl Assembly</b>	see #4 above	

# 12CS/50CS Series<sup>1</sup>

## Coreless Medium Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
12CS	2	10QE	B	N	K	S12	A

BOX 1: Filter Series	
Symbol	Description
12CS	15 GPM max.
50CS	50 GPM max.

BOX 2: Element Length	
Symbol	Description
1	Single (50CS only)
2	Double (12CS only)

BOX 3: Media Code	
Symbol	Description
02QE	Microglass, 2 micron
05QE	Microglass, 5 micron
10QE	Microglass, 10 micron
20QE	Microglass, 20 micron

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
V	Fluorocarbon

BOX 5: Indicator	
Symbol	Description
N	No indicator
ML	Visual w/ push to test, left
M	Visual w/ push to test, right
EL	Electrical w/12" flying leads, left
E	Electrical w/12" flying leads, right
AL	Analog w/12" flying leads, left
A	Analog w/12" flying leads, right

BOX 6: Bypass	
Symbol	Description
G	25 PSID (1.7 bar)
K	50 PSID (3.5 bar)

BOX 7: Ports	
Symbol	Description
<b>12CS</b>	
S12	SAE-12 integral threads
N12	3/4" NPT integral threads
<b>50CS</b>	
S16	SAE-16 integral threads
N16	1" NPT integral threads
S20	SAE-20 integral threads
N20	1-1/4" NPT integral threads
S24	SAE-24 integral threads
N24	1-1/2" NPT integral threads

BOX 8: Options	
Symbol	Description
1	None
4	Drain port

- Filters include the element you select already installed.
- Drain port available on 50CS only.

### Replacement Elements

Media	Filter Model (Nitrile Seals)		Filter Model (Fluorocarbon Seals)	
	12CS-2	50CS-1	12CS-2	50CS-1
02QE	940765Q	940816Q	937619Q	940881Q
05QE	940764Q	940817Q	937618Q	940882Q
10QE	940763Q	940818Q	937617Q	940883Q
20QE	940762Q	940819Q	937622Q	940884Q



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Last updated August 4th, 2023

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# IL8 Series

Medium Pressure Filters



ENGINEERING YOUR SUCCESS.

# IL8 Series

## Applications

### Applications for IL8 series filters

- Lube oil systems
- Power generation plants
- Test stands
- Primary metal equipment
- Pulp & paper equipment
- Offshore drilling and oil patch
- Flushing skids

IL8 series filters are excellent choices for your demanding applications whether you require simplex, duplex or quadplex assemblies.

Wherever high flow or high capacity filters are required, the IL8 series can be applied with confidence.

Filter housings have a simple yet critical job... securely contain the filter element with positive internal sealing.

The IL8 series filter housings are the result of careful engineering. High grade materials are used to provide strength at critical stress points.

The cover and base are anodized aluminum, the handle is nickel plated ductile iron and the bowl is rugged carbon steel. The result is a reliable high performance filter for an array of applications.

#### Cover

- Handle protects indicators from damage
- Easy on, easy off, for fast service

#### Air Bleed

- Helps protect bearings and other sensitive components from trapped air

#### Fill Port

- Prefilter the fluid, before it gets into the machine's system
- Purge air while filling

#### Indicators

- You can tell element condition at a glance
- Both visual and electrical available

#### Bowl

- Rugged cold drawn steel—excellent fatigue resistance
- Three sizes for any application: Single (8"), Double (16"), and Triple (39")

#### Ports

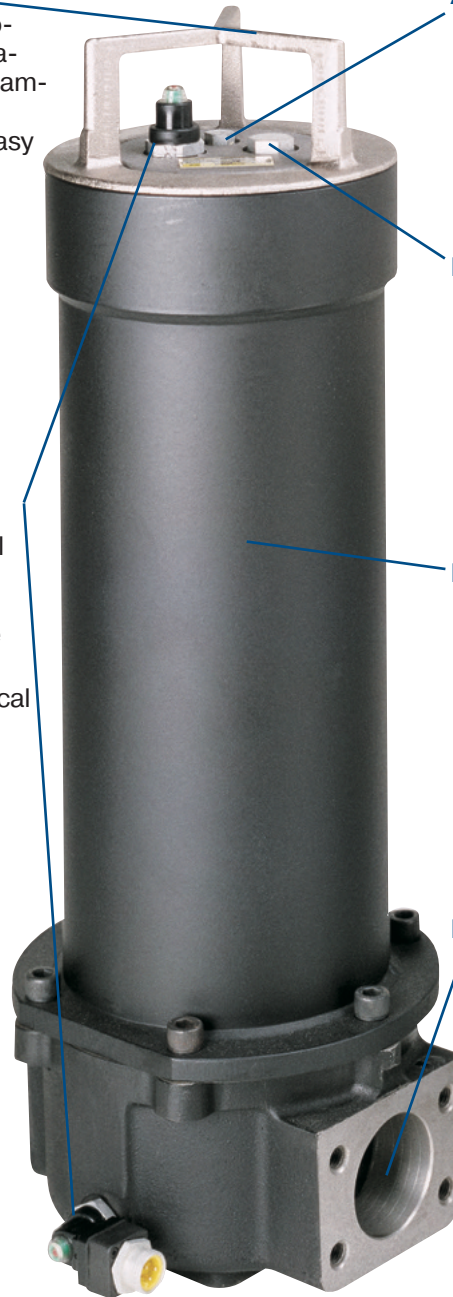
- SAE straight thread or flange face

#### Drain Port (not visible)

- Clean and easy servicing
- Lets you drain bowl of fluid—before element changes

#### Bypass Valve (not visible)

- Soft seat design for zero internal leakage
- Located in cover assembly



# IL8 Series

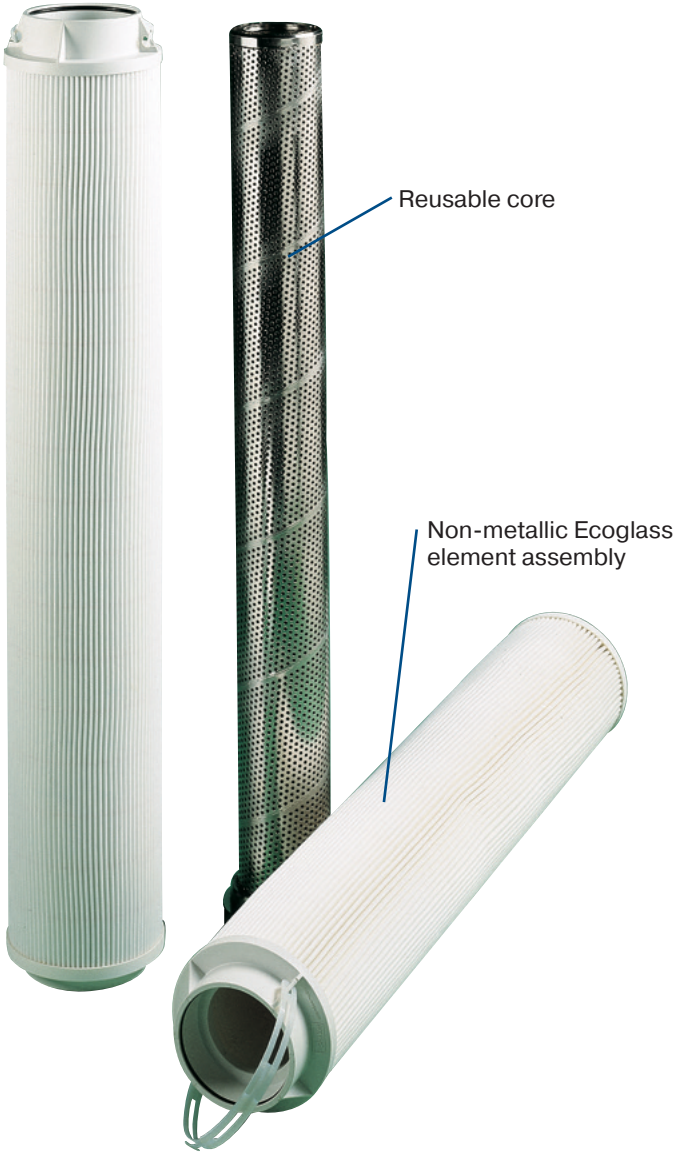
## Element Features

### Ecoglass Replacement Elements

The latest in Ecoglass represents the merging of high performance filtration technology with environmentally conscious engineering. The Ecoglass line of replacement elements feature 100% non-metallic construction. The design reduces solid waste and minimizes disposal costs for industry. The non-metallic construction means lightweight elements (60% less weight) for easier servicing.

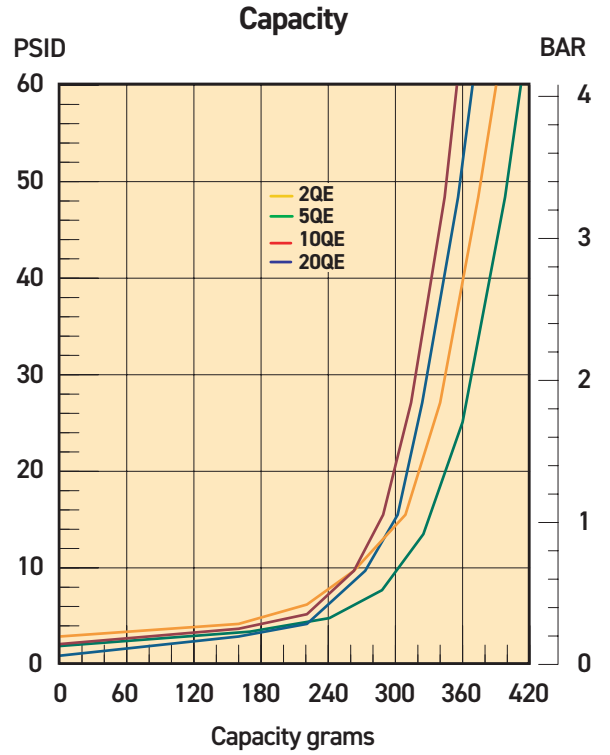
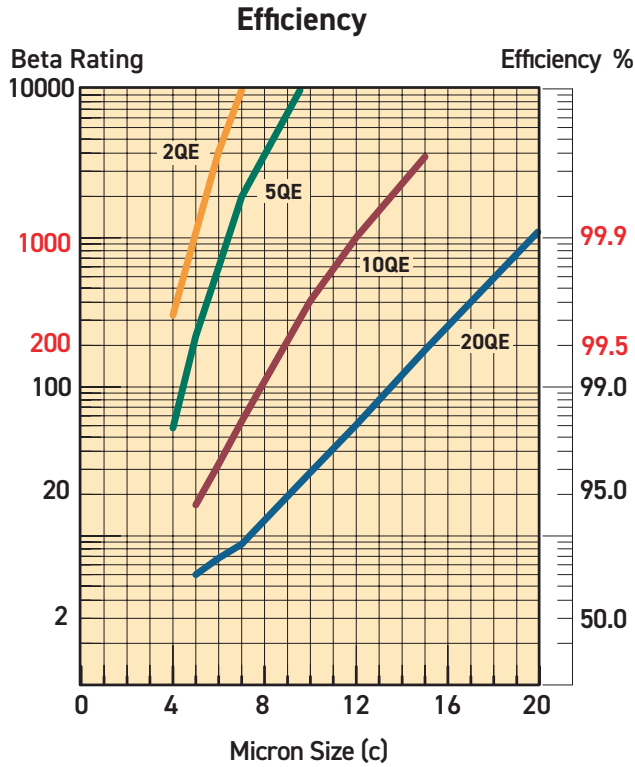
Ecoglass elements utilize the same proprietary media design as our Microglass line of replacement elements.

With Ecoglass, a reusable core is installed into the filter housing and remains in service throughout the life of the assembly.



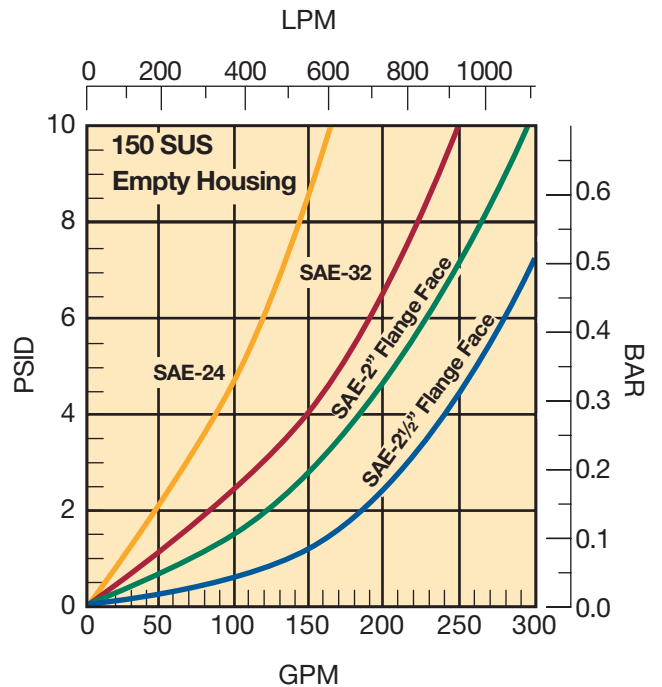
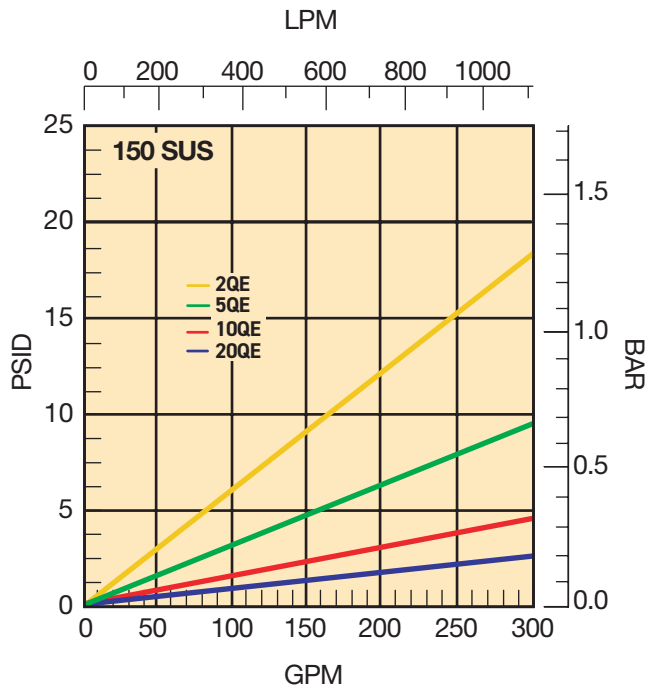
# IL8 Series

## IL8-2 Element Performance



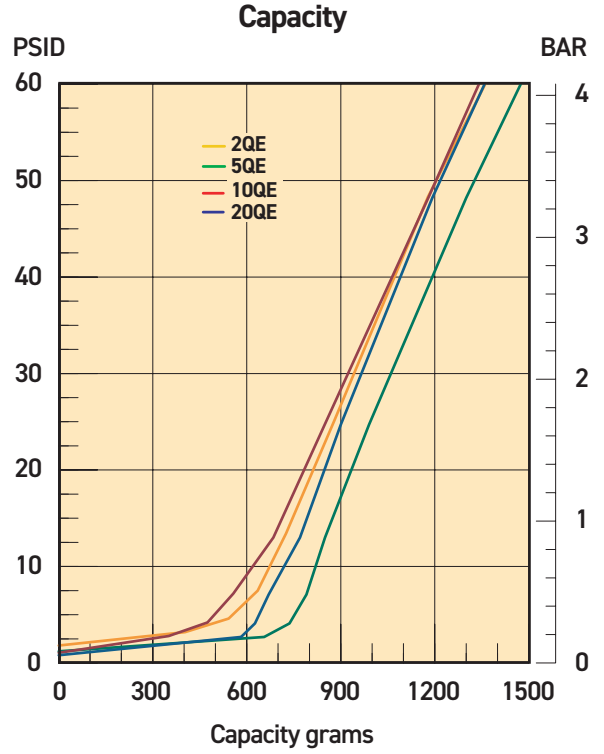
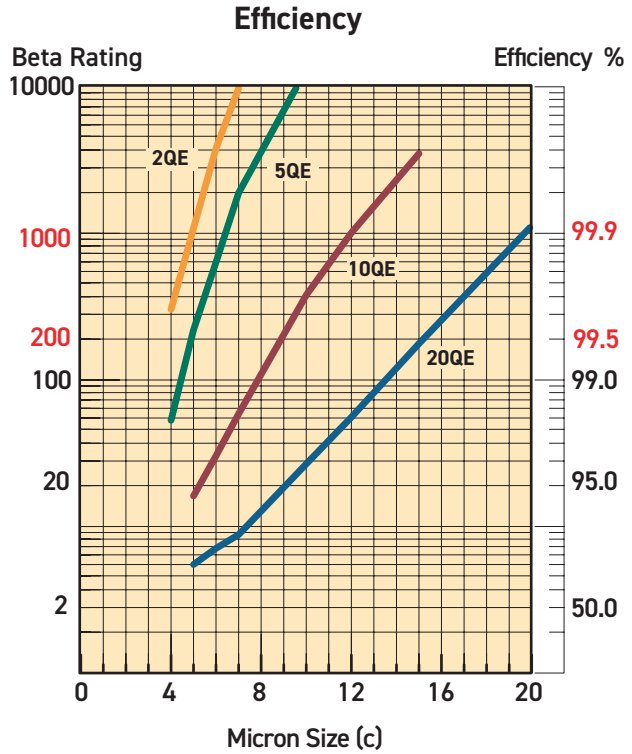
Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 60 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

## Flow vs. Pressure Loss



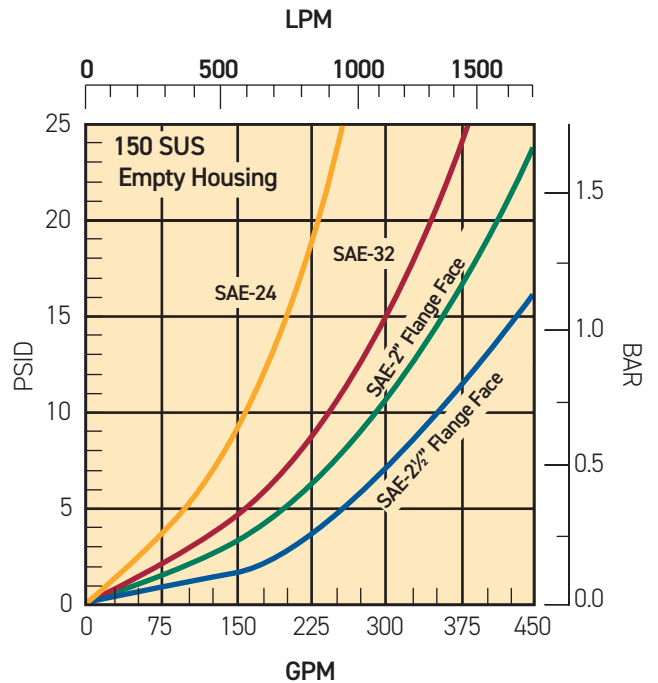
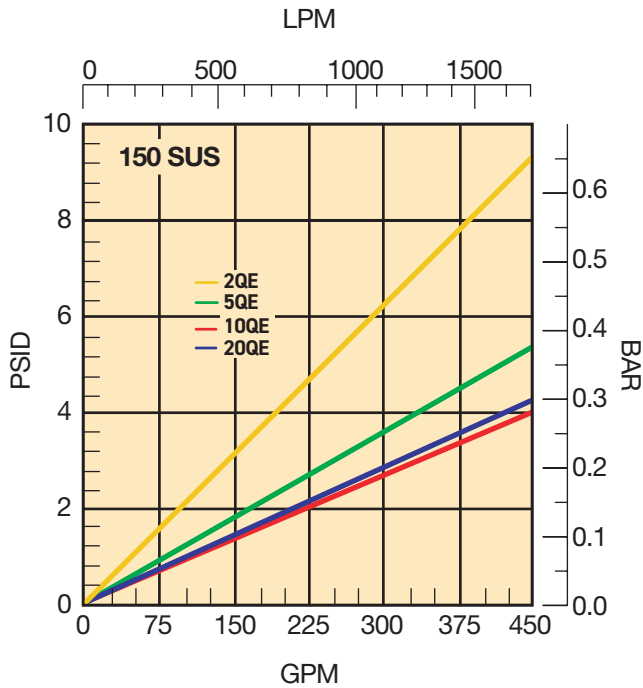
# IL8 Series

## IL8-3 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 60 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

## Flow vs. Pressure Loss



# IL8 Series

## Specifications: IL8

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 500psi (34.5 bar)  
 Rated Fatigue Pressure: 330psi (22.8 bar)  
 Design Safety Factor: 3:1

### Operating Temperatures:

Buna: -40°F (-40°C) to 225°F (107°C)  
 Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Element Collapse Rating:

150 psid (10.3 bar)

### Element Condition Indicators:

Visual (optional)  
 Electrical -heavy duty (optional)  
 SPDT .25 amps (resistive) MAX 5  
 watts 12 to 28 VDC & 110 to 175 VAC  
 Note: Product of switching voltage and current  
 must not exceed wattage rating

### Color Coding:

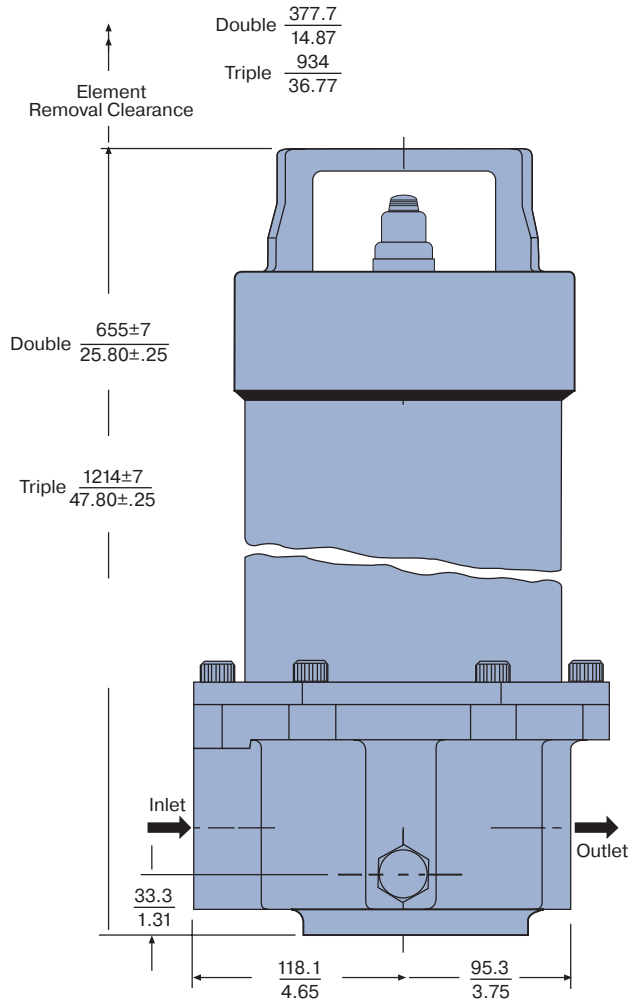
White (common)  
 Black (normally open)  
 Blue (normally closed)

### Materials:

Bowl: low carbon steel  
 Cover: anodized aluminum  
 Handle: nickel plated ductile iron  
 Base: anodized aluminum

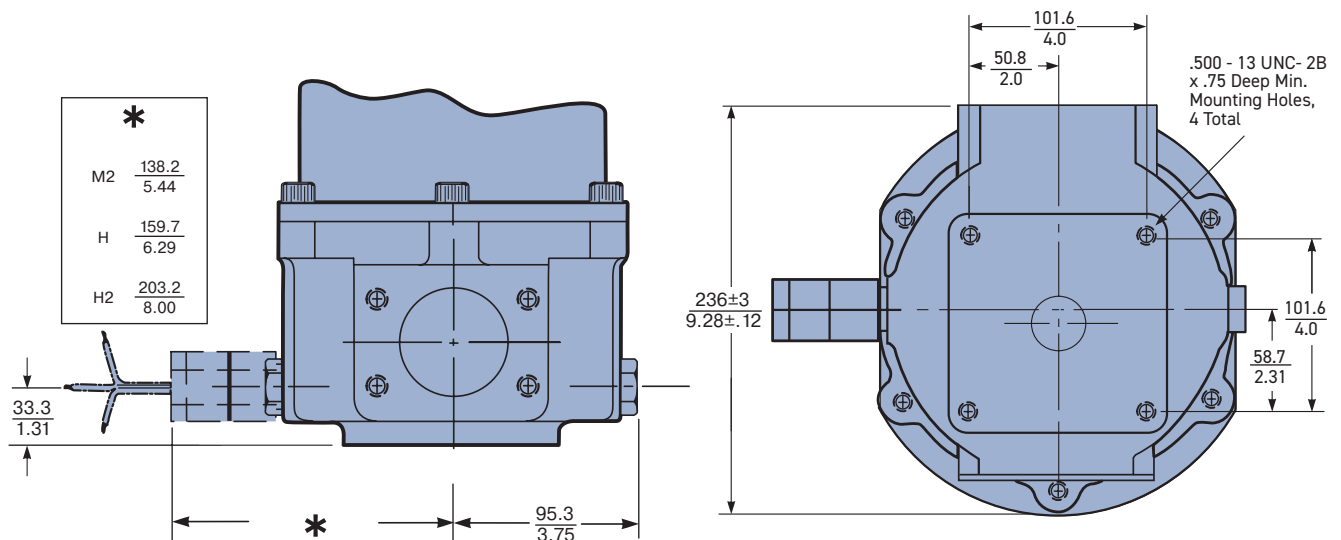
### Shipping Weights (approximate):

Double: 50 lbs. (22.7 kg)  
 Triple: 75 lbs. (34 kg)



Linear Measure: millimeter  
inch

Drawings are for reference only.  
 Contact factory for current version.



# IL8 Series

## Specifications: HDIL8/HQIL8

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 400psi (27.6 bar)  
 Rated Fatigue Pressure: 330psi (22.8 bar)  
 Design Safety Factor: 2.5:1

### Operating Temperatures:

-15°F (-26°C) to 200°F (93°C)

### Element Collapse Rating:

150 psid (10.3 bar)

### Materials:

Changeover valve: steel  
 Bowl: low carbon steel  
 Cover: anodized aluminum  
 Cover handle: nickel plated ductile iron  
 Base: steel

### Element Condition Indicators:

Visual (optional)  
 Electrical-heavy duty (optional)  
 SPDT .25 amps (resistive) MAX 5 watts  
 12 to 28 VDC & 110 to 175 VAC  
 Note: Product of switching voltage and current must not exceed wattage rating

### Color Coding:

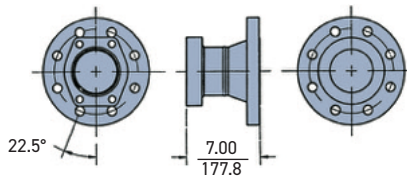
White (common)  
 Black (normally open)  
 Blue (normally closed)

### Shipping Weights (approximate):

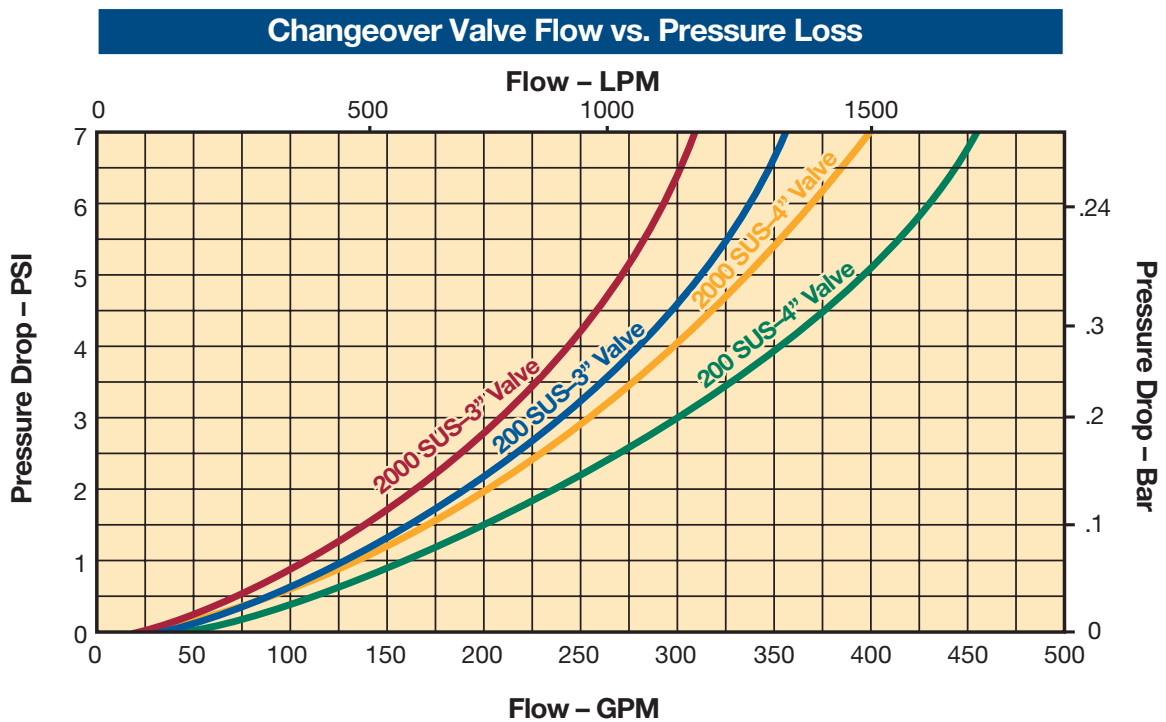
HDIL8-2	320 lbs. (145 kg)
HDIL8-3	375 lbs. (170 kg)
HQIL8-2	525 lbs. (238 kg)
HQIL8-3	650 lbs. (295 kg)

### ANSI Flange Adapter

End, Side View



Linear Measure:  $\frac{\text{millimeter}}{\text{inch}}$

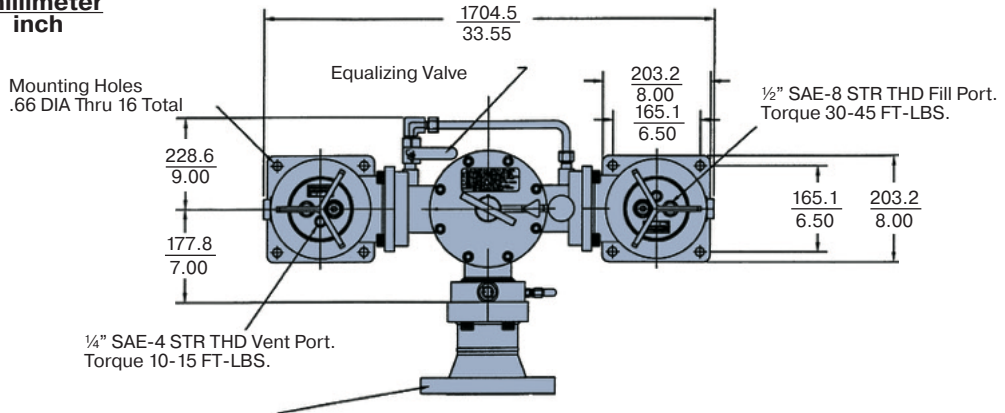


# IL8 Series

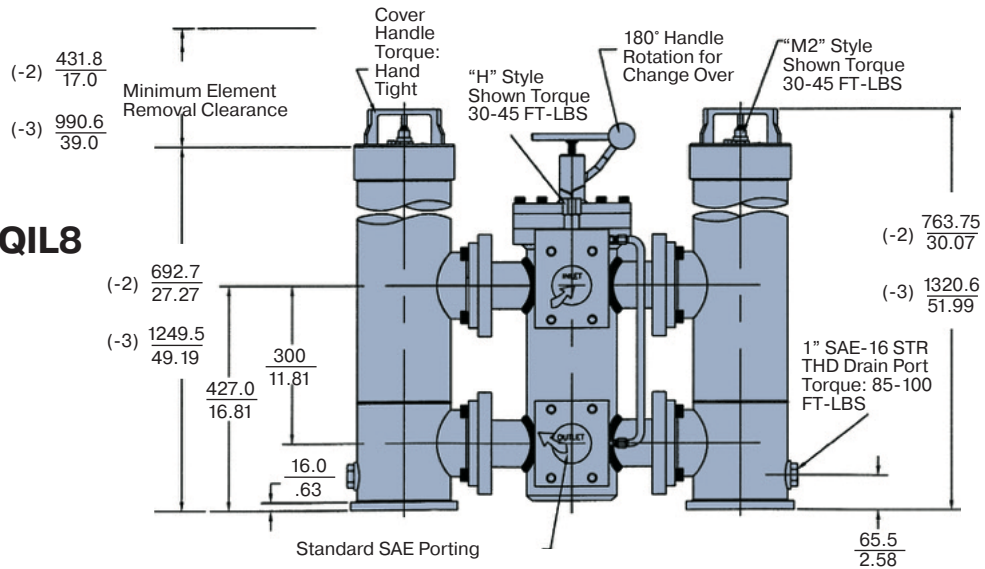
## Specifications: HDIL8/HQIL8

Linear Measure: millimeter  
inch

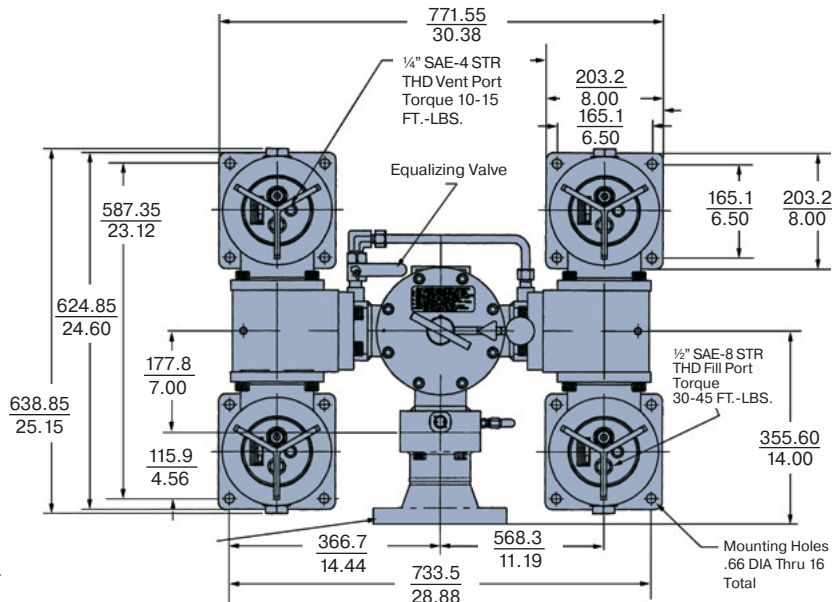
**HDIL8**  
Top View



**HDIL8/HQIL8**  
Side View



**HQIL8**  
Top View

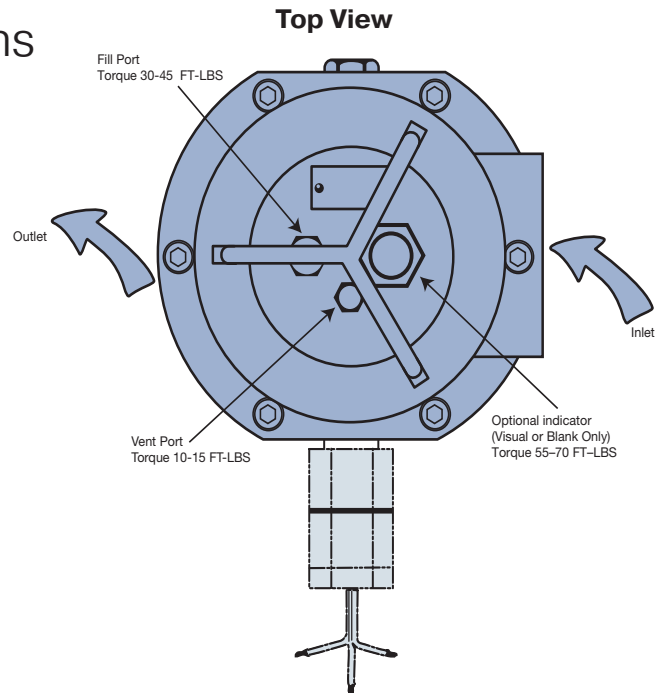


Drawings are for reference only.  
Contact factory for current version.

# IL8 Series

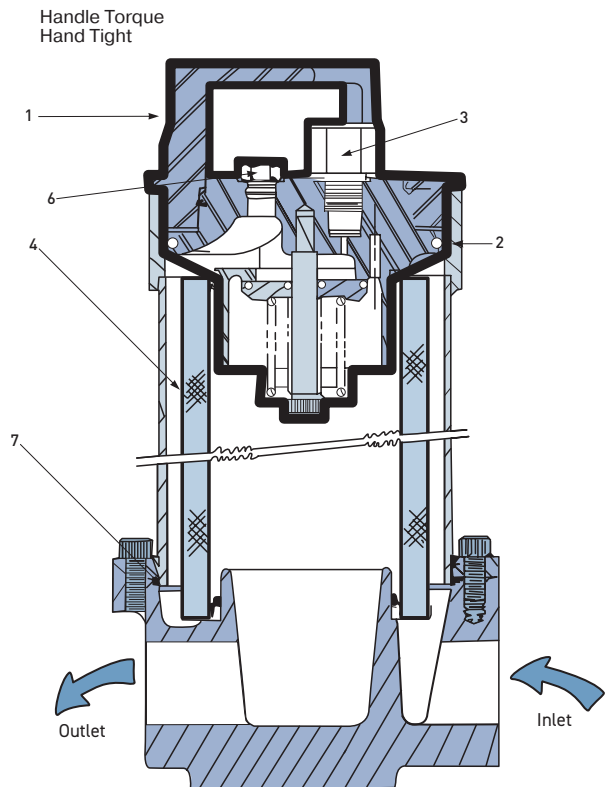
## Element Servicing Instructions

1. Stop the system's power unit.
2. Relieve pressure in the filter line. Drain fluid from housing if desired.
3. Rotate cover handle counter-clock wise. Carefully lift and remove the cover.
4. Remove element from the housing. Discard all disposable elements as they are not cleanable. With Ecoglass elements the permanent core will remain in the housing.
5. Place new element in housing, centering it on the element locator in the bottom of bowl.
6. Inspect cover o-ring and replace if necessary.
7. Install cover, rotate clockwise and hand tighten.



### Parts List

Index	Description	Nitrile P/N	Fluorocarbon P/N
1	<b>Cover Assembly</b>		
	25 psi bypass w/indicator port	928887	928888
	50 psi bypass w/indicator port	928889	928890
	No bypass w/indicator port	928891	928892
2	<b>Cover o-ring</b>	N72257	V72257
3	<b>Indicators</b>		
	P option-indicator port plug	N/A	925515
	M2 25 PSI	N/A	932026
	M2 50 PSI	N/A	932027
	H 25 PSI	N/A	933053
	H 50 PSI	N/A	932905
	H2 25 PSI	N/A	933141
H2 50 PSI	N/A	933142	
4	<b>Elements</b> (See chart on model code page)		
not shown	<b>Bleed (vent) Plug, SAE 4</b>	931357	931358
6	<b>Fill Plug, SAE 8</b>	908822	928628
not shown	<b>Drain Port Plug, SAE 10</b>	925513	928883
7	<b>Base O-ring</b>	N72262	V72262
	<b>Flange Kits (optional)</b>		
	1 1/2" NPTF (w/2" flange face only)	924786	926011
	2" NPTF (w/2" flange face only)	924785	926010
	SAE-24 (w/2" flange face only)	924782	926007



Drawings are for reference only.  
Contact factory for current version.

# IL8 Series

## Element Servicing Instructions: HDIL8/HQIL8

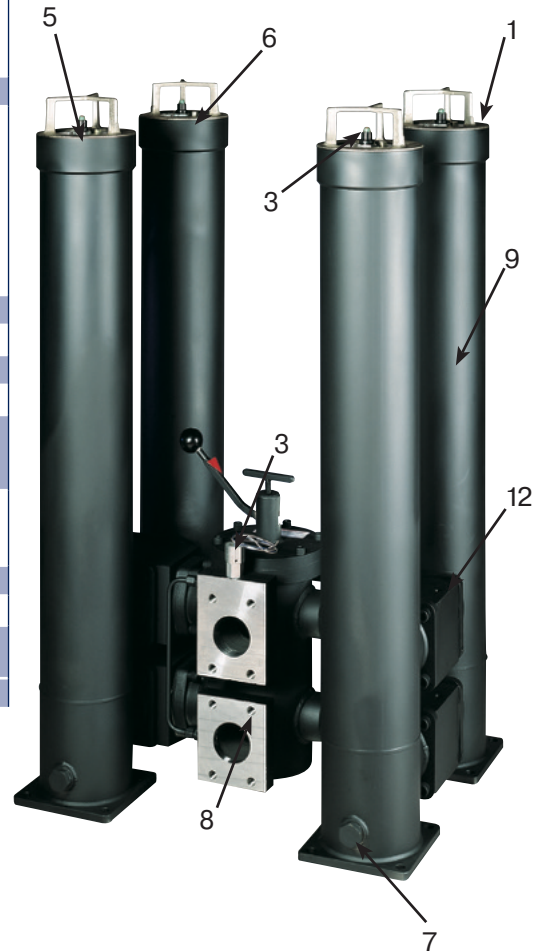
The system does not need to be shut down to service the elements.

- Red arrow on operating handle points to on-duty chamber(s).
- Open off-duty vent plug(s). Do not thread out completely.
- Open the pressure equalizing (fill line) valve slowly to admit fluid to the off-duty chamber(s).
- When fluid is discharged from the off-duty vent plug(s), close and tighten.
- Turn the “T” handle, on the center valve section, counter-clockwise 5 turns.
- Depress the operating handle to unseat the seal shoes, then rotate 180° and return handle upward into the opposite slot.
- Turn the “T” handle fully clockwise and hand tighten only. This will seat the shoes.
- Close the pressure equalizing valve.
- Red arrow now points to the new on-duty chamber(s).
- Open the new off-duty vent plug(s).
- Remove the new off-duty chamber cover(s) by rotating counter-clockwise.
- Remove the new off-duty drain plugs and drain chambers to desired level.
- Follow steps 3 - 7 on opposite page.
- Close and tighten the vent plug(s).

**Warning: You should not rotate the handle until you equalize the pressure.**

### Parts List

Index	Description	HDIL8		HQIL8	
		Nitrile	Fluorocarbon	Nitrile	Fluorocarbon
1	<b>Cover Assembly</b>				
	25psi bypass w/indicator port	928887	928888	928887	928888
	50psi bypass w/indicator port	928889	928890	928889	928890
	No bypass w/indicator port	928891	928892	928891	928892
2	<b>Cover O-ring</b>	N72257	V72257	N72257	V72257
3	<b>Indicators</b>				
	P option-indicator port plug	N/A	925515	N/A	925515
	M2 25psi	N/A	932026	N/A	932026
	M2 50psi	N/A	932027	N/A	932027
	H 25psi	N/A	933053	N/A	933053
	H 50psi	N/A	932905	N/A	932905
	H2 25psi	N/A	933141	N/A	933141
	H2 50psi	N/A	933142	N/A	933142
4	<b>Elements</b> (see chart on model code page)				
5	<b>Bleed (vent) Plug, SAE-4</b>	931357	931358	931357	931358
6	<b>Fill Plug, SAE-8</b>	908822	928628	908822	928628
7	Drain Plug SAE-16	925353	928364	925353	928364
8	<b>Transfer Valve</b>				
	SAE 4" SAE 3"	933824 933825	936123 936122	933824 933825	936123 936122
9	<b>Housing Assembly</b>				
	Double length Triple length	933832 933831	933832 933831	933832 933831	933832 933831
10	5/8"-11 x 3" SHCS	933928	933928	933928	933928
11	5/8" Lock Washer	933879	933879	933879	933879
12	<b>Adapter Block Kit</b> (block, 3 o-rings, 12 bolts)	N/A	N/A	N/A	933833
13	<b>Seal Kit Transfer Valve</b>	935409		936346	



# IL8 Series

## Medium Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8	BOX 9
	IL8	2	R	20QE	HM2	25	QQ	1

BOX 1: Seal Material	
Symbols	Description
None	Nitrile
F3	Fluorocarbon

BOX 2: Filter Series	
Symbols	Description
IL8	In-Line

BOX 3: Element Length	
Symbols	Description
2	Double
3	Triple

BOX 4: Core	
Symbols	Description
R	Reusable

BOX 5: Media Code	
Symbols	Description
02QE	Ecoglass, 2 micron
05QE	Ecoglass, 5 micron
10QE	Ecoglass, 10 micron
20QE	Ecoglass, 20 micron

BOX 6: Indicators	
Symbols	Description
<b>Base Indicator Options</b>	
P	No pressure port indicator, port only
M2	Visual auto reset
H	Electrical w/ conduit connection
H2	Electrical w/ DIN 43650 connection
<b>Cover Indicator Options</b>	
P	No pressure port indicator, port only
M2	Visual auto reset

BOX 7: Bypass	
Symbols	Description
25	25 psid (1.7 bar)
50	50 psid (3.5 bar)
XX	No indicator and blocked bypass

BOX 8: Ports	
Symbols	Description
PP	SAE-24 straight thread
RR	SAE-32 straight thread
YY	SAE 2" flange face
ZZ*	SAE 2-1/2" flange face

BOX 8: Options	
Symbol	Description
1	None
11	Blocked bypass

### Replacement Elements

Media	Double	Triple
02QE	933834Q	933734Q
05QE	933835Q	933612Q
10QE	933836Q	933735Q
20QE	933837Q	933736Q
Reusable Core	933838	933636



Hydraulic & Fuel Filtration Division  
[www.parker.com/emhff](http://www.parker.com/emhff)

Last updated August 4th, 2023

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# 15/40/80CN Series

Coreless Medium Pressure Filters



ENGINEERING YOUR SUCCESS.

# 15/40/80CN Series

## Applications

- **Compressor Lube Oil**
- **Off-line Filter Loops**
- **Machine Tools (Automotive Standard)**
- **Hydrostatic Drive Charge Pumps**
- **Mobile Equipment**
- **Pilot Lines For Servo Controls**
- **Oil Patch Drilling Equipment**
- **Injection Molding**

This partial list of applications for Parker CN series filters has a common factor, the need for an economical, medium pressure range filter with excellent fatigue pressure ratings. Prior to the availability of the CN filter, applications such as those listed were restricted by limitations of a spin-on can, or forced into the higher cost range of high pressure filters.

The CN series fills this gap, and now with the newly increased fatigue rating from 550 to 800 psi, the applications are expanded.



Feature	Advantage	Benefit
800 psi fatigue rating (eight times that of a spin-on)	<ul style="list-style-type: none"> <li>• Ability to provide reliable service under tough cyclic operating conditions</li> <li>• Can be utilized in applications where high pressure filters may have been the only option</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced downtime due to premature filter failures</li> <li>• Reduce costs, better “fit” for the application</li> </ul>
Diametral (side) seal between head and bowl	<ul style="list-style-type: none"> <li>• Proven reliability in cyclic applications</li> <li>• Reduced importance of bowl torque</li> </ul>	<ul style="list-style-type: none"> <li>• No downtime, no leaks</li> <li>• Performs with “real world” service</li> </ul>
Dust seal	<ul style="list-style-type: none"> <li>• Prevents contamination from building up on bowl / head threads</li> </ul>	<ul style="list-style-type: none"> <li>• Easier service, no galling</li> </ul>
Cast aluminum head	<ul style="list-style-type: none"> <li>• Low profile, lightweight and durable</li> </ul>	<ul style="list-style-type: none"> <li>• Less weight, smaller envelope and cleaner appearance</li> </ul>
Standard Microglass elements	<ul style="list-style-type: none"> <li>• Multi-layered design produced high capacity and efficiency</li> <li>• Reduces pleat bunching, keeps performance consistent</li> </ul>	<ul style="list-style-type: none"> <li>• Great performance value</li> <li>• Reliable performance throughout element life</li> <li>• Reduces downtime, maximizes element life</li> </ul>
Complete performance data disclosure	<ul style="list-style-type: none"> <li>• All pertinent information is provided in an easy-to-compare format</li> </ul>	<ul style="list-style-type: none"> <li>• No hidden deficiencies</li> <li>• Easy selection of proper filtration</li> </ul>
Visual, electrical or electrical/visual indicators available	<ul style="list-style-type: none"> <li>• Check element condition at a glance</li> <li>• Right style for the application</li> </ul>	<ul style="list-style-type: none"> <li>• Optimize element life, prevent bypassing</li> <li>• Matches your system electrical connections</li> </ul>

# 15/40/80CN Series

## Features

### Ports

SAE, NPT or flange face (80CN) provides mounting flexibility.

### Element Assembly

#### Element Condition Indicators

Available in visual or electrical, with a choice of several power connections (E3 shown).

### Head

Cast aluminum is rugged with small profile for easy mounting.

### Diametral (side) Seal Dust Seal

Protects head and bowl threads from external contamination buildup.

### Bypass

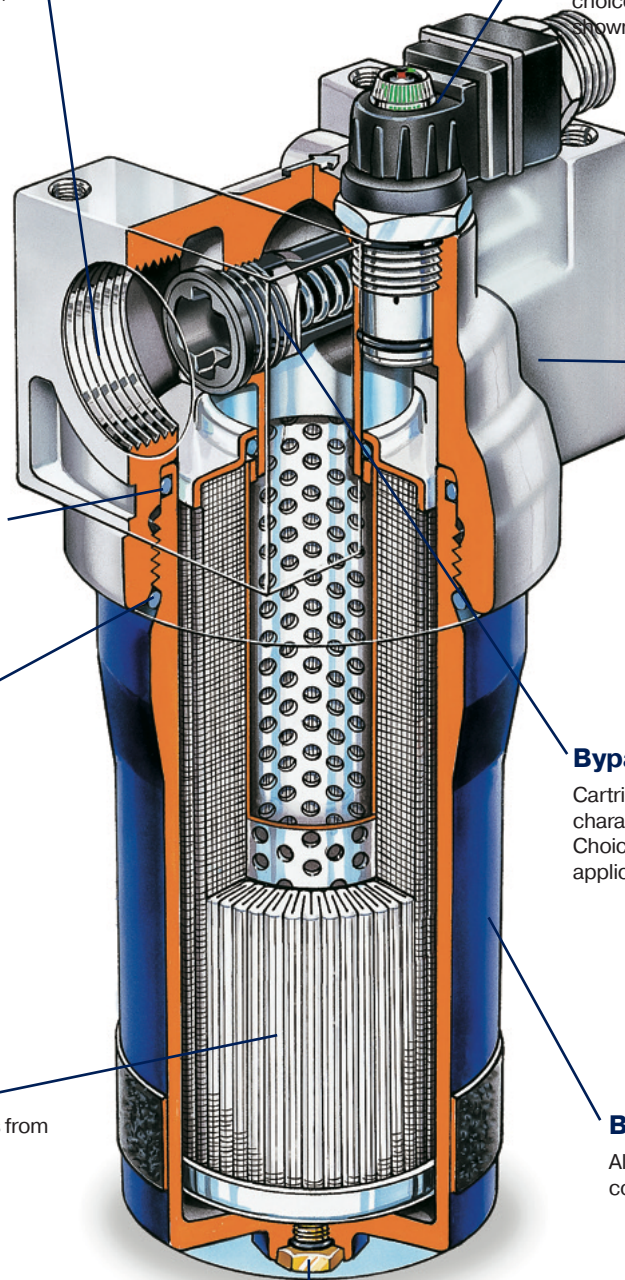
Cartridge style bypass has good sealing characteristics and low hysteresis. Choice of two settings to match application needs.

### Bowl

Aluminum is lightweight and corrosion resistant.

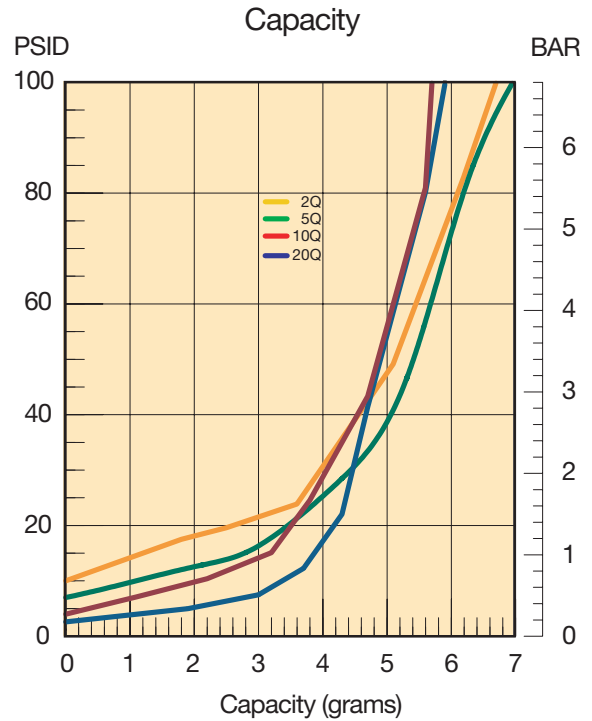
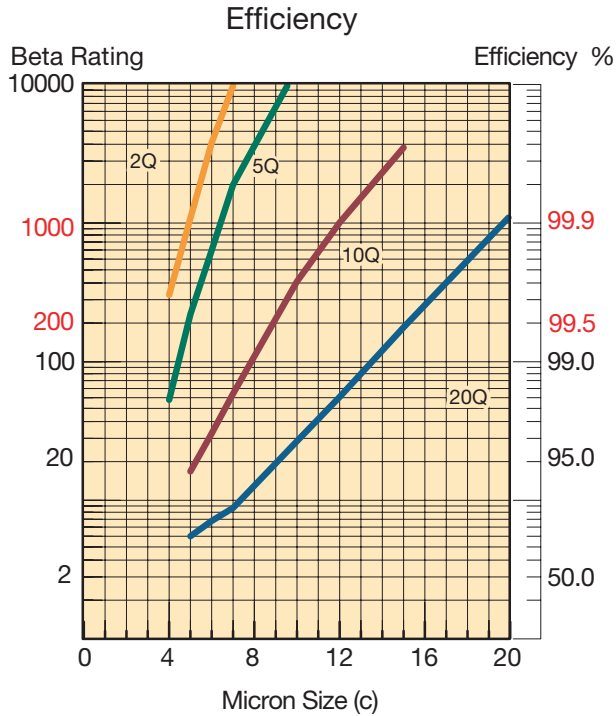
### Drain Port (optional)

Optional drain port allows for easy element servicing.



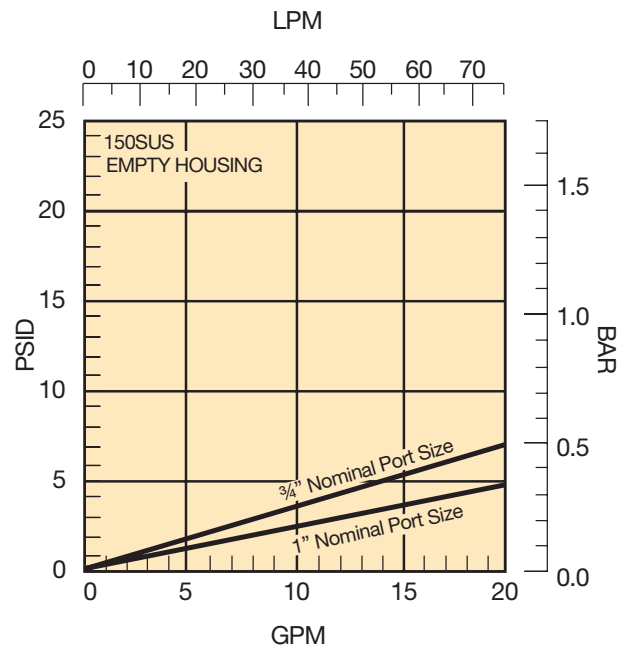
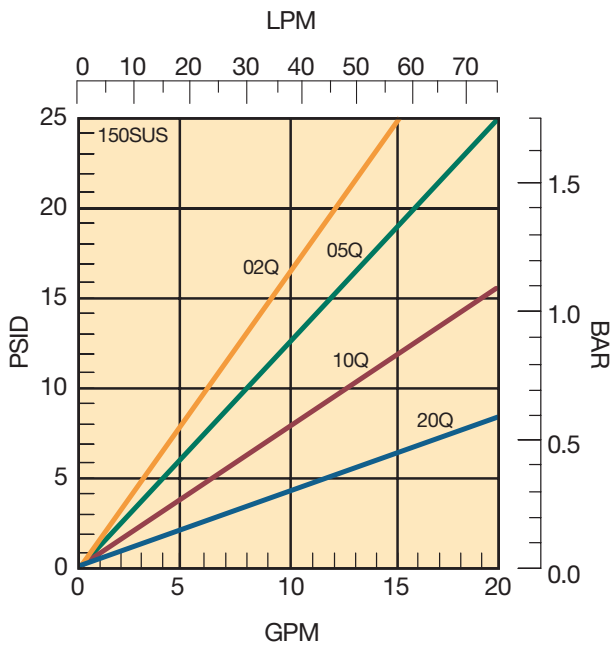
# 15CN Series

## 15CN-1 Element Performance



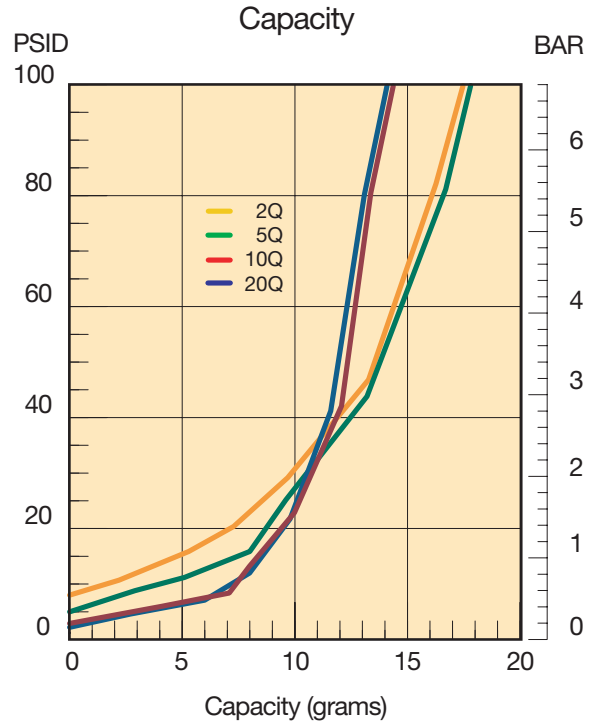
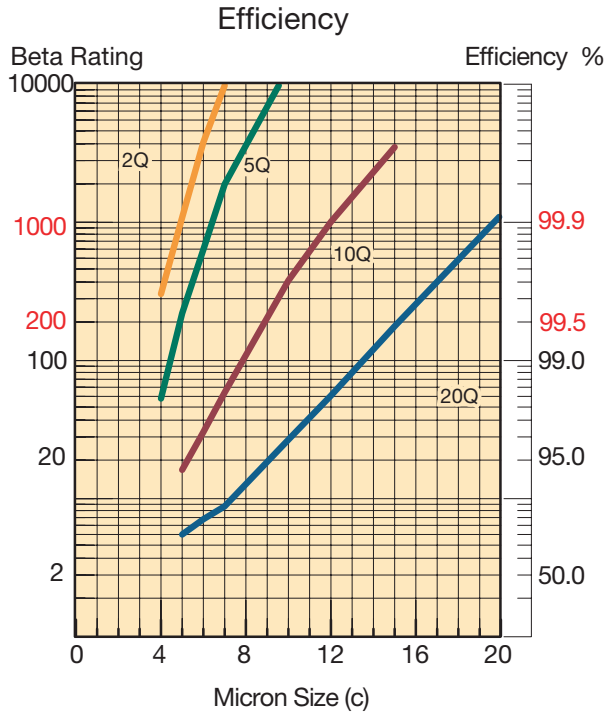
Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



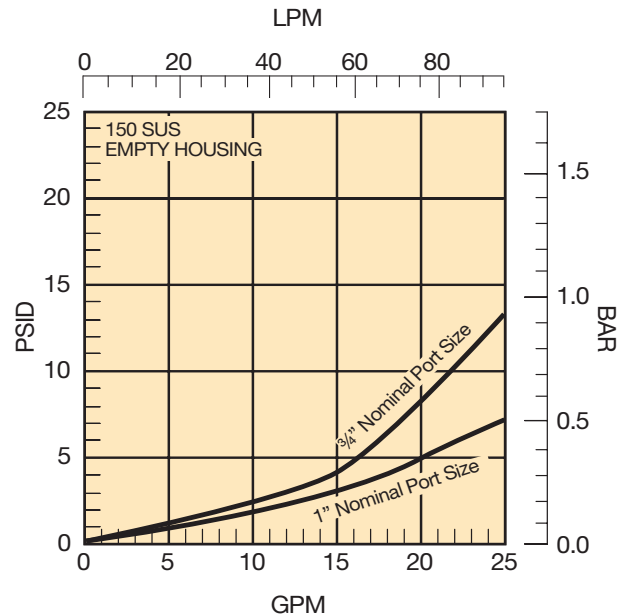
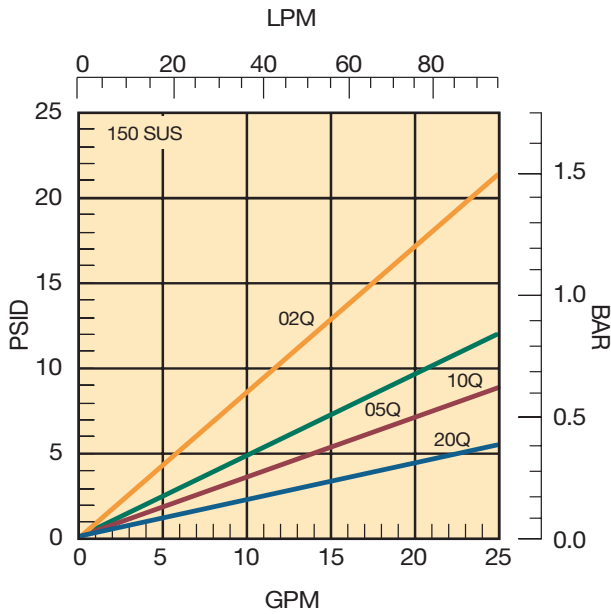
# 15CN Series

## 15CN-2 Element Performance



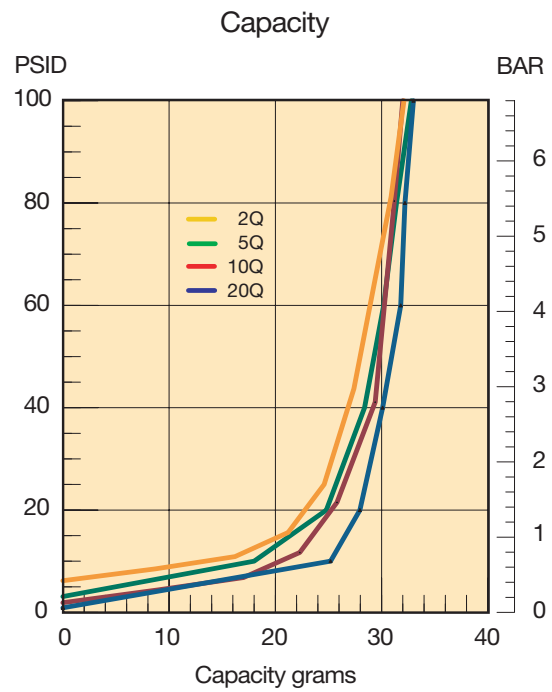
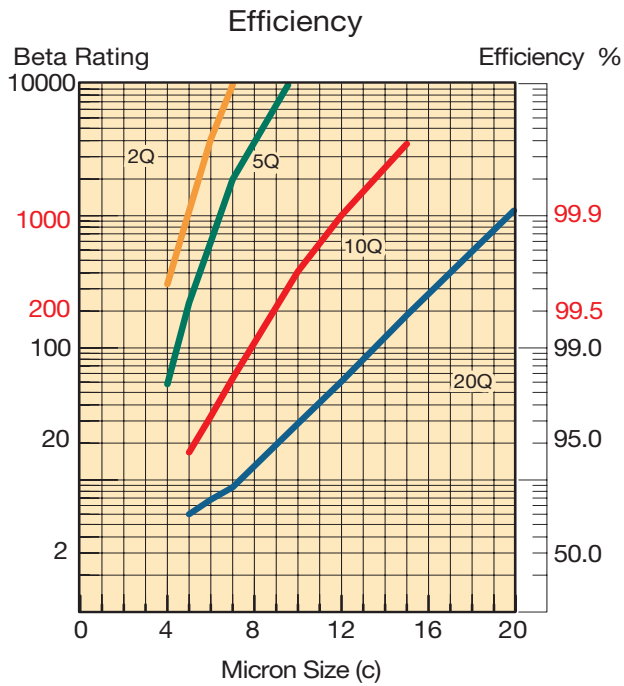
Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL  
 Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



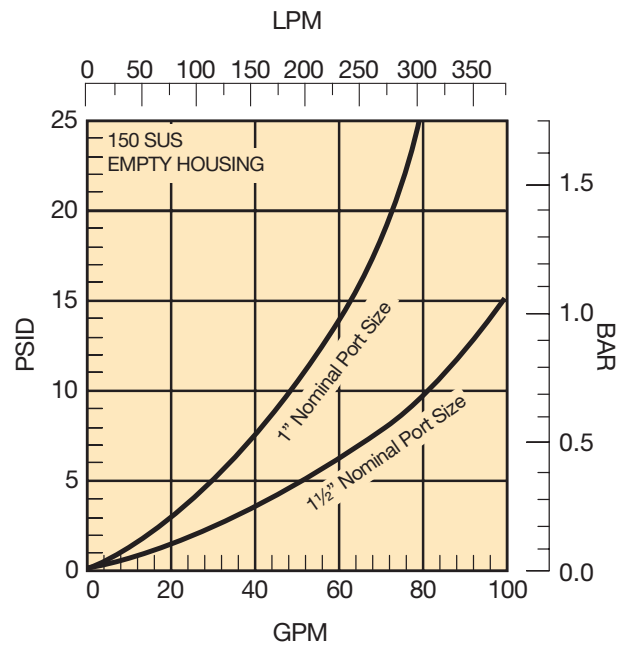
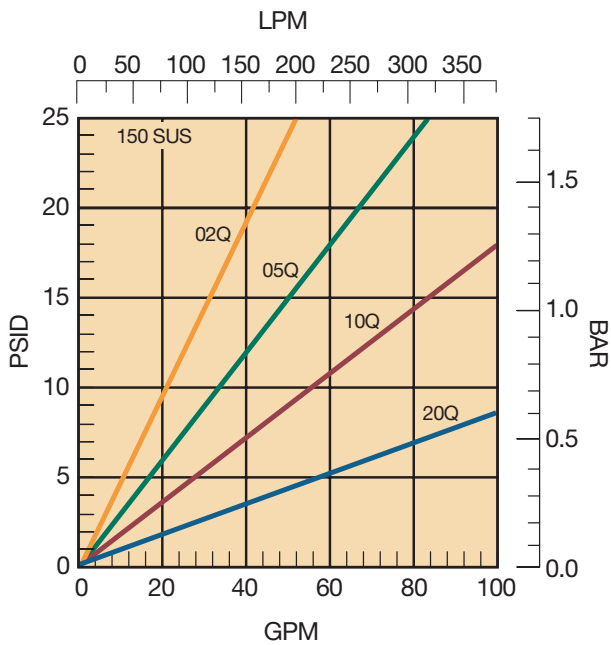
# 40CN Series

## 40CN-1 Element Performance



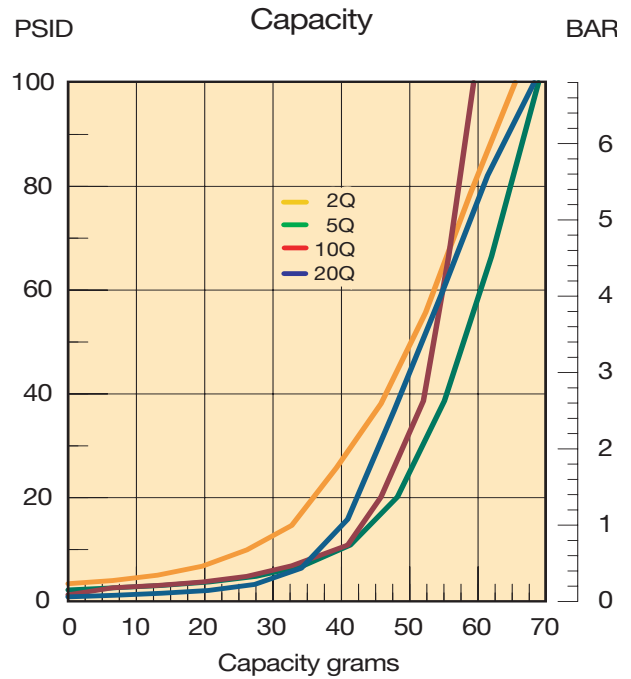
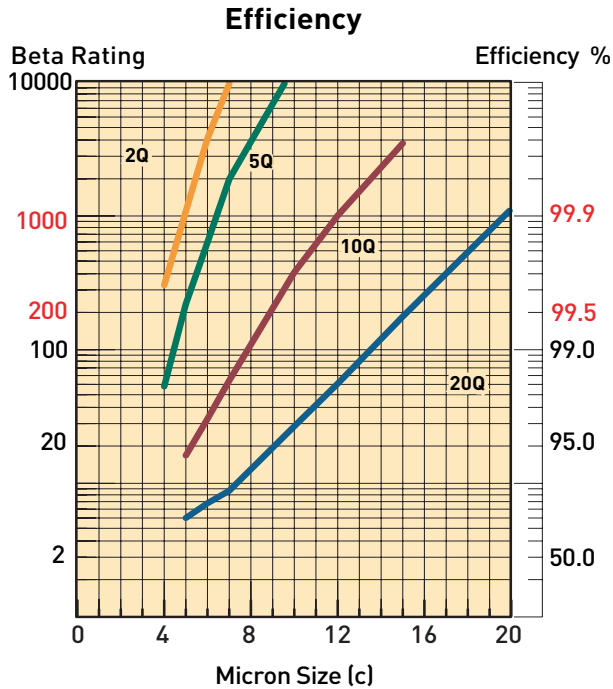
Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL  
 Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



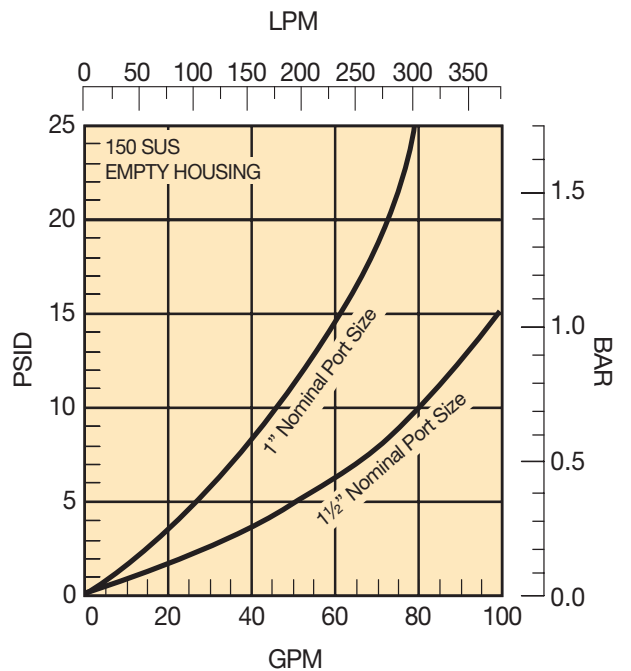
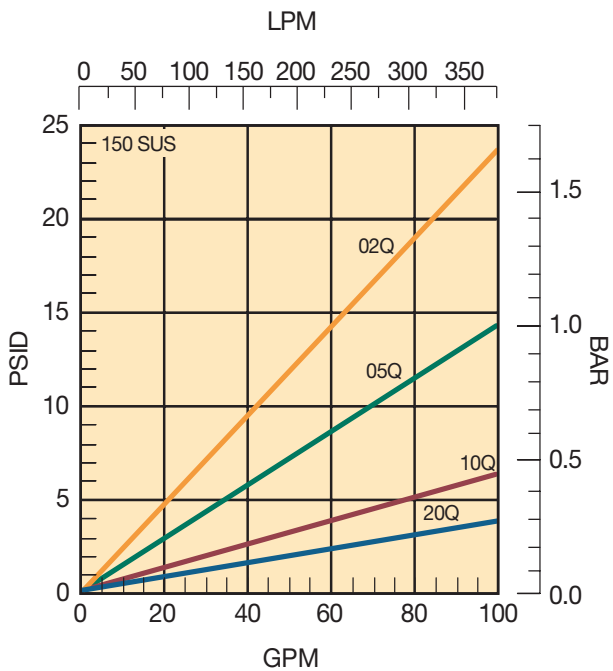
# 40CN Series

## 40CN-2 Element Performance



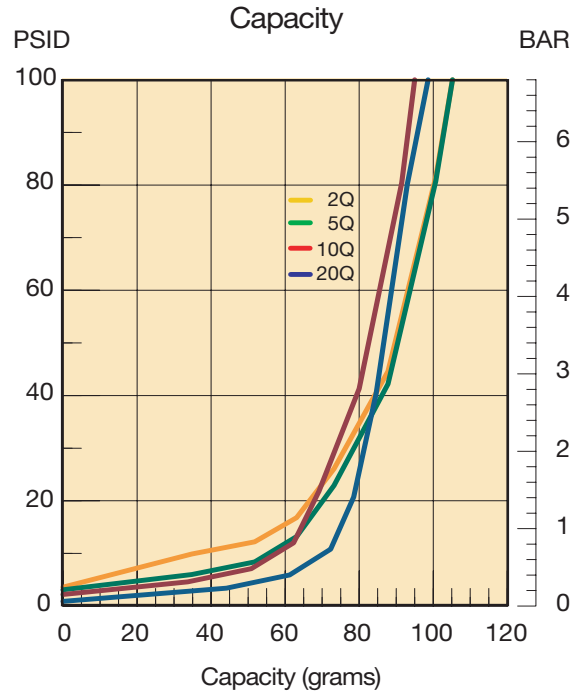
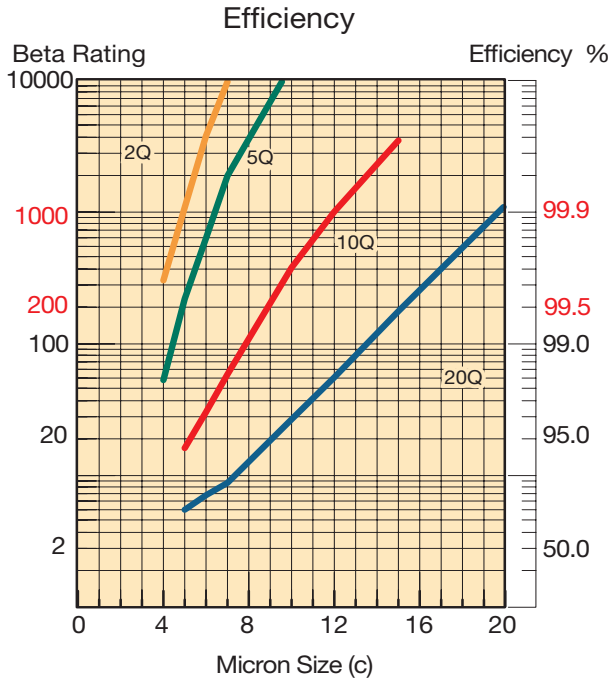
Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



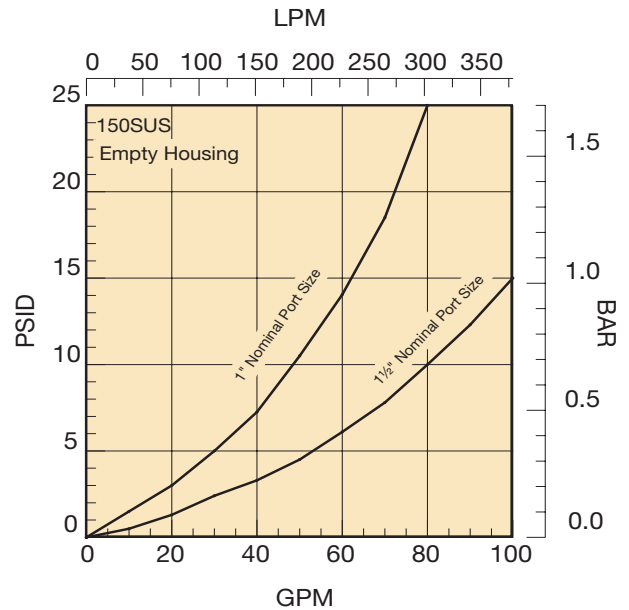
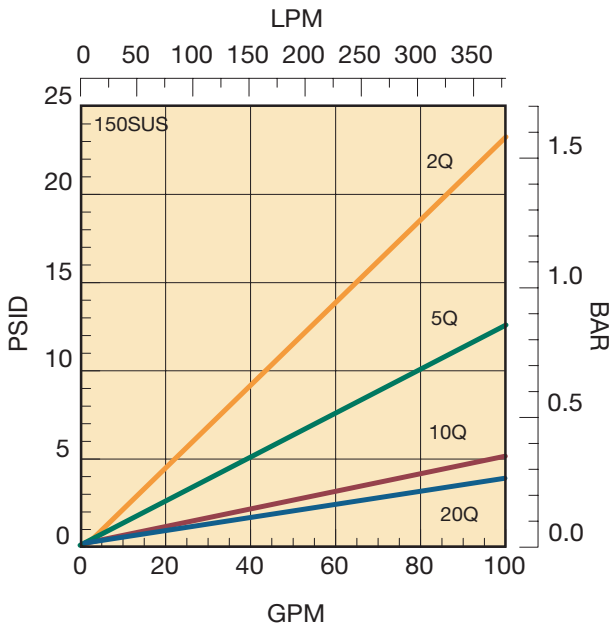
# 40CN Series

## 40CN-3 Element Performance



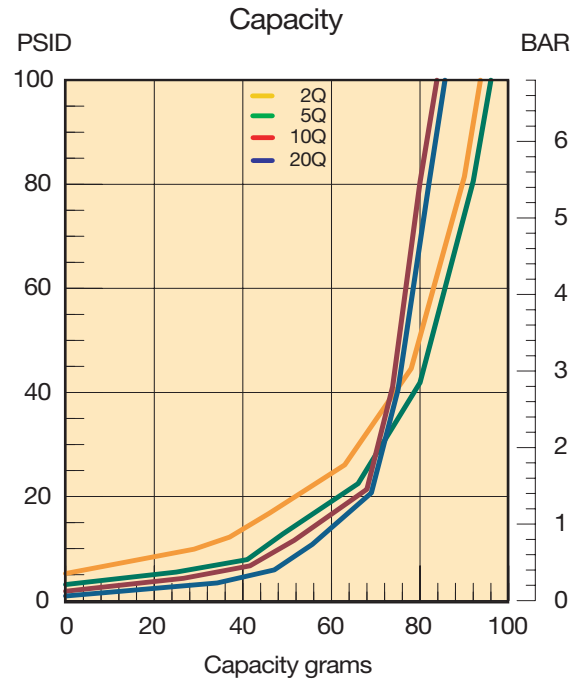
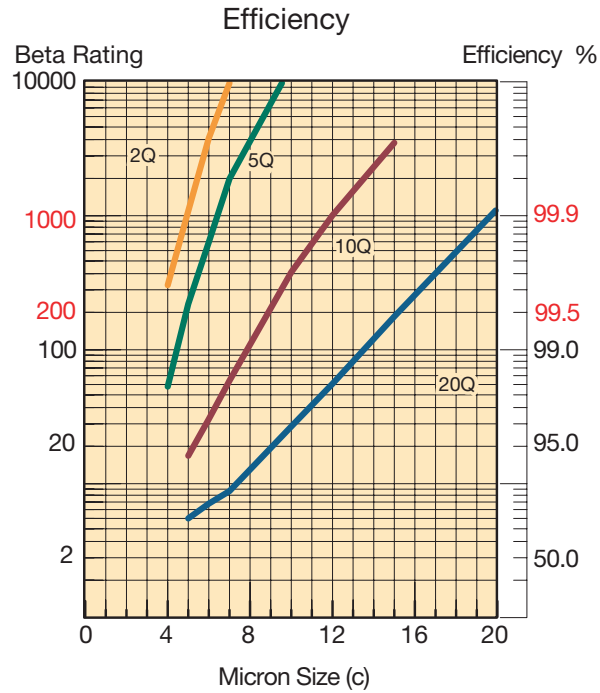
Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



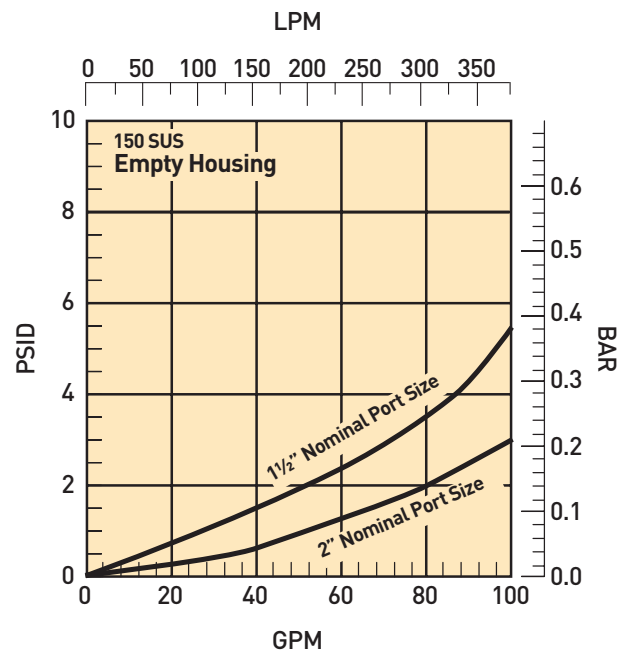
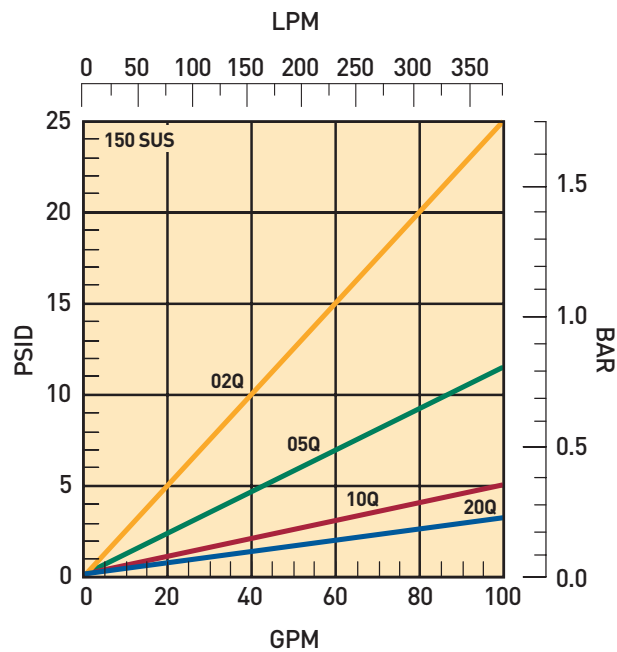
# 80CN Series

## 80CN-1 Element Performance



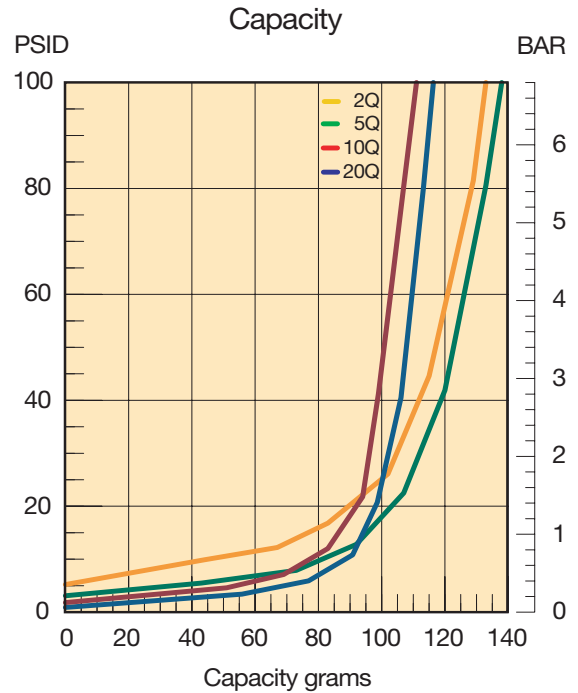
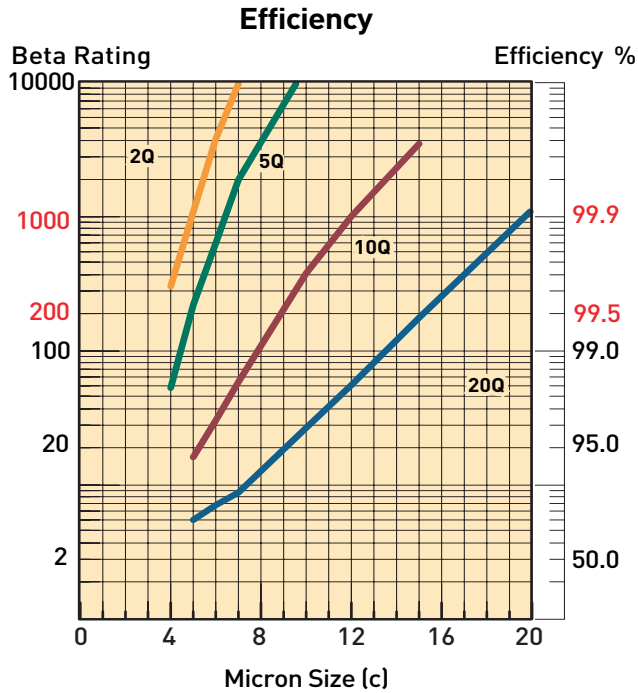
Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 100 psid terminal - 10 mg/L BUGL  
 Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



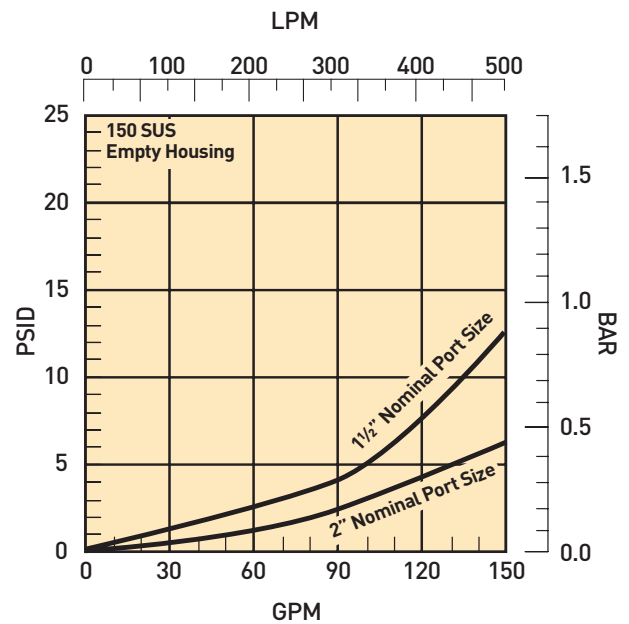
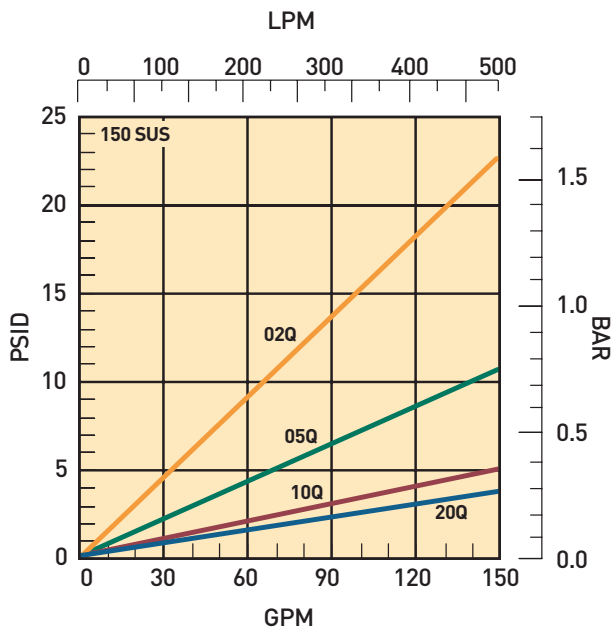
# 80CN Series

## 80CN-2 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 70 gpm to 100 psid terminal - 10 mg/L BUGL  
 Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



# 15/40/80CN Series

## Specifications

### Maximum Allowable Operating Pressure (MAOP):

1000 psi (69 bar)

### Rated Fatigue Pressure:

800 psi (55.2 bar)

### Design Safety Factor: 2.5:1

### Operating Temperatures:

Nitrile: -40°F (-40°C) to 225°F (107°C)

Fluorocarbon: -15°F (-26°C) to 225°F (107°C)

### Element Collapse Rating:

Standard: 150 psi (10.3 bar)

Drawings are for reference only.

Contact factory for current version.

### Materials:

Head and Bowl: Aluminum

Indicators: Aluminum body, plastic connectors

Bypass: Nylon

### Weights (approximate):

Model	Single length	Double length
15CN	2.5 lb. (1.13 kg)	3.5 lb. (1.6 kg)
40CN	4.5 lb. (2.00 kg)	5.5 lb. (2.49 kg)
80CN	12.4 lb. (5.62 kg)	15.2 lb. (6.89 kg)

### Element Condition Indicators:

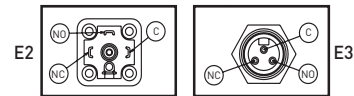
Visual 360° green/red auto reset  
Electrical/Visual (E)

5A @ 240VAC, 3A @ 28VDC

Black (common)

Red (normally open)

White (normally closed)



### Electrical-Heavy Duty (H)

.25A (resistive) MAX 5 watts

12 to 28 VDC & 110 to 175 VAC

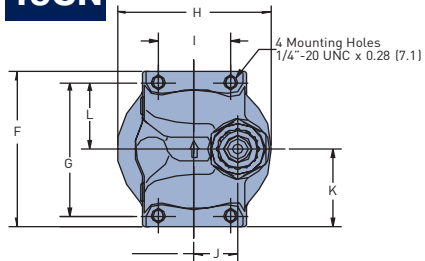
White (common)

Black (normally open)

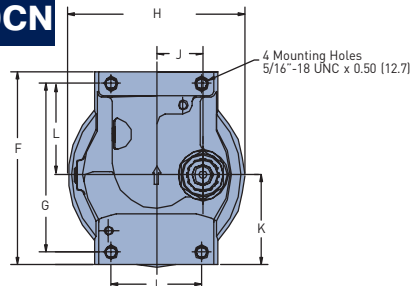
Blue (normally closed)

Dimensions are in (mm)	A	B	C	D	E	F	G	H	I	J	K	L	M
<b>15CN</b>	6.17 (156.6)	9.87 (250.7)	1.85 (47.0)	1.00 (25.4)	2.80 (71.1)	3.38 (85.9)	2.88 (73.2)	3.25 (82.6)	1.50 (38.1)	.90 (22.9)	1.69 (42.9)	1.44 (36.6)	NA
<b>40CN</b>	6.73 (170.8)	10.33 (262.4)	2.44 (62.0)	1.28 (32.6)	4.22 (107.2)	5.00 (127.0)	4.37 (111.0)	4.80 (121.9)	2.44 (62.0)	1.25 (31.8)	2.32 (58.8)	2.37 (60.2)	15.07 (382.8)
<b>80CN</b>	11.06 (280.9)	15.81 (401.6)	3.06 (77.7)	1.95 (49.5)	4.91 (124.8)	6.25 (158.7)	3.25 (82.6)	5.96 (151.4)	4.00 (101.6)	1.62 (41.1)	3.12 (79.4)	1.63 (41.3)	NA

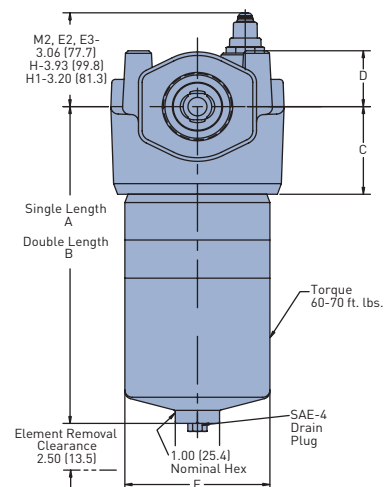
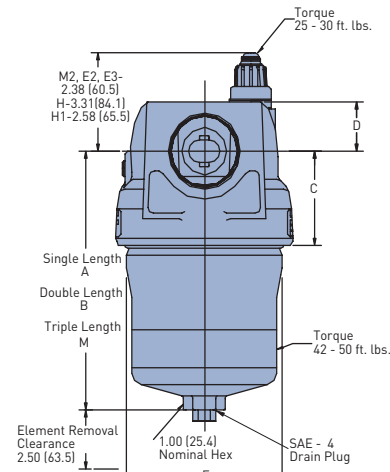
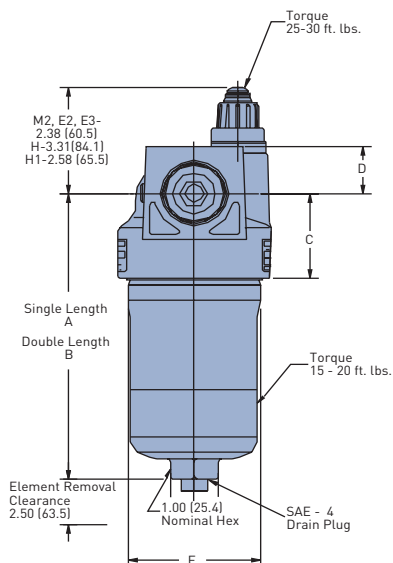
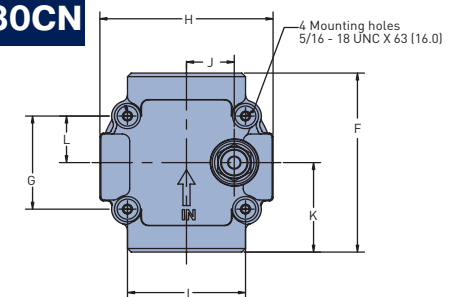
### 15CN



### 40CN



### 80CN



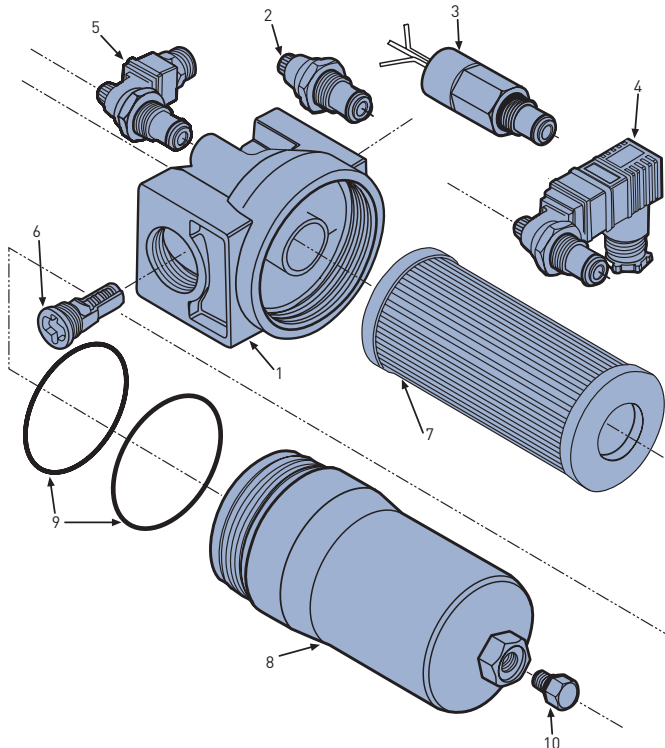
# 15/40/80CN Series

## Element Service Instructions

- A. Stop the system's power.
- B. Relieve any system pressure in the filter line.
- C. Drain the filter bowl if drain port option is provided.
- D. Loosen and remove bowl.
- E. Remove element by pulling downward with a slight twisting motion and discard.
- F. Check bowl o-ring for damage and replace if necessary.
- G. Lubricate element o-ring with system fluid and place on post in filter head.
- H. Install bowl and tighten to specified torque.
  - 15CN - 15-20 ft-lbs
  - 40CN - 42-50 ft-lbs
  - 80CN - 60-70 ft-lbs
- I. Confirm there are no leaks after powering the system.

### Parts List

Index	Description	15CN	40CN	80CN
1	Head			
	3/4" NPT bypass/ indicator ready	933865	N/A	N/A
	3/4" NPT no bypass/ no indicator	933877	N/A	N/A
	3/4" NPT no bypass/ indicator ready	933869	N/A	N/A
	3/4" NPT no indicator/ bypass ready	933873	N/A	N/A
	SAE-12 bypass/ indicator ready	933863	N/A	N/A
	SAE-12 no bypass/ no indicator	933875	N/A	N/A
	SAE-12 no bypass/ indicator ready	933867	N/A	N/A
	SAE-12 no indicator/ bypass ready	933871	N/A	N/A
	1" NPT bypass/ indicator ready	933864	932950	N/A
	1" NPT no bypass/ no indicator	933876	932986	N/A
	1" NPT no bypass/ indicator ready	933868	932962	N/A
	1" NPT no indicator/ bypass ready	933872	932974	N/A
	SAE-16 bypass/ indicator ready	933862	932947	N/A
	SAE-16 no bypass/ no indicator	933874	932983	N/A
	SAE-16 no bypass/ indicator ready	933866	932959	N/A
	SAE-16 no indicator/ bypass ready	933870	932971	N/A
	1 1/2" NPT bypass/ indicator ready	N/A	932948	934012
	1 1/2" NPT no bypass/ no indicator	N/A	932984	934018
	1 1/2" NPT no bypass/ indicator ready	N/A	932960	934016
	1 1/2" NPT no indicator/ bypass ready	N/A	932972	934014
	SAE-24 bypass/ indicator ready	N/A	932945	934027
	SAE-24 no bypass/ no indicator	N/A	932981	934033
	SAE-24 no bypass/ indicator ready	N/A	932957	934031
	SAE-24 no indicator/ bypass ready	N/A	932969	934029
	2" NPT bypass/ indicator ready	N/A	N/A	934020
	2" NPT no bypass/ no indicator	N/A	N/A	934026
	2" NPT no bypass/ indicator ready	N/A	N/A	934024
	2" NPT no indicator/ bypass ready	N/A	N/A	934022
	SAE-32 bypass/ indicator ready	N/A	N/A	934035
	SAE-32 no bypass/ no indicator	N/A	N/A	934042
	SAE-32 no bypass/ indicator ready	N/A	N/A	934040
	SAE-32 no indicator/ bypass ready	N/A	N/A	934037
	Flange face, SAE 2" bypass/indicator ready	N/A	N/A	934103
Flange face, SAE 2" no bypass/no indicator	N/A	N/A	934109	
Flange face, SAE 2" no bypass/indicator ready	N/A	N/A	934107	
Flange face, SAE 2" no indicator/bypass ready	N/A	N/A	934105	
Indicators				
2	M2-Visual auto reset/ 25 psi	932026	932026	932026
	M2-Visual auto reset/ 50 psi	932027	932027	932027
3	H-Electrical/ 25 psi w/ 1/2" conduit connection	933053	933053	933053
	H-Electrical/ 50 psi w/ 1/2" conduit connection	932905	932905	932905
	H1-Electrical/ 25 psi w/ wire leads	933054	933054	933054
	H1-Electrical/ 50 psi w/ wire leads	932906	932906	932906
	Not Shown:			
	E-Electrical/Visual 25 psi w/ wire leads	929610	929610	929610
	E-Electrical/Visual 50 psi w/ wire leads	929587	929587	929587
4	E2-Electrical/Visual 25 psi w/ DIN connection	931153	931153	931153
	E2-Electrical/Visual 50 psi w/ DIN connection	929599	929599	929599
5	E3-Electrical/Visual 25 psi w/ 3-pin connection	932773	932773	932773
	E3-Electrical/Visual 50 psi w/ 3-pin connection	929596	929596	929596
6	Bypass Valve			
	25 psid assembly	928979	930507	933628
	50 psid assembly	928981	933424	933630
	Not Shown:			
	No bypass plug	935744	927719	934174
7	Element (see model code page)			
8	Bowl			
	Single length	936758	936760	936763
	Double length	936759	936761	936764
	Triple length	-	936762	-
9	Bowl and Dust Seal			
	Buna N (Nitrile)	N72142	N72239	N72244
	Fluorocarbon	V72142	V72239	V72244
10	Drain Plug - SAE-4			
	Buna N (Nitrile)	921088	921088	921088
	Fluorocarbon	928882	928882	928882



# 15/40/80CN Series<sup>1</sup>

## Coreless Medium Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
40CN	2	10QE	B	M2	K	S16	4

BOX 1: Filter Series	
Symbol	Description
15CN	3/4" nominal ports
40CN	1-1/2" nominal ports
80CN	2" nominal ports

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
E	Ethylene Propylene
V	Fluorocarbon

BOX 7: Ports	
Symbol	Description
<b>15CN</b>	
N12	3/4" NPT
N16	1" NPT
S12	SAE-12 straight threads
S16	SAE-16 straight threads
<b>40CN</b>	
N16	1" NPT
N24	1-1/2" NPT
S16	SAE-16 straight threads
S24	SAE-24 straight threads
<b>80CN</b>	
N24	1-1/2" NPT
N32	2" NPT
S24	SAE-24 straight threads
S32	SAE-32 straight threads
Y32	2" SAE Flange face, Code 61

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double
3	Triple (40CN only)

BOX 5: Indicator	
Symbol	Description
P	Port plugged
M2	Visual Automatic Reset
E2	Electrical/Visual (DIN43650 Hirschman style connection)

BOX 3: Media Code	
Symbol	Description
02QE	Microglass, 2 micron
05QE	Microglass, 5 micron
10QE	Microglass, 10 micron
20QE	Microglass, 20 micron

BOX 6: Bypass	
Symbol	Description
G	25 psi (1.7 bar)
K	50 psi (3.5 bar)

BOX 8: Options	
Symbol	Description
4	Drain port
21 <sup>2</sup>	No bypass with drain port

- Filters include the element you select already installed.
- When an indicator is chosen in conjunction with the no bypass ("21") option, Box 6 denotes the indicator calibration.

### Replacement Elements

Media	15CN-1	15CN-2	40CN-1	40CN-2	40CN-3	80CN-1	80CN-2
02QE	936698Q	936702Q	936706Q	936710Q	936622Q	936713Q	936716Q
05QE	936699Q	936703Q	936707Q	936711Q	936623Q	936714Q	936717Q
10QE	936700Q	936704Q	936708Q	936601Q	936720Q	936602Q	936718Q
20QE	936701Q	936705Q	936709Q	936712Q	936721Q	936715Q	936719Q



Hydraulic & Fuel Filtration Division  
www.parker.com/emhff

Last updated August 4th, 2023

Parker's willingness to conduct business with Buyer is expressly conditioned on Buyer's assent to Parker's Offer of Sale. www.parker.com/saleterms



# MPD Series

Medium Pressure Duplex Filters

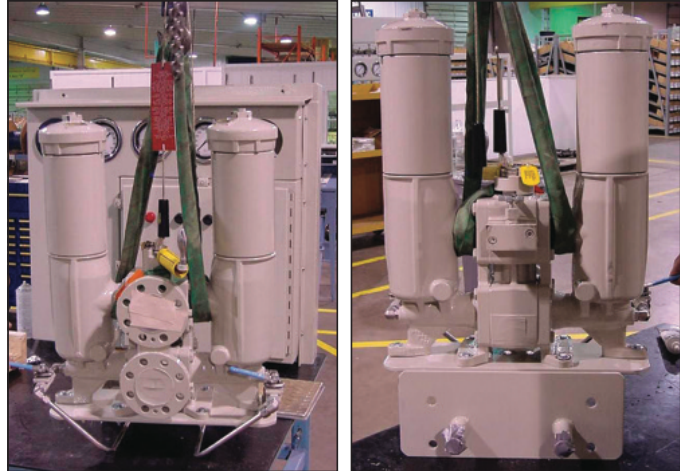


ENGINEERING YOUR SUCCESS.

# MPD Series

## Applications

- **Circulating Lube Oil Systems**
- **Power Generation Control Systems**
- **Steel Mill Control Systems**
- **Pulp & Paper Control Systems**
- **Test Stands**
- **Automotive Stamping Presses**
- **Offshore & Land Based Oilfield Applications**

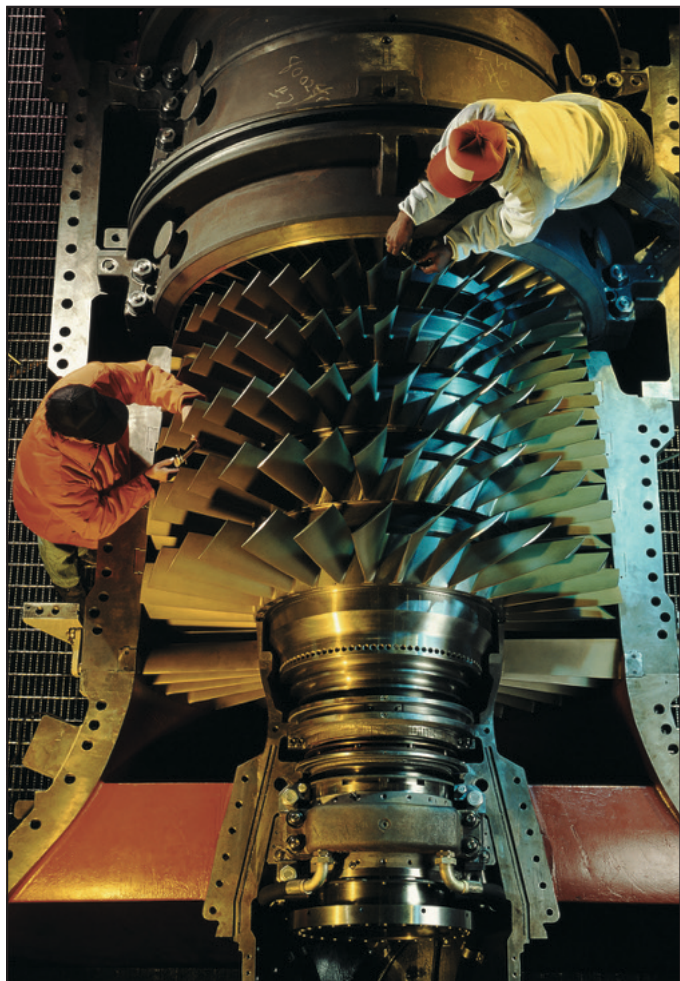


MPD series filters are an outstanding choice for today's demanding hydraulic control and circulating oil systems.

The MPD's innovative modular design, rugged ductile iron construction and coreless element technology, combined with many other features, provide solutions across a broad range of industrial applications.

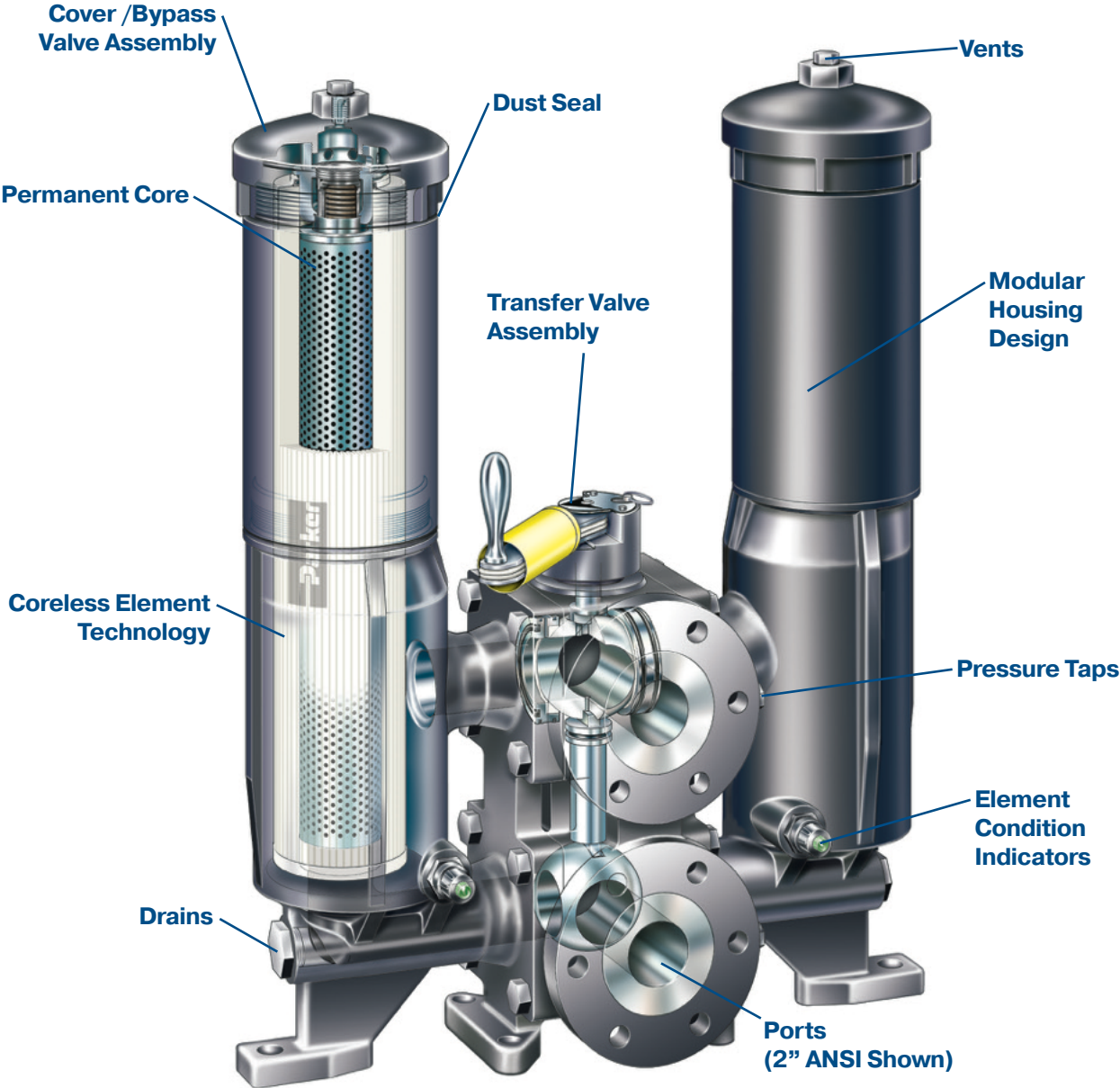
The Modular design provides user flexibility for simplex or duplex applications. Incorporating side chambers as simplex filters along with duplex installations provide common elements across the circuit design.

Construction features like full ported transfer valve with neutral center flow capability offer tremendous benefit in cold start conditions. Standard features like pressure sensing taps, vents, drains and internal pressure equalization make this product incomparable in industry.



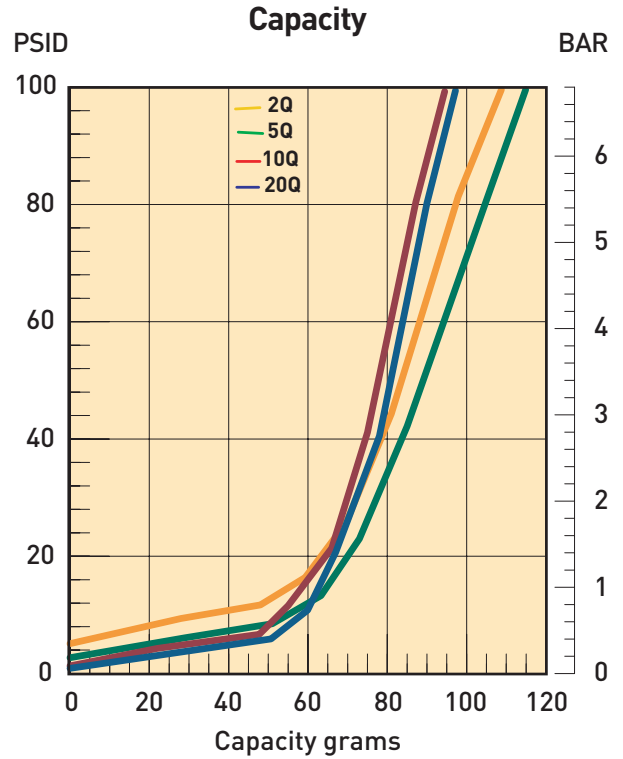
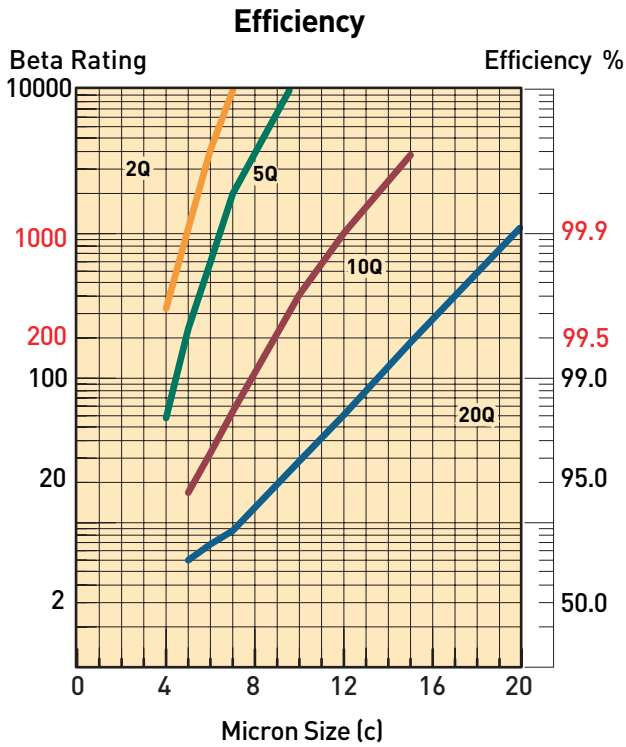
# MPD Series

## Features



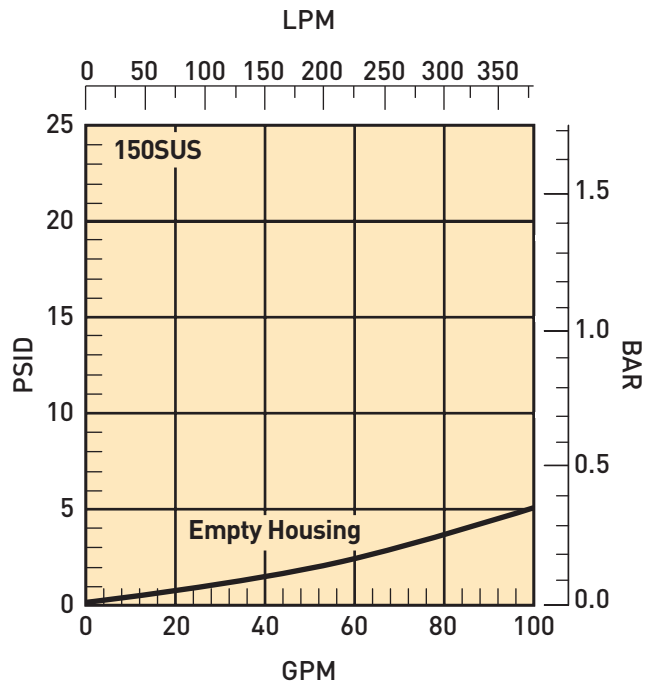
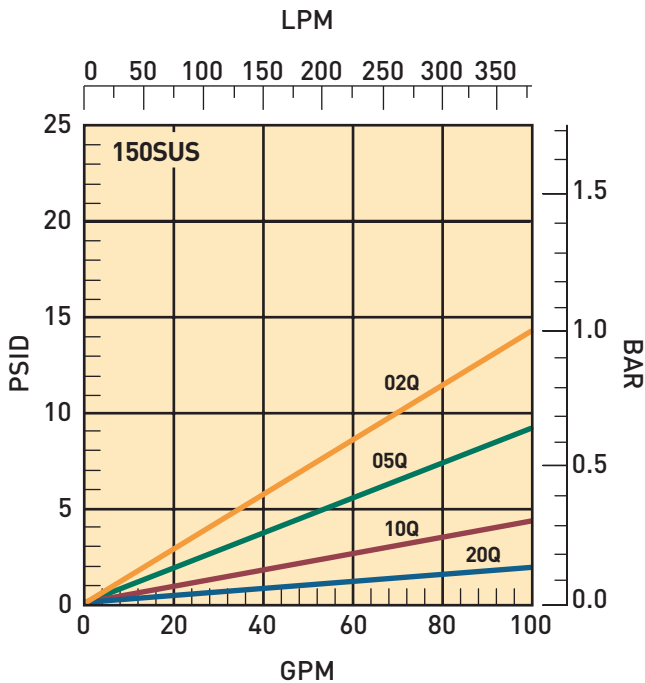
# MPD Series

## MPD-1 Element Performance



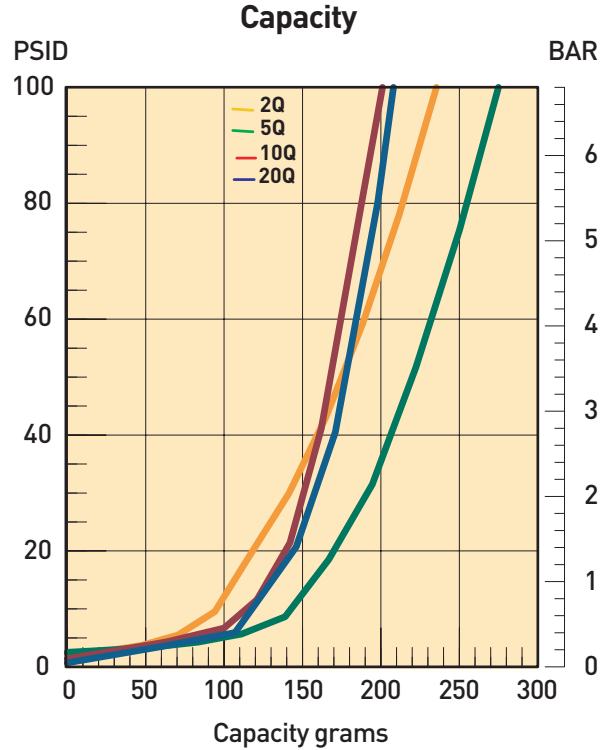
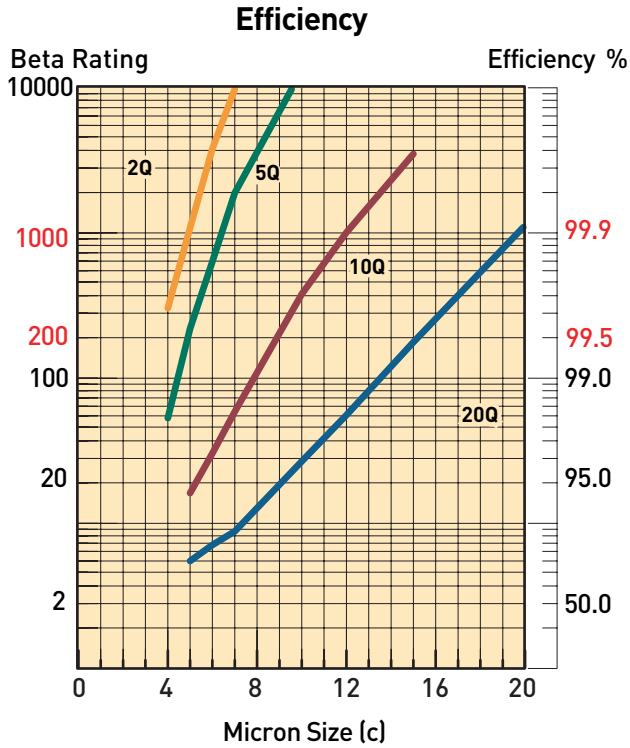
Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



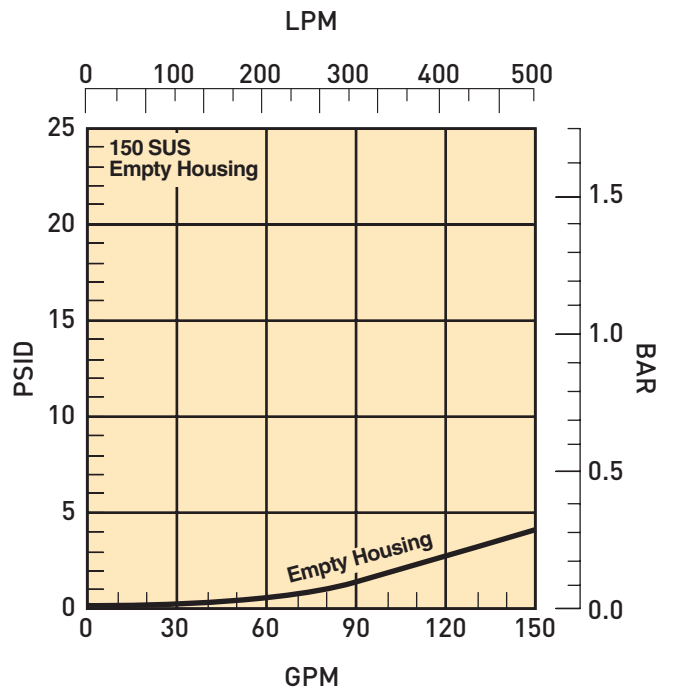
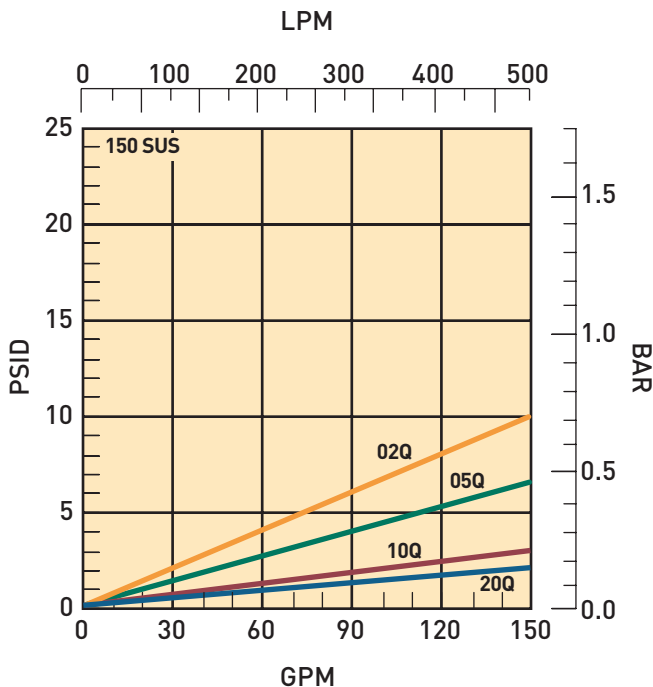
# MPD Series

## MPD-2 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 80 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



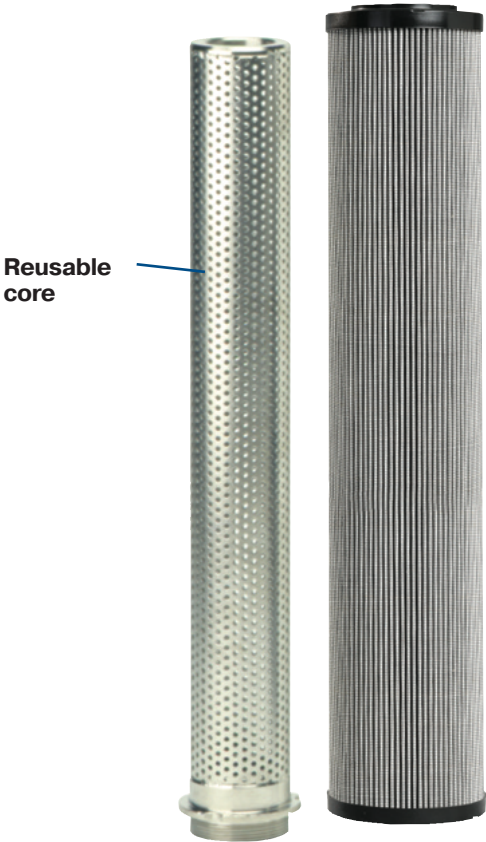
# MPD Series

## Replacement Elements

### Microglass Replacement Elements

The unique multi-layer design combines high efficiencies with exceptional dirt holding capacities for performance that is unequalled in the industry today. This performance is further enhanced in the MPD series with the introduction of the deep pleat design. The deep pleat element design increases the amount of media in the element and therefore increases capacity.

With Microglass, you do not have to make a compromise between efficiency and capacity; you can have both.



Feature	Advantage	Benefit
Modular design filter	<ul style="list-style-type: none"> <li>• Use a simplex or duplex</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced installation due to common elements</li> <li>• Application flexibility</li> </ul>
Top access cover	<ul style="list-style-type: none"> <li>• Remove element from top</li> <li>• Lighter than removing entire bowl</li> </ul>	<ul style="list-style-type: none"> <li>• No oil mess</li> </ul>
Visual and electrical indicators	<ul style="list-style-type: none"> <li>• Know exactly when to service elements</li> </ul>	<ul style="list-style-type: none"> <li>• Keeps system clean</li> </ul>
Drain port	<ul style="list-style-type: none"> <li>• Drain all oil from assembly prior to servicing</li> </ul>	<ul style="list-style-type: none"> <li>• Eliminates cross contamination</li> </ul>
Vent port	<ul style="list-style-type: none"> <li>• Purges all trapped air in filter</li> </ul>	<ul style="list-style-type: none"> <li>• Get the maximum performance from elements</li> </ul>
Multipass tested elements (per ANSI/NFPA T3.10.8.8 R1-1990)	<ul style="list-style-type: none"> <li>• Element performance backed by recognized test standards</li> </ul>	<ul style="list-style-type: none"> <li>• Elements selected will have consistent performance levels</li> </ul>
Microglass Elements	<ul style="list-style-type: none"> <li>• Multi-layer media</li> <li>• Coreless as standard</li> <li>• HF4 as option</li> </ul>	<ul style="list-style-type: none"> <li>• High capacity with high efficiency</li> <li>• No performance loss from pleat bunching</li> </ul>
Equalizing valve & manifold	<ul style="list-style-type: none"> <li>• No external plumbing</li> </ul>	<ul style="list-style-type: none"> <li>• Safety &amp; reliability</li> </ul>
Upstream & downstream sensing ports	<ul style="list-style-type: none"> <li>• Add additional instrumentation</li> </ul>	<ul style="list-style-type: none"> <li>• Product flexibility</li> </ul>

# MPD Series

## Specifications

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP):

- 3000 psi (206.9 bar) SAE port — MPDH only
- 1200 psi (81.6 bar) SAE port;
- 500 psi (34 bar) ANSI port

Rated Fatigue Pressure:

- 3000 psi (206.9 bar) SAE port — MPDH only
- 1200 psi (81.6 bar) SAE port;
- 500 psi (34 bar) ANSI port

Design Safety Factor: 3:1

\*Consult factory for higher operating pressures

### Operating Temperatures:

-15°F (-26°C) to 160°F (71°C)

\*Consult factory for temperatures outside specified range

### Element Collapse Rating:

Standard: 150 psid (10.3 bar)

High collapse Microglass only:

- 1200 psid (81.6 bar) (SAE);
- 500 psid (34 bar) (ANSI)

### Materials:

Transfer Valve: Ductile Iron

Side Chamber: Ductile Iron

Side Chamber Extension: Steel

Cover: Ductile Iron (MPD), Carbon Steel (MPDH)

Equalizing Valve and Manifolds: Steel

### Shipping Weights (approximate):

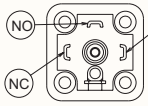

MPD-1: 215 lbs.(98 kg)

MPD-2: 285 lbs.(129 kg)

### Element Condition Indicators:

Type M2 Series: Visual, auto-resetting with a red indication at the designated differential pressure. In the clean condition, indication is green.

Type E Series: Electrical/Visual, auto-resetting with a red indication at the designated differential pressure. In the clean condition, indication is green. Rated 5 Amps at 125/250 VAC; 5 Amps resistive, 3 amps inductive (sea level) at 28 VDC; SPDT.

Connector	Model Coding	Wiring / Male Connector
DIN 43650 3 pole + earth DIN 50005 plug pin code	e2	
3 pin ANSI/B93.55m (dimensions only)	E3	

Type H Series: Heavy duty electrical/no visual, rated 0.25 Amps resistive, 12 to 28 VDC and .25 Amps resistive, 110-175 VAC; 5 watts; SPDT.

Connector	Model Coding	Wiring / Male Connector
½"-14 NPT conduit adapter w/24" wire leads (for all light to heavy conduit uses)	H	Black (NO), Blue (NC), and White (C)
None: 12" wire leads only	H1	Black (NO), Blue (NC) and White (C)

No indicator P option: plugged indicator port.

Contact factory for other available indicator options & types.

### Element Servicing Instructions

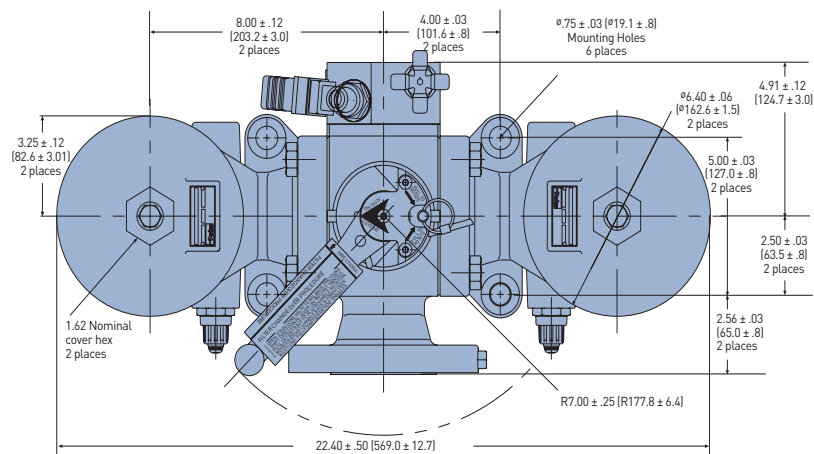
The system does not need to be shut down to service elements; however, pressure must be equalized at both side chambers of the duplex filter before performing transfer valve changeover.

1. Black flow arrow on top of the transfer valve points to the on-duty chamber.
2. Open the equalizing valve (counter-clockwise) to balance pressure at the side chambers.
3. Shift directional lever on the ratchet handle to switch the ratchet direction.
4. Pull detent ring up to disengage the locking pin and allow handle to rotate.
5. Rotate ratchet handle back and forth over the inlet port until the transfer valve is fully shifted and the detent locking pin engages.
6. Black flow arrow now points to the new on-duty side chamber.
7. Close equalizing valve (clockwise) to isolate the side chambers.
8. Loosen new off-duty vent plug (counter-clockwise) approximately 2 turns. Do not thread out complete.
9. Remove drain plug (counter-clockwise) from new off-duty chamber to lower oil level.
10. Remove new off-duty chamber cover by rotating (counter-clockwise) until unthreaded then lift from chamber.
11. Pull element out from chamber. Discard used disposable elements as they are not cleanable.
12. Install new element by centering it on the element locator in the bottom of the chamber and pushing down into place.
13. Inspect cover o-rings and replace if necessary.
14. Install cover onto the chamber by rotating clockwise) and tightening to 90-100 ft.-lbs.
15. Install and tighten drain plug (clockwise) to 60-70 ft.-lbs.
16. Open equalizing valve (counter-clockwise) to purge air from the new off-duty chamber.
17. When oil flows from the vent close the equalizing valve (clockwise).
18. Tighten new off-duty vent plug (clockwise) to 15-20 ft.-lbs.

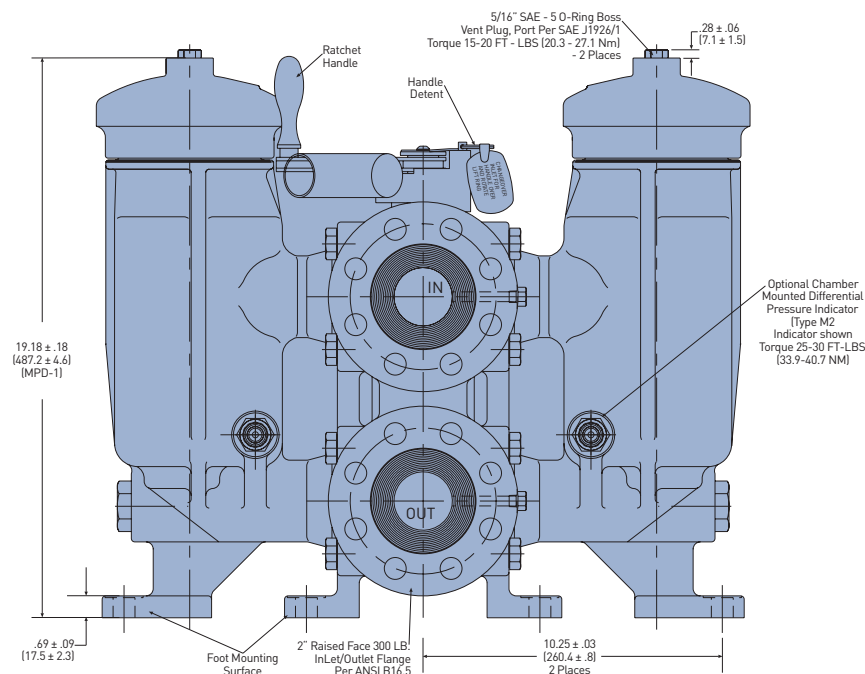
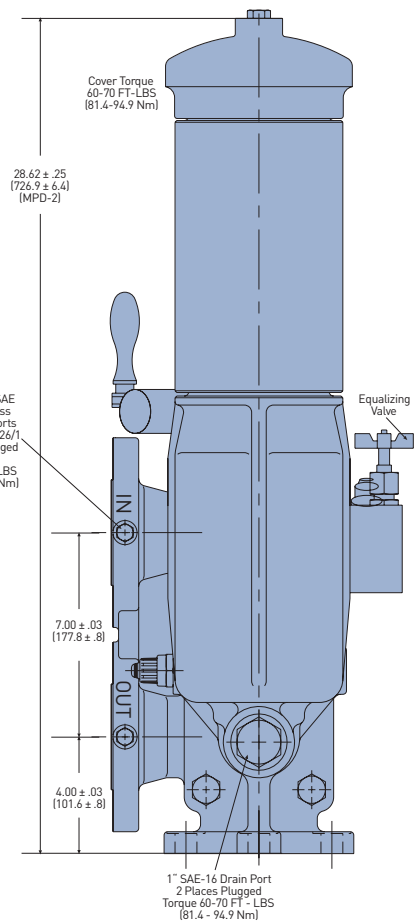
# MPD Series

## Specifications

### ANSI Dimensional Drawing



Linear Measure: inch [millimeter]

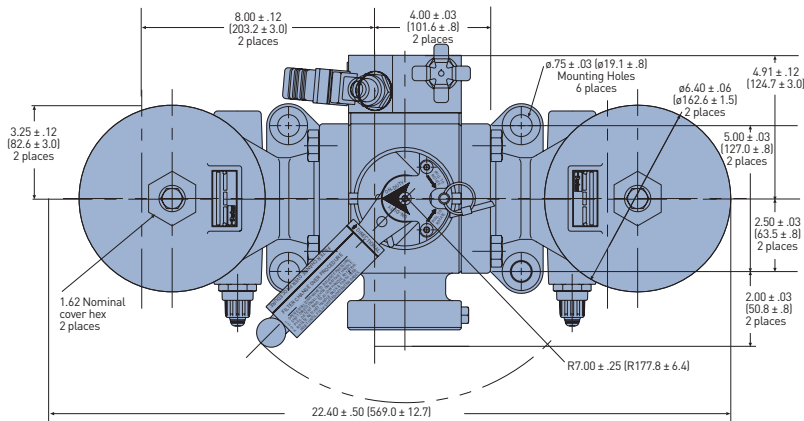


Drawings are for reference only.  
Contact factory for current version.

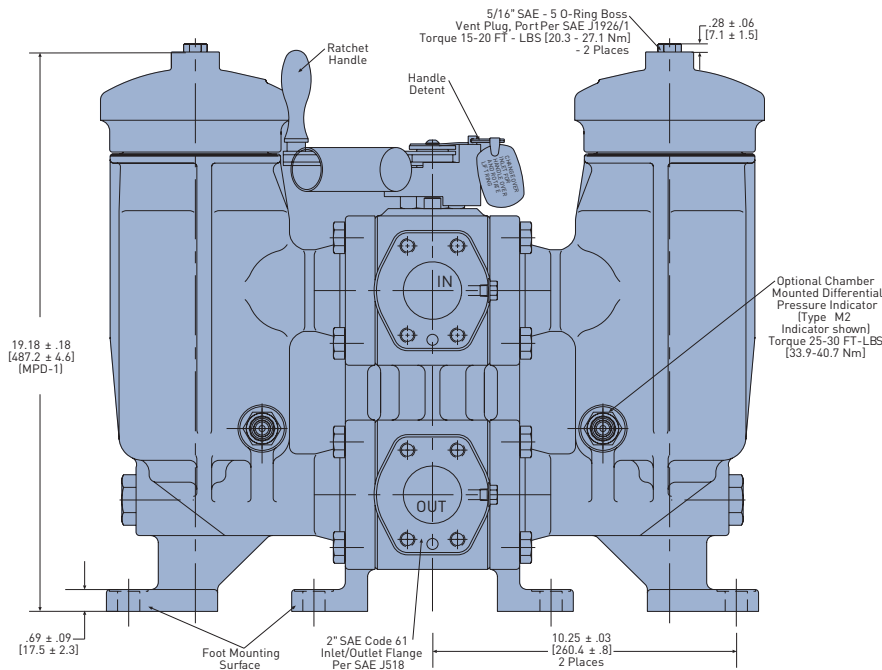
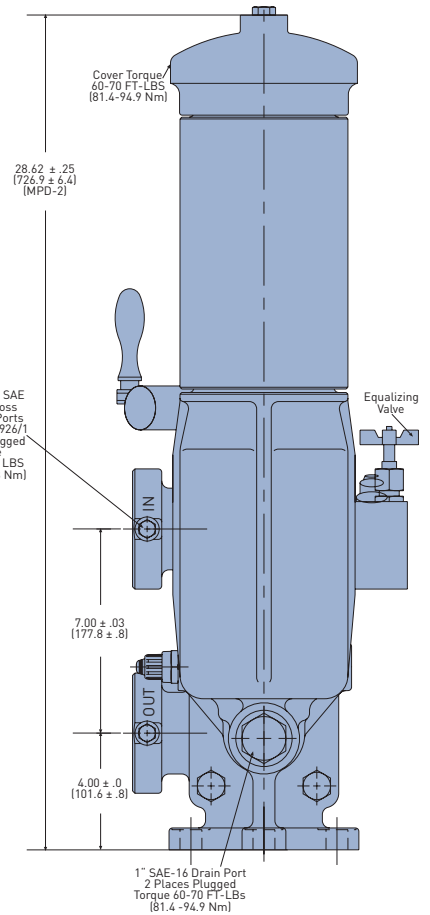
# MPD Series

## Specifications

### SAE Dimensional Drawing



Linear Measure: inch [millimeter]



Drawings are for reference only.  
Contact factory for current version.

# MPD Series

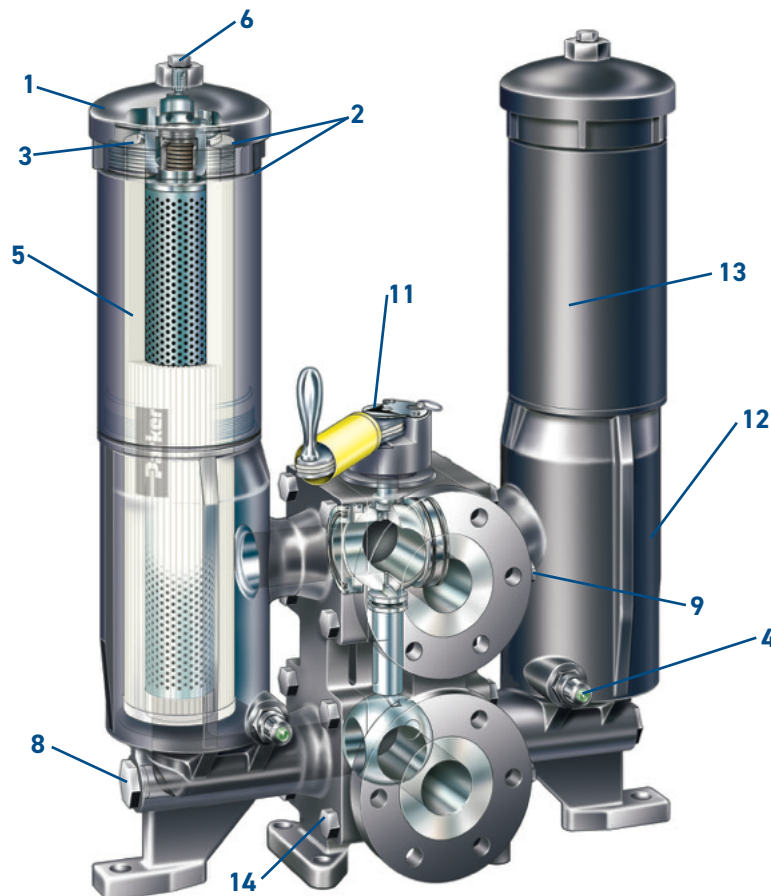
## Parts List

In- dex	Description	Element Type	
		Ecoglass	Microglass
1	Cover Assembly		
	w/ 25 psi bypass	935964	935964
	w/ 50 psi bypass	935965	935965
	w/ no bypass	935966	935966
2	Cover (O-ring & Dust seal)	V72247	V72247
3	Cover backup ring	935419	935419
4	Indicator		
	P option - plugged port	925515	925515
	M2 25 psi	932026	932026
	M2 50 psi	932027	932027
	E2 25 psi	931153	931153
	E2 50 psi	929599	929599
	E3 25 psi	932773	932773
	E3 50 psi	929596	929596
	H 25 psi	933053	933053
	H 50 psi	932905	932905
H1	25 psi	933054	933054
	50 psi	932906	932906
5	Element	see chart on model code page	

In- dex	Description	Element Type	
		Ecoglass	Microglass
6	Vent plug	935466	935466
7**	Vent plug o-ring	V93905	V93905
8	Drain plug w/ o-ring	928364	928364
9	Pressure tap plug w/ o-ring	928882	928882
10**	Equalizing valve	928118	928118
11	Transfer valve assembly		
	ANSI 2" w/ indicator port	935968	935968
	SAE 2" w/ indicator port	935969	935969
12	Housing assembly		
	right side w/ indicator port	935970	935972
	right side w/o indicator ports	935974	935975
	left side w/ indicator port	935971	935973
	left side w/o indicator ports	935974	935975
13	Housing extension (MPD-2)	935489	935489
14	5/8" - 11x1-3/4" HHCS	922812	922812
15**	Seal kit - transfer valve	Consult Factory	
16**	Seal kit - housing assembly	Consult Factory	

\* Consult factory for MPDH components

\*\* Not Shown



# MPD Series<sup>1</sup>

## Medium Pressure Duplex Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
	MPD	1	10QE	NE2	25	B2	1

BOX 1: Seal Material	
Symbol	Description
None	Nitrile
F3	Fluorocarbon

BOX 2: Filter Series	
Symbol	Description
MPD	Duplex Filter 1200 psi
MPDH	Duplex Filter 3000 psi

BOX 3: Element Length	
Symbol	Description
1	Single
2	Double

BOX 4: Media Code	
Symbol	Description
02QE	Microglass, 2 micron
05QE	Microglass, 5 micron
10QE	Microglass, 10 micron
20QE	Microglass, 20 micron

BOX 5: Indicator	
Symbol	Description
<b>Side Chamber</b>	
N	No indicator; no pressure port
P	Indicator, port only
M2	Visual auto reset
E2	Electrical w/ DIN 43650 connector
<b>Equalizing Valve Manifold</b>	
P	Port plugged
M2	Visual auto reset
E2	Electrical w/ DIN 43650 connector

BOX 6: Bypass	
Symbol	Description
25	25 PSI (1.7 bar)
50	50 PSI (3.5 bar)

BOX 7: Ports	
Symbol	Description
B2	2" 300 lb RF ANSI flange (500 psi)
Y9	2" SAE 4 bolt Code 61 flange face

BOX 8: Options	
Symbol	Description
1	None
11	No bypass

1. Filters include the element you select already installed.

### Replacement Elements<sup>2</sup>

Media	MPD-1	MPD-2
02QE	935516Q	935488Q
05QE	935517Q	935458Q
10QE	935518Q	935520Q
20QE	935519Q	935521Q

2. Elements have fluorocarbon seals.



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Last updated August 4th, 2023

Parker's willingness to conduct business with Buyer is expressly conditioned on Buyer's assent to Parker's Offer of Sale. www.parker.com/saleterms



# 15P/30P Series

High Pressure Filters



ENGINEERING YOUR SUCCESS.

# 15P/30P Series

## Applications

- Saw mills
- Aircraft ground support equipment
- Asphalt pavers
- Hydraulic fan drives
- Power steering circuits
- Waste trucks
- Cement trucks
- Servo control protection
- Logging equipment

These application examples have one thing in common... the need for clean hydraulic fluid.

Modern high pressure hydraulic systems are demanding. Better controls and long component life are expected. To deliver the high standards of performance, hydraulic components are built with tighter tolerances which increases their sensitivity to contamination.

That's where Parker pressure filters come into play. They filter out ingressed contamination before it jams a valve or scores a cylinder. They block pump generated debris before it gets to servo or proportional valves. Parker pressure filters are a key ingredient in meeting today's system demands.

Put your hydraulic systems in our care. We are committed to designing and building the best filters available to industry.

### Indicators

Both visual auto reset style and dual indicator visual/electrical style available to suit your application.

### Straight Thread Ports

SAE straight thread for positive sealing



### Bypass Valve (not visible)

May be blocked for critical applications

### Bowl Construction

Formed of high grade 6061 T6 aluminum.

Powder painted, corrosion resistant finish.

### Hex (not visible)

Hex formed at base of bowl for easy removal

### Bowl Configurations

Single and double length bowls available to cover a wide range of flows.

30P available in a duplex version.

### Drain Port (not visible)

Clean and easy servicing

Lets you drain bowl before element changes

# 15P/30P Series

## Element Features

### Quality elements make the difference

The important item in a filter assembly is the element. It must capture and retain contaminants that can damage system components. At the same time it must allow flow to pass as freely as possible to perform its function.

There are many ways to design and build an element, and it's easy to produce a low cost element. However, cost is not the only selection criteria, especially when the risk is loss of critical machine performance.

For instance, wire mesh reinforcement. Not all filter elements have it. It's used in Parker elements to keep the pleats from bunching or collapsing. If pleats bunch, the effective surface area of the element is reduced, excessive pressure drop develops, and the filter assembly may go into premature bypass mode.

There are many other features that are included standard with every quality Parker element. The table below outlines several.

### O-Ring Seal

Positive sealing for optimum element efficiency

### Wire Reinforced Media

Prevents pleat bunching  
Helps prevent media migration  
Maintains media efficiency



### Engineered Element Design

The right combination of pleat depth and number of pleats means lower pressure losses (longer life)

Dirt holding capacity is maximized for less frequent element change-out

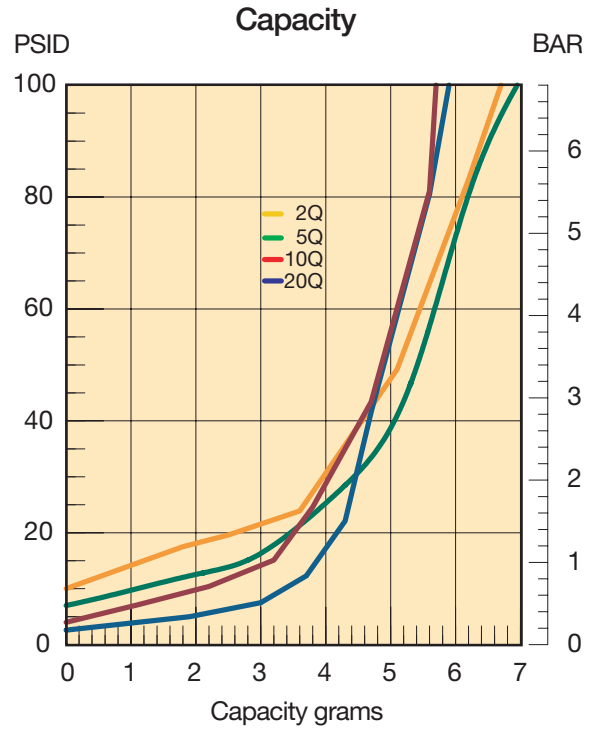
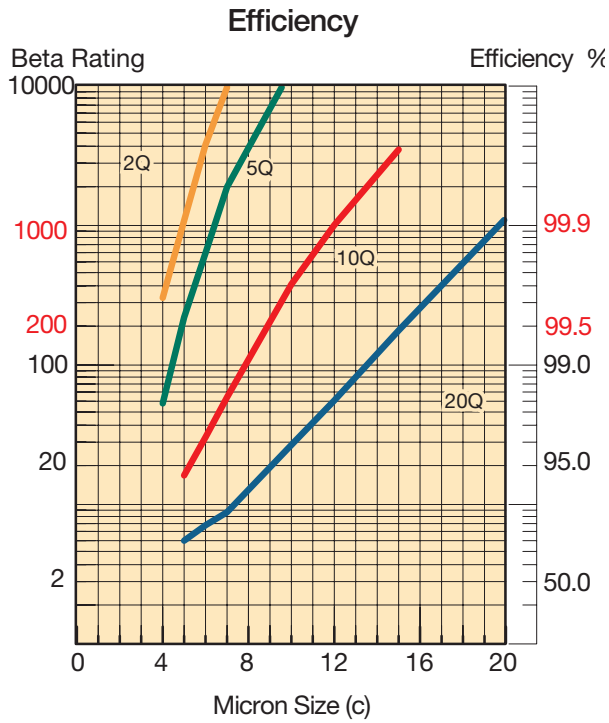
### Elements for Every Application

Standard Microglass media for long life and excellent system protection

Feature	Advantage	Benefit
Wire reinforced Microglass elements	Rugged construction, stands up to abuse of cyclic flows without performance loss Wire support reduces pleat bunching, keeps pressure drops consistent	The reliable filtration provided assures equipment protection, reduces downtime, maximizes element life, and allows the hydraulic system to operate properly
Multipass tested elements (per ANSI/NFPA T3.10.8.8 R1-1990)	Filter performance backed by recognized and accepted laboratory test standards	Filters you select have known performance levels
Complete element performance data disclosure	All pertinent information is provided in an easy-to-compare format	Provides an easy guide to proper filter selection

# 15P Series

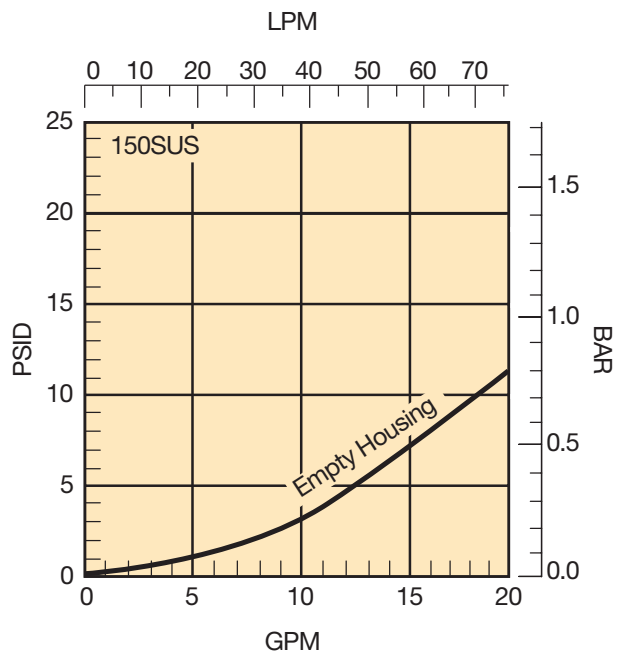
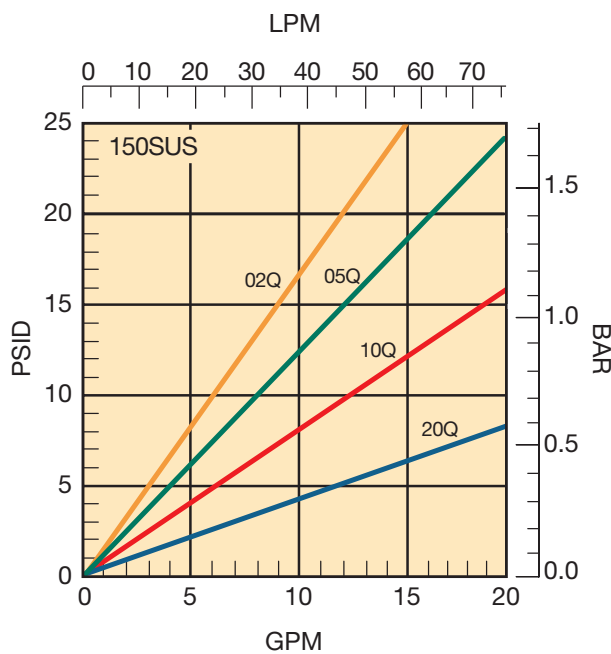
## 15P-1 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

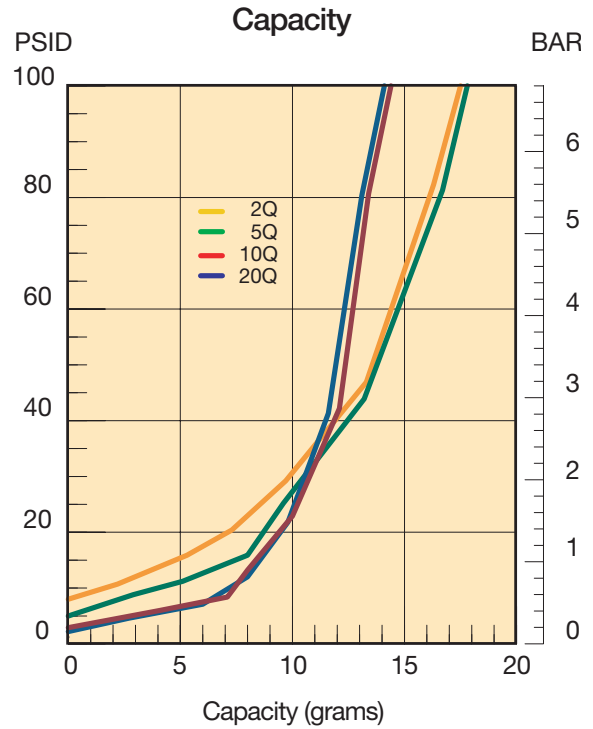
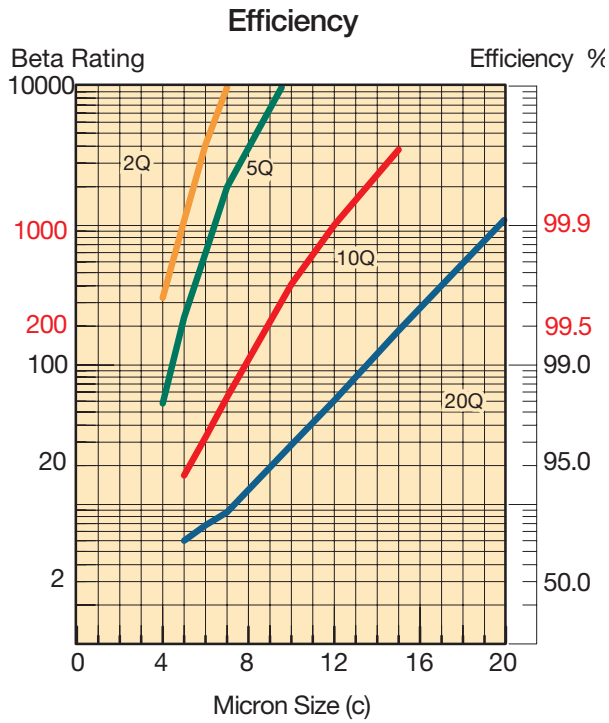
\*High Collapse Correction Factor:  
\*QH\* Elements (2000 psid) = 1.4 times reported loss

### Flow vs. Pressure Loss



# 15P Series

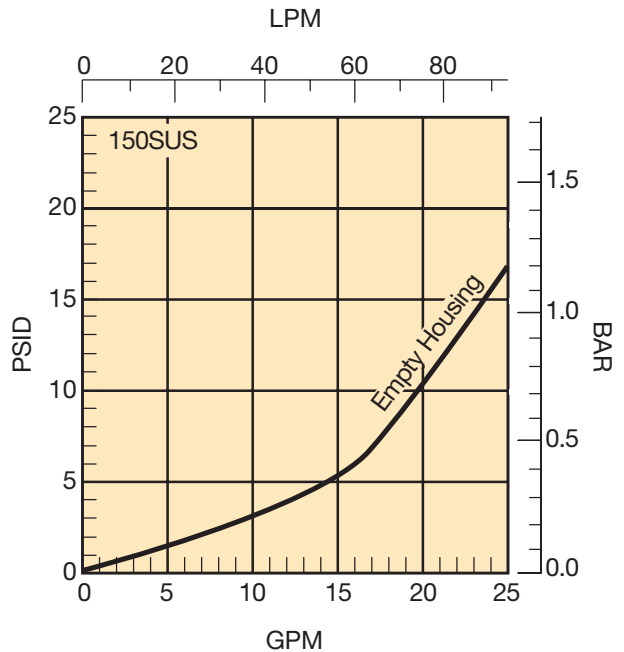
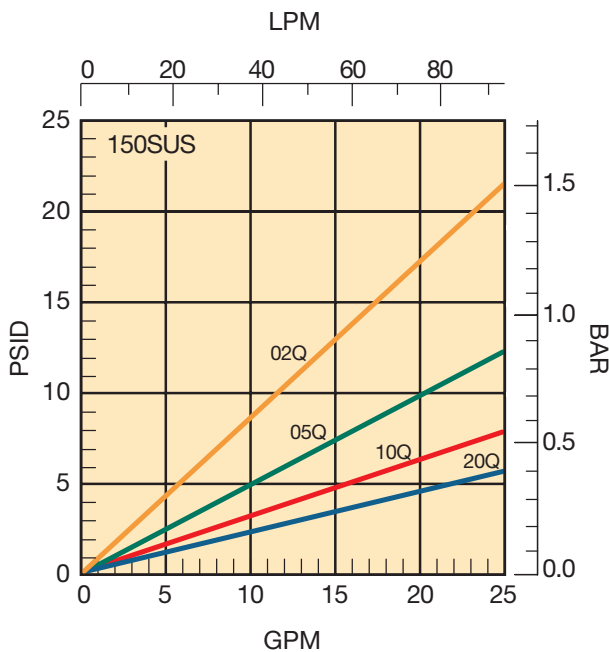
## 15P-2 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL  
 Refer to Appendix for relationship to test standard ISO 4572.

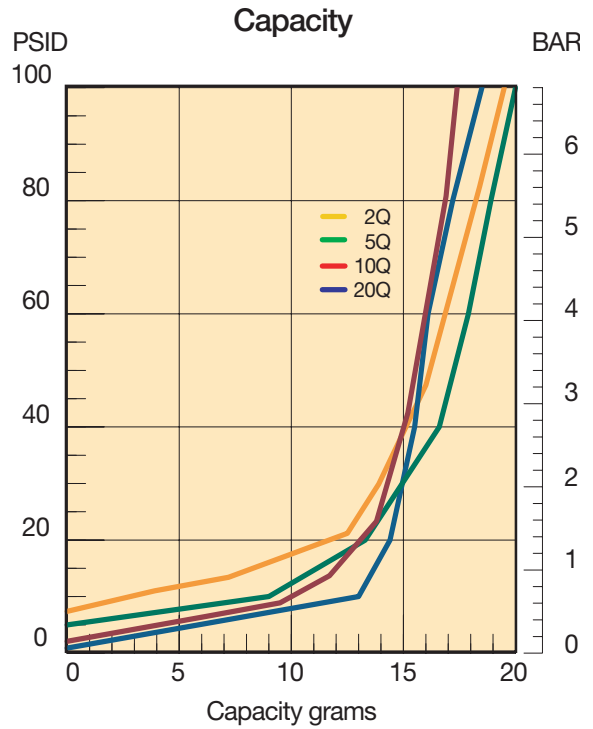
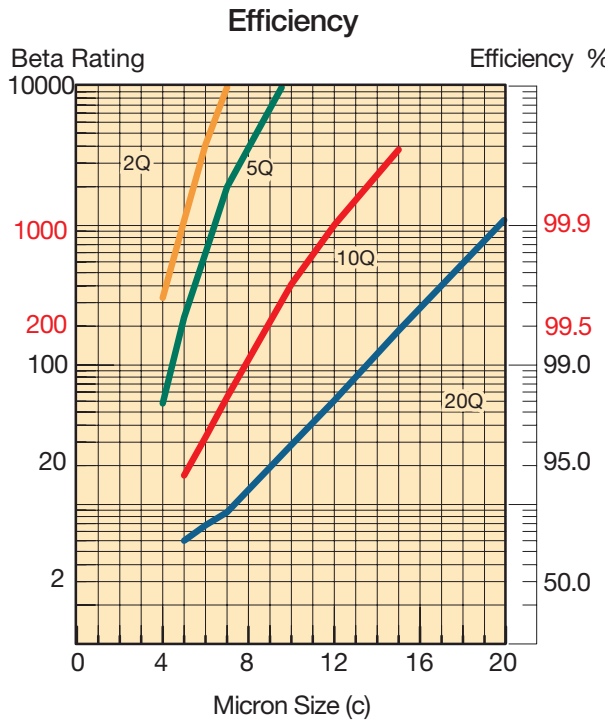
\*High Collapse Correction Factor:  
 \*QH\* Elements (2000 psid) = 1.4 times reported loss

### Flow vs. Pressure Loss



# 30P Series

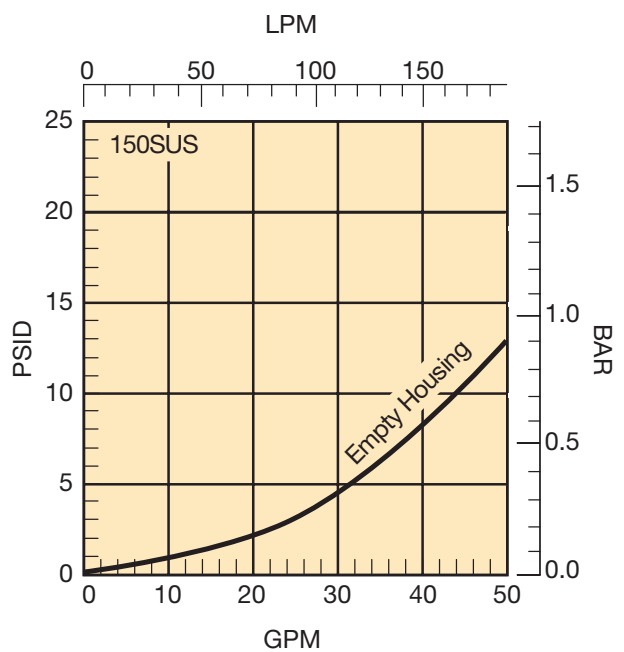
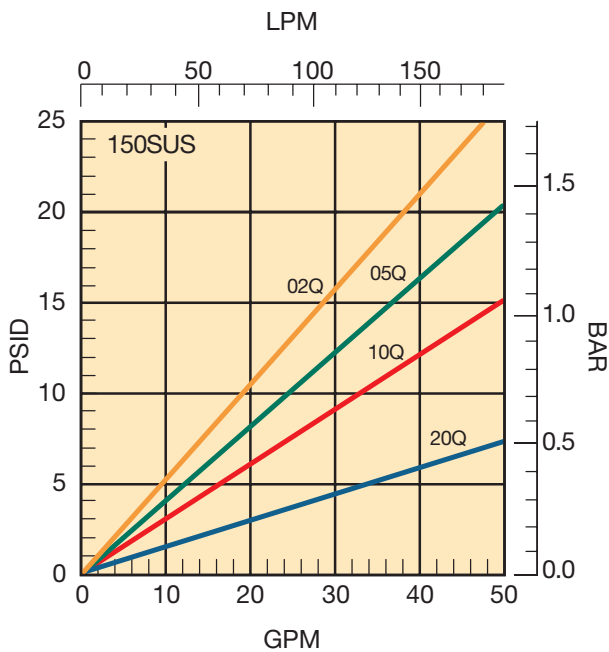
## 30P-1 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 20 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

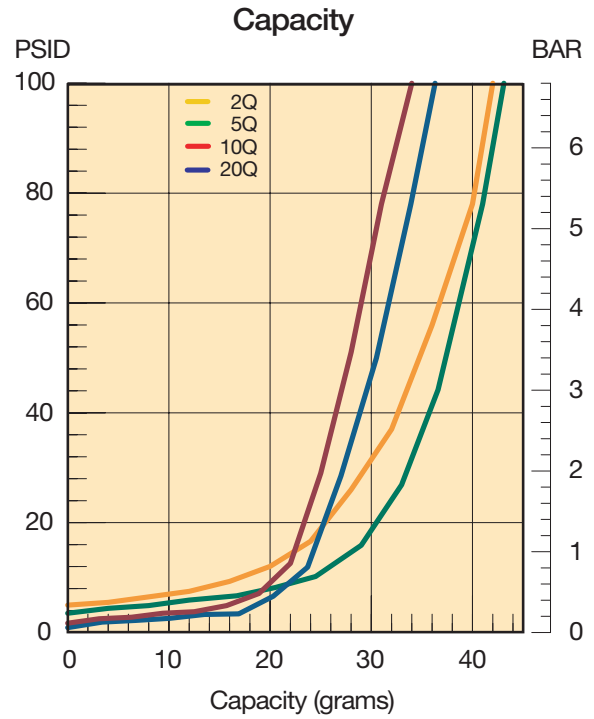
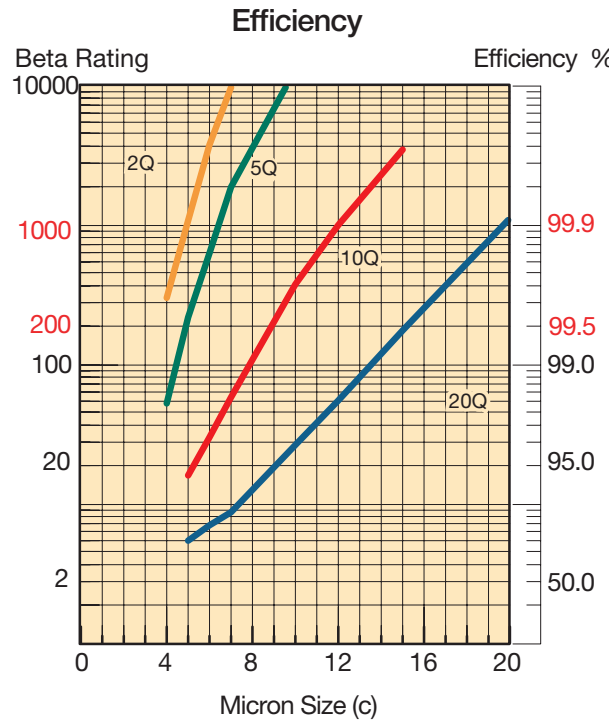
\*High Collapse Correction Factor:  
\*QH\* Elements (2000 psid) = 1.4 times reported loss

### Flow vs. Pressure Loss



# 30P Series

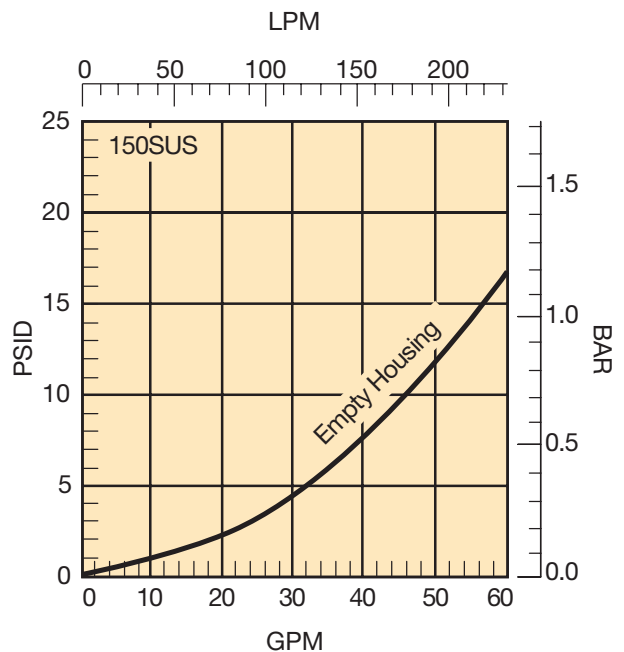
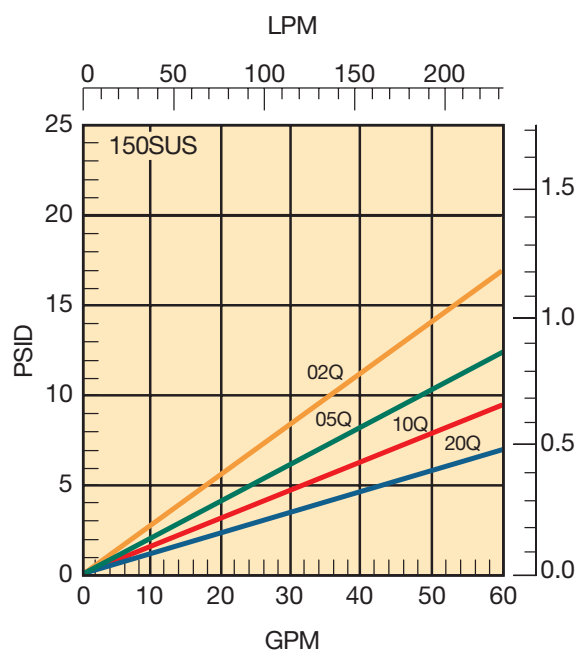
## 30P-2 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

\*High Collapse Correction Factor:  
\*QH\* Elements (2000 psid) = 1.4 times reported loss

### Flow vs. Pressure Loss





# 30P/30PD Series

## Specifications

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 3000 psi ( 206.9 bar)  
 Rated Fatigue Pressure: 2000 psi (138 bar)  
 Design Safety Factor: 3:1

### Operating Temperatures:

Buna: -40°F (-40°C) to 225°F (107°C)  
 Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Element Collapse Rating:

Standard- 350 psid (24.1 bar)  
 "H" Option- 2000 psid (138 bar)  
 "X" Option- 3000 psid (206.9 bar)

### Weights (approximate):

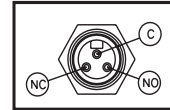
30P-1 6.4 lb. (2.9 kg.)  
 30PD-1 36 lb. (16.3 kg.)  
 30P-2 8.7 lb. (3.9 kg.)  
 30PD-2 40 lb. (18.1 kg.)

### Materials:

Bowl: impacted aluminum (6061-T6, black powder painted exterior)  
 Head: extruded aluminum (anodized 6061-T6)  
 Bypass: Nylon

### Element Condition Indicators:

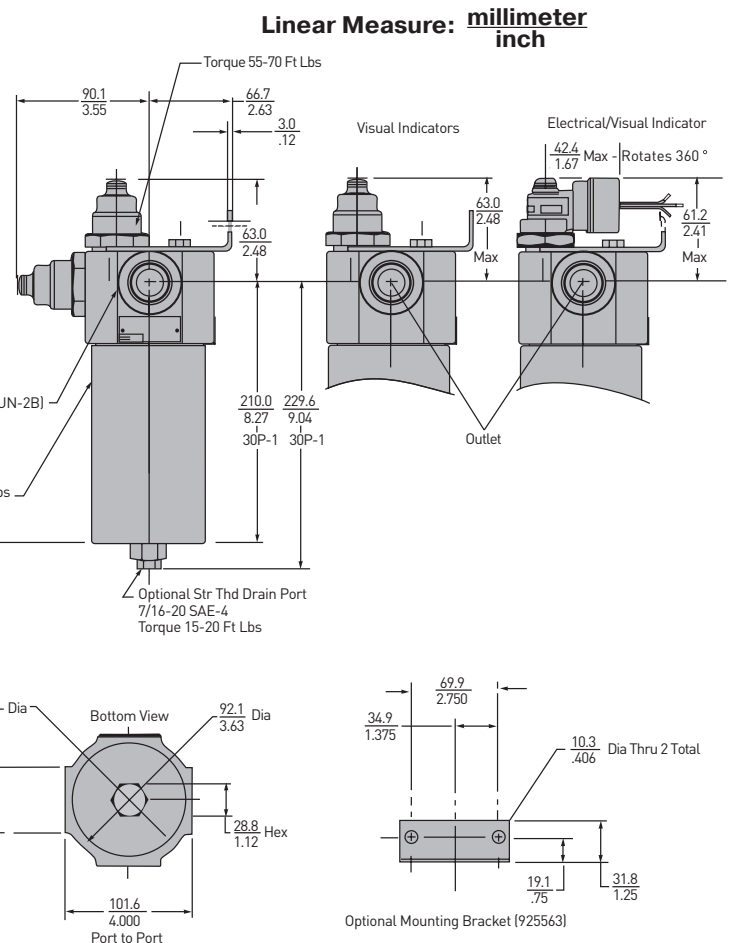
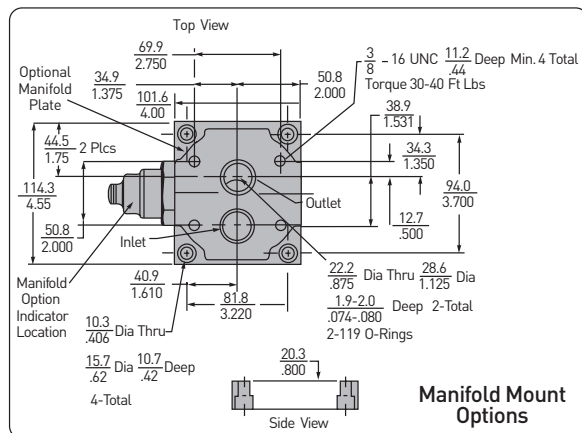
Visual (optional) 360° green/ red  
 Electrical/ Visual (optional)  
 5A @ 240VAC, 3A @ 28VDC  
 Electrical-heavy duty (optional)  
 .25A (resistive) MAX 5 watts  
 12 to 28 VDC & 110 to 175 VAC



Model code option 'E3'

### Color Coding:

White (common)  
 Black (normally open)  
 Blue (normally closed)



Drawings are for reference only.  
 Contact factory for current version.

# 30P Duplex Filter

The Parker 30PD duplex pressure filter provides uninterrupted filtration for equipment that cannot be shut down for servicing.

The 30PD allows you to simply switch the diverter valve and service the element while the other side is in service.

Pressure balancing valves and check valves are all neatly assembled in a compact manifold head that makes operation safe, smooth and easy.

Vent valves are also included to insure that all air is purged during service so that maximum system performance is achieved.

The Parker 30PD makes use of industry proven components. Elements are multi-pass tested in accordance with ANSI/NFPA T3.10.8.8 R1 - 1990. Bowls and head are subjected to rigorous fatigue testing to insure a trouble free service life.

Drawings are for reference only.  
Contact factory for current version.

## Diverter Valve

- Low torque for easy servicing
- Detent for valve handle prevents accidental switching
- Handle indicates which filter is in use

## Vent Valves

- Allow for convenient purging of trapped air, and pressure

## Ports

- SAE straight thread ports for positive sealing

## Balance Valve

- Safety valve equalizes pressure between the two bowls

## Operating Instructions

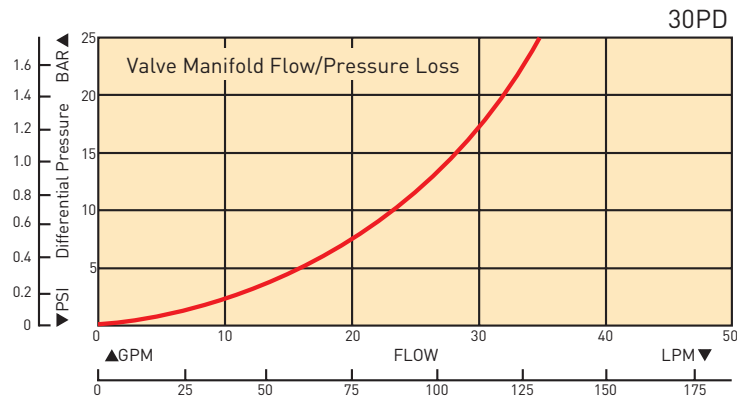
- Name tag and operating instructions riveted to manifold

## Vent Drains

- 1/8-27 NPT drain port, both sides

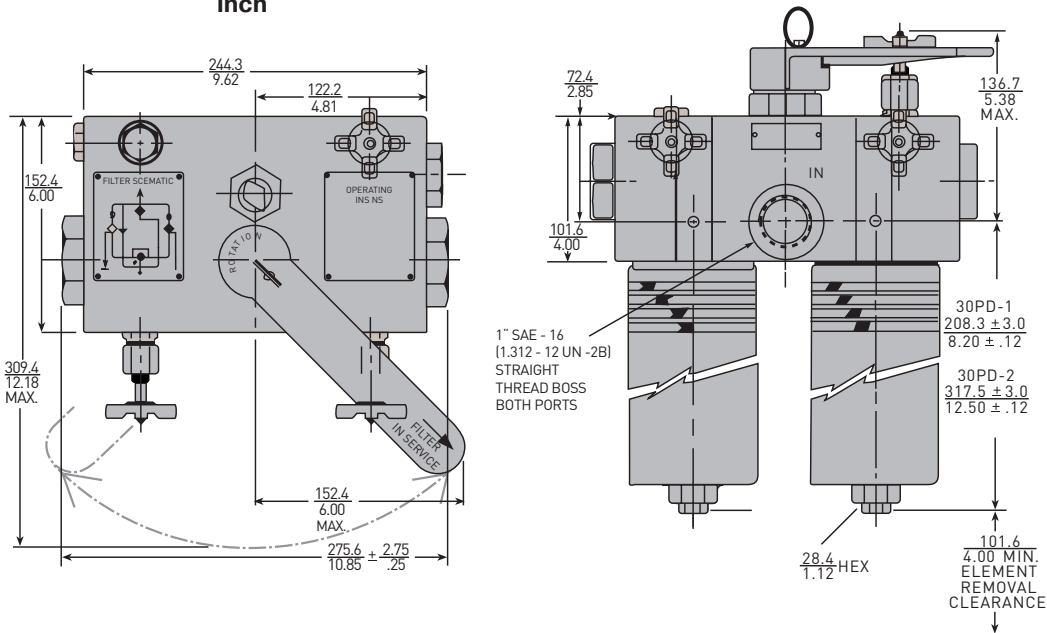
## 30PD Empty Housing Flow vs Pressure Loss

To obtain total filter assembly pressure loss, add empty housing loss to the pressure loss of selected element on 30P element performance pages.



## Installation Dimensions

Linear Measure: millimeter  
inch



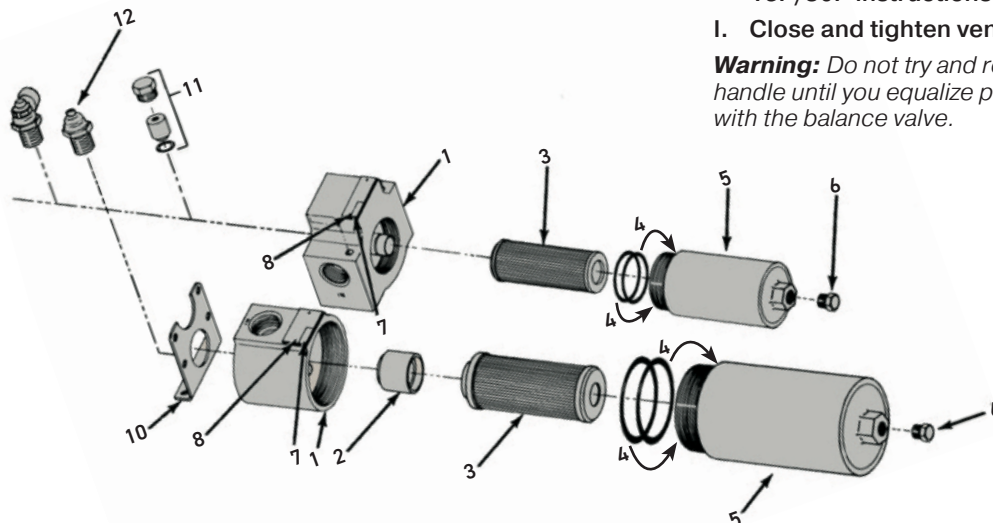
# 15P/30P Series

## Parts List

Index	Description	15P	30P
1	<b>Head</b>		
	<b>In-line porting</b>		
	Bypass w/ top indicator port	931520	933956
	No bypass w/ top indicator port	931519	933956
	Bypass w/ side indicator port	931522	933955
	No bypass w/ side indicator port	931521	933955
1	<b>Manifold Porting</b>		
	Bypass w/ indicator port	931135	933954
	No bypass w/ indicator port	931523	933954
2	<b>Bypass valve assembly</b>		
50 psid (in-line model only)	928981	925127	
No bypass	935744*	925209	
3	<b>Elements</b> (see chart on model code page)		
4	<b>Bowl &amp; Dust Seal O-ring</b>		
	Nitrile	N92138	N92151
	Fluorocarbon	V92138	V92151
5	<b>Bowl</b>		
	Single w/out drain	937547	937551
	Single w/ drain	937549	937553
	Double w/ out drain	937548	937552
	Double w/ drain	937550	937554
6	<b>Drain plug, SAE-4</b>		
	w/ nitrile o-ring	921088	921088
	w/ fluorocarbon o-ring	928882	928882
7	<b>Nameplate (unstamped)</b>	920928	920928
8	<b>Drive Screws</b>	903393	903393
9	<b>Mounting spacer tube (not shown)</b>	925650	N/A
10	<b>Mounting bracket kit</b>	N/A	925563
11	<b>Blank indicator kit</b>	925515	925515
12	<b>Indicators</b> (fluorocarbon seals)		
	Visual auto reset	932027	932027
	H option (1/2" conduit connection)	932905	932905
	E2 option (DIN 43650 connection)	929599	929599
	E3 option (3 pin ANSI/B93.55M connection)	929596	929596
13	<b>Manifold mounting kit</b>	N/A	925562
	<b>Manifold o-ring</b> (2 required)		
	Nitrile	N92117	N92119
	Fluorocarbon	V92117	V92119

Note: consult factory for EPR part numbers

\*Not for manifold-style head



## Element Servicing

### 15P/30P

- A. Stop the system's power unit.
- B. Relieve any pressure in the filter line and drain filter bowl if drain port is provided.
- C. Loosen and remove bowl.
- D. Remove element from housing.
- E. Place new, clean element in housing, centering it on the element locator.
- F. Inspect the bowl & dust seal o-rings and replace if necessary.
- G. Install bowl and tighten to specified torque.

### 30PD

- A. Arrow on diverter handle points to the on-duty chamber.
- B. Open off-duty vent valve (vent port should be plumbed back to reservoir).
- C. Open balance valve slowly to admit fluid into off duty chamber.
- D. When fluid is discharged from vent port, close and tighten.
- E. Pull up on detent pin and rotate diverter approximately 90° until detent relocates in seat.
- F. Close and tighten balance valve.
- G. Open new off-duty vent valve to relieve pressure.
- H. Follow steps C-G from 15P/30P instructions above.
- I. Close and tighten vent valve.

**Warning:** Do not try and rotate handle until you equalize pressure with the balance valve.

# 15P/30P Series<sup>1</sup>

## High Pressure Duplex Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
30P	1	10Q	E	M2	K	S16	4

BOX 1: Filter Series	
Symbol	Description
15P	Pressure Filter
30P	Pressure Filter
30PD	Duplex style 30P

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double

BOX 3: Media Code <sup>2,3</sup>	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron

Add H to element code for high collapse (2,000 psid)

Add X to element code for high collapse (3,000 psid) 02 Q and 10Q media only.

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
E	Ethylene propylene
V	Fluorocarbon

BOX 5: Indicator	
Symbol	Description
P	Indicator pressure port only
M2	Visual auto reset
E2	Electrical/visual (DIN 43650 style connector)

Note: For side mount indicators, place a "S" after indicator symbol. Not available on 30PD model.

BOX 6: Bypass <sup>4</sup>	
Symbol	Description
K	50 PSI (3.5 bar)

BOX 7: Ports	
Symbol	Description
<b>15P</b>	
S12	SAE-12
X <sup>5</sup>	3/4" manifold port
<b>30P</b>	
S16	SAE-16
X <sup>5</sup>	1" manifold port
<b>30PD</b>	
S16	SAE-16

BOX 8: Options	
Symbol	Description
1	None
2	No bypass
4	SAE-4 drain port on bowl
21	No bypass and drain port

- Filters include the element you select already installed.
- The high collapse element is recommended when the no-bypass option is selected.
- "H" high collapse option not available with 20Q.
- If indicator and no bypass are selected, indicator setting is 50 psid.
- Customer supplies subplate for 30P manifold porting or may purchase 925562 30P subplate kit. 15P requires no subplate.

### Replacement Elements (Fluorocarbon)

Media	15P-1	15P-2	30P/30PD-1	30P/30PD-2
02Q	932610Q	932616Q	932622Q	932628Q
05Q	932611Q	932617Q	932623Q	932629Q
10Q	932612Q	932618Q	932624Q	932630Q
20Q	930369Q	930370Q	933135Q	933136Q
02QH	932613Q	932619Q	932625Q	932631Q
05QH	932614Q	932620Q	932626Q	932632Q
10QH	932615Q	932621Q	932627Q	932633Q
20QH	934983Q	930544Q	NA	NA
02QX	933576Q	933578Q	933580Q	933582Q
10QX	933577Q	933579Q	933581Q	933583Q



Hydraulic & Fuel Filtration Division

[www.parker.com/emhff](http://www.parker.com/emhff)

Last updated August 4th, 2023



# 50P Series

High Pressure Filters



ENGINEERING YOUR SUCCESS.

# 50P Series

## Applications

### Applications for 50P series filters

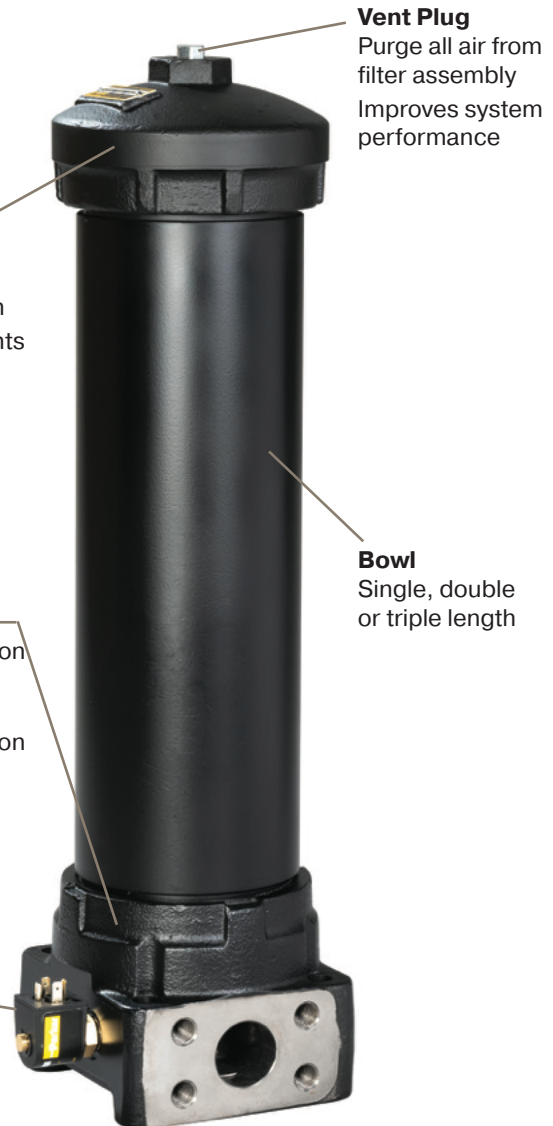
- Automotive specified equipment
- Hydrostatic transmission circuits
- Servo and proportional controls
- Offshore drilling rigs
- Mining equipment
- Power units

The design objective for all Parker filters is to achieve a sensible balance between cost and performance. We use state of the art technology to arrive at innovative yet practical designs, which are cost effective for OEM's and users alike.

The 50P series allows you to customize each filter to closely match your needs. Choose the options which best fit your application.

The 50P series filters are bowl-up, which provides several possible advantages. The bowl-up mounting makes servicing the elements quick and easy. Simply remove the top cover to access the element. A drain port is provided to allow oil removal prior to element servicing. This design reduces the possibility of oil spillage and injury to maintenance personnel.

The 50P series has optional manifold porting for space saving. The porting is also designed to match the installation of many other manufacturers. Most important, the 50P series meets the SAE HF4 automotive standard.



**Vent Plug**  
Purge all air from filter assembly  
Improves system performance

**Cover**  
Durable ductile iron  
Top service elements  
No oil spills during service

**Bowl**  
Single, double or triple length

**Head**  
Ductile iron construction  
SAE or manifold ports  
Meets SAE HF4 automotive specification

**Indicators**  
Visual, electrical or analog  
Several connector options

**Drain Plug** (not visible)  
Drain oil for easy service

**Bypass** (not visible)  
Cartridge style  
Precision matched assemblies

# 50P Series

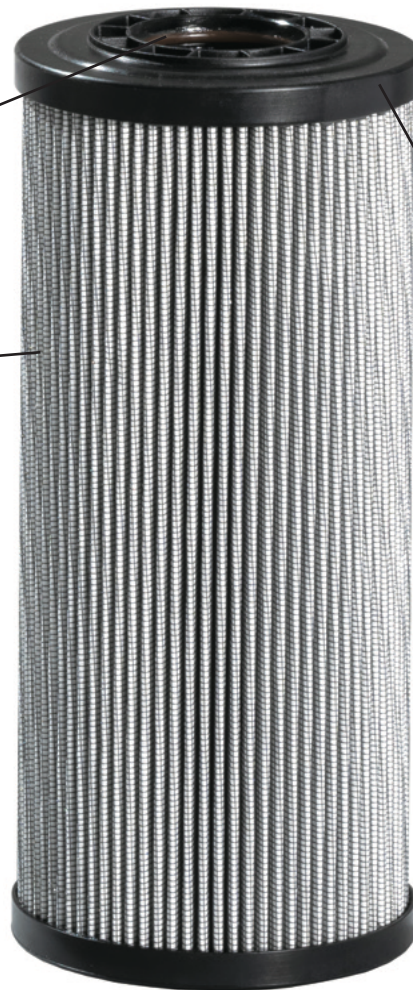
## Features

### O-Ring Seal

Positive sealing for optimum element efficiency

### Microglass Media

- Multi-layer for high capacity and high efficiency
- Multiple micron sizes available
- Wire reinforced to prevent pleat bunching



### Plastic End Caps

- Excellent corrosion protection
- Laser marked for clear long lasting identification

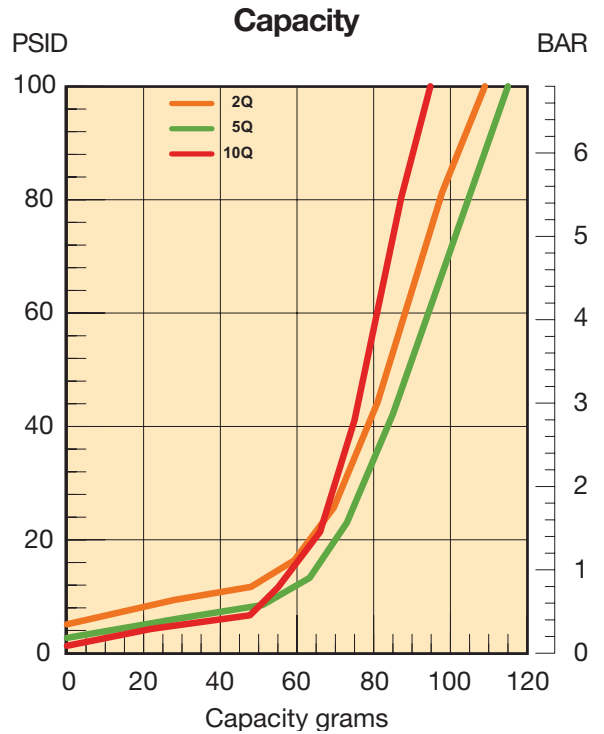
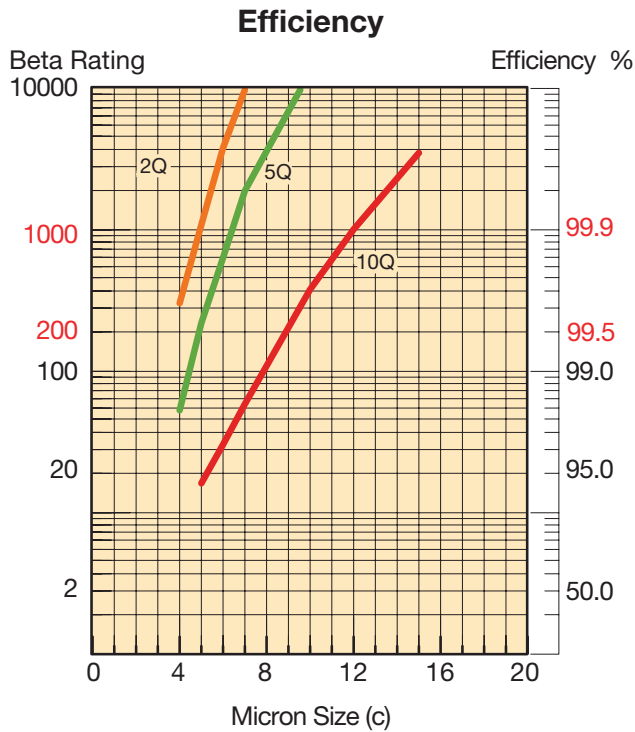
### Spiral Support Cylinders (Not visible)

- High strength consistent support
- Continuous length eliminates leak points and increases surface area
- Meets SAE HF4 specification for automotive uses

Feature	Advantage	Benefit
Base mounted filter	No brackets required for installation	Reduces installation costs
Top access cover	Removing the element from the top is lighter than removing entire bowl	Allows for easier element replacement
Visual, electrical and analog indicators	Know exactly when to service elements	Ensures maximum element life without entering bypass or replacing elements prematurely.
Drain port	Drain all oil from assembly prior to servicing	No oil mess
Vent port	Purges all trapped air in filter	Get the maximum performance from elements Prevents a "spongy" system
Multipass tested elements	Element performance backed by recognized test standards	Elements selected will have consistent performance levels
Microglass elements	Multi-layer media Wire reinforced pleats	High capacity with high efficiency No performance loss from pleat bunching

# 50P Series

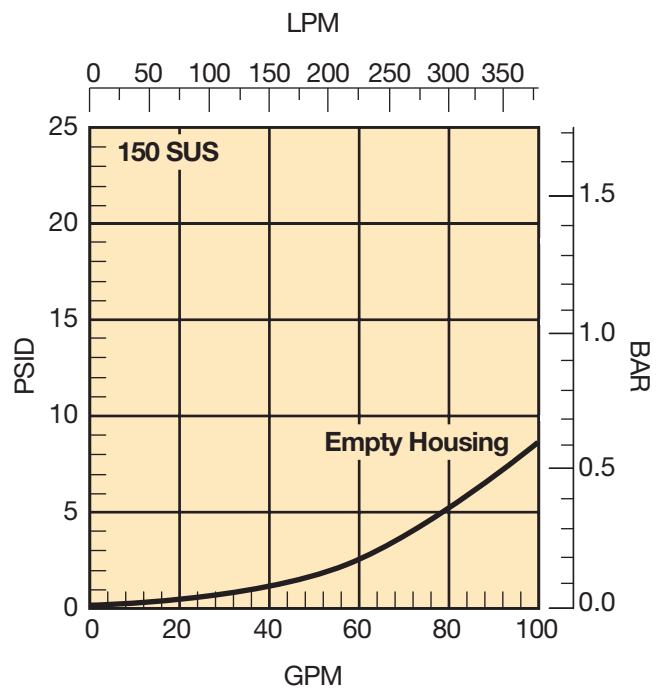
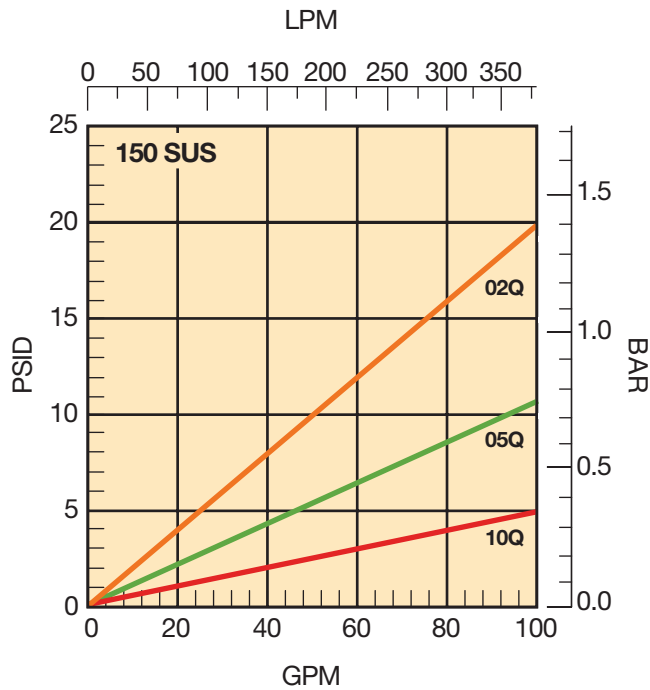
## 50P-1 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

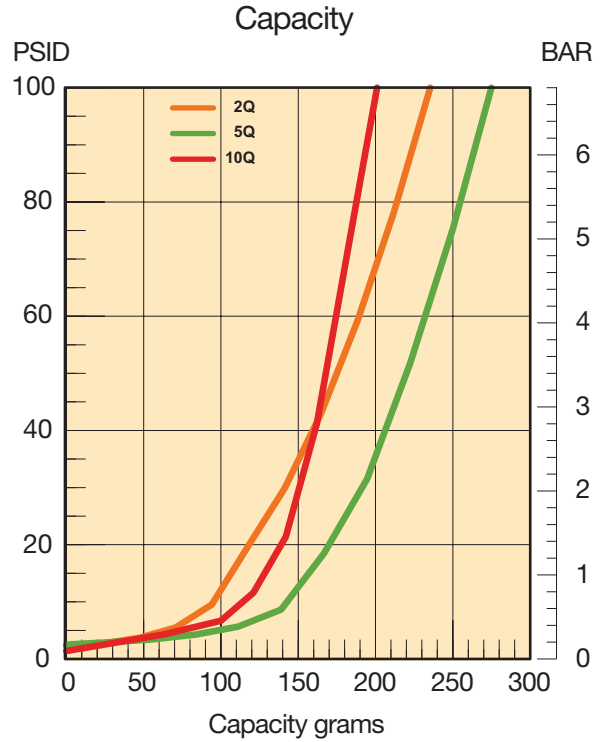
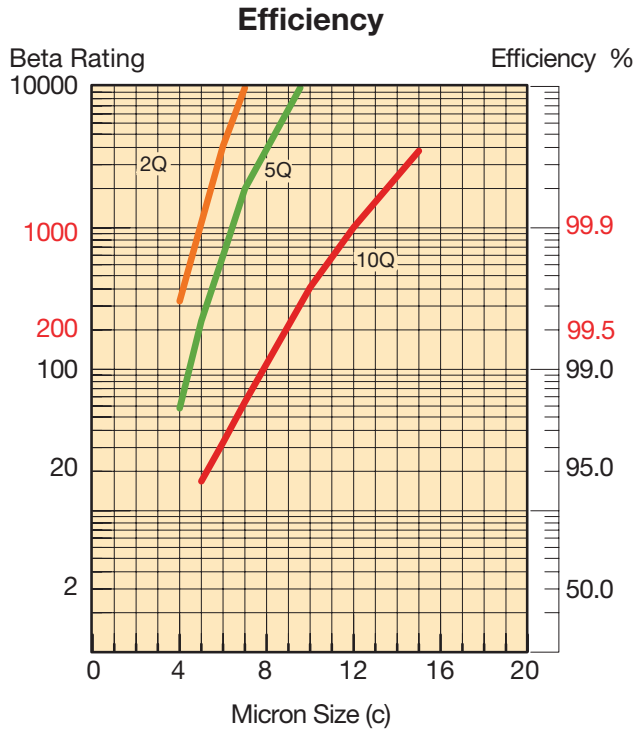
\*High Collapse Correction Factor:  
\*QH\* Elements (2000 psid) = 1.4 times reported loss

### Flow vs. Pressure Loss



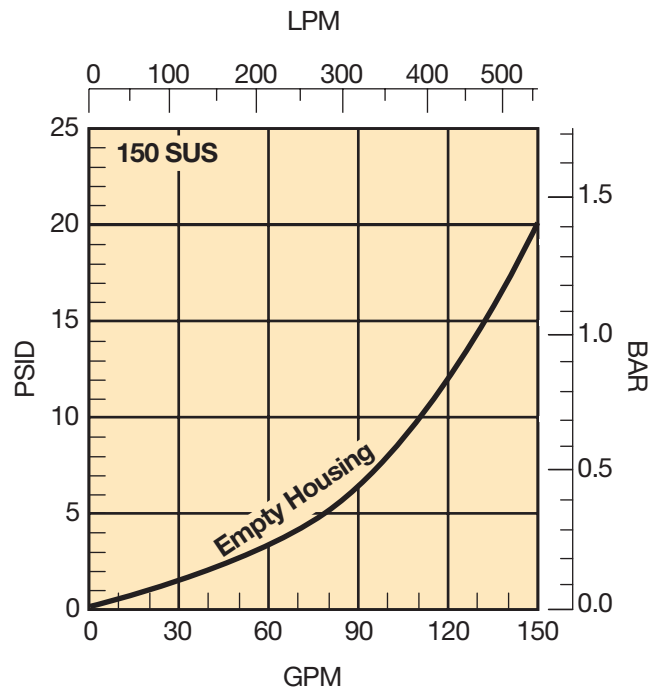
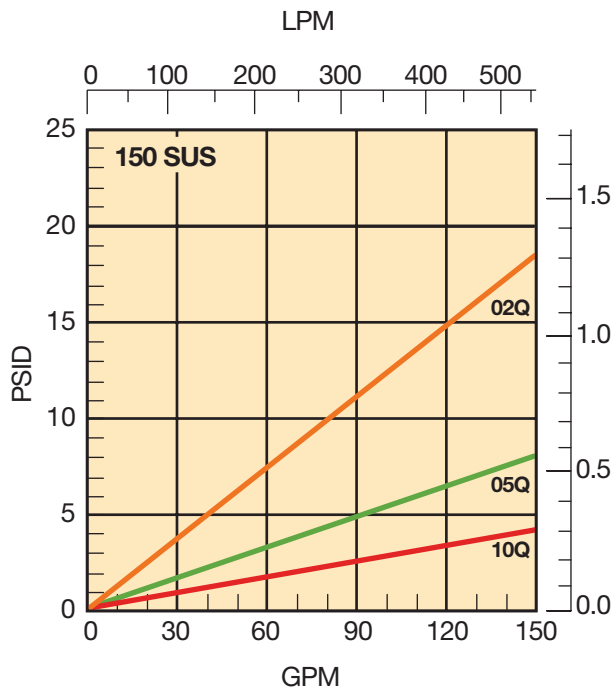
# 50P Series

## 50P-2 Element Performance



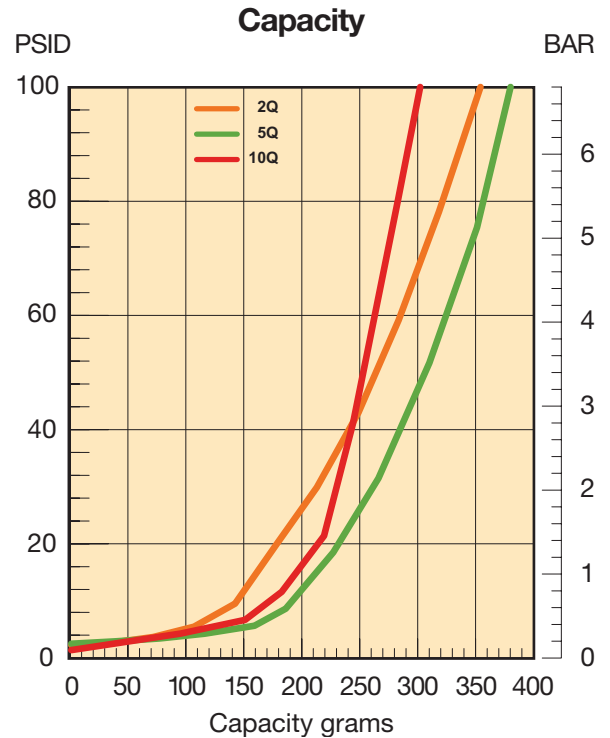
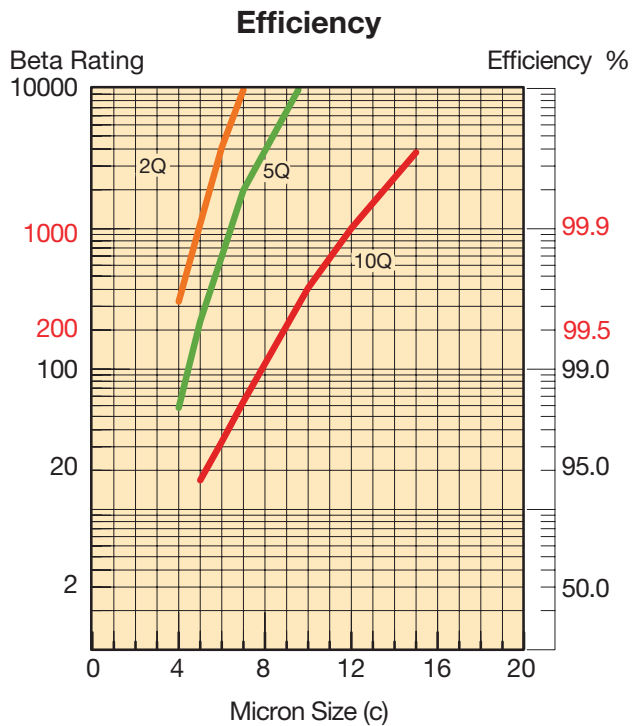
Results typical from Multi-pass tests run per test standard ISO 16889 @ 80 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



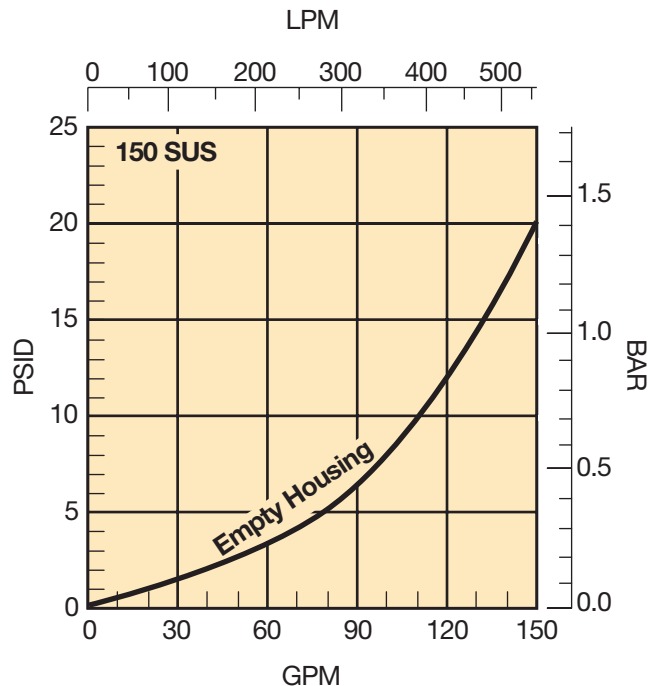
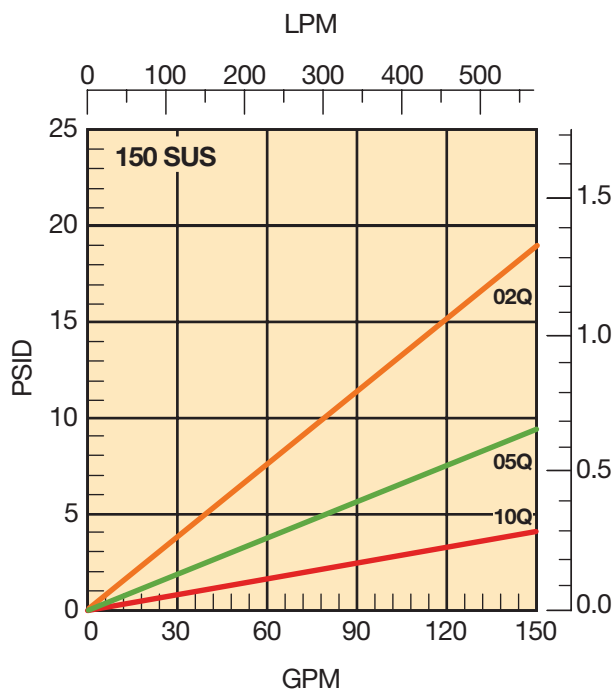
# 50P Series

## 50P-3 Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 80 gpm to 100 psid terminal - 10 mg/L BUGL  
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

### Flow vs. Pressure Loss



# 50P Series

## Specifications

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 5000 psi (344.8 bar)  
 Rated Fatigue Pressure: 3500 psi (241.4 bar)  
 Design Safety Factor: 2.5:1

### Element Collapse Rating:

150 psid (10.2 bar) standard

### Operating Temperatures:

Buna: -40°F (-40°C) to 225°F (107°C)  
 Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Filter Materials:

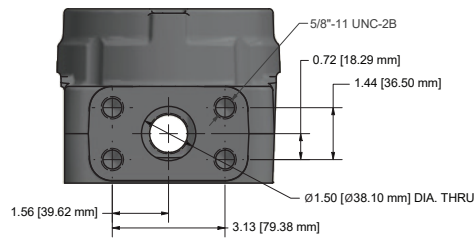
Head (base) and Cover: ductile iron  
 Bowl: seamless steel tube

### Shipping Weights (approximate):

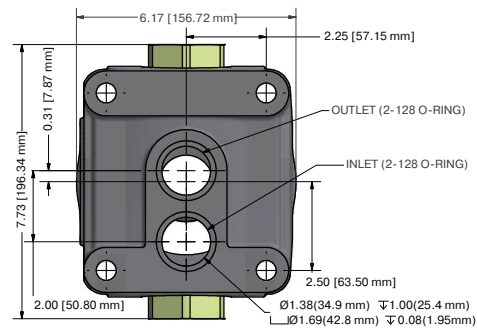
50P-1: 56 lb. (25.4 kg)  
 50P-2: 77 lb. (34.9 kg)  
 50P-3: 95 lb. (43 kg)

Dimensions: mm/inches	50P-1	50P-2	50P-3
X	387.1 15.24	622.8 24.52	850.4 33.48
Z	254.0 10.00	508.0 20.00	760.2 30.00

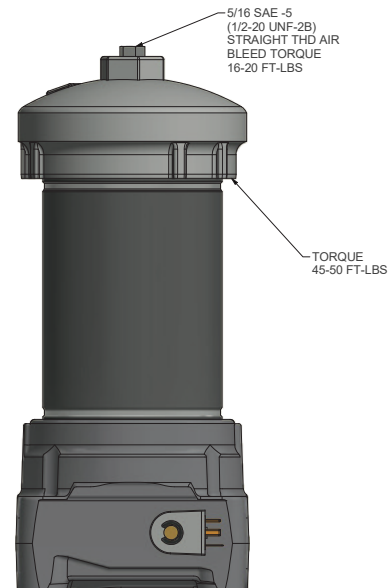
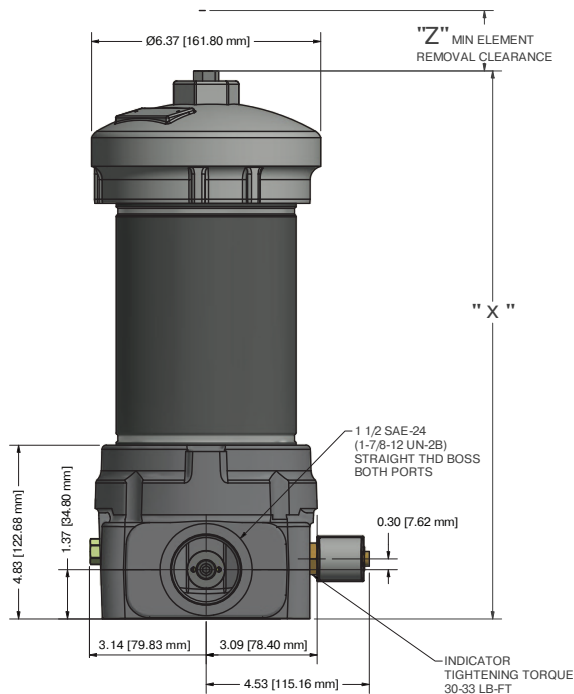
Drawings are for reference only.  
 Contact factory for current version.



SAE 1 1/2" FLANGE FACE

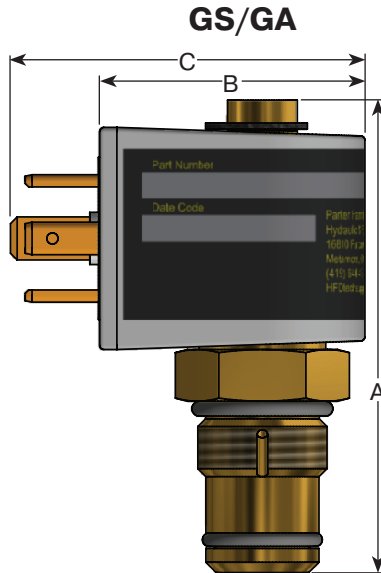


MANIFOLD PORTS ON  
 BOTTOM OF HEAD



# 50P Series

## Indicator Specifications



### GS

**Output:** Dry Contact Reed Switch

- Absolute maximum carry current 1 amp (AC/DC)
- Absolute maximum switching current 500 mA (AC/DC)
- Absolute maximum voltage 125 VAC/30 VDC

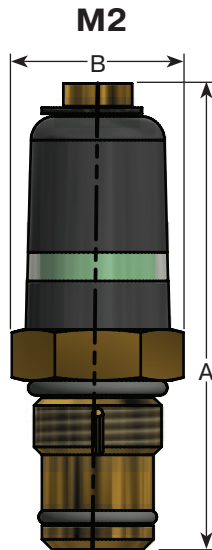
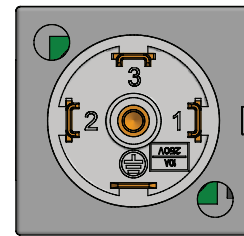
**Torque:** 30-35 ft lbs

### GA

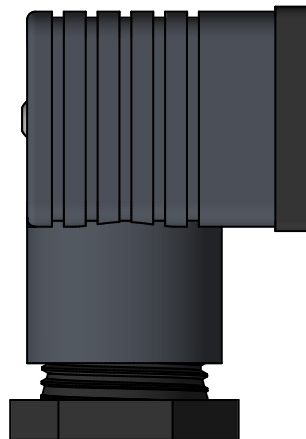
**Output:** Analog 4-20 mA

**Supply Voltage:** 10.0 VDC - 28 VDC (Clean and Filtered)

**Torque:** 30-35 ft lbs



### 947356



- DIN43650 standard socket
- For use with GS and GA

### 947355



- DIN43650 visual LED socket
- 12-35 VDC
- For use with GS

**Output:** Visual

Option	Description	Connection/Power	Wiring	A	B	C
				inches/mm		
GS	Reed Switch	DIN 43650 3 Pole + Earth 500mA @ 30 VDC 500mA @ 125 VAC	Pin 1 - Common Pin 2 - Normally Open Pin 3 - Normally Closed Pin 4 - Not Connected	2.74 69.6	1.54 39.1	2.06 52.3
GA	4-20mA Analog	DIN 43650 3 Pole + Earth Supply Voltage: 10 VDC - 28 VDC Output: 4-20 mA	Pin 1 - Supply (10VDC - 28VDC) Pin 2 - Common (Circuit Ground) Pin 3 - 4-20mA Out Pin 4 - Not Connected	2.74 69.6	1.54 39.1	2.06 52.3
M2	Visual	N/A	N/A	2.74 69.6	1.45 36.8	N/A

# 50P Series

## Parts List and Service Instructions

Index	Description	Part Number 50P	
1	Head Assembly	C/F	
2	Bowl	C/F	
3	Cover	926655	
4	Cover O-ring, Nitrile	N92246	
	Cover O-ring, Fluorocarbon	V92246	
5	Vent Plug	927363	
	Vent Plug O-ring - Nitrile	N93905	
	Vent Plug O-ring - Fluorocarbon	V93905	
6	Element	See Replacement Element Table	
7	Drain Plug	927363	
	Drain Plug O-ring - Nitrile	N93905	
	Drain Plug O-ring - Fluorocarbon	V93905	
8	<b>Bypass Valve</b>		
	50 psid	924189	
	90 psid	927399	
<b>Indicators<sup>1</sup></b>		<b>50 psid</b>	<b>90 psid</b>
9	M2 - Visual	945661	947378
10	GS - Electrical	946201	946204
10	GA - Analog	946210	946213
Not Shown	Standard DIN 43650 Socket Kit	947356	
Not Shown <sup>2</sup>	12-35VDC LED Visual DIN 43650 Socket	947355	
Not Shown	Manifold port O-ring - Nitrile	N92128	
Not Shown	Manifold port O-ring - Fluorocarbon	V92128	

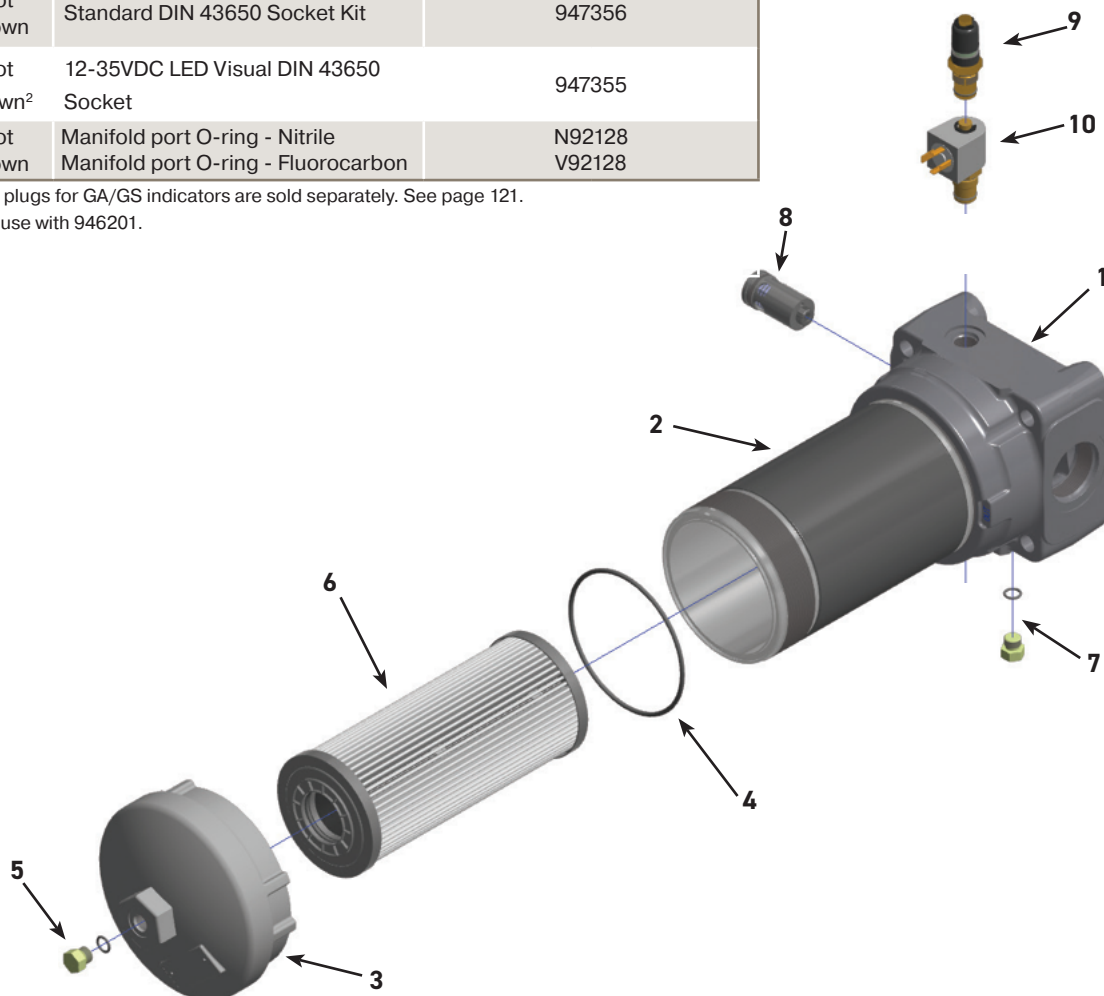
1. DIN plugs for GA/GS indicators are sold separately. See page 121.

2. For use with 946201.

### Element Service Instructions

When servicing the 50P filter, use the following procedure.

- A. Stop the system's power unit.
- B. Relieve any pressure in the filter or line.
- C. If desired, oil can be drained from filter housing by removing the drain port plug located in the head.
- D. Rotate the cover counterclockwise and remove.
- E. Remove element from housing.
- F. Place new, clean element into housing centering element over locator.
- G. Inspect cover o-ring and replace if necessary.
- H. Apply cover to filter and tighten to 45-50 ft. lbs.
- I. Replace drain plug and tighten 20-25 ft. lbs.



# 50P Series<sup>1,2</sup>

## High Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
50P	1	10Q	B	GS	M	S24	1

BOX 1: Filter Series	
Symbol	Description
50P	5000 PSI (MAOP)
50PR*	Reverse flow hydrostatic version

\* Not available on triple length, must choose 1 or 2 in box 2.

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double
3	Triple (50P only)

BOX 3: Media Code	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
V	Fluorocarbon

BOX 5: Indicator	
Symbol	Description
P	Plugged indicator port
M2	Visual
GS	Electrical Reed Switch with DIN 43650 socket
GA	Analog 4-20mA with DIN 43650 socket

BOX 6: Bypass	
Symbol	Description
K	50 psid
M	90 psid

BOX 7: Ports	
Symbol	Description
S24	SAE-24
Y24	SAE Code 62 Flange
X22	1 3/8" Manifold ports

BOX 8: Options	
Symbol	Description
1	None

- Filters include the element you select already installed.
- This is a non-returnable product.

### Replacement Elements (Fluorocarbon)

Standard Collapse			
Media	Single	Double	Triple
02Q	932668Q	932677Q	933486Q
05Q	932669Q	932678Q	933487Q
10Q	932670Q	932679Q	933488Q



Hydraulic & Fuel Filtration Division  
www.parker.com/emhff

Last updated April, 2024

Parker's willingness to conduct business with Buyer is expressly conditioned on Buyer's assent to Parker's Offer of Sale. www.parker.com/saleterms



# World Pressure Filters

The Standard in 7,000 psi Pressure Filters



ENGINEERING YOUR SUCCESS.

# WPF Series

## Applications

Parker engineers have developed what soon will be the industry standard in high pressure hydraulic filtration. The new 7,000 psi WPF series incorporates many advanced features designed for one reason: to improve your bottom line.

There is no better high pressure filter available today for durability and performance. The reduction of your operating costs is our primary concern, and we are committed to contributing towards your success.

### Typical Applications

- **Aircraft Ground Support**
- **Injection Molding**
- **Mining**
- **Mobile Ag**
- **Mobile Construction**
- **Oil & Gas Exploration**
- **Power Generation**
- **Primary Metals**
- **Refuse Trucks**



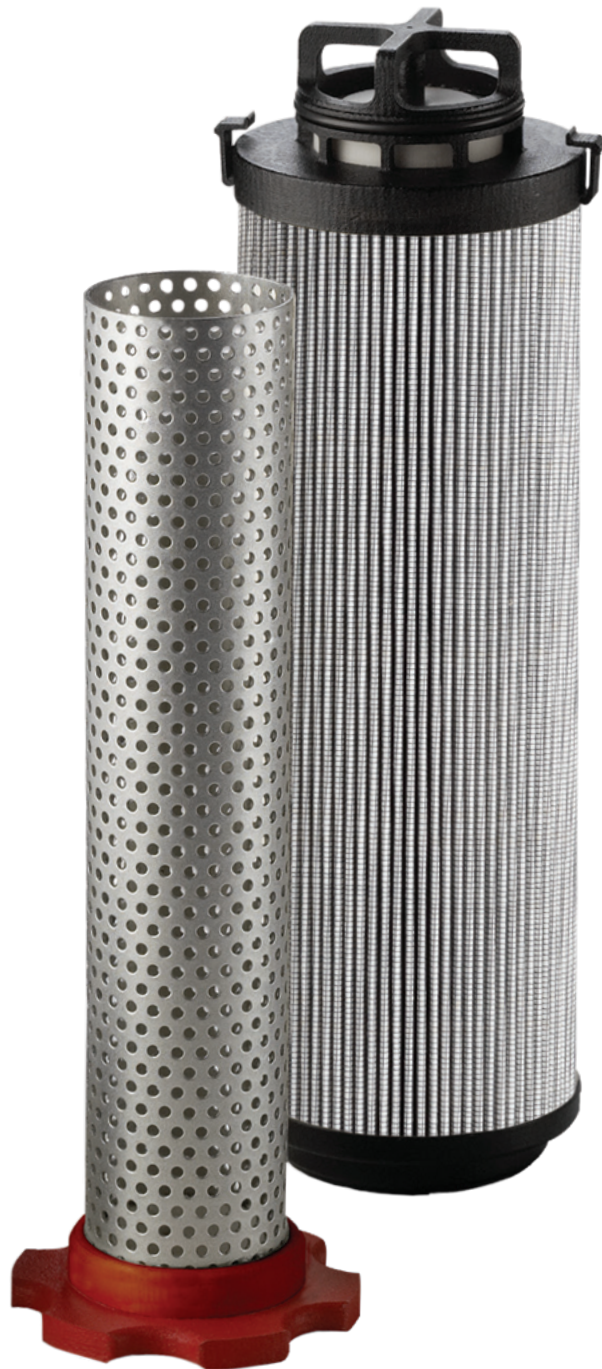
# WPF Series

## Features



# WPF Series

## SurgeGuard Elements



Proprietary  
SurgeGuard protection  
System protection  
from back-flow

Component performance  
integrity with improved flow fatigue  
resistance

Integrated bypass & reverse flow  
valve technology  
Every element serviced provides  
new bypass &  
reverse flow valve assembly

Reliable, high performance, quick  
response design

Low mass, low  $\Delta P$   
reverse flow valve  
Ideal for closed-loop  
applications

Greater design and  
service flexibility

Patented  
deformable tangs  
Automatic element  
locate and removal

Easy, fast, safe, clean

Element removal  
clearance  
Benchmarked best-in-class  
against major competitors

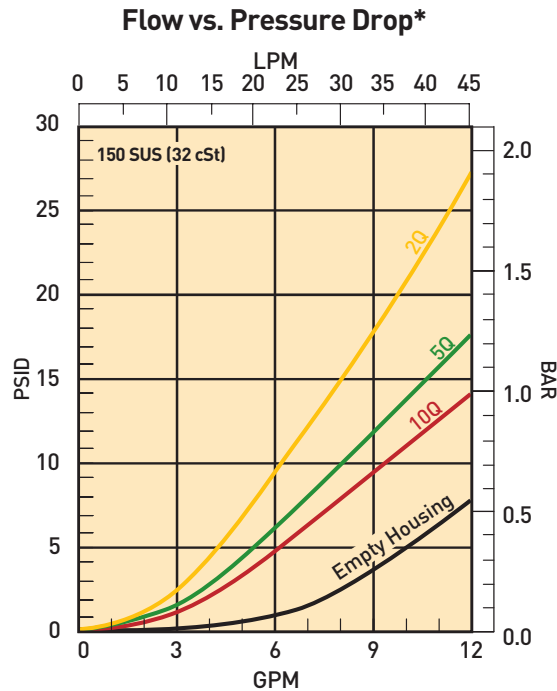
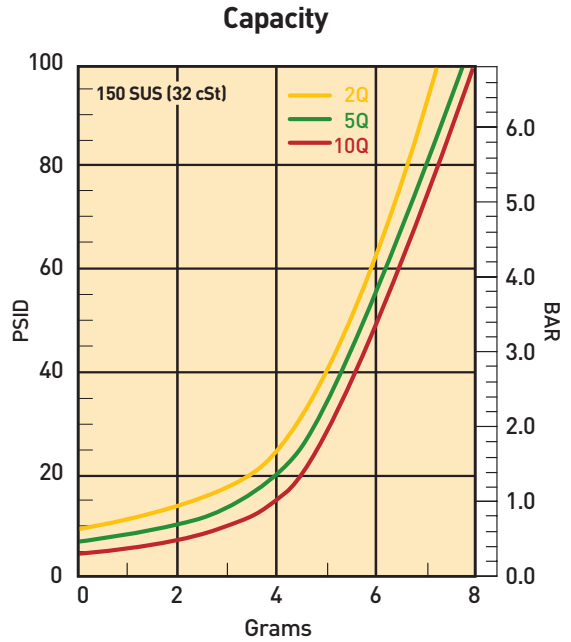
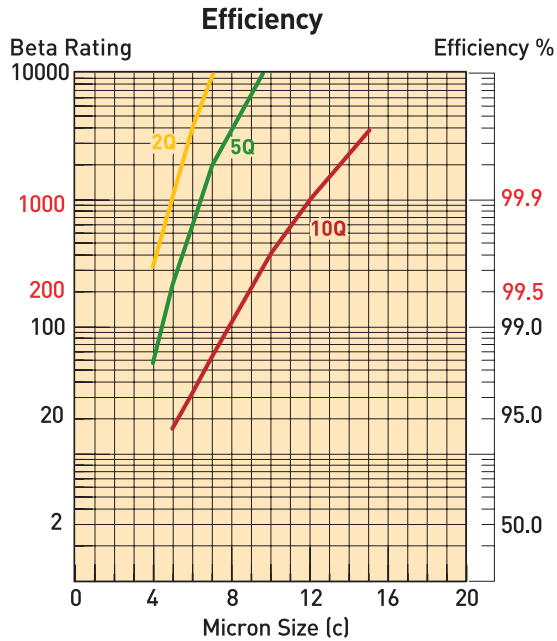
Ease-of-service.  
Machine design flexibility

Patented valves  
with low hysteresis  
Zero leakage  
and low friction

Optimum performance

# WPF Series

## WPF1 Element Performance



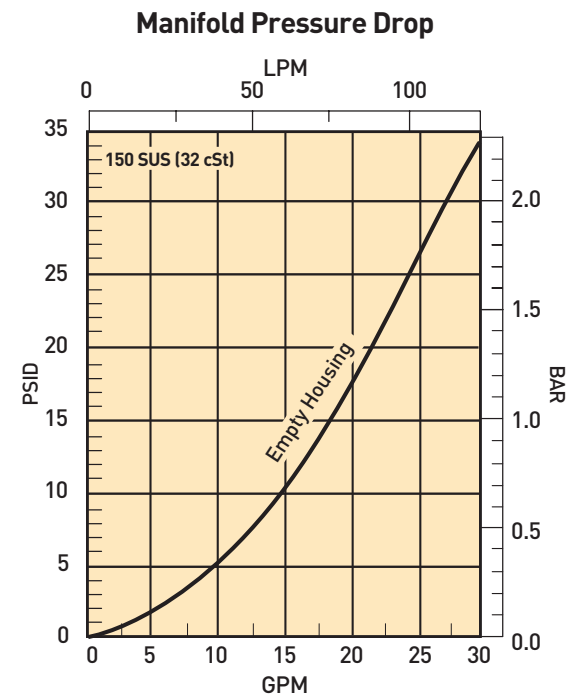
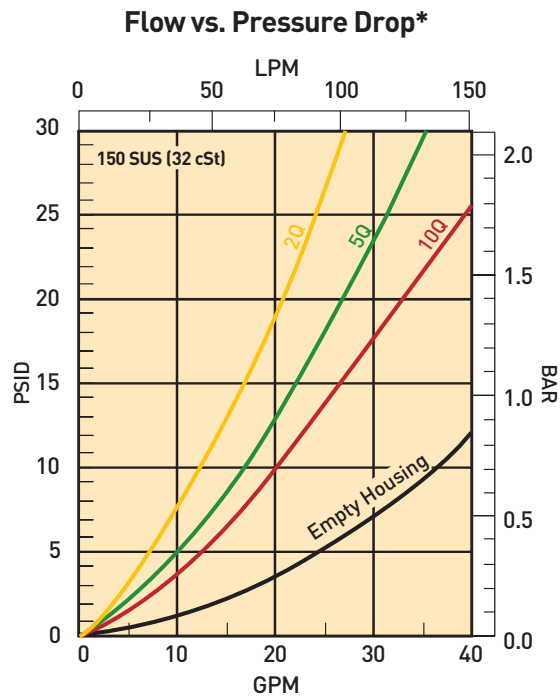
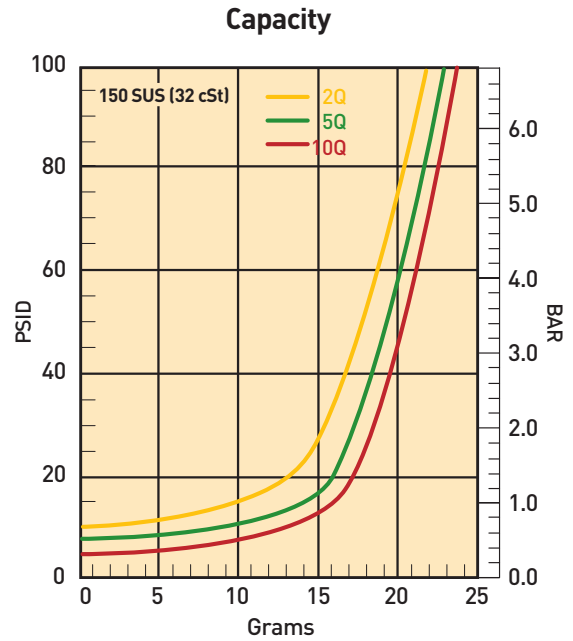
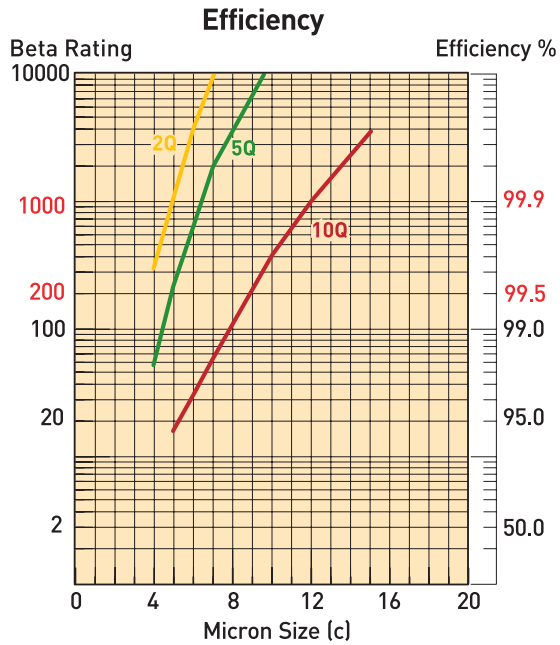
\*High Collapse Correction Factor:  
 "QH" Elements (2000 psid) = 1.4 times reported loss

Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 50 psid terminal - 10 mg/L BUGL.

Note: During reverse flow, ΔP is 20 psid at max. flow.

# WPF Series

## WPF2 Element Performance



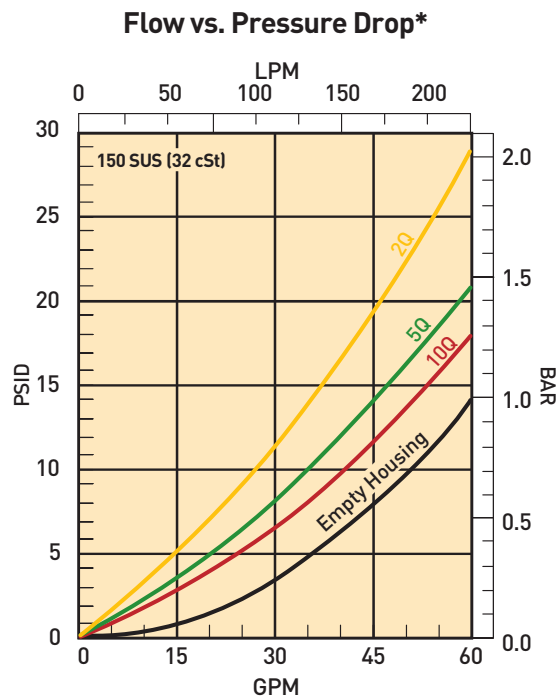
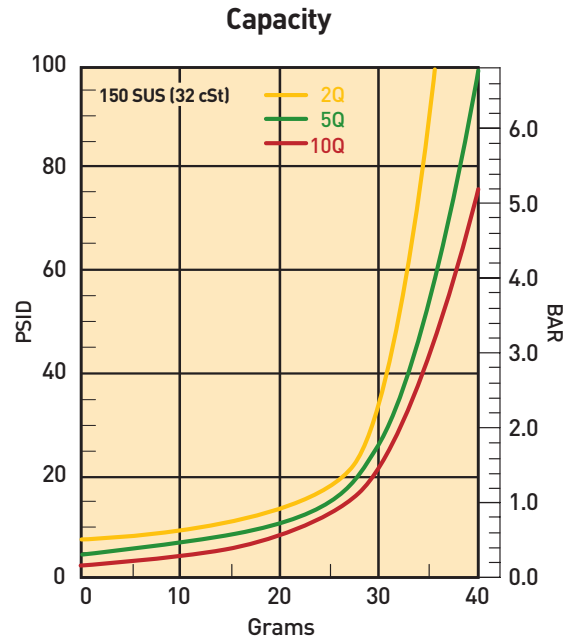
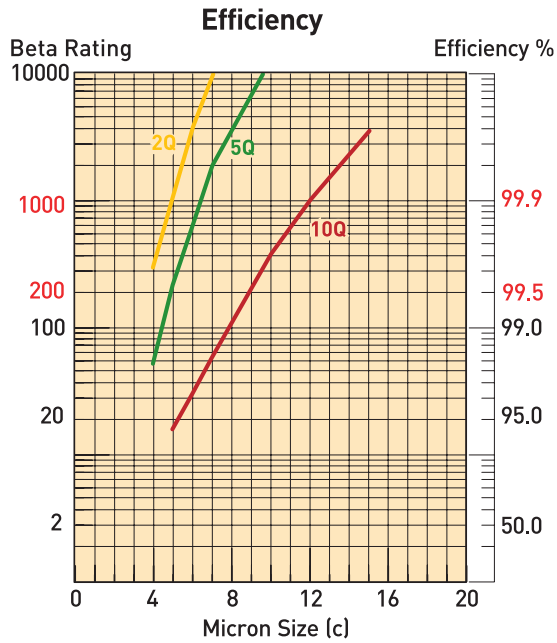
\*High Collapse Correction Factor:  
 "QH" Elements (2000 psid) = 1.4 times reported loss

Results typical from Multi-pass tests run per test standard ISO 16889 @ 25 gpm to 50 psid terminal - 10 mg/L BUGL.

Note: During reverse flow,  $\Delta P$  is 20 psid at max. flow.

# WPF Series

## WPF3 Element Performance



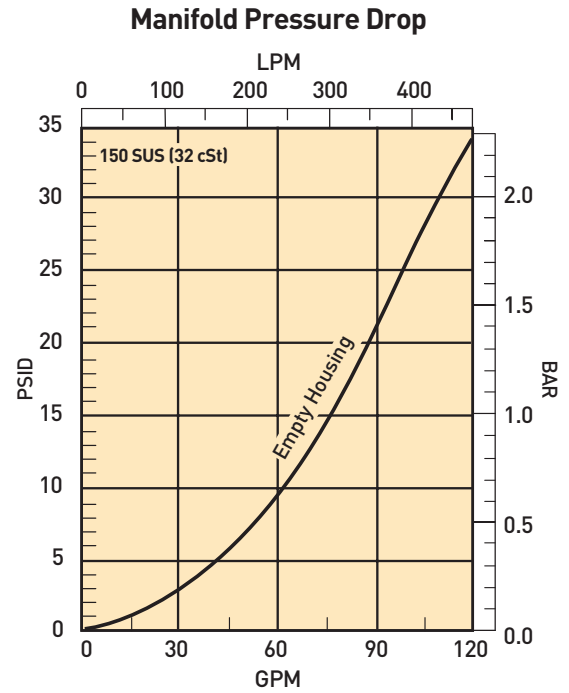
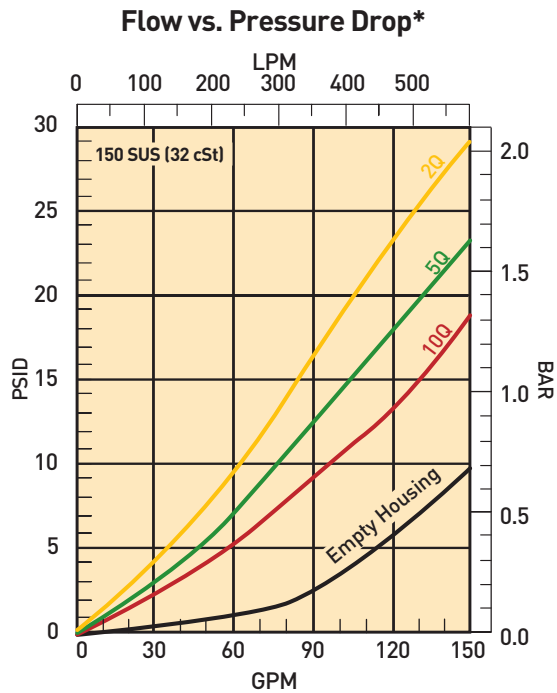
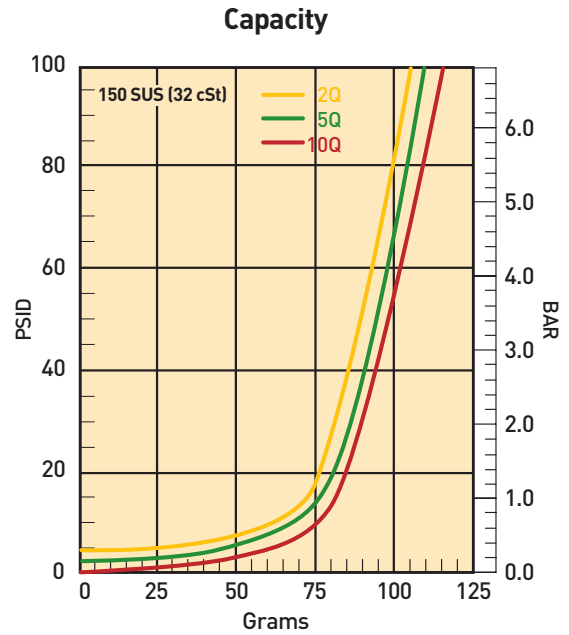
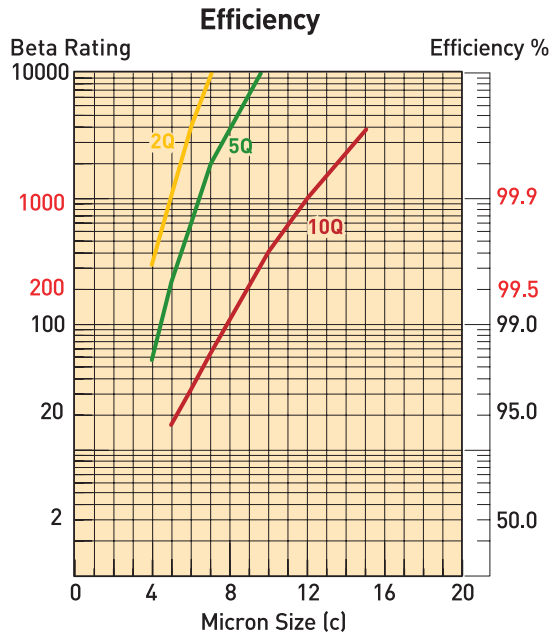
\*High Collapse Correction Factor:  
 "QH" Elements (2000 psid) = 1.4 times reported loss

Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 50 psid terminal - 10 mg/L BUGL.

Note: During reverse flow,  $\Delta P$  is 20 psid at max. flow.

# WPF Series

## WPF4 Element Performance



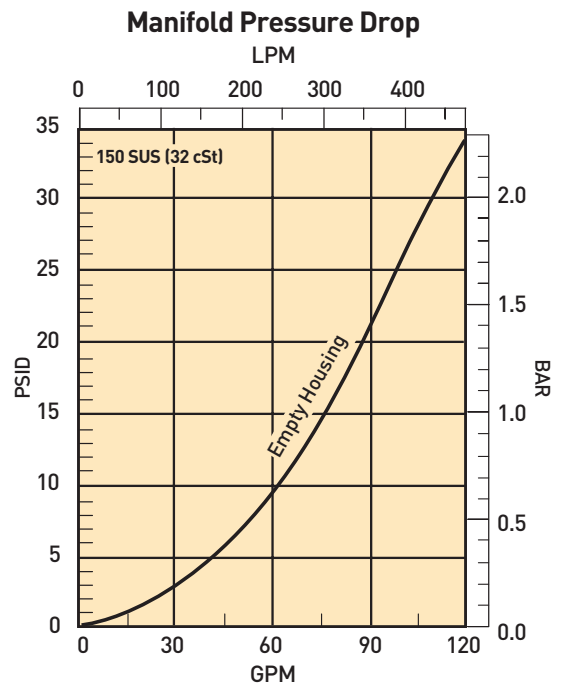
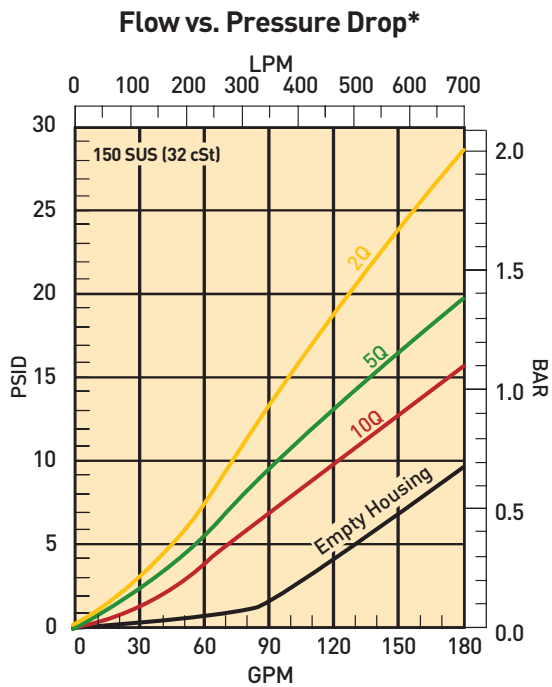
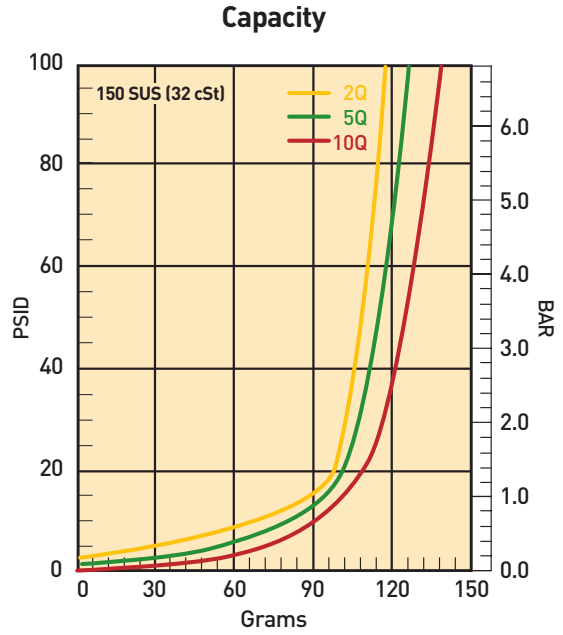
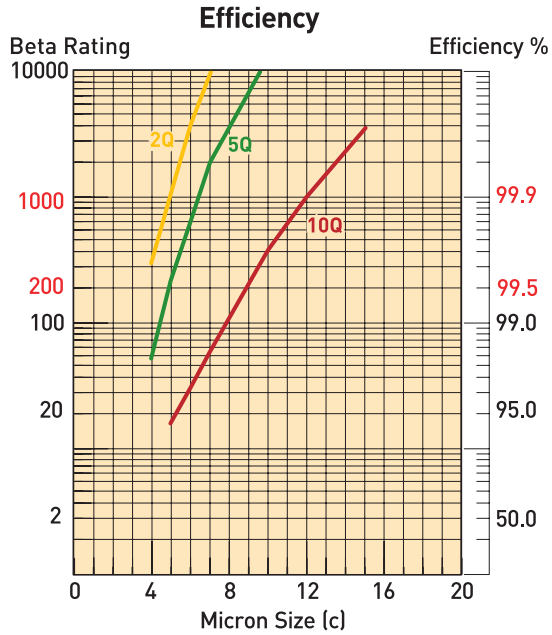
\*High Collapse Correction Factor:  
 "QH" Elements (2000 psid) = 1.4 times reported loss

Results typical from Multi-pass tests run per test standard ISO 16889 @ 90 gpm to 50 psid terminal - 10 mg/L BUGL.

Note: During reverse flow, ΔP is 20 psid at max. flow.

# WPF Series

## WPF5 Element Performance



\*High Collapse Correction Factor:  
 "QH" Elements (2000 psid) = 1.4 times reported loss

Results typical from Multi-pass tests run per test standard ISO 16889 @ 100 gpm to 50 psid terminal - 10 mg/L BUGL.

Note: During reverse flow, ΔP is 20 psid at max. flow.

# WPF Series

## Specifications

### Maximum Allowable Operating Pressure (MAOP):

7000 psi (483 bar)

### Rated Fatigue Pressure:

6000 psi (414 bar)

### Design Safety Factor: 3:1

### Operating Temperatures:

-15°F (-26°C) to 250°F (135°C)

### Element Collapse Rating:

Standard: 300 psi (21 bar)

High Collapse: 2000 psi (138 bar)

### Materials:

Head: SG Iron

Bowl: Steel

Indicator: Brass with

Plastic Connectors

### Weights:

WPF1 9 lbs. (4.1 kg)

WPF2 13 lbs. (5.9 kg)

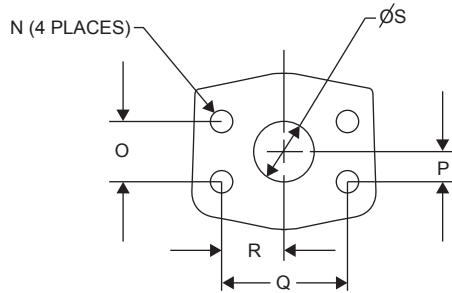
WPF3 21 lbs. (9.5 kg)

WPF4 45 lbs. (20.4 kg)

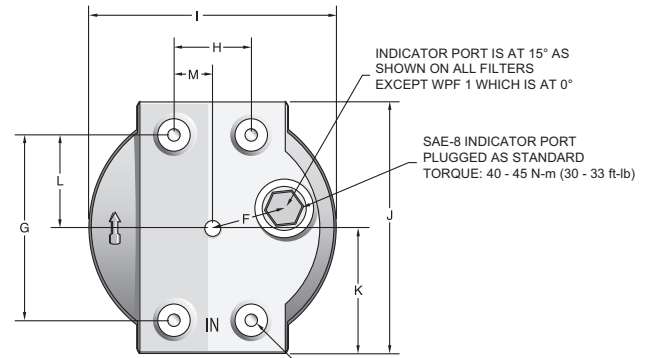
WPF5 67 lbs. (30.4 kg)

Drawings are for reference only.

Contact factory for current version.



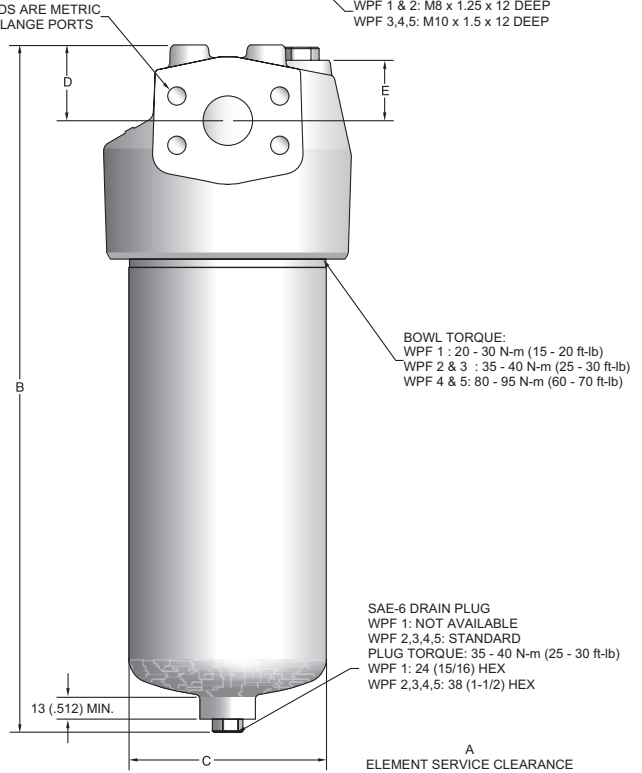
### T-Port



INDICATOR PORT IS AT 15° AS SHOWN ON ALL FILTERS EXCEPT WPF 1 WHICH IS AT 0°

SAE-8 INDICATOR PORT PLUGGED AS STANDARD TORQUE: 40 - 45 N-m (30 - 33 ft-lb)

MOUNTING HOLES (4 PLACES)  
WPF 1 & 2: M8 x 1.25 x 12 DEEP  
WPF 3,4,5: M10 x 1.5 x 12 DEEP



BOWL TORQUE:  
WPF 1 : 20 - 30 N-m (15 - 20 ft-lb)  
WPF 2 & 3 : 35 - 40 N-m (25 - 30 ft-lb)  
WPF 4 & 5: 80 - 95 N-m (60 - 70 ft-lb)

SAE-6 DRAIN PLUG  
WPF 1: NOT AVAILABLE  
WPF 2,3,4,5: STANDARD  
PLUG TORQUE: 35 - 40 N-m (25 - 30 ft-lb)  
WPF 1: 24 (15/16) HEX  
WPF 2,3,4,5: 38 (1-1/2) HEX

A  
ELEMENT SERVICE CLEARANCE

Flange Size	N: Thread & Depth	O	P	Q	R	S
3/4"	M10 x 1.5, 0.68"	.937"	.469"	2.000"	1.000"	.750"
1"	M12 x 1.75, 0.75"	1.093"	.546"	2.250"	1.125"	1.000"
1-1/4"	M14 x 2.0, 0.75"	1.250"	.625"	2.625"	1.312"	1.250"
1-1/2"	M16 x 2.0, 1.34"	1.437"	.719"	3.125"	1.563"	1.500"

### T-Port Dimensions (mm/inch)

Filter Model	A	B	C	D	E	F	G	H	I	J	K	L	M
WPF1	<u>70</u> 2.76	<u>180</u> 7.09	<u>69.5</u> 2.74	<u>23</u> .91	<u>15</u> .59	<u>27</u> 1.06	<u>60</u> 2.36	<u>30</u> 1.18	<u>90</u> 3.54	<u>92</u> 3.62	<u>46</u> 1.81	<u>30</u> 1.18	<u>15</u> .59
WPF2	<u>79</u> 3.11	<u>293</u> 11.53	<u>75</u> 2.95	<u>32</u> 1.26	<u>26</u> 1.02	<u>30</u> 1.18	<u>80</u> 3.15	<u>40</u> 1.57	<u>98</u> 3.86	<u>110</u> 4.33	<u>55</u> 2.17	<u>40</u> 1.57	<u>20</u> .78
WPF3	<u>88</u> 3.47	<u>345</u> 13.58	<u>93</u> 3.66	<u>40</u> 1.57	<u>29</u> 1.14	<u>35</u> 1.38	<u>90</u> 3.54	<u>55</u> 2.17	<u>120</u> 4.72	<u>126</u> 4.96	<u>63</u> 2.48	<u>45</u> 1.77	<u>27.5</u> 1.08
WPF4	<u>100</u> 3.94	<u>445</u> 17.52	<u>128</u> 5.04	<u>49</u> 1.93	<u>39</u> 1.54	<u>48</u> 1.89	<u>120</u> 4.72	<u>50</u> 1.97	<u>160</u> 6.3	<u>163</u> 6.42	<u>81.5</u> 3.21	<u>60</u> 2.36	<u>25</u> .98
WPF5	<u>100</u> 3.94	<u>561</u> 22.09	<u>128</u> 5.04	<u>61</u> 2.40	<u>51</u> 2.01	<u>48</u> 1.89	<u>140</u> 5.51	<u>80</u> 3.15	<u>160</u> 6.30	<u>183</u> 7.20	<u>91.5</u> 3.60	<u>70</u> 2.76	<u>40</u> 4.57

# WPF Series

## Specifications

### Maximum Allowable Operating Pressure (MAOP):

7000 psi (483 bar)

### Rated Fatigue Pressure:

6000 psi (414 bar)

### Design Safety Factor: 3:1

### Operating Temperatures:

-15°F (-26°C) to 250°F (135°C)

### Element Collapse Rating:

**Standard:** 300 psi (21 bar)

**High Collapse:** 2000 psi (138 bar)

### Materials:

Head: SG Iron

Bowl: Steel

Indicator: Brass with  
Plastic Connectors

### Weights:

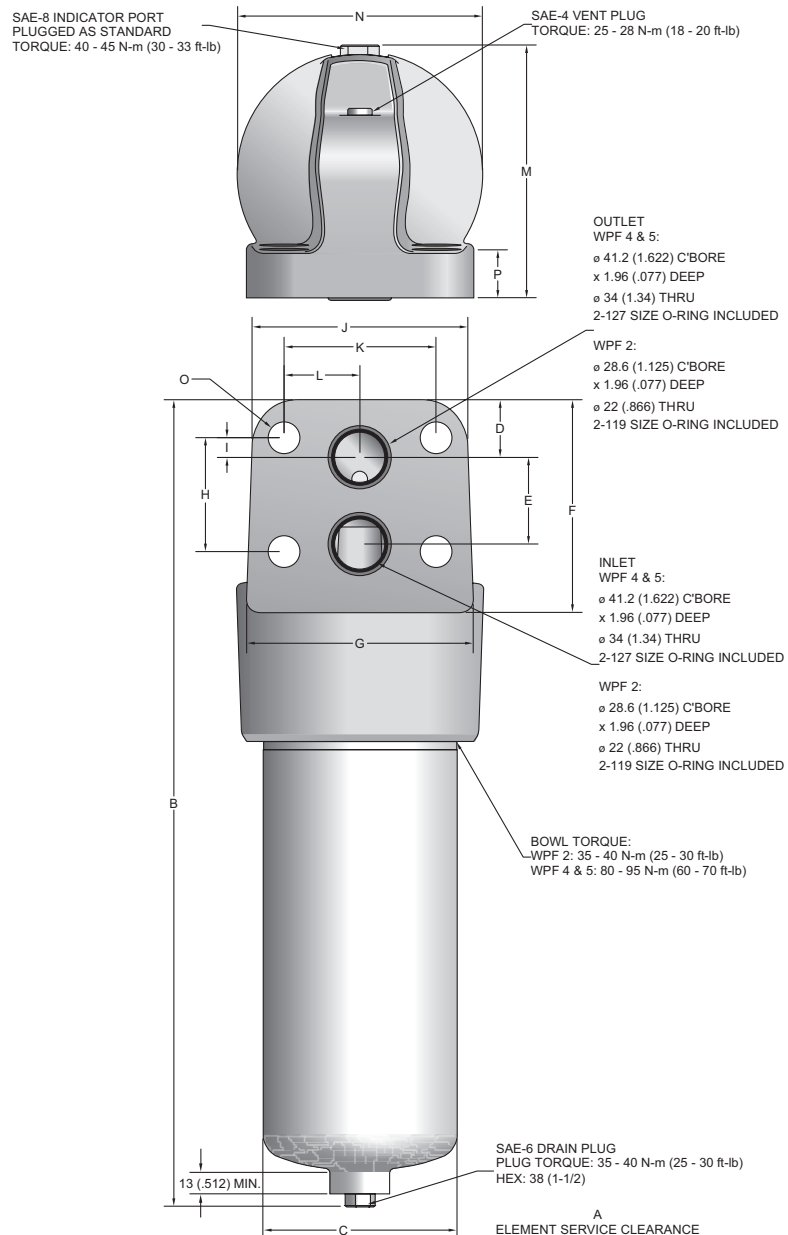
WPF2 18 lbs. (8.2 kg)

WPF4 63 lbs. (28.6 kg)

WPF5 70 lbs. (31.7 kg)

Drawings are for reference only.  
Contact factory for current version.

### Manifold

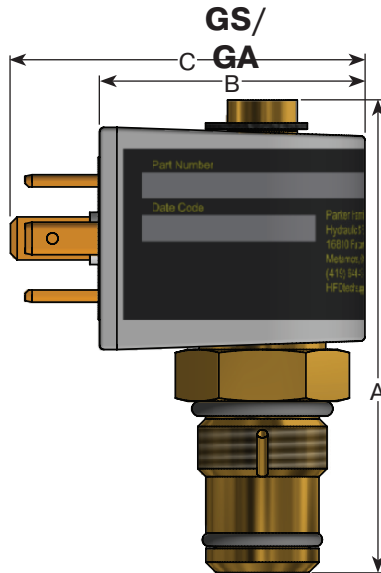


### Manifold Dimensions (mm/inch)

Filter Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
WPF2	<u>79</u> 3.11	<u>343</u> 13.50	<u>75</u> 2.95	<u>24</u> .94	<u>39</u> 1.53	<u>95</u> 3.74	<u>116</u> 4.57	<u>50</u> 1.97	<u>6</u> .24	<u>110</u> 4.33	<u>80</u> 3.15	<u>40</u> 1.57	<u>110</u> 4.33	<u>121</u> 4.76	<u>17</u> .67	<u>30</u> 1.18
WPF4	<u>100</u> 3.94	<u>532</u> 20.94	<u>128</u> 5.04	<u>38</u> 1.50	<u>57</u> 2.24	<u>140</u> 5.51	<u>150</u> 5.91	<u>75</u> 2.95	<u>13</u> .51	<u>142</u> 5.59	<u>100</u> 3.94	<u>50</u> 1.97	<u>166.5</u> 6.56	<u>161</u> 6.34	<u>21</u> .83	<u>31.7</u> 1.25
WPF5	<u>100</u> 3.94	<u>627</u> 24.69	<u>128</u> 5.04	<u>38</u> 1.50	<u>57</u> 2.24	<u>140</u> 5.51	<u>150</u> 5.91	<u>75</u> 2.95	<u>13</u> .51	<u>142</u> 5.59	<u>100</u> 3.94	<u>50</u> 1.97	<u>166.5</u> 6.56	<u>161</u> 6.34	<u>21</u> .83	<u>31.7</u> 1.25

# WPF Series

## Indicator Specifications



### GS

**Output:** Dry Contact Reed Switch

- Absolute maximum carry current 1 amp (AC/DC)
- Absolute maximum switching current 500 mA (AC/DC)
- Absolute maximum voltage 125 VAC/30 VDC

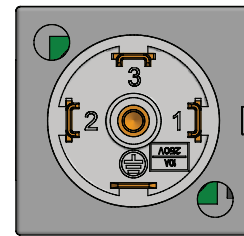
**Torque:** 30-35 ft lbs

### GA

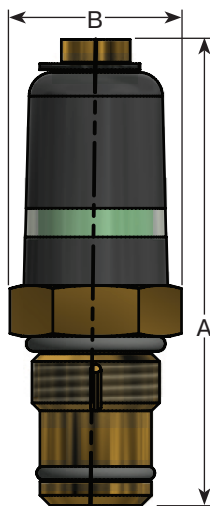
**Output:** Analog 4-20 mA

**Supply Voltage:** 10.0 VDC - 28 VDC (Clean and Filtered)

**Torque:** 30-35 ft lbs

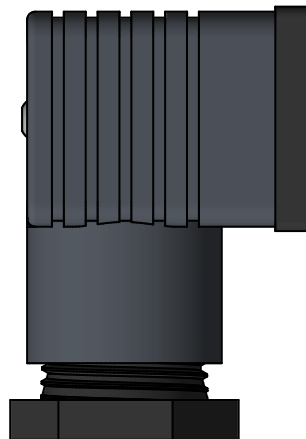


### M2



**Output:** Visual

### 947356



- DIN43650 standard socket
- For use with GS and GA

### 947355



- DIN43650 visual LED socket
- 12-35 VDC
- For use with GS

Option	Description	Connection/Power	Wiring	A	B	C
				inches/mm		
GS	Reed Switch	DIN 43650 3 Pole + Earth 500mA @ 30 VDC 500mA @ 125 VAC	Pin 1 - Common Pin 2 - Normally Open Pin 3 - Normally Closed Pin 4 - Not Connected	$\frac{2.74}{69.6}$	$\frac{1.54}{39.1}$	$\frac{2.06}{52.3}$
GA	4-20mA Analog	DIN 43650 3 Pole + Earth Supply Voltage: 10 VDC - 28 VDC Output: 4-20 mA	Pin 1 - Supply (10VDC - 28VDC) Pin 2 - Common (Circuit Ground) Pin 3 - 4-20mA Out Pin 4 - Not Connected	$\frac{2.74}{69.6}$	$\frac{1.54}{39.1}$	$\frac{2.06}{52.3}$
M2	Visual	N/A	N/A	$\frac{2.74}{69.6}$	$\frac{1.45}{36.8}$	N/A

# WPF Series

## Service & Maintenance Instructions

**1 Stop system power and vent captive pressure.**

**2 Drain filter assembly.**

**3 Remove bowl and element assembly.**

**4 Push down to squeeze tangs and lift element.**

**5 Twist to remove core.**

**6 Retain reusable core.**

**7 Discard used element.**

**8 Insert reusable core into new element until it snaps.**

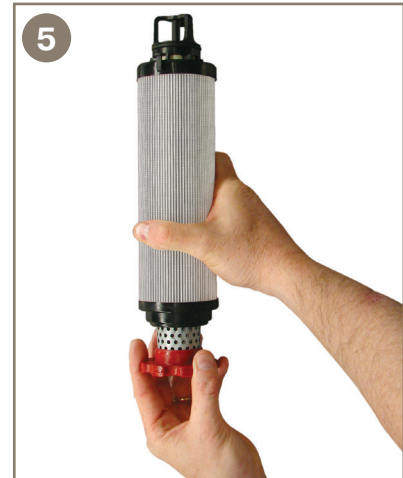
**9 Push element assembly into bowl, snap tangs.**

**10 Inspect o-ring and anti-extrusion ring.**

**11 Install bowl with new element.**

**12 Torque bowl, vent and drain plugs.**

**13 Power up and inspect.**

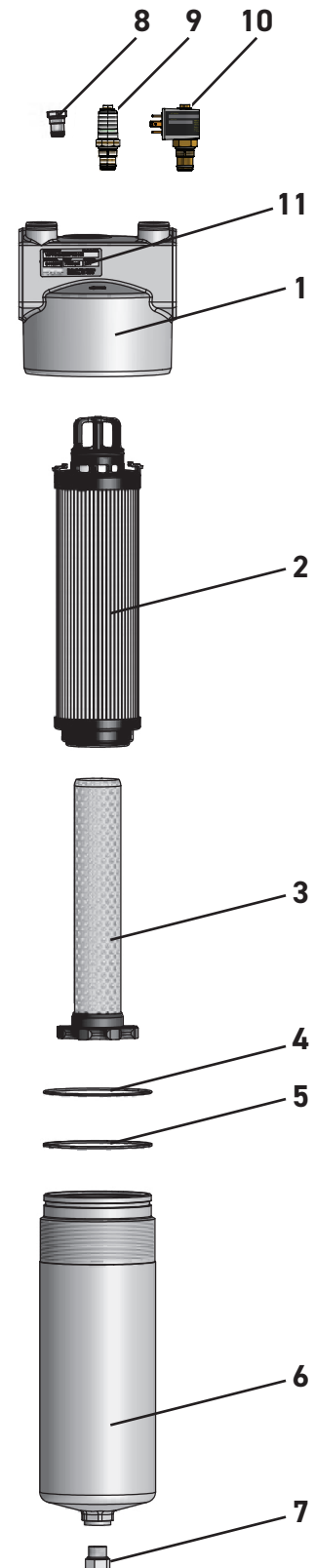


# WPF Series

## Parts List

### T-port

Index	Part Description	Part Number
1	WPF1 Head SAE-8	940986
	WPF2 Head 3/4" Flange	940989
	WPF2 Head SAE-12	940988
	WPF3 Head 1" Flange	940992
	WPF3 Head SAE-16	940991
	WPF4 Head 1-1/4" Flange	940923
	WPF4 Head SAE-20	940924
	WPF5 Head 1-1/2" Flange	940773
	WPF5 Head SAE-24	940921
2	Element See chart on How to Order page	
3	WPF1 Reusable Core	941175
	WPF2 Reusable Core	941176
	WPF3 Reusable Core	941177
	WPF4 Reusable Core	941178
	WPF5 Reusable Core	941179
4	WPF1 Bowl O-ring	V92141
	WPF2 Bowl O-ring	V92144
	WPF3 Seal Kit <sup>1</sup> FKM	947535
	WPF4 Bowl O-ring	V92157
	WPF5 Bowl O-ring	V92157
5	WPF1 Anti-extrusion Ring	941185
	WPF2 Anti-extrusion Ring	934798
	WPF4 Anti-extrusion Ring	941187
	WPF5 Anti-extrusion Ring	941187
6	WPF1 Bowl	942269
	WPF2 Bowl	942299
	WPF3 Bowl	945767
	WPF4 Bowl	941156
	WPF5 Bowl	941157
7	Drain Plug	934320
8	Indicator Plug	941172
9	50psi Visual Indicator	945661
9	50psi Visual Indicator EPR	947292
10 <sup>2</sup>	50psi Electrical Reed Switch Indicator	946201
10 <sup>2</sup>	50psi Electrical Reed Switch Indicator - EPR	947288
10 <sup>2</sup>	50psi Analog 4-20mA Indicator	946210
10 <sup>2</sup>	50psi Analog 4-20mA Indicator - EPR	947289
Not Shown <sup>2</sup>	Standard DIN 43650 Socket Kit	947356
Not Shown <sup>2,3</sup>	12-35VDC LED Visual DIN 43650 Socket	947355
11	Name Plate	920928
Not Shown	Drive Screw (2 required)	900028



1. 947536 includes o-ring and anti-extrusion ring.  
 2. Indicator and DIN43650 socket sold separately.  
 3. For use with 946201 and 947288.

# WPF Series

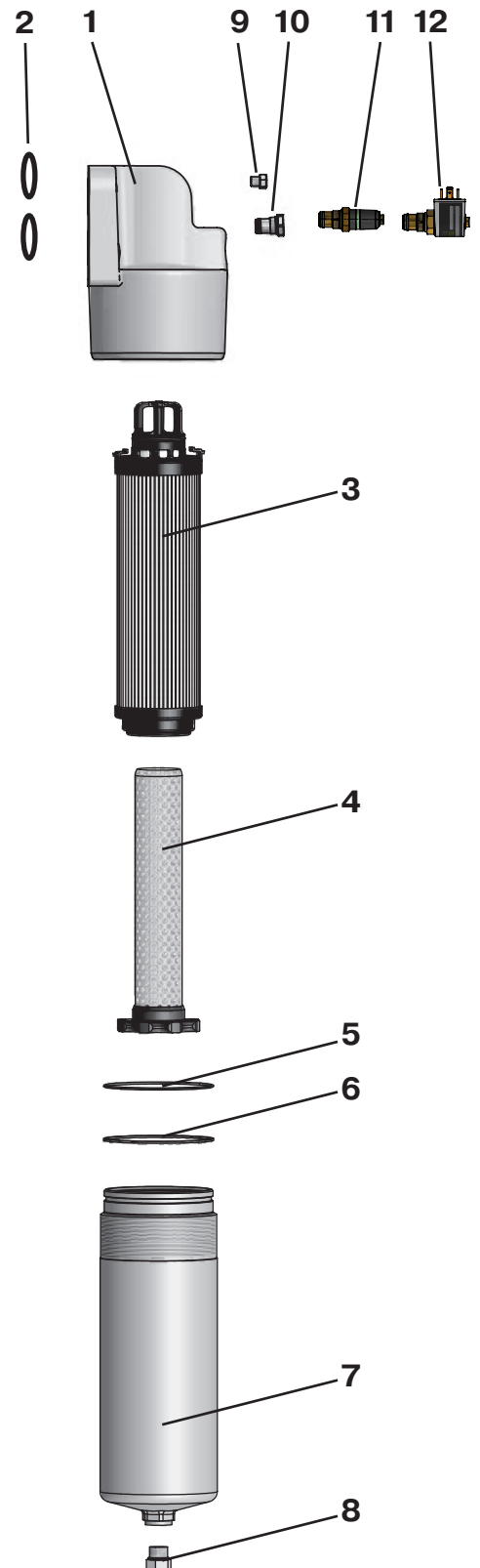
## Parts List

### Manifold

Index	Part Description	Part Number
1	WPF2 Manifold Mount Head	941273
	WPF4 Manifold Mount Head	940982
	WPF5 Manifold Mount Head	940982
2	WPF2 Manifold Mount O-rings (2 req'd)	V92119
	WPF4 Manifold Mount O-rings (2 req'd)	V92127
	WPF5 Manifold Mount O-rings (2 req'd)	V92127
3	Element See chart on page 153	
4	WPF2 Reusable Core	941176
	WPF4 Reusable Core	941178
	WPF5 Reusable Core	941179
5	WPF2 Bowl O-ring	V92144
	WPF4 Bowl O-ring	V92157
	WPF5 Bowl O-ring	V92157
6	WPF2 Anti-extrusion Ring	934798
	WPF4 Anti-extrusion Ring	941187
	WPF5 Anti-extrusion Ring	941187
7	WPF2 Bowl	942299
	WPF4 Bowl	941156
	WPF5 Bowl	941157
8	Drain Plug	934320
9	Vent Plug	928882
10	WPF Indicator Plug	941172
11	50psi Visual Indicator	945661
11	50psi Visual Indicator EPR	947292
12 <sup>1</sup>	50psi Electrical Reed Switch Indicator	946201
12 <sup>1</sup>	50psi Electrical Reed Switch Indicator - EPR	947288
12 <sup>1</sup>	50psi Analog 4-20mA Indicator	946210
12 <sup>1</sup>	50psi Analog 4-20mA Indicator - EPR	947289
Not Shown <sup>1</sup>	Standard DIN 43650 Socket Kit	947356
Not Shown <sup>1,2</sup>	12-35VDC LED Visual DIN 43650 Socket	947355
Not Shown	Name Plate	920928
Not Shown	Drive Screw (2 required)	900028

1. Indicator and DIN43650 socket sold separately.

2. For use with 946201 and 947288.



# WPF Series<sup>1</sup>

## High Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
WPF	2	10QE	V	M2	K	S12	1

BOX 1: Filter Series	
Symbol	Description
WPF	High Pressure Filter

BOX 2: Element Length	
Symbol	Description
1	1/2" Nominal ports
2	3/4" Nominal ports
3	1" Nominal ports
4	1 1/4" Nominal ports
5	1 1/2" Nominal ports

BOX 3: Media Code	
Symbol	Description
<b>Standard Element (bypass only)</b>	
02QE	Microglass, 2 micron
05QE	Microglass, 5 micron
10QE	Microglass, 10 micron
<b>High Collapse (no-bypass only)</b>	
02QH	Microglass, 2 micron
10QH	Microglass, 10 micron

BOX 4: Seal Material	
Symbol	Description
B	Nitrile
E	Ethylene Propylene
V	Fluorocarbon

BOX 5: Indicator <sup>2</sup>	
Symbol	Description
P	Plugged indicator port
M2	50psi Visual
GS <sup>2</sup>	50psi Electrical Reed Switch with DIN 43650 socket
GA	50psi Analog 4-20mA with DIN 43650 socket

BOX 6: Bypass	
Symbol	Description
K	50 psid (3.5 bar)
X <sup>3</sup>	No bypass & No indicator (port plugged)

BOX 7: Ports	
Symbol	Description
<b>WPF1</b>	
S08	SAE-8
<b>WPF2</b>	
S12	SAE-12
Y12	3/4" SAE code 62 flange face
X12	Manifold
<b>WPF3</b>	
S16	SAE-16
Y16	1" SAE code 62 flange face
<b>WPF4</b>	
S20	SAE-20
Y20	1 1/4" SAE code 62 flange face
X20	Manifold
<b>WPF5</b>	
S24	SAE-24
Y24	1 1/2" SAE code 62 flange face
X24	Manifold

Notes:

1. The filter includes the element you select already installed.
2. When an indicator is selected, the indicator port is plugged and the indicator is shipped as a loose part.
3. When the no bypass option is selected, a high collapse element must also be selected.

BOX 8: Options	
Symbol	Description
1	Bypass (standard element only)
2 <sup>3</sup>	No bypass (high collapse element only)

### Replacement Elements

	Media	WPF1	WPF2	WPF3	WPF4	WPF5
Standard Collapse 300 psid (21 bar)	Microglass, 02QE	941029Q	941032Q	941035Q	941038Q	941041Q
	Microglass, 05QE	941030Q	941033Q	941036Q	941039Q	941042Q
	Microglass, 10QE	941031Q	941034Q	941037Q	941040Q	941043Q
High Collapse 2000 psid (138 bar)	Microglass, 02QH	941044Q	941046Q	941048Q	941050Q	941052Q
	Microglass, 10QH	941045Q	941047Q	941049Q	941051Q	941053Q



Hydraulic & Fuel Filtration Division  
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Last updated August 4th, 2023



# 12S Series

High Pressure Filters



ENGINEERING YOUR SUCCESS.

# 12S Series

## Applications

- **Offshore – High pressure and aggressive environment**
- **DI Water – Water fogging**
- **Food Processing – Caustic washdown (poultry, etc.)**
- **Test Stands – High pressure**



## Specifications

### Pressure Ratings:

Maximum Allowable  
Operating Pressure  
(MAOP): 10,000 psi (690 bar)  
Proof: 15,000 psi (1035 bar)

### Operating Temperatures:

Fluorocarbon (FKM)  
-15°F(-26°C) - 275°F(135°C)  
Ethylene Propylene (EPR)  
-40°F(-40°C) - 225°F(107°C)

### Element Collapsing Rate:

High Collapse "H" option:  
2,000 psi (138 bar)

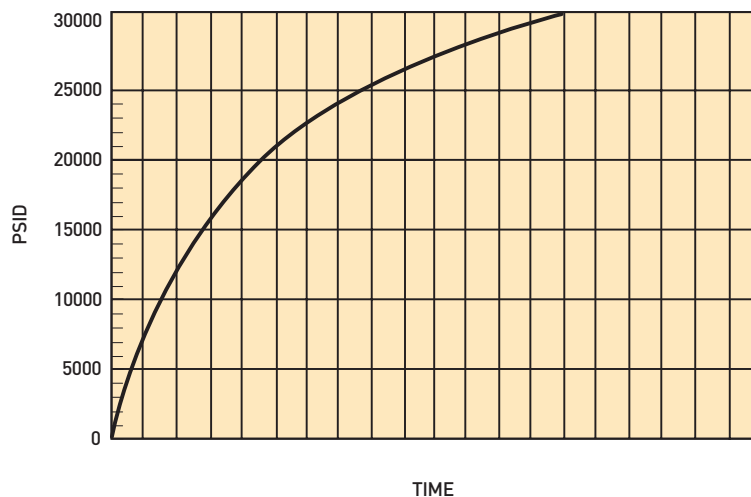
### Materials:

Head: Stainless Steel 316L  
Bowl: Stainless Steel 316L

### Weight (approximate):

**Single Length**  
14 lbs. (6.35 kg.)  
**Double Length**  
17 lbs. (7.71 kg.)

**BURST TEST**  
PROOF TEST ON FILTER HOUSING

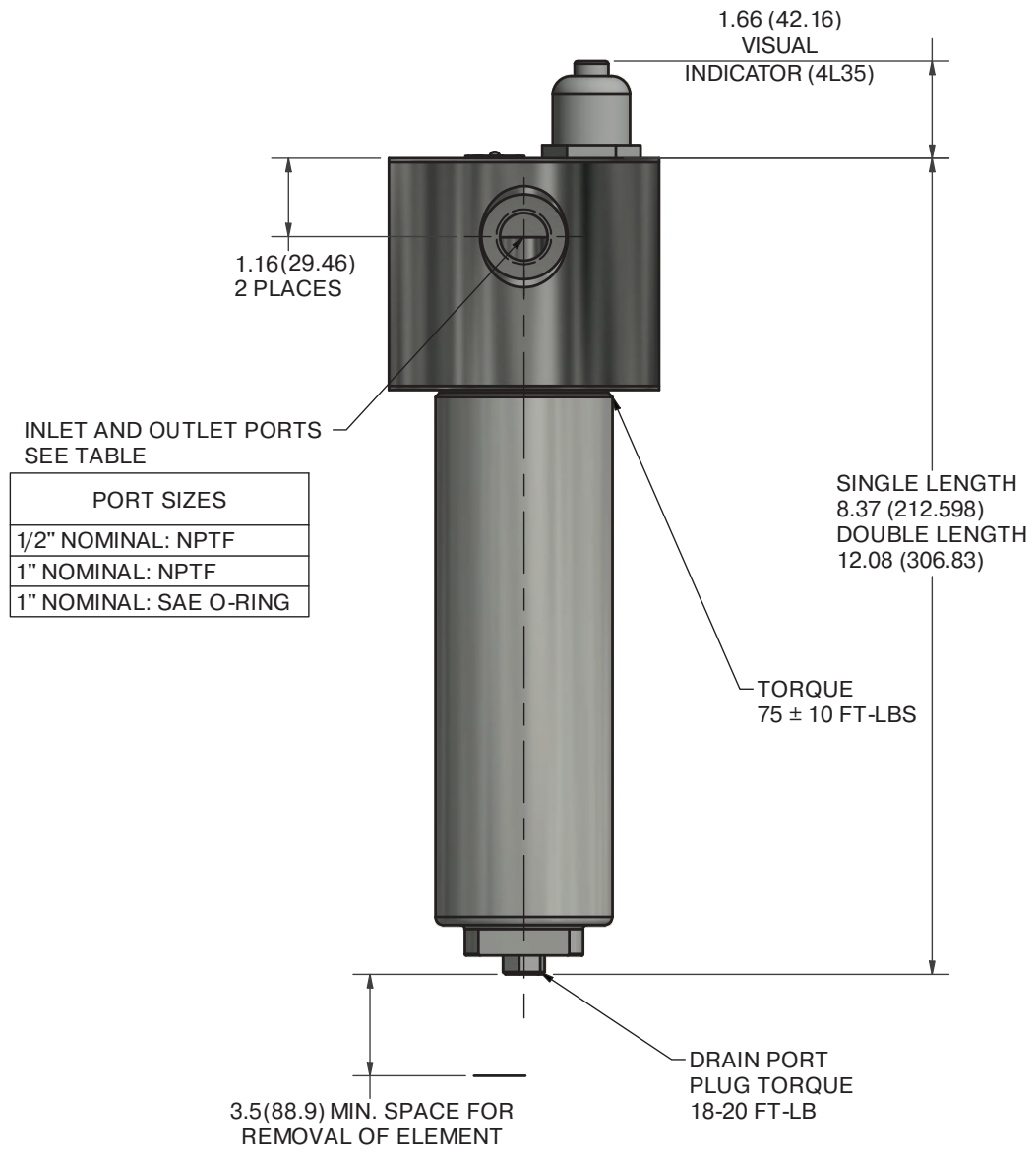
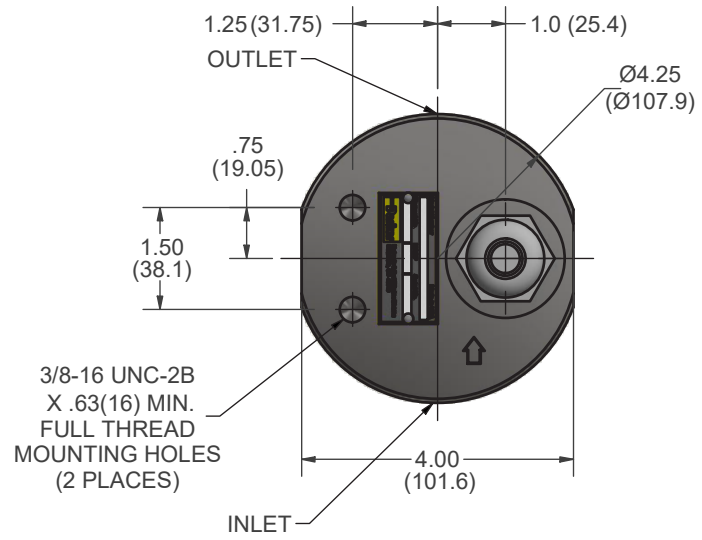


Feature	Advantage	Benefit
Lightweight	Ease of service and installation	Reduced installation cost
Porting	Flexibility	Reduction in piping and use of adaptors
Multipass tested elements (per ANSI/NFPA T3.10.8.8 R1-1990)	Filter performance backed by recognized and accepted laboratory test standards	Filters you select have known performance levels
Drain port	Drain all oil from assembly prior to servicing	Eliminates cross contamination
High strength Microglass elements	2000 psid collapse strength Multi-layer media Wire reinforced pleats	High capacity with high efficiency No performance loss from pleat bunching
100% pressure tested	Quality	Reliability

# 12S Series

## Specifications

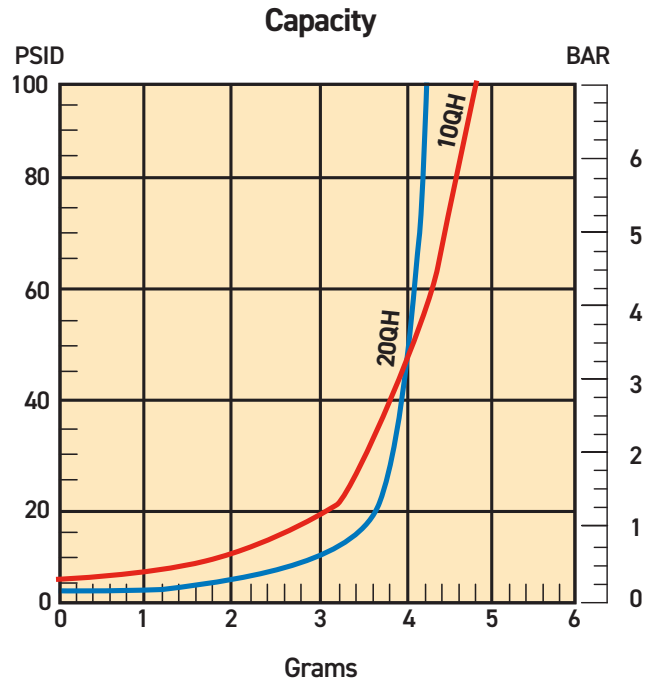
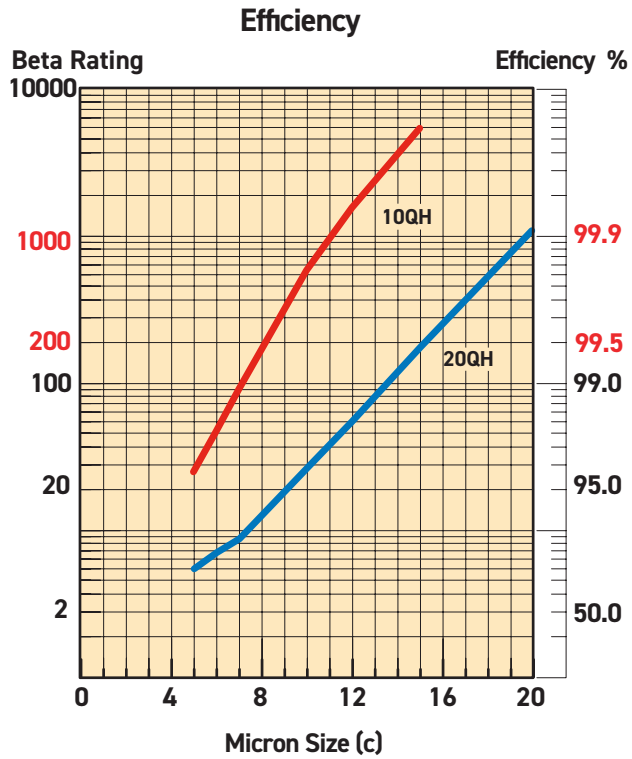
### Dimensions in (mm)



Drawings are for reference only.  
Contact factory for current version.

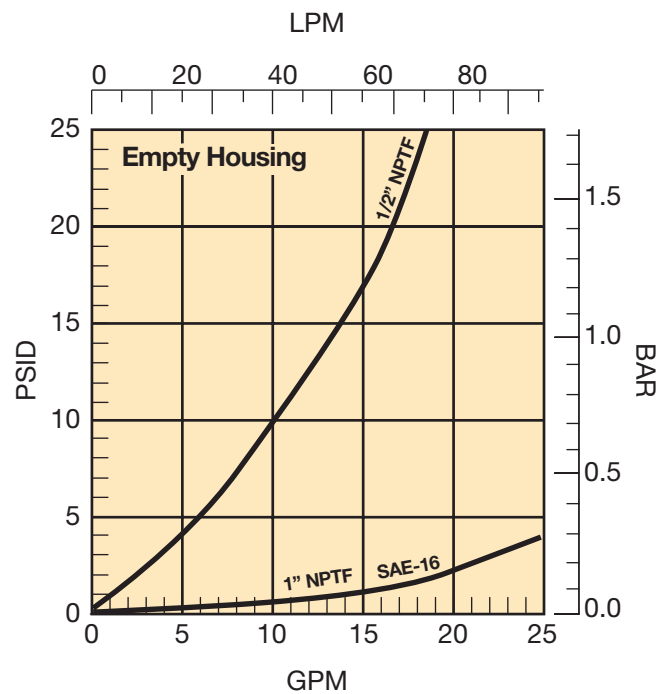
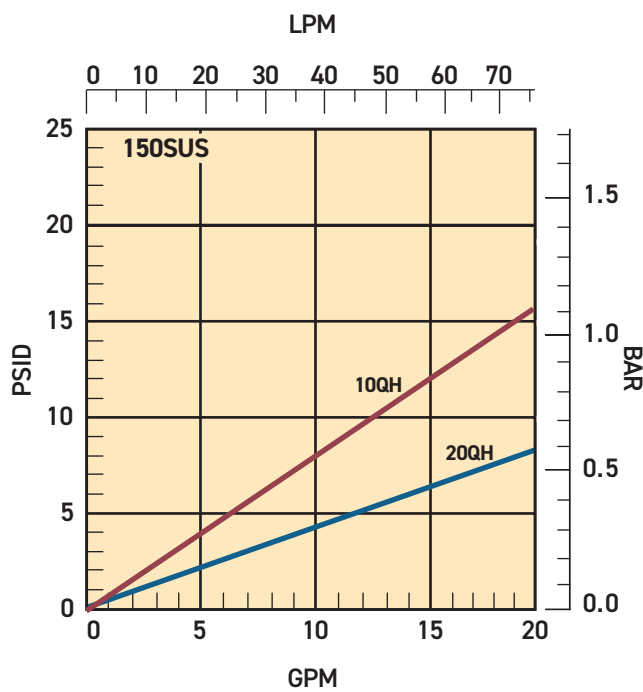
# 12S Series

## 12S-1 Element Performance



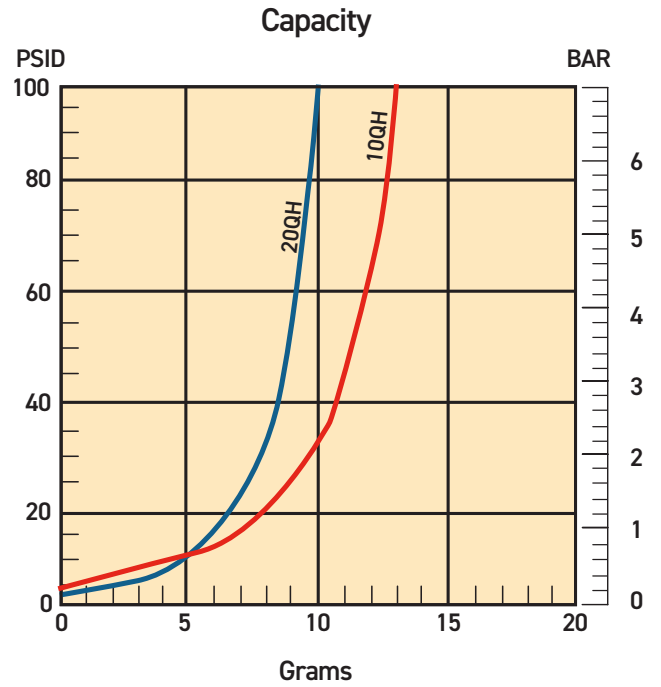
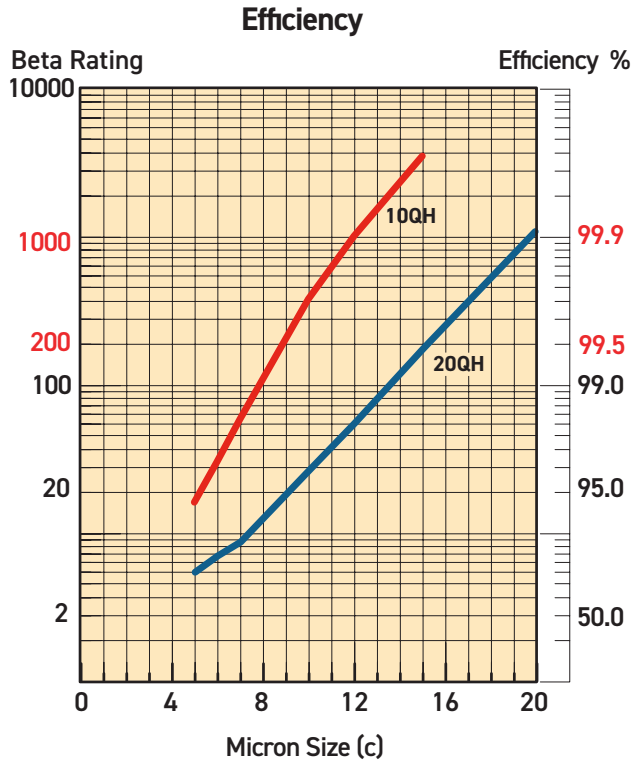
Multipass tests run @ 10 gpm to 100 psid terminal - 5mg/L BUGL

### Flow vs. Pressure Loss



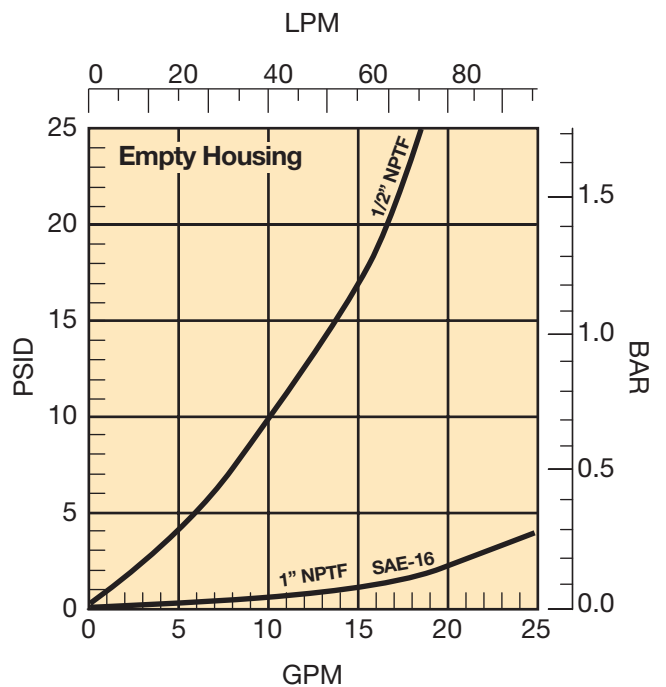
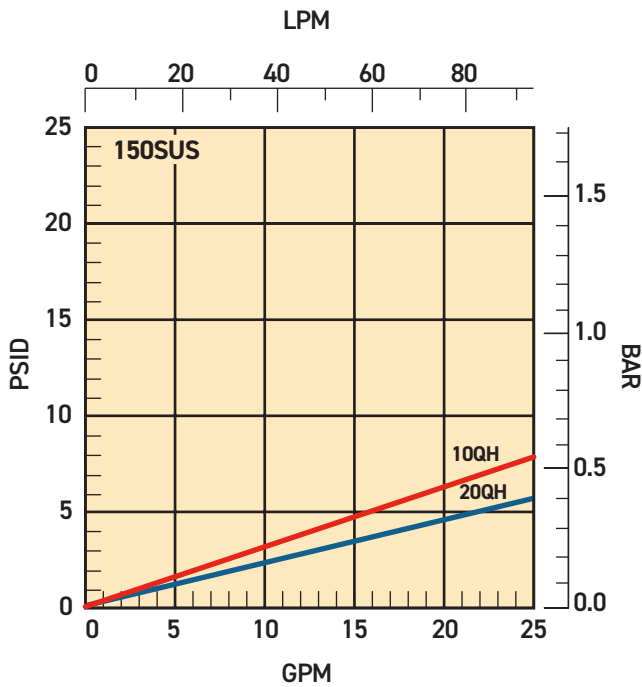
# 12S Series

## 12S-2 Element Performance



Multipass tests run @ 15 gpm to 100 psid terminal - 5mg/L BUGL

### Flow vs. Pressure Loss



# 12S Series

## Parts List

Ref.	Part Number	Description
1	403411	Head, ½" NPT no indicator port
	403499	Head, ½" NPTF w/ indicator port
	937016	Head, 1" NPTF w/ indicator port
	937465	Head, SAE-16 w/ indicator port
	937512	Head, 1" NPTF no indicator port
	943392	Head, SAE-16 no indicator port
2	403409	Bowl - Double
	403410	Bowl - Single
3	929007	Drain Plug - SAE-4 w/O-Ring (Fluorocarbon)
	930130	Drain Plug - SAE-4 w/O-Ring (Ethylene Propylene)
4	V93904	Drain Plug O-Ring - (Fluorocarbon)
	E83904	Drain Plug O-Ring - (Ethylene Propylene)
5	V92138	Bowl O-Ring - (Fluorocarbon)
	E82138	Bowl O-Ring - (Ethylene Propylene)
6	V93908	Indicator Plug O-Ring - (Fluorocarbon)
	E83908	Indicator Plug O-Ring - (Ethylene Propylene)
7	V72014	Indicator Plug O-Ring - (Fluorocarbon)
	E82014	Indicator Plug O-Ring - (Ethylene Propylene)
8	4L35-1SH	50 PSID Visual Indicator - (Fluorocarbon)
	4L35-1SB	50 PSID Visual Indicator - (Ethylene Propylene)
9	Element	See Replacement Elements Table



Drawings are for reference only.  
Contact factory for current version.

# 12S Series<sup>1</sup>

## High Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code.

Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
12SMP	1	20QH	V	4L35	N	8	21

BOX 1: Filter Series	
Symbol	Description
12SMP	10,000 psi MAOP (316 SS)

BOX 2: Element Length	
Symbol	Description
1	Single
2	Double

BOX 3: Media Code <sup>2,3</sup>	
Symbol	Description
10QH	Microglass, 10 micron
20QH	Microglass, 20 micron

BOX 4: Seal Material	
Symbol	Description
V	Fluorocarbon
E <sup>4</sup>	Ethylene Propylene

BOX 5: Indicator	
Symbol	Description
N	No indicator, no pressure port
4L35	Visual manual reset, 50 psid

BOX 6: Ports <sup>3</sup>	
Symbol	Description
S <sup>5</sup>	SAE O-ring
N	NPTF

BOX 7: Port Size	
Symbol	Description (Port Type)
8	1/2" nominal (N)
16	1" nominal (S, N)

BOX 8: Options	
Symbol	Description
21	No bypass w/ 1/4" SAE-4 drain port

#### Notes:

- Filters include the element you select already installed.
- Element collapse rating is 2000 psid.
- For other options contact the division.
- Recommended for DI water applications.
- 6,000 psi MAOP

### Replacement Elements<sup>3</sup>

	Media	Microglass (Fluorocarbon)		Microglass (Ethylene Propylene)	
		Single	Double	Single	Double
No-bypass	10QH	403399	403403	403484	403487
	20QH	403400	403404	403485	403488



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Last updated January, 2024

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# 40S Series

Stainless Steel High Pressure Filter



ENGINEERING YOUR SUCCESS.

# 40S Series

Parker's comprehensive asset health management approach extends well beyond traditional methods and brings focus to long term system performance and reliability.

The 40S Series is another example of this approach, a high pressure filter constructed in all 316 stainless steel which makes it ideally suited for water and caustic applications or where harsh environmental conditions exist. The filter offers allowable operating pressure of 3000 PSI/138 Bar and capable of flows up to 150 GPM/570 LPM depending on viscosity.

## Typical Markets-Applications

- **Mining Dust Control - Water Spray**
- **Oil & Gas Offshore BOP Fluids**
- **Power Gen Wet Compression**
- **Marine Hydraulic Power Unit**
- **Food & Beverage Caustic Wash Down**
- **Pulp & Paper Caustic Environment**

## Features

- Bowl-up configuration for ease of element maintenance
- 316 stainless steel construction
- Large porting for increase flow capacity
- Stainless steel visual and electrical indicator options
- Integral mounting holes for installation flexibility
- High fatigue pressure rating for demanding applications
- High efficient microglass elements standard

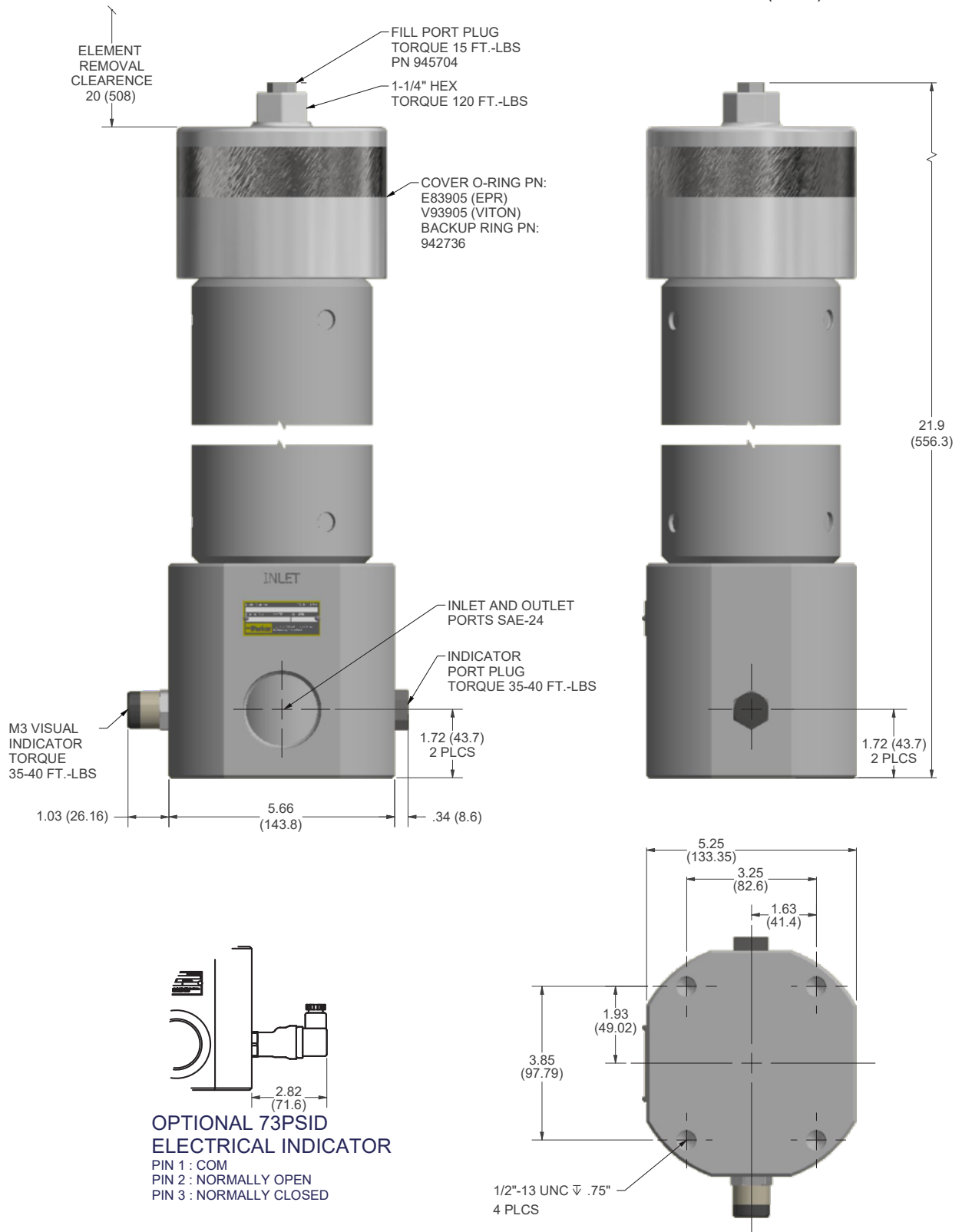


# 40S Series

## Specifications

## Dimensions

in. (mm)



# 40S Series

## Specifications

### Pressure Ratings:

Maximum Allowable Operating Pressure (MAOP): 3,000 psi (206 bar)

**Rated Fatigue Pressure:** 3,000 psi (206 bar)

**Design Safety Factor:** 3:1

### Operating Temperatures:

EPR: -40°F (-40°C) to 225°F (107°C)

Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

### Element Collapse Rating:

High Collapse: 2,000 psi (138 bar)

### Element Materials:

End Caps: 316 Stainless Steel

Core: 316 Stainless Steel

### Housing Materials:

Head: 316 Stainless Steel

Bowl: 316 Stainless Steel

Cover: 316 Stainless Steel

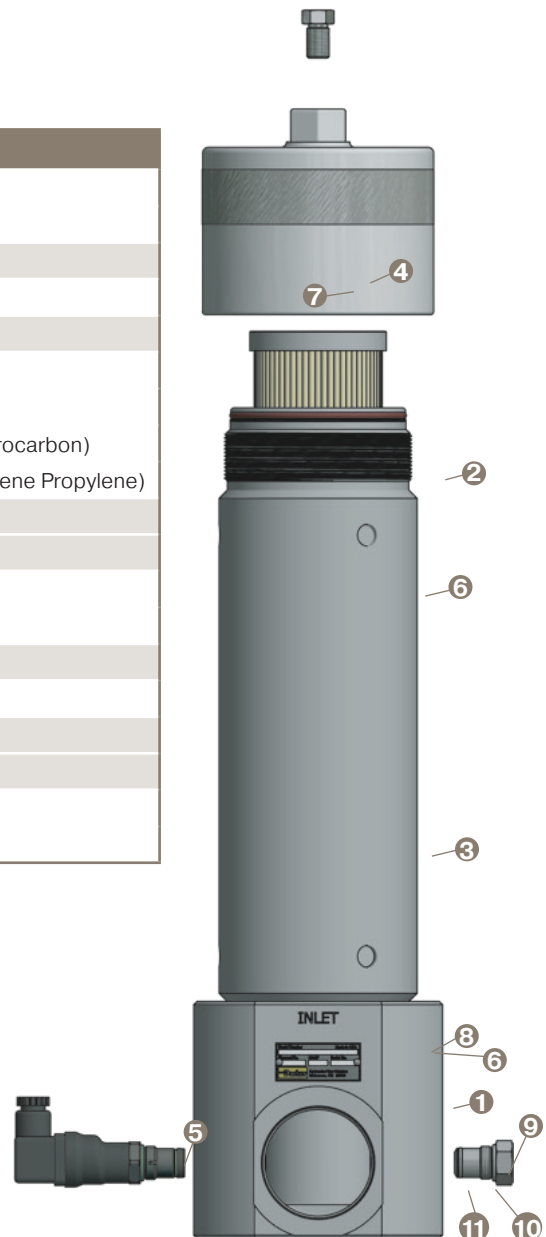
Indicator: 300 Series Stainless Steel with Thermoplastic connectors

**Weight (approximate): 65 lbs (29.5 kg)**

## Parts List

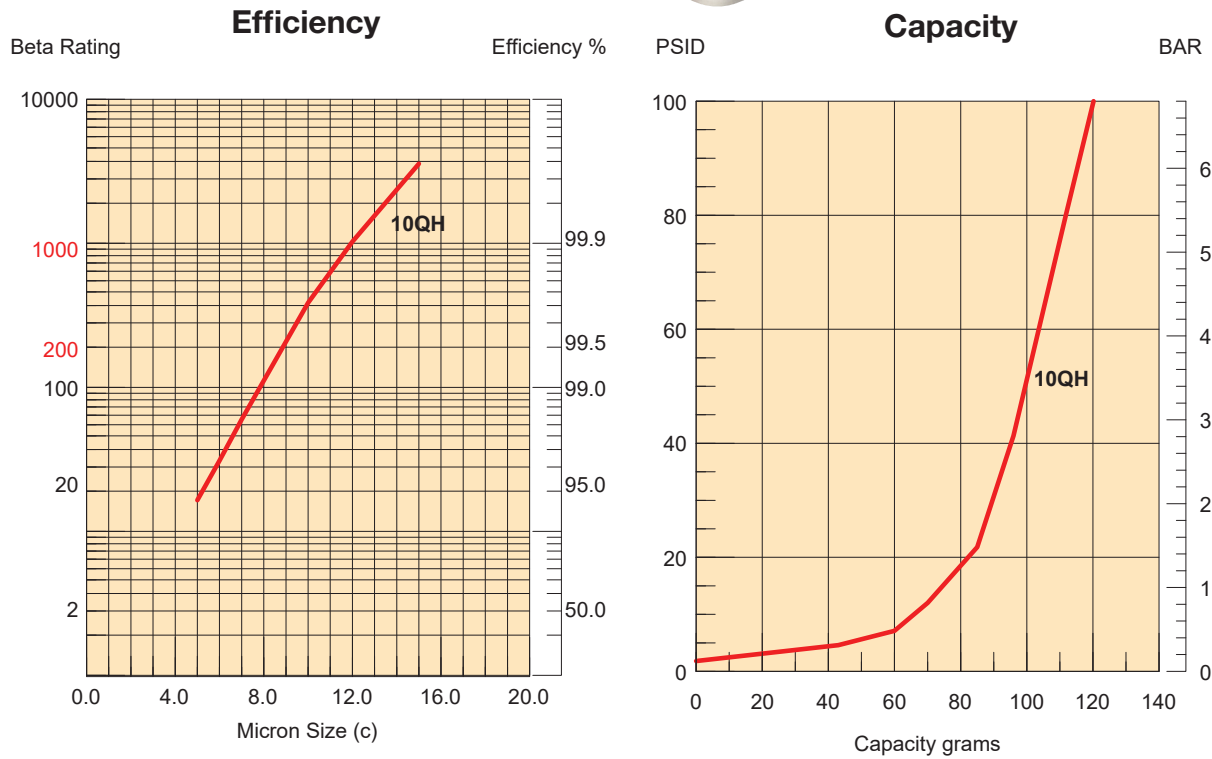
Ref.	Part Number	Description
1	945924	Head, SAE-24
	945684	Head, 2" NPTF (2" - 11 1/2)
2	945667	Cover
3	945666	Bowl
4	945704	Fill Port Plug (no O-ring)
5	DPIM3MVS08RX1	Visual 73psi (5bar) (Fluorocarbon)
	DPIM3MES08RX1	Visual 73psi (5bar) (Ethylene Propylene)
	FMUT1MVRS08	Electrical 73psi (5bar) IP65 DIN 43650 (Fluorocarbon)
	FMUT1MERS08	Electrical 73psi (5bar) IP65 DIN 43650 (Ethylene Propylene)
6	E82240	Bowl O-Ring (Ethylene Propylene)
	V92240	Bowl O-Ring (Fluorocarbon)
7	E83905	SAE-5 Fill port O-Ring (Ethylene Propylene)
	V93905	SAE-5 Fill port O-Ring (Fluorocarbon)
8	942736	Back up ring
9	942508	Indicator Plug
10	V93908	Indicator Plug O-ring (Fluorocarbon)
	E83908	Indicator Plug O-ring (Ethylene Propylene)
11	V93906	Indicator Plug O-ring (Fluorocarbon)
	E83906	Indicator Plug O-ring (Ethylene Propylene)

Drawings are for reference only.  
Contact factory for current version.



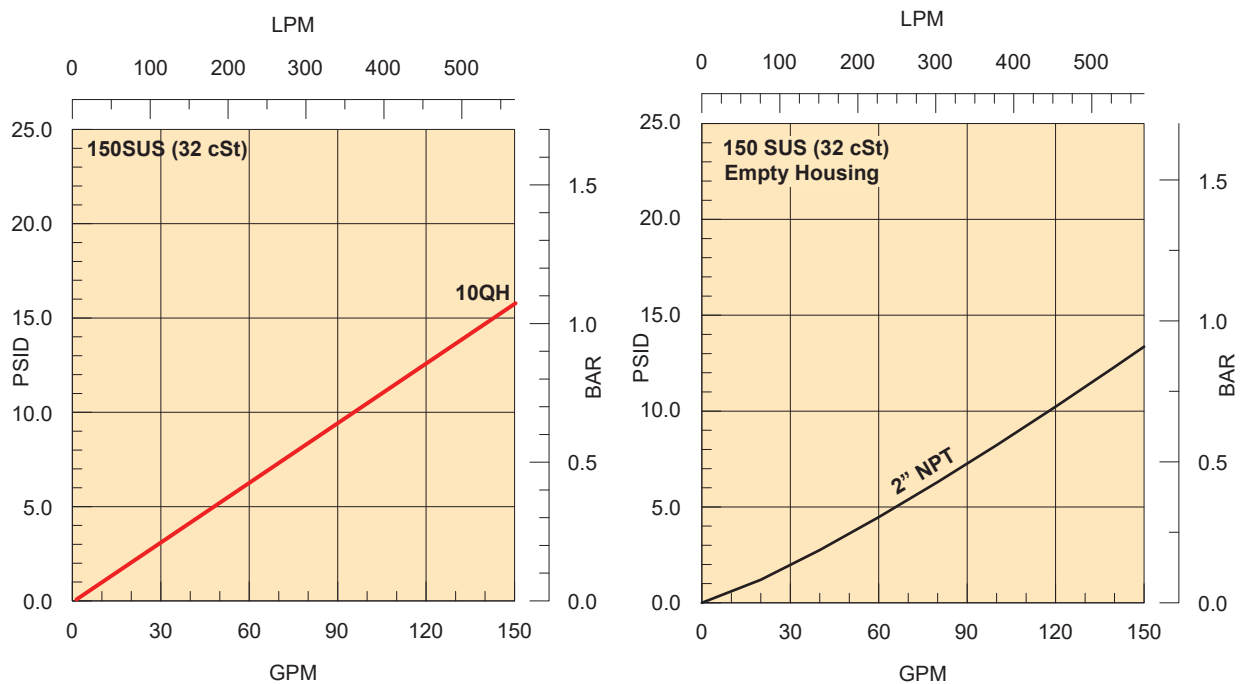
# 40S Series

## Element Performance



Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 100 psid terminal - 10 mg/L BUGL

### Flow vs Pressure Loss



# 40S Series<sup>1</sup>

## Stainless Steel High Pressure Filters

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
40S	2	10QH	E	M3	X	S24	2

BOX 1: Filter Series	
Symbol	Description
40S	High Pressure Filter, 100 gpm nominal

BOX 4: Seal Material	
Symbol	Description
V	Fluorocarbon (FKM)
E <sup>4</sup>	Ethylene Propylene (EPR)

BOX 7: Ports	
Symbol	Description
S24	SAE-24 (1 <sup>7</sup> / <sub>8</sub> " - 12 UN-2B)
N32	2" NPTF (2" - 11 1/2)

BOX 2: Element Length	
Symbol	Description
2	Double

BOX 5: Indicator <sup>5</sup>	
Symbol	Description
M3	Visual
T1	Electrical IP65 DIN 43650

BOX 8: Options	
Symbol	Description
2	No Bypass

BOX 3: Media Code <sup>2, 3</sup>	
Symbol	Description
10QH	Microglass, 10 micron, high collapse

BOX 6: Bypass	
Symbol	Description
X	No bypass

#### Notes:

1. The filter includes the element you select already installed.
2. 2,000 psid collapse.
3. For other options contact the division.
4. Recommended for DI Water applications.
5. Both indicators are 73 psid (5 bar)

### Replacement Elements

	Media	Fluorocarbon	Ethylene Propylene
		Part Number	Part Number
<b>No Bypass</b>	10QH	945776Q	945777Q



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Last updated January, 2024

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# Portable Fluid Conditioning Cart

Models 5PFCC & 10PFCC



ENGINEERING YOUR SUCCESS.

# Portable Fluid Conditioning Cart

## Applications

- Filtering new fluid before putting into service
- Transferring fluid from drums or storage tanks to system reservoirs
- Conditioning fluid that is already in use
- Complimenting existing system filtration
- Removing free and emulsified water from a system
- For use with fluids such as hydraulic, gear and lube oils

Parker portable filter carts are the ideal way to prefilter and transfer fluids into reservoirs or to clean up existing systems.

Fluid should always be filtered before being put into use. New fluid is not necessarily clean fluid. Most new fluids (right out of the drum) are unfit for use due to high initial contamination levels. Contamination, both particulate and water, may be added to a new fluid during processing, mixing, handling and storage.

Water is removed by installing Par-Gel™ elements in the outlet filter. Par-Gel™ elements are made from a polymer which has a very high affinity for free water.

Once water comes into contact with this material, it is removed from the system.

The Parker portable filter cart uses two high capacity ModuFlow™ Plus filters for long element life and better system protection. The first stage (inlet) filter captures larger particles, while the second stage (outlet) filter captures finer particles or removes water. A rugged industrial quality gear pump gets the job done fast.

Using a Parker portable filter cart is the most economical way to protect your system from the harm that can be caused by contamination.

Features	Advantages	Benefits
In-series filtration	Capable of multi-staged filtration Ability to remove free water and particulate in the same pass	Can extend the service life, reduce maintenance hours in servicing the filtration systems and equipment, and remove contaminant and water out of a system in a single pass across the elements
Wide variety of particulate elements available	Capable of getting a fluid to a desired cleanliness level	Extends fluid life and system performance
Heavy duty frame	Rugged and durable	Built to last
Lightweight and Portable	Easy to move from place-to-place	One person operation
Two flow rates available: 5 GPM or 10 GPM	Motor is now 1 HP, enabling use in lower or higher viscosity applications	Matched to your needs
Eleven-foot hose and wand assemblies included	Additional hardware not necessary	Ready to use as received
Narrow design	Better maneuverability	Exceptional movement through tight spaces, narrow aisles, and smaller overall footprint
Ergonomic frame design	Improved handle height and center of gravity for most average users	Decreased force needed for tipping into moving position, improved handle height for comfort and decreased strain on neck, back, and shoulders
10 inch wheels	Larger 10 inch wheels	Increased mobility and handling in various terrains
Removable drip tray	Drip tray now removable	Ability to easily dispose of any excess oil in drip pan by disconnecting it from the frame
Filter pump strainer	Protection of pump from large contaminant	The addition of a filter pump strainer provides protection from large contaminants allowing both filters to be used in series after the pump
IcountPD	Capable of polishing a systems hydraulic fluid to a specific ISO cleanliness code	Ensure fluid entering system meets or exceeds specific component recommended ISO codes, guaranteeing longer service life and reduced maintenance of system

# Portable Fluid Conditioning Cart

## Features



### icountPD (Intelli-Cart™ option)

- Allows for real time monitoring of fluid ISO code cleanliness while running
- Early warning digital display indicators for low, medium and high contamination levels
- Moisture % RH LED indicator

### Gear pump

- Available in both 5 gpm and 10 gpm sizes
- Industrial quality with a long life and quiet operation

### Inlet suction strainer

- Protects the gear pump from large contamination
- Allows the main double length filters to be used in series after the pump

### 110V/220VAC motor

- Standard 1 HP industrial brand name motor for both 5 gpm and 10 gpm models
- Allows for use in both higher and lower viscosity applications

### Kick stand bar

- Ergonomic & weight Balanced design easy to move and stand

### Hose & wand assembly

- Ready to use; no additional hardware needed
- Parker EZ form hoses provide extreme flexibility for easy use and eliminates kinks

### Service cover

- Allows for easy top access for changing filter elements

### Visual indicator

- Know from just a glance when to change the filter element
- Helps prevent bypass condition
- 35 psid 3-band

### Dual - In Series Filters

- Two stage filtration provides flexibility to combine particulate and water removal on the same pass
- Extends service life and reduces maintenance/ servicing hours
- In series filtration provides ultra clean level of fluid cleanliness

### Heavy Duty frame

- Built to last even with rugged use
- Ergonomic design for easy maneuverability

### Removable Drip tray

- Helps keep the work area safe and clean
- Allows for an easy clean up by removing the tray to dispose of any excess oil properly

### Elements (not shown)

- Available for both particulate in 02Q, 05Q, 10Q, 20Q and WR (Water Removal) for main stage filters
- Standard Filter Cart is equipped with 149W woven wire strainer element and Intelli-Cart is equipped with 74W woven wire strainer element



# Portable Fluid Conditioning Cart

## Features

### Maximum Recommended Fluid Viscosity:

5PFCC – 5 GPM pump  
3500 SUS (755cSt)

10PFCC – 10 GPM pump  
1000 SUS (215 cSt)

*For optimum particle detector performance results when monitoring contamination levels, fluid viscosity range should be 50 - 250 SUS.*

### Visual Indicator (outlet filter):

Visual differential type  
3-band (clean, change, bypass)

### Filter Bypass Valve Settings (Integral to Element):

Element 1 – 35 psid (2.4 bar)  
Element 2 – 35 psid (2.4 bar)

### Operating Temperature:

Seal option "B" (standard)  
-40°F to +150°F (-40°C to +66°C)

### Electrical Service Required:

110/220 volts, 60 Hz  
Single phase, 10/5.5 amps

### Electrical Motor:

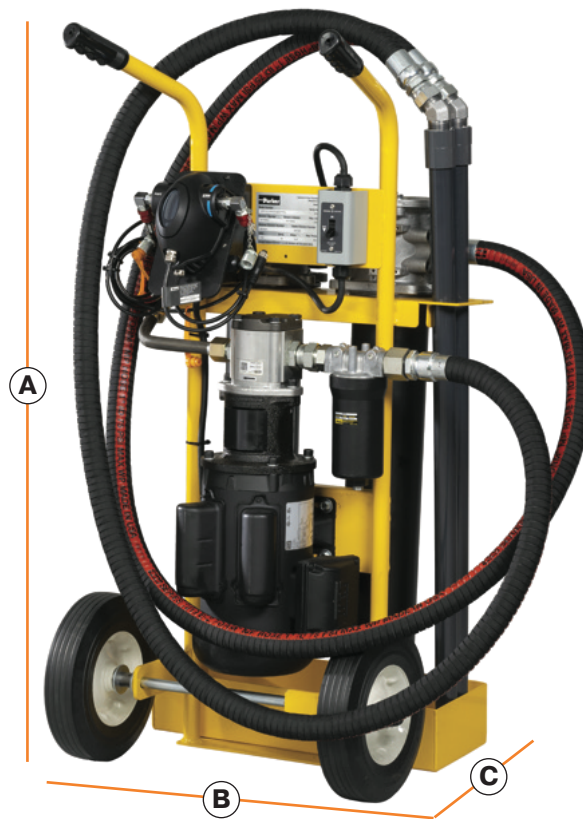
1 hp @ 1745 rpm  
open, drip proof

### Construction:

Cart frame – Steel  
Filter head – Aluminum  
Filter bowl – Steel  
Hoses – Parker EZ form Buna  
Wands – PVC

### Weight:

145 lbs (65.77 kg)



A - Height: 43 in (1092 mm)  
B - Width: 21 in (536 mm)  
C - Depth: 19 in (472 mm)

## Typical Fluid Cleanliness Level Requirements

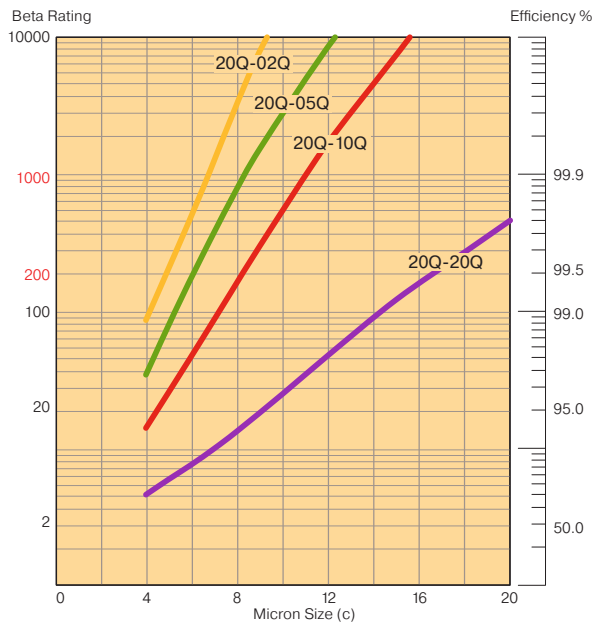
Many manufacturers of hydraulic components have established fluid cleanliness levels for their components. Using a portable filter cart can be a very effective way to reach and maintain these cleanliness levels.

Component	ISO Cleanliness Level
Servo control valves	16/14/11
Proportional valves	17/15/12
Vane and piston pumps/motors	18/16/13
Directional and pressure control valves	18/16/13
Gear pumps/motors	19/17/14
Flow control valves cylinders	20/18/15
New fluid	20/18/15

## Filter Cart Element Performance (two-stage filtration)

Element 1	Element 2	Minimum Overall Capacity, grams
20Q	20Q	391
20Q	10Q	375
20Q	05Q	326
20Q	02Q	296

## In-Series Filtration Efficiency



Notes: Multipass test run @ 25 GPM, 70 PSID terminal, 10 mg/l BUGL

## Filter Cart Performance

Fluid cleanliness levels are a function of initial contamination levels, contamination ingress rates, reservoir size and filter element efficiency. The chart below lists approximate time requirements to achieve certain cleanliness levels based on the assumptions noted.

Reservoir Capacity (Gallons)	Time Required (Hours)	Projected Cleanliness Level (ISO)
50	0.5	20/18/15
50	1.0	17/15/12
50	2.5	16/14/11
100	1.5	18/16/13
100	2.5	17/15/12
100	4.0	16/14/11
200	2.5	19/17/14
200	3.5	18/16/13
200	5.0	17/15/12

Notes:

The results in the chart are based on the following assumption:

1. Initial contamination level is 500,000 particles greater than 10 micrometers per 100 ml of fluid (10PFCC cart).
2. Element 1:20Q element; Element 2:10Q element.
3. System ingress rate equal to  $1 \times 10^6$  particles greater than 10 micrometers entering the system per minute.

The Intelli-Cart™ with particle detector provides an excellent method for filtering and trending contamination levels.

For optimum particle detector performance results when monitoring contamination levels, fluid viscosity range should be 50 - 250 SUS.

## Par-Gel™ Media Water Capacity

Model	Fluid Viscosity	Capacity
5PFCC	75 SUS	600 ml
	200 SUS	420 ml
10PFCC	75 SUS	500 ml
	200 SUS	300 ml

Notes:

1. Par-Gel™ elements are designed to remove “free water”, which is defined as water that is above a particular fluid’s saturation level.
2. Capacity is very dependent on flow rate and viscosity. Not recommended with fluids in excess of 500 SUS.

# Portable Fluid Conditioning Cart

## Assembly

1. Install hoses to inlet strainer and outlet of series filters by threading the hose end with the straight thread o-ring seal fitting.
2. Connect the PVC tube wands to the swivel fitting.
3. The Intelli-Cart™ is shipped with a bag that contains accessory parts.
4. The iPD is shipped with the factory default setting. Users can reprogram the iPD with the cable located in the attached bag and the iPD owners manual.

## Operating Instructions

1. Insert the inlet wand assembly into the supply fluid receptacle (drum/reservoir).
2. Insert the outlet wand assembly into the clean fluid receptacle (drum/reservoir).

**Caution:** Do not kink the hose assemblies. This may result in excessive vacuum or pressure at the pump.

3. Verify that the ON/OFF switch is OFF and plug the cord into the proper grounded power source (3 wire).
4. Turn switch to ON position and check outlet wand for oil flow. Allow 30 to 60 seconds for filters to fill with oil. If repeated attempts to obtain oil flow fail, check pump inlet fittings for tightness.

5. The condition of the filter elements should be monitored by observing the cleanliness indicator on the filters. When the indicator is in the CHANGE position, both filter elements MUST be replaced to prevent fluid from going through the bypass in the filters.
6. The inlet strainer element is provided to protect the pump from damaging contaminants. The series filter elements are provided with a 35 PSI bypass to prevent excessive pressure which may be harmful to personnel or to the filter cart.

**Warning:** The filter bypass acts as a relief valve for the pump. Do not restrict the discharge hose in any way which will defeat the function of the bypass valve, causing excessive pressure, which may be harmful to personnel or to the filter cart.

7. The cleanliness indicator works on differential pressure and will indicate the condition of the element (CLEAN - green, CHANGE - yellow, or BYPASS - red).

**NOTE:** The filter cart must be in operation for the indicator to read properly.

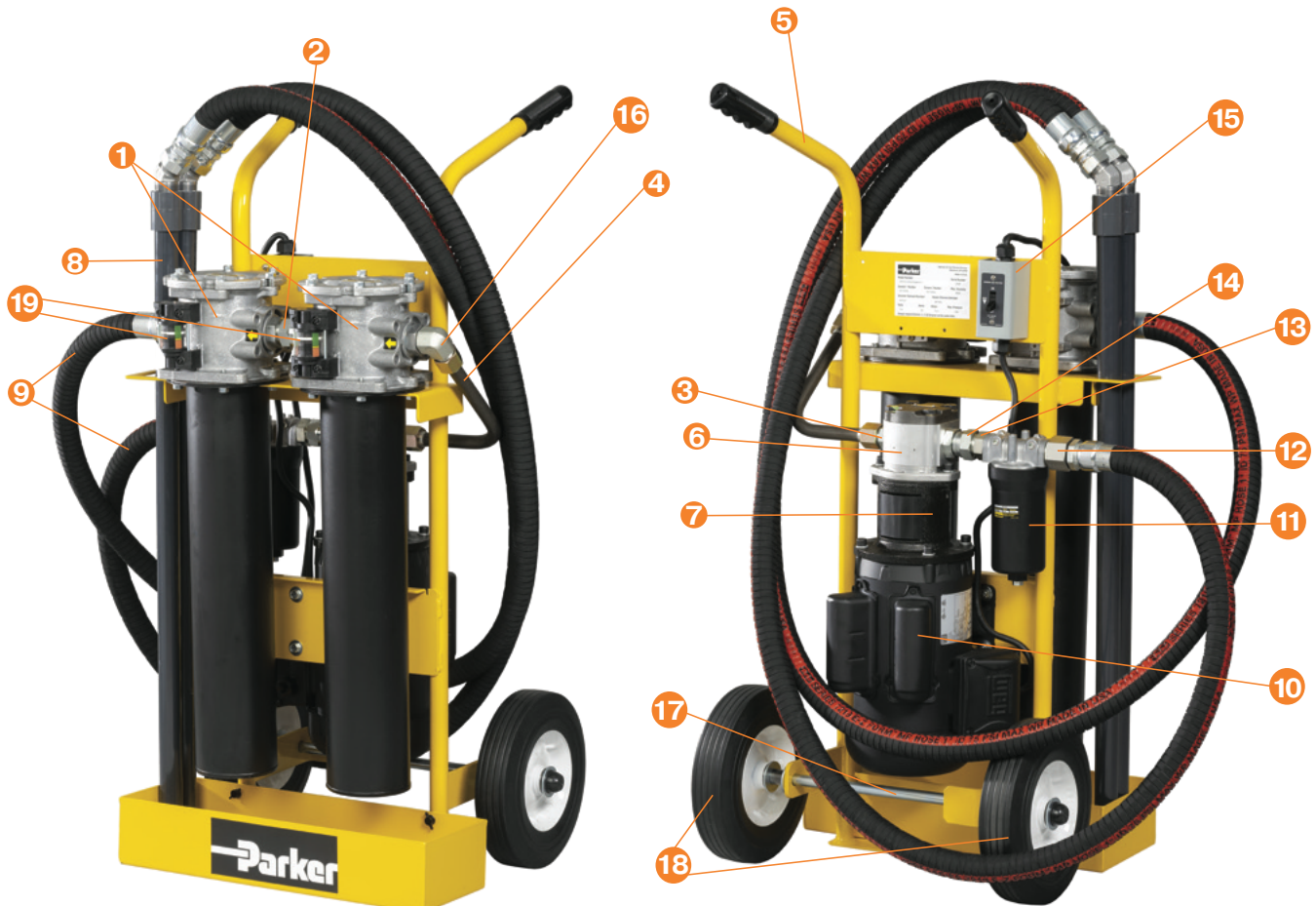
## Maintenance Instructions

1. Turn switch to OFF position and unplug cord from electrical outlet.
2. Remove tube wands from oil to prevent siphoning.
3. Loosen hex head screws on filter cover. Turn cover to clear screws, remove cover.
4. Pull filter element from the filter head.
5. Replace with new filter element. Make sure element o-rings seat properly into the head, making sure that the notch on the element lines up with the notch in the head.
6. Inspect the cover o-ring and replace if necessary.
7. Replace cover and tighten hex head screws until they are snug. Do not over-torque (16 - 19 Ft. lbs.) these screws.
8. Remove drain plug from strainer bowl and allow oil to drain. Remove strainer bowl and replace used element with a new element.

Problem	Cause	Solution
Does not start	<ul style="list-style-type: none"> <li>• ON/OFF Switch</li> <li>• No electrical power</li> <li>• Defective motor</li> <li>• Motor overload</li> <li>• Fuse failure</li> </ul>	<ul style="list-style-type: none"> <li>• Turn switch ON, replace switch if defective</li> <li>• Plug in cart/Check power source</li> <li>• Replace</li> <li>• Reset ON/OFF switch</li> </ul>
No oil flow or erratic pump noise	<ul style="list-style-type: none"> <li>• Filter housing not filled with oil</li> <li>• Suction leak</li> <li>• Defective pump</li> </ul>	<ul style="list-style-type: none"> <li>• Allow pump to run 30 to 60 seconds</li> <li>• Check tightness of inlet fittings</li> <li>• Check for kink or restriction in inlet hose</li> <li>• Replace strainer element</li> <li>• Replace pump</li> </ul>
Indicator reads CHANGE or BYPASS	<ul style="list-style-type: none"> <li>• Element dirty</li> <li>• Oil extremely cold or viscous</li> </ul>	<ul style="list-style-type: none"> <li>• Replace elements</li> <li>• Change element to coarser micron rating</li> </ul>
Indicator does not seem to move	<ul style="list-style-type: none"> <li>• No element</li> </ul>	<ul style="list-style-type: none"> <li>• Install element</li> </ul>

# 5PFCC & 10PFCC

## Parts List



Item No.	Qty	PN	Description
1	2	941666	Filter Housing
2	1	16 F5OX-S	Straight Thread Fitting
3	1	12 F5OX-S	Straight Thread Fitting
4	1	947584	Inlet Tube Assembly w/o IPD
4		See Below	Inlet Tube Assembly with IPD
	1	947556	Tubing
	1	12 6F4OMXS	Male tubing connector
	1	STI.0144.100	IPD In-Line Sensing Ports
	1	16 3-8 AOE40-S	Male Elbow
5	1	947636	Filter Cart Frame
6	1	947586	10 GPM Pump
6	1	947623	5 GPM Pump
7	1	947561	Bell Housing
8	2	928784	Wand Assembly - Buna
9	2	945582	EZ Form Hose
10	1	947398	1 HP Motor

Item No.	Qty	PN	Description
11	1	947632	Strainer Assembly
12	1	12-16 F5OX-S	Fitting Reducer / Expander
13	2	16-F65OX-S	Fitting
14	1	16-12 F5OX-S	Straight Thread Fitting
15	1	947458	Manual Motor Starter Assembly
16	1	940978	Elbow Fitting
17	1	947633	Axle
18	2	947638	10 Inch Wheel
19	2	926750	Visual Indicator
	1 each	See Chart *	Elements for both Stage 1, 2, and Strainer
	1	IPD12322230	LCD IPD with RH Sensor
	2	ACC6NH001	Hose Extension with M12 Coupling
	2	EMA3_1_8ED	IPD Fitting
	2	2-2A4OEG4M-S	IPD Fitting

# 5PFCC & 10PFCC<sup>1</sup>

## Portable Fluid Conditioning Cart

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
10PFCC	2	20Q	10Q	B	VP	I	1

BOX 1: Filter Series	
Symbol	Description
5PFCC	5 GPM (4000 SUS max)
10PFCC	10 GPM (1000 SUS max)

BOX 4: Stage 2 Element	
Symbol	Description
10Q	Microglass, 10 micron
WR	Par-Gel Water Removal
X	No Element <sup>2</sup>

BOX 7: Bypass	
Symbol	Description
I	35 PSID (2.4 bar) (on both elements)

BOX 2: Element Length	
Symbol	Description
2	Double

BOX 5: Seal Material	
Symbol	Description
B	Nitrile

BOX 8: Options	
Symbol	Description
1	None
PDL	Particle Detector <sup>3</sup>

BOX 3: Stage 1 Element	
Symbol	Description
20Q	Microglass, 20 micron
X	No Element <sup>2</sup>

BOX 6: Indicator	
Symbol	Description
VP	Visual indicator, 3-band (mounted on both stages)

#### Notes:

- The cart includes the elements you select installed.
- For the No Element option, "X" must be selected in Boxes 3 & 4.
- Particle Detector option is only available on model 10PFCC.
- 74W comes standard with particle detector option.

### Replacement Elements

Symbol	Media	Element 1	Element 2	Strainer
02Q	Microglass	NA	937397Q	NA
05Q	Microglass	NA	937398Q	NA
10Q	Microglass	937399Q	937399Q	NA
20Q	Microglass	937400Q	937400Q	NA
WR	Water Removal	NA	940734	NA
74W <sup>4</sup>	Woven Wire	NA	NA	947629
149W	Woven Wire	NA	NA	947630



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Last updated November 28, 2023

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# AFS Auxiliary Filtration System

Hydraulic or Gear Fluid Portable Filtration System



ENGINEERING YOUR SUCCESS.

# AFS

The AFS is the ideal way to prefilter and transfer fluids, on the ground or in the air.

Fluid should always be filtered prior to use. New fluid is not necessarily clean fluid. Most new fluids (directly from the container) are unfit for use, due to high initial contamination levels. Contamination, both particulate and water, may be introduced to a new fluid during processing, mixing, handling and storage.

The AFS uses a high capacity ModuFlow™ Plus filter for long element life and optimum filtration. The single element package provides a high level of filtration performance in a compact size. Free water is controlled by utilizing Parker's Par-Gel™ element. Par-Gel™ elements have a very high affinity for free water.

Designed with functionality, space and durability in mind the AFS comes standard with a rated lifting eye. The optimized design and rugged steel construction allow service personnel access to the critical hydraulic systems through passageways as small as 12" x 16".

The use of a Parker portable filtration system is the most efficient and economical way to extend fluid life and protect critical system components from harmful contaminants.

## Specifications:

### Maximum Recommended Fluid Viscosity:

**AFSG** - 4080 SUS (880 cSt)

0.85 specific gravity

**AFSH** - 500 SUS (108 cSt)

0.85 specific gravity

*For Optimal Particle Detector*

*Performance: 50-250 SUS*

*(7.5-54 cSt)*

### Visual Indicator (outlet

**filter):** 35 psid 3-band  
(clean, change, bypass)

### Filter Bypass Valve Settings (Integral to Element):

35 psid (2.4 bar)

### Operating Temperature:

-4°F to +140°F (-20°C to +60°C)

### Flow Rate:

**AFSG** - 4 gpm (15.1 lpm)

**AFSH** - 10 gpm (37.8 lpm)

### Electrical Service Required:

**AFSG** - 110/220 volts, 60/50

Hz, single phase, 8/4 amps

**AFSH** - 110/220 volts, 60/50

Hz, single phase, 10/5 amps

### Electrical Motor:

**AFSG** - 1/2 hp @ 1725 rpm,

open, drip proof

**AFSH** - 3/4 hp @ 3450 rpm,

open, drip proof, thermal

overload protection

### Construction:

Cart frame - Steel

Filter head - Aluminum

Filter bowl - Steel

Hose - Reinforced Nitrile

Wands - PVC

Optional concentric wand -

steel

**Weight:** 85 lbs. (39kg)

### Dimensions:

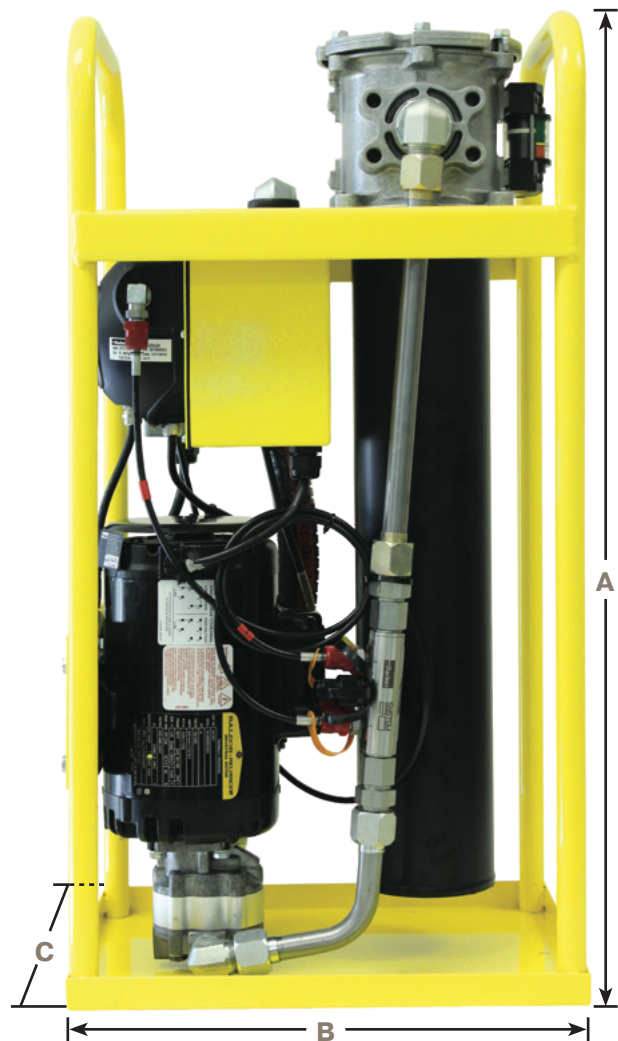
A = Height: 30.1 in (765 mm)

B = Width: 15.8 in (401 mm)

C = Depth: 11.9 in (960 mm)

## Applications:

- **Pre-clean hydraulic fluids prior to system fill**
- **Transferring fluid from drums or storage tanks to system reservoirs**
- **Conditioning fluid in use**
- **Complimenting existing system filtration**
- **Removing free and emulsified water from a system**

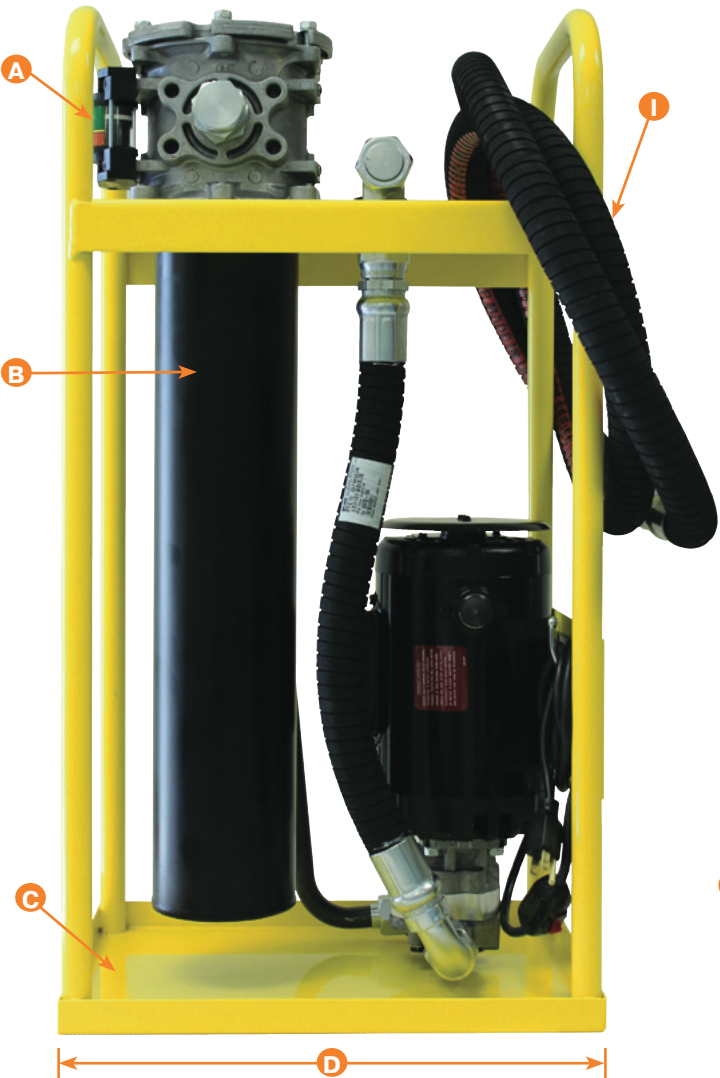


# Features

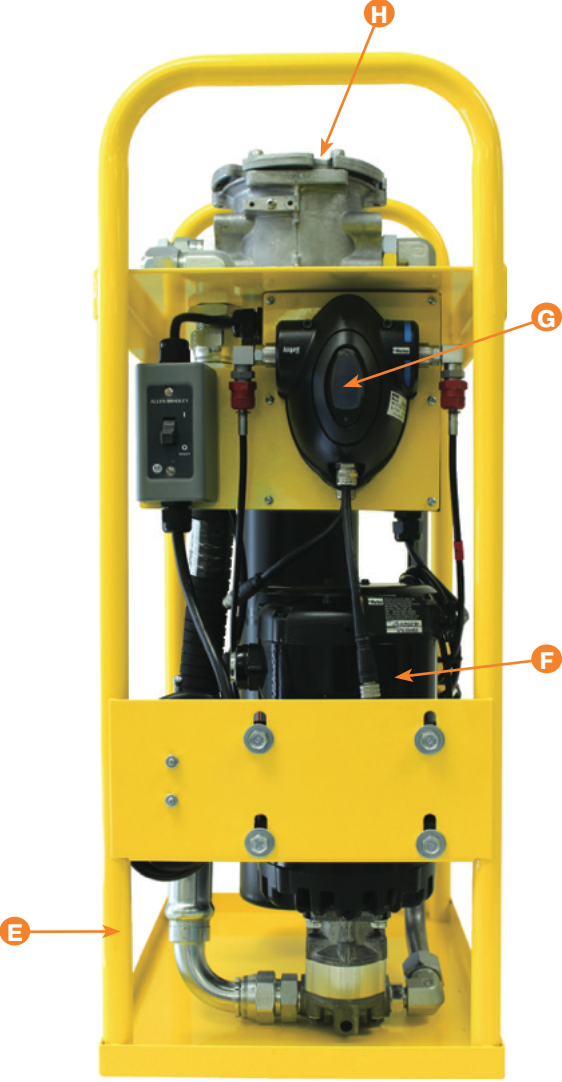
- A Visual indicator**
  - Tells you when to change element
- B Single filter**
  - Double length filtration for long element life
- C Drip tray**
  - Helps keep the work area safe and clean
- D Smaller footprint**
  - Fits into 12"x16" wind turbine hatch
- E Heavy duty steel frame**
  - Rugged and built to last
- F 110V/220V AC motor**
  - Industrial brand name
- G Particle detection**
  - Detects changes in contamination levels and alerts when oil is clean

- H Element access cover**
  - Top-accessible for easy changing of elements
- I Hose**
  - 8 foot, kink-resistant hose prevents pump cavitation
- Element (not shown)**
  - Available for both particulate and water removal (WR)
- Lifting eye (not shown)**
  - Rated hoisting ring not to exceed 250 lbs.

- Optional Concentric wand (pg 6)**
- Ready to use; no additional hardware needed



AFS - Gear



AFS - Hydraulic with IPD

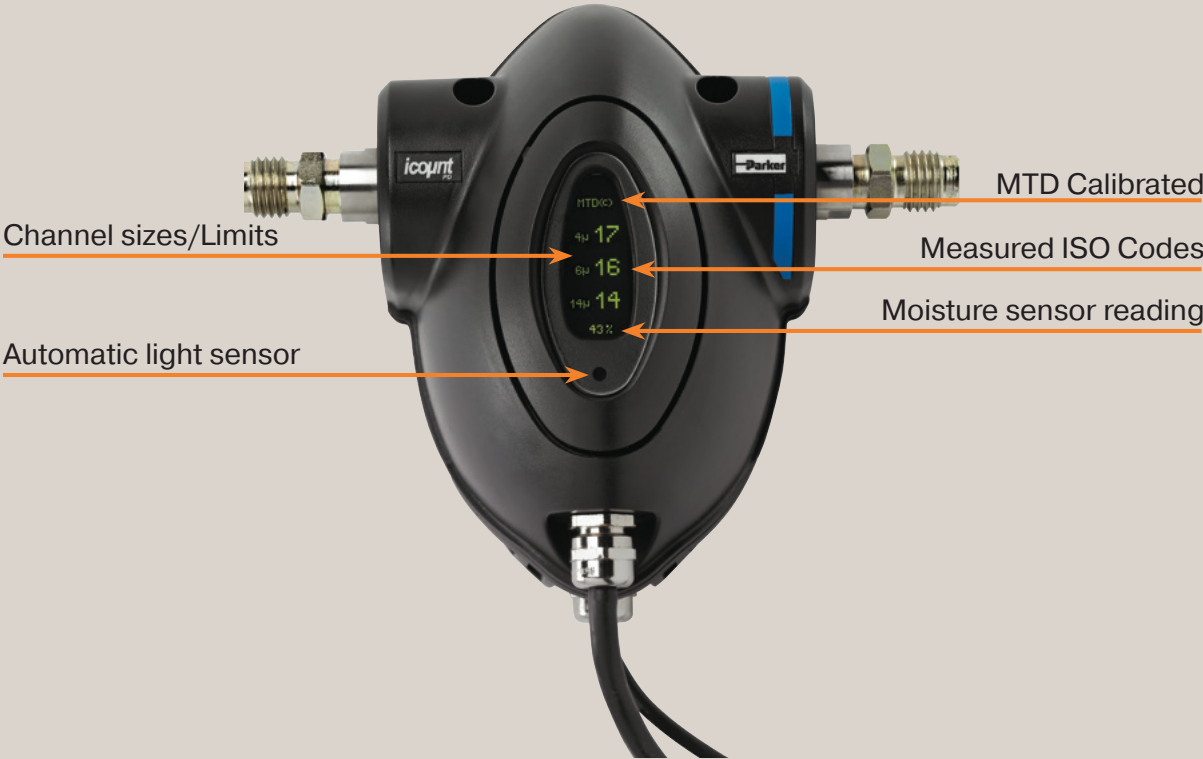
# Features

## icountPD® - icount Particle Detector

The Most Up-to-Date Technology in Solid Particle Detection.

The design dynamics, attention to detail, and small size of the permanently mounted, on-line particle detector brings a truly innovative product to all industry. The laser based,

leading-edge technology is a cost effective market solution to fluid management and contamination control.

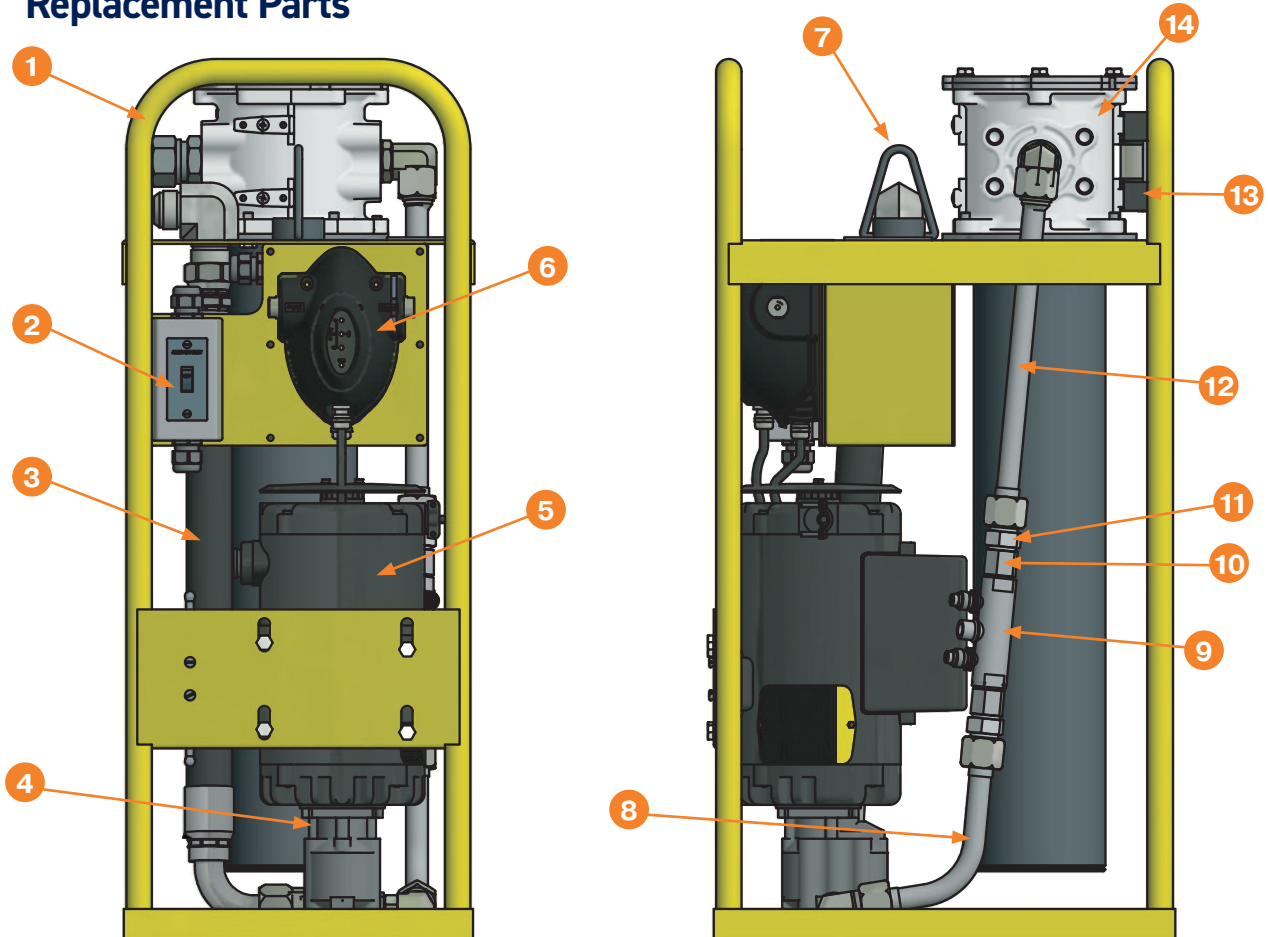


### Features and benefits of the icountPD include:

- Independent monitoring of system contamination trends.
- Early warning digital display indicators for Low, Medium and High contamination levels.
- Moisture % RH LED indicator.
- Cost effective solution in prolonging fluid life and reducing machine downtime.
- Visual indicators with power and alarm output warnings.
- Continuous performance for dependable analysis.
- Hydraulic, phosphate ester & fuel fluid compatible construction.
- Self diagnostic software.
- Fully integrated PC/PLC integration technology utilizing RS232 and 4-20mA.
- Annual calibration in US Service Center. Counter easily removed for return.

# AFS

## Replacement Parts



#	Description	AFSG	AFSH	AFSH w/ IPD
1	Frame Assembly	946275	946275	946275
2	Manual Motor Starter			928617
3	Suction Hose Assmby	946280	946280	946280
4	Gear Pump	D22BS1A	928731	928731
5	Electric Motor	941767	941766	941766
6	Icount PD			IPD12322230
7	Hoist Ring	945994	945994	945994
8	Discharge tube	946281	946281	941466
9	System 20 Sensor			STI.0144.100
10	System 20 BSP to SAE Fitting			3/8-8F4OHG5S
11	Triple-Lok 37° Flare JIC Adapter			928729
12	Upper Discharge tube			946282
13	Differential Pressure Indicator	926750	926750	926750
14	Filter Housing	946297	946057	946057
	Inlet/Outlet Hose *	946063	946063	946063
	Wand Assemblies *	928624	928624	928624
	System 20 Oil Sample Hose*			ACC6NH001

\* Item not pictured

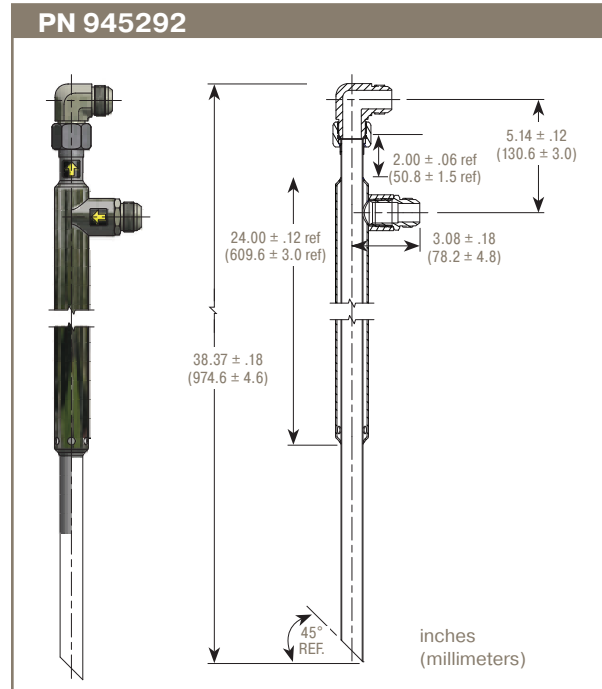
# AFS

## Optional Parts

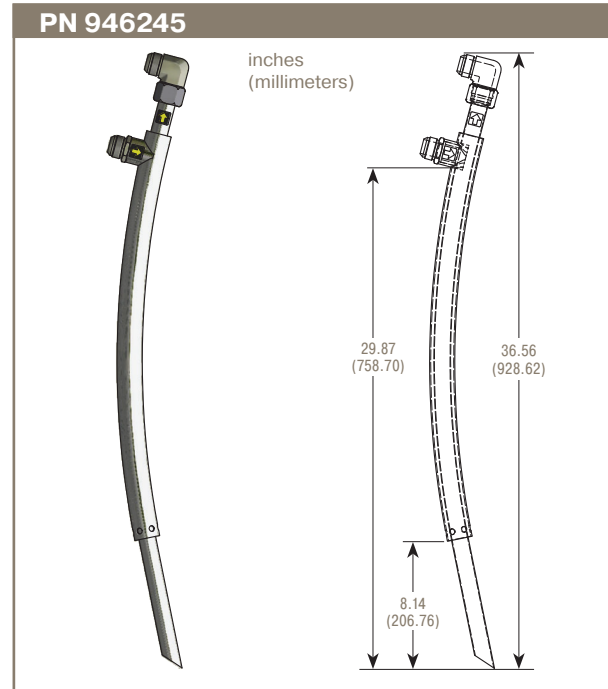
### Concentric Wands

- Single point suction & return
- 1" diameter suction tube
- Fits openings 1.5 inches and larger
- 30" suction depth
- In-tank filtering
- One port access to the tank
- All steel construction

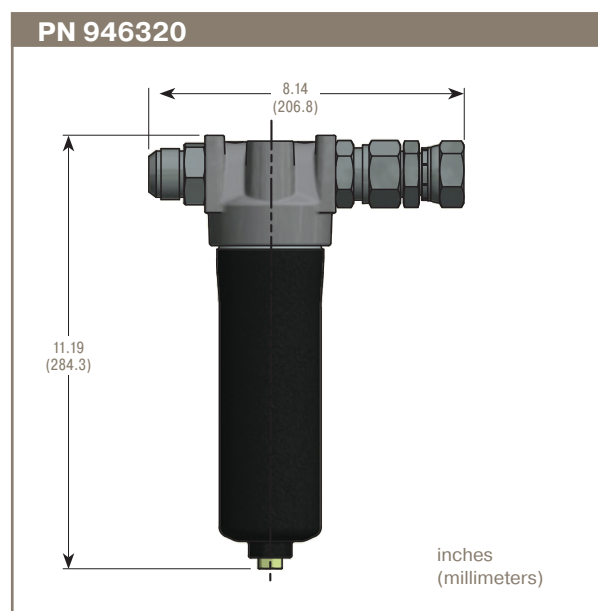
### Standard Concentric Wand



### Curved Concentric Wand



### Suction Strainer Filter



# AFS<sup>1</sup>

## Auxiliary Filtration System

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4	BOX 5	BOX 6	BOX 7	BOX 8
AFS	H	2	02Q	B	VP	I	1

BOX 1: Filter Series	
Symbol	Description
AFS	Auxiliary Filtration System

BOX 2: Flow	
Symbol	Description
H	10 GPM (500 SUS max)
G	4 GPM (4,080 SUS max)

BOX 3: Element Length	
Symbol	Description
2	Double

BOX 4: Media Code	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron
WR	Par-Gel™ Water Removal

BOX 5: Seal Material	
Symbol	Description
B	Nitrile

BOX 6: Indicator	
Symbol	Description
VP	Visual indicator, 3-band

BOX 7: Bypass	
Symbol	Description
I	35 PSID (2.4 bar)

BOX 8: Options	
Symbol	Description
1	None
PDL <sup>2</sup>	IPD with LCD display and integrated Moisture Sensor

Notes:  
 1. The cart includes the element you select installed.  
 2. Must choose option H in Box 2.

### Replacement Elements

Media	Filter (35 psid integral bypass)
02Q	937397Q
05Q	937398Q
10Q	937399Q
20Q	937400Q
WR	940734



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# Guardian<sup>®</sup>

Portable Filtration System



ENGINEERING YOUR SUCCESS.

# Guardian®

## Portable Filtration System

The Guardian portable filtration system is a unique pump/motor/filter combination designed for conditioning and transferring petroleum-based and water emulsion fluids. It protects your system from contamination added with new fluid because new fluid is not necessarily clean fluid. Most new fluids right out of the drum are unfit for use due to high initial concentrations of contaminants. Contamination may be added to a new fluid during processing, mixing, handling, and storage.



The Guardian also circulates and “polishes” fluid in your existing systems to reduce the contamination to an acceptable level. There are hundreds of applications that the Guardian is suited for, with more being discovered each day. If your system is sensitive to the harmful effects of contamination, then the Guardian may be ideal for you.

Features	Advantages	Benefits
Lightweight, hand held, compact design	Easy to carry and fits easily on top of 55 gallon drums.	One person operation, capable of getting to hard to reach areas.
Flow rate to 4 gpm (18 lpm).	Filters and transfers simultaneously.	One step operation.
Pump/motor combination with Carboxylated Nitrile seals standard.	Handles fluids up to 16,000 SUS viscosity.	Reliable performance in a wide variety of operating conditions.
Built-in relief valve with no downstream fluid bypass.	Only filtered fluid reaches downstream components.	100% filtration ensured, even when unattended.
Wide variety of filter elements available.	High capacity 2 micron absolute disposable microglass to 74 micron cleanable wire and water removal.	Maximizes element life between changes.
Clear, wire-reinforced 5' hose assemblies with wand attachments.	No additional hardware required.	Ready to use and easy to maneuver.
Optional quick disconnect hose connections.	Fast, easy setup and tear-down.	Eliminates messy drips.
Heavy-duty ¼ HP, 115 VAC (230 VAC optional) motor with thermal overload protection.	UL recognized and CSA listed, with replaceable brushes.	Safe, reliable performance; field serviceable.
Geroter pump with visible serviceable inlet strainer.	Dirt tolerant design with added protection.	Pump reliability in highly contaminated fluids.
Quiet operation.	Less than 70dB noise level @ 3 feet.	Can be used most anywhere with minimal disturbance.
Convenient inlet-to-outlet hose connection.	Contains fluids when transporting.	Clean and safe operation.
Low center of gravity.	Guardian stability.	Unattended reliability.
Dual motor seals.	Added motor protection.	Longer motor life.
Auxiliary inlet/outlet ports.	Used in place of, or in addition to, standard ports. The outlet can also be used as a sampling port.	Flexibility.

# Guardian®

## Specifications and Installation

### Maximum Allowable Operating Pressure (MAOP)

50 psi (3.4 bar)

### Flow Capacity

Up to 4 gpm (15 lpm)

### Maximum Recommended Fluid Viscosity

(.85 specific gravity)  
110-120 VAC and 220-240 VAC -  
16,000 SUS

### Warning

Explosion hazard. Do not pump flammable liquids such as gasoline, alcohol, solvents, etc.

### Ambient Operating Temperature

-15°F to 104°F (-26°C to 40°C)

### Fluid Operating Temperature

-15°F to 120°F (-26°C to 49°C)

### Visual Indicator

Differential pressure type, set at 25 psid (1.7 bar)

### Recommended Fluids

Petroleum based oils, water emulsions, and diesel fuels

### Integral Relief Valve

Set at 50 psi (3.4 bar) for motor protection.

### Noise Level

<70db at 3 ft.

### Electrical Motor

¼ hp@2500 rpm.  
110-120 VAC; 50/60 Hz; 3A max.  
220-240 VAC; 50/60 Hz; 1.5A max.

Thermal overload protected.  
Replaceable brushes (500 hours).

### Weight

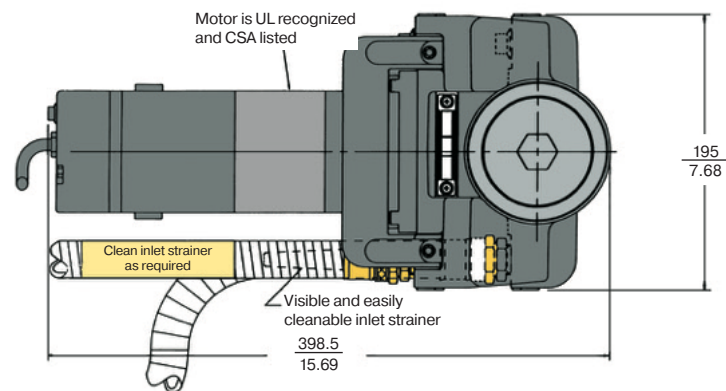
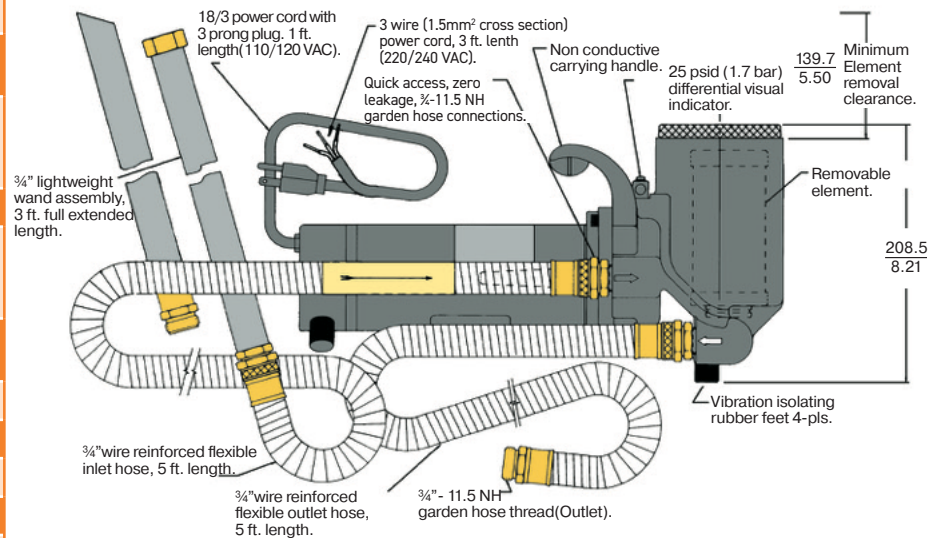
Approximately 24 lbs (10.8 kg)

### Materials

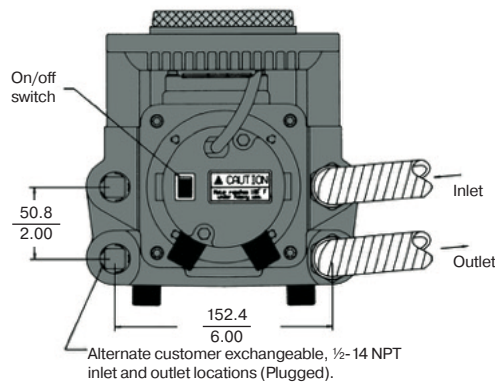
Housing - cast aluminum  
Cover - die cast aluminum  
Handle and Indicator - nylon  
Wands and Hose - PVC  
Fittings - brass  
Seals - fluorocarbon/carboxylated nitrile

### Dimensions

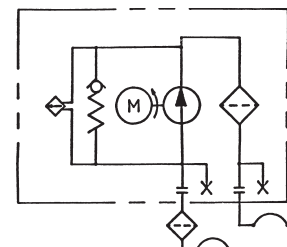
mm  
in



#10-24 Terminal Studs  
2-places (24 VDC)



### Guardian Schematic



# Guardian®

## Element Performance

Media Code	Filter Media	Time Averaged Beta x/y/z =2/20/75 Where x/y/z is:	Dirt Capacity (Grams)
74W	Woven Wire	74 micron <sup>1</sup>	*
40W	Woven Wire	40 micron <sup>1</sup>	*
25W	Woven Wire	25 micron <sup>1</sup>	*
20C	Cellulose	20 micron <sup>1</sup>	*
10C	Cellulose	5/8/16	4
20Q	Microglass	7.1/13.7/17.3	16.2
10Q	Microglass	2.7/7.3/10.3	14.4
05Q	Microglass	<2/2.1/4.0	14.9
02Q	Microglass	<2/<2/<2	14.3

Beta Rating	Efficiency at x Particle Size
B <sub>x</sub> = 2	50.0%
B <sub>x</sub> = 20	95.0%
B <sub>x</sub> = 75	98.7%
B <sub>x</sub> = 200	99.5%
B <sub>x</sub> = 1000	99.9%

Multipass test run at 4 gpm (15 lpm) to 35 psid (2.4 bar)  
<sup>1</sup>Reference ratings only. Not multipass tested due to coarseness.  
 \* Not applicable

### Estimated Guardian Element Life and Cleanliness Levels

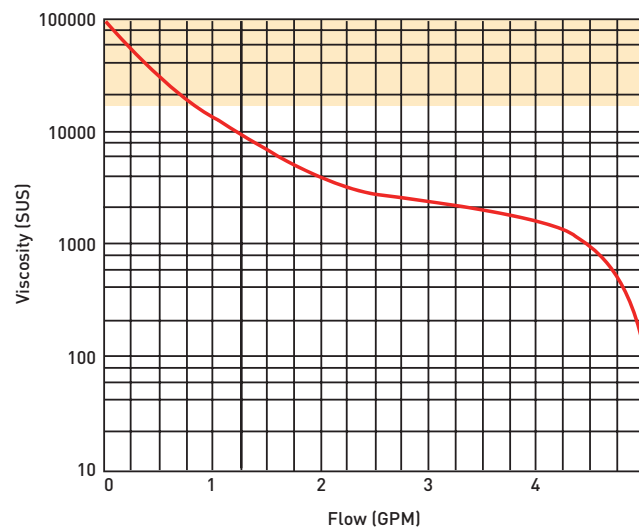
The following chart shows typical element life (in gallons of oil passed) and cleanliness levels achieved by standard Parker elements available with the Guardian. Some assumptions have been made.\*

Media Code	New Oil ISO	ISO Achieved	Element Life	Elements Used per 250 gallons
10C	22/20/16	21/19/15	120 gallons	2.08
20Q	22/20/16	21/19/15	486 gallons	.51
10Q	22/20/16	19/16/14	407 gallons	.61
05Q	22/20/16	17/15/12	330 gallons	.75
02Q	22/20/16	15/13/10	316 gallons	.79

\* 1. New oil is at ISO 22/20/16.  
 2. No environment or work ingestion.  
 3. Single pass oil transfer.

NOTE: Data for fluid transfer only. For continuous fluid polishing, lower ISO cleanliness levels will be achieved.

### Guardian Flow vs. Viscosity Performance

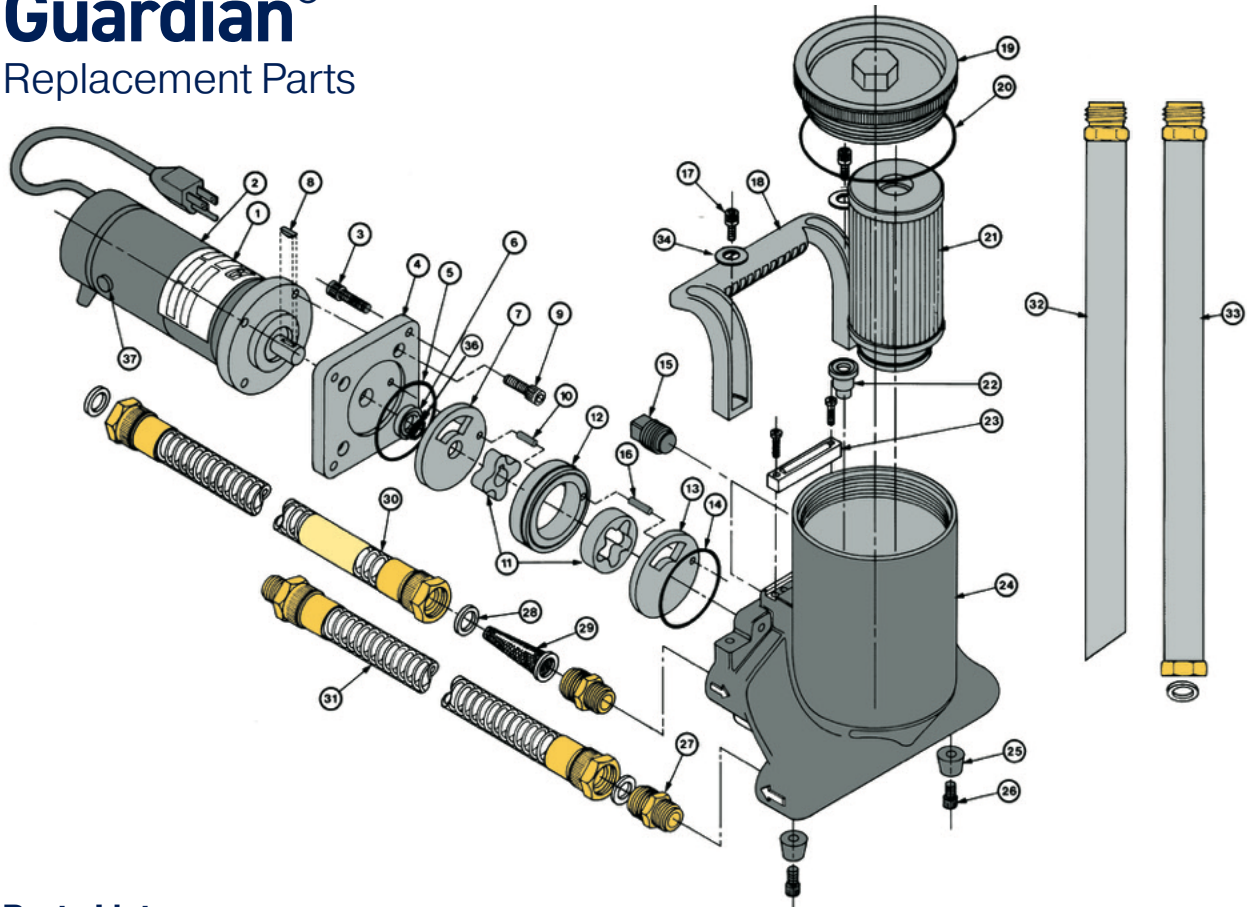


Note 1: Guardian not recommended for fluid viscosities greater than 16,000 SUS

Note 2: Flows based on Guardian with no element installed

# Guardian®

## Replacement Parts



### Parts List

#	Part Number	Description
1	CF	LABEL
2	931913 932381	MOTOR (110-120 VAC) MOTOR (220-440 VAC)
3	902734	SOCKET HEAD CAP SCREW (4), ¼-20X1
4	931890	ADAPTER PLATE
5	V72041	HOUSING O-RING
6	931921	POLYPAK SEAL
7	931899	SHADOW PLATE
8	931877	WOODRUFF KEY 1/8 X 3/8
9	902679	SOCKET HEAD CAP SCREW (4), ¼-20 X ¾
10	903630	ROLL PIN 1/8 X ¾
11	931873	GEROTER SET
12	931903	GEROTER RING
13	931900	OUTLET PLATE
14	V72135	GEROTER O-RING
15	931920	BRASS PIPE PLUG (2) ½-14
16	903426	Roll Pin 1/8 x 5/8
17	931889	SOCKET HEAD CAP SCREW (2), ¼-20 x 5/8
18	931897	HANDLE
19	931892	COVER
20	V72237	COVER O-RING

#	Part Number	Description
21	SEE 44	ELEMENT
22	928981	RELIEF VALVE
23	927422	INDICATOR KIT
24	931838	HOUSING
25	931888	RUBBER BUMPERS (2)
26	902907	SOCKET HEAD CAP SCREW (2), ¼-20 x ½
27	931928	BRASS FITTING (2)
28	931956	GASKET (4)
29	931927	INLET SCREEN
30	931936	INLET HOSE ASSEMBLY
31	931937	OUTLET HOSE ASSEMBLY
32	931965	WAND CREVICE ASSEMBLY
33	931966	WAND ADAPTER ASSEMBLY
34	926106	WASHER (2)
35	932097	QUICK DISCONNECT KIT (NOT SHOWN)
36	932085	WASHER
37	934329 934327	BRUSH KIT (110/120 VAC) BRUSH KIT (220/240 VAC)
	932263	SEAL KIT
	932081	BOWL EXTENSION KIT

CF - Consult Factory

## Guardian Operation

- A. Remove all shipping plugs from the hoses and fittings.
- B. Connect the inlet and outlet hose assemblies to the unit.
- C. Connect the wand assemblies, if required.
- D. Place the inlet hose wand assembly into the fluid to be filtered and/or transferred.
- E. Place the outlet hose/wand assembly into the container where the fluid discharge is desired.
- F. Plug in the unit.
- G. Flip the switch on the end of the unit to the “on” position.

NOTE: For no-mess transportation, the inlet and outlet hose assemblies can be screwed together by removing the wand assembly.

## Guardian Element Servicing

- A. Flip the switch on the end of the unit to the “off” position and disconnect the electrical plug.
- B. Rotate the cover counter-clockwise and remove.
- C. Remove the element from the housing. Discard all disposable elements. These elements are not cleanable,
- D. Place the new element in the housing, fitting the o-ring neck into the large hole at the bottom.
- E. Inspect the cover o-ring and replace if necessary.
- F. Replace the cover and hand-tighten.

NOTE 1: It is recommended that the Guardian be cleaned and flushed between uses with dissimilar fluids to prevent fluid mixing.

NOTE 2: Motor brushes may require changeout every 500 service hours

## Troubleshooting Guide

Problem	Cause	Solution
Does not start.	ON/OFF switch. No electrical power. Rectifier. Motor overheats (160°F). Defective motor.	Turn switch on, replace switch if defective. Plug in Guardian, check for tripped circuit breakers, check for blown fuses. Replace if defective. Allow motor to cool, thermal overload will automatically reset. Replace motor.
Does not start or erratic motor noise.	Worn motor brushes.	Replace motor brushes.
Intermittent start/stop operation.	High viscosity fluids. Worn motor brushes. Defective motor.	High viscosity fluids can cause the motor to overheat and cycle intermittently. Replace motor brushes. Replace motor.
Hot motor.	Pumping under heavy load. Defective motor.	It is normal, under a heavy pumping load for the motor to reach 160°F. Replace motor if shell temperature reaches greater than 170°F.
No flow or erratic pump noise.	Filter housing not filled with oil. Suction leak. Obstructed outlet. Element dirty. Sheared pump key. Defective Guardian.	Allow Guardian to run a few seconds. Check tightness of inlet fittings and hoses. Check gaskets are in place and are not damaged. Kink or restriction in the inlet hose. Clear outlet. Replace or clean element. Replace woodruff key. Replace unit.
No flow, erratic pump noise, motor overheats.	Gears binding.	Disassemble Guardian and thoroughly clean the gear set. Always use the inlet strainer provided to protect the unit. Replace defective gears.
No suction.	Plugged strainer.	Clean or replace the inlet strainer as required. Clean relief valve. Check for damaged internal o-rings.
Reduced oil flow.	High viscosity fluids. Element dirty. Relief valve sticks or is lodged open. Partially obstructed inlet or outlet hose. Suction leak. Worn gears.	High viscosity fluids can cause reduced flow, which is normal. Replace or clean element. Clean relief valve or replace if defective. Clear the hose obstruction. Check tightness of inlet fittings and hose. Replace gear set.
Indicator moves to RED Area.	Element dirty. Oil extremely cold or viscous. Obstructed outlet. Defective indicator.	Replace or clean element. Change element to coarser micron rating. Clear outlet obstruction. Replace indicator.
Indicator does not seem to move.	No element. Defective indicator.	Install element. Replace indicator.
Hoses discolor or are hard.	Fluid compatibility.	Certain fluids, over time, will cause the hoses to discolor. This does not impair their performance. But, some fluids will cause the hoses to become brittle, requiring replacement.
Oil formation under unit.	Defective shaft seal.	Replace the motor shaft seal.

# Guardian Series

## Portable Filtration System

### How To Order

Select the desired symbol (in the correct position) to construct a model code. Example:

BOX 1	BOX 2	BOX 3	BOX 4
	GT4	10C	1

BOX 1: Seal Material	
Symbol	Description
None	Fluorocarbon

BOX 2: Filter Series	
Symbol	Description
GT4	110/120 VAC
GT4E	220/240 VAC

BOX 3: Media Code	
Symbol	Description
74W	Wire Mesh
40W	Wire Mesh
25W	Wire Mesh
10C	Cellulose
20Q	Microglass, 20 micron
10Q	Microglass, 10 micron
05Q	Microglass, 5 micron
02Q	Microglass, 2 micron
WR	Water Removal

BOX 4: Options	
Symbol	Description
1	None
6	Quick disconnect hose connections

### Replacement Elements

Media	Part No.	Box Qty.
02Q	933467Q	2
05Q	932018Q	2
10Q	932017Q	2
20Q	933468Q	2
10C	932016	2

Media	Part No.	Box Qty.
20C	932020	2
25W	922627	1
40W	922628	1
74W	922626	1
WR	932019	2



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Last updated August 4th, 2023

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# Sentinel™

Portable Purification System



ENGINEERING YOUR SUCCESS.

# Sentinel™

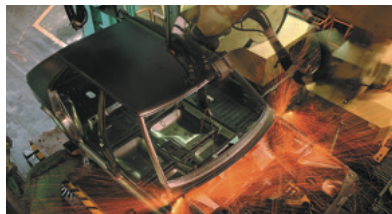
Delivering big results in a compact, lightweight package, the Sentinel is the latest in fluid purification technology from Parker. The system guards over mission critical hydraulic and lubrication systems to effectively attack water, solids and gases while improving equipment health, productivity and reliability.

The smallest in Parker's family of oil purifiers, the Sentinel's unattended automatic operation minimizes energy consumption while extending the usable life of fluids. Equipped with Parker's IQAN MD3 platform control system, the Sentinel provides user confidence in system monitoring while delivering maximum performance on demand.



## Typical Markets/ Applications

- **Automotive**  
Plastic Injection Molding  
Lubrication Systems
- **Power Generation**  
Electrohydraulic Control  
Systems
- **Marine**  
Propulsion  
Steering Systems Thrusters
- **Petrochemical**  
Lubrication Systems  
Process Controls
- **Aerospace**  
Ground Support Equipment  
Test Stands
- **Mining**  
Lubrication Systems



# Sentinel™

## Features

### Compact Size

- Will fit through small doorways
- Makes marine applications possible

### Ecoglass Particulate Element

- Coreless, non-metallic constructions
- Environmentally friendly, wasy disposal

### Diffusion Head / Manifold

- Flexibility with various fluid viscosities
- Excellent moisture removal efficiency

### Forklift Guides / Lifting Eyes

- Safe and secure method of lifting
- Employee safety

### Automatic Operation

- Inattended use
- Reduces labor costs
- Increases operation time

### Desiccant Breather

- Provides dry, clean air intake
- More efficient operation

### 316 Stainless Steel

- Used for primary wetted surfaces
- No corrosion
- Product reliability

### Reverse Phase Switch

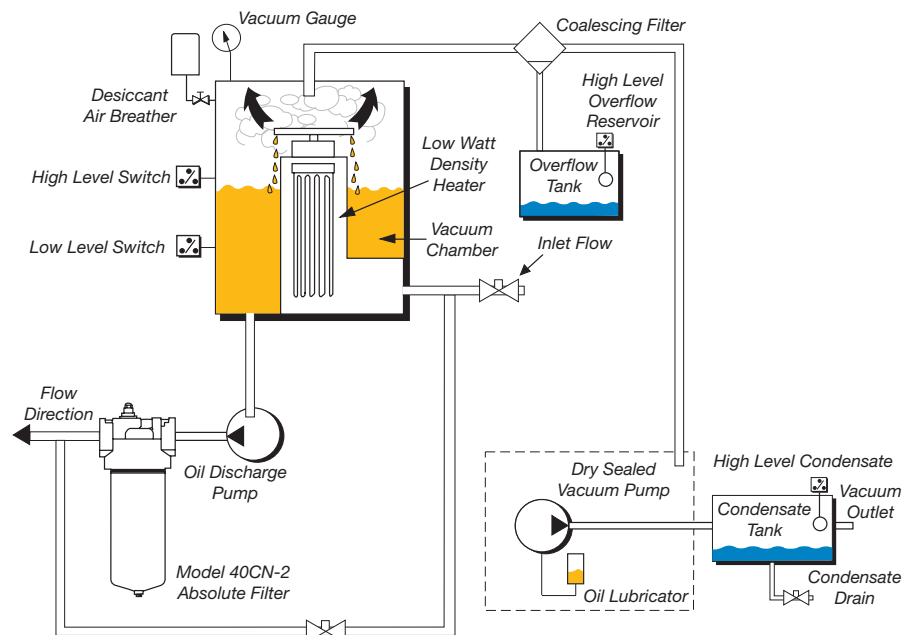
- Enable easy change of motor rotation if out of phase
- Ease of maintenance
- Prevents incorrect rotation

## Principles of Operation

Contaminated fluid is drawn through the Sentinel circuit by vacuum. The fluid is subjected to optimum vacuum, temperature and surface area to reduce the boiling point of water and convert water to water vapor. Optimum temperature is achieved with a low watt density heater. Maximum surface area is accomplished by passing the fluid through a unique diffusing column.

The fluid is protected from excessive heat by circulation for a fixed time period. When the pre-set time period is realized, the fluid discharges through high efficiency filtration to the main system reservoir. Water vapor that has been extracted from the system is exposed to a series of coalescers to eliminate any carryover oil vapor in the exhaust stream.

The process repeats until the desired steady state condition is achieved.



# Sentinel™

One of the highlights of the new Sentinel unit is the addition of Parker's IQAN system. The IQAN is an electronic PLC interface that controls many of the operating functions on the Sentinel. With IQAN, the operator can customize set points for various applications within their facility. Some of the user defined set points are:

- **sample rate**
- **moisture high limit**
- **moisture set point (low limit)**
- **temperature**
- **vacuum purge cycle**
- **auto condensate drain**
- **energy conserving features**



## Three modes of operation

### Standard

Conventional purifiers require that the reservoir fluid be at 150°F before efficient water removal occurs. This could take hours if the ambient temperatures are low and the reservoir volumes are large. Standard mode allows for less power consumption by drawing the fluid through the unit in a unique cyclic method. The fluid is drawn into the unit and held while heat and vacuum act on it to remove water. Every two minutes the fluid is discharged and the process repeats, conserving power that otherwise would be necessary to bring the entire main system reservoir to the required 150°F.



### Sentinel

Sentinel mode acts the same as standard mode other than it samples by drawing in fluid from the reservoir and testing the water saturation point. If the level is less than the desired set point, the system will hibernate until the next sampling point. The minimum time between sampling is 20 minutes and the maximum is 12 hours.



### Sample

Once started, three batches of hydraulic fluid will be drawn into the system where overall moisture level and temperature are averaged and displayed on the IQAN screen.



# Sentinel™

## Specifications

<b>Flow Rate</b>	5 gpm (18.9 lpm)
<b>Dimensions</b>	45" H x 19.5" W x 24" L (1143mm x 495mm x 686mm)
<b>Weight</b>	440 lbs. (200 kg)
<b>Seal material</b>	Fluorocarbon
<b>Condensate tank</b>	.5 gal (1.9 ltrs)
<b>Dispersal elements</b>	1
<b>Minimum operating capacity</b>	5 gal (18.9 ltrs)
<b>Vacuum (max)</b>	24 In/Hg
<b>Viscosity (max)</b>	2150 SUS (460 cSt)
<b>Outlet pressure (max)</b>	60 psi (4.1 bar)
<b>Ports</b>	3/4" JIC (male) inlet 3/4" JIC (male) outlet
<b>FLA (full load amps)</b>	16 amps @ 480VAC
<b>Shipping Weight</b>	640 lbs. (290 kg) maximum
<b>Shipping Dimensions</b>	56" H x 37" W x 37" L (1422mm x 940mm x 940mm)

### Electrical Requirements:

230VAC, 3P, 60Hz  
380VAC, 3P, 50Hz  
415VAC, 3P, 50Hz  
460VAC, 3P, 60Hz  
575VAC, 3P, 60Hz

### Electrical Connection Port:

NEMA L16-30P Flanged Inlet

### Hydraulic Connections:

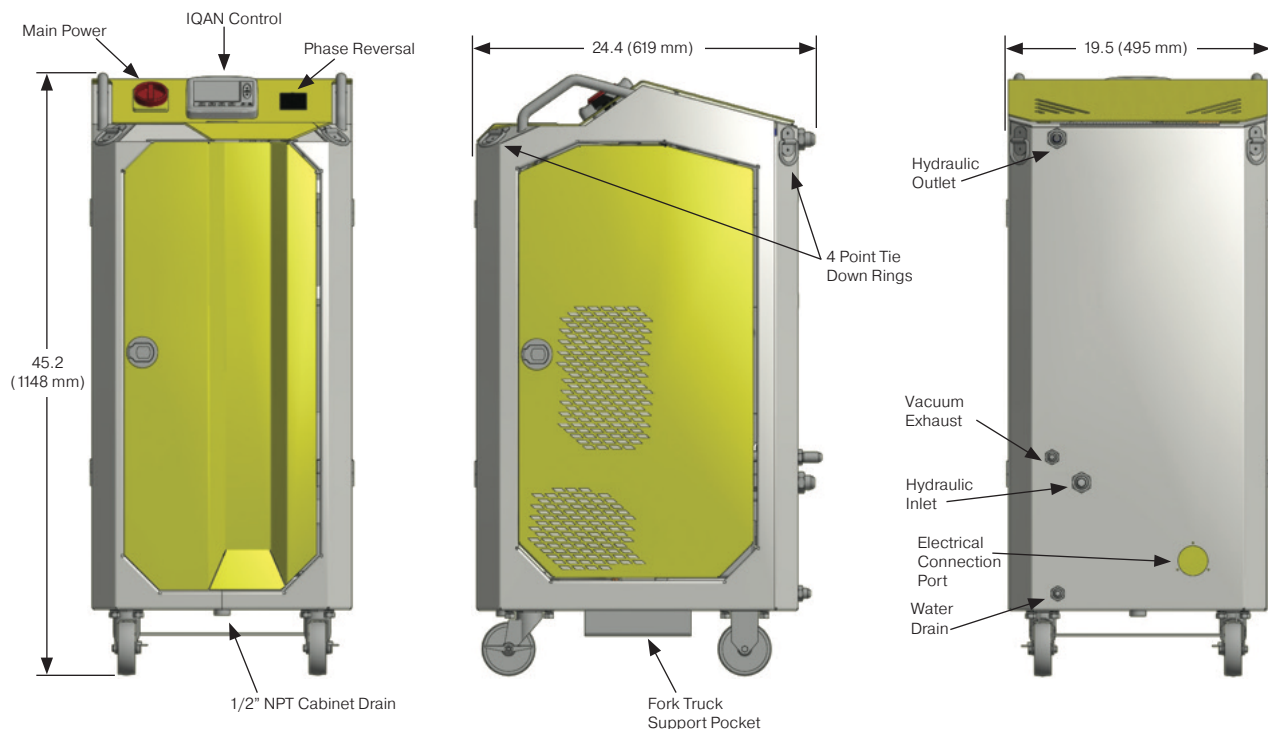
Inlet: JIC 12  
Outlet: JIC 12  
Max Flow: 5 GPM  
Water Drain: JIC 8

### Vacuum Exhaust Port: JIC 8

### Max Pressure: 60 psi (gauge)

### Vibration: Band 1: 900 hz .5 g\*g/Hz

### Storage: Max Temp 180°F, 100% rh



Note: Dimensions and weights are approximate and are for reference only.

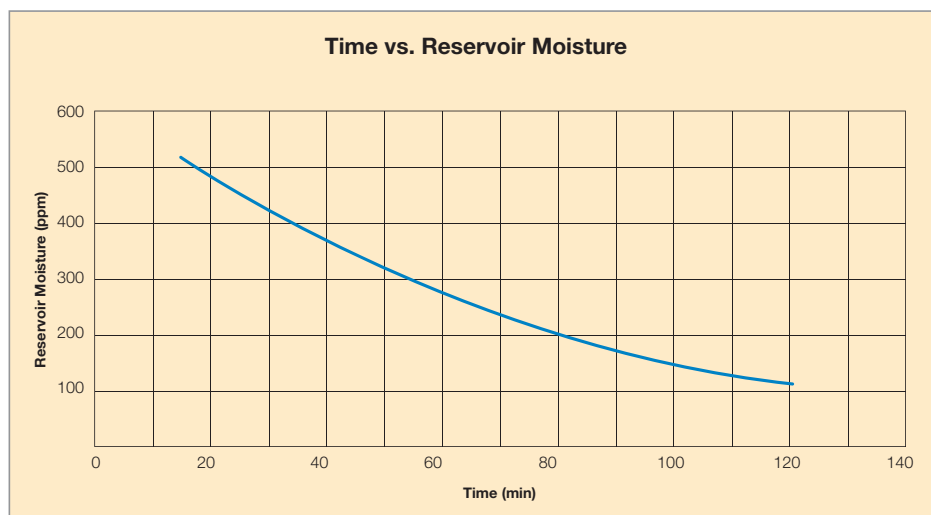
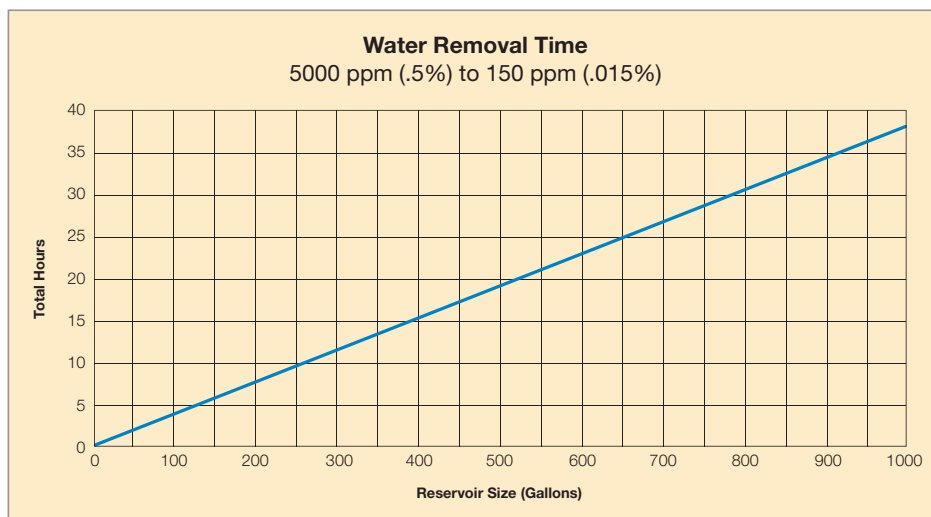
# Sentinel™

## Specifications



Potential Contaminant	Sentinel Performance
Solid particulate	ISO Cleanliness Code 14/13/10 Attainable
Water	Removes 100% of free water, 90% of dissolved water
Air/Gases	Removes 100% of free air and gases, 90% of dissolved air and gases

Typical Performance	
Tank Size	55 gallon test drum
Run Time	16 hours
Fluid Type	Hydraulic
Water Content	Start: 7,000+ ppm (1%) Saturation pt: 5,000 ppm Stop: 200 ppm (0.005%)



# Ordering

Part Number	Description
<b>Standard Unit</b>	
943118*	230VAC, 3P, 60Hz
943116*	380VAC, 3P, 50Hz
943494*	415VAC, 3P, 50Hz
943213*	460VAC, 3P, 60Hz
945341*	575VAC, 3P, 60Hz
<b>Optional Accessories</b>	
943236	Mounting Bracket Kit
943238	Cordset (pigtail end)
<b>Service Parts</b>	
936711Q	Hydraulic Particulate Element
943237	Service Kit (includes TriCeptor air breather, hydraulic particulate element, coalescing element, vacuum pump oil and vacuum pump filter element)
20072409	IQAN MD3
B-10235-0-460	Heater 460VAC
B-10235-0-380	Heater 380VAC
B-10235-0-230	Heater 230VAC
CEM3546T	Hydraulic Pump Motor
06F20C2218A1FPH80	Condensate Drain Valve
00424	Float Switch
MPS-V33N-PGAT	Vacuum Sensor
2820008	Pressure Sensor
40CN205QEVE2GS164	Filter
MS1504	Moisture Sensor
3349116565	Gear Pump

\* Standard unit includes

Dry sealed vacuum pump, Coalescing filter, 5 micron Ecoglass element, 6KW 3 phase low watt density heater, 3" diameter rubber-wheel casters, Consult factory for other options

# Sentinel Specification Worksheet

**Customer Name & Address:** \_\_\_\_\_

**Market & Application** (i.e. Power Gen/Turbine Lube) \_\_\_\_\_

**Fluid Type:** \_\_\_\_\_ **Brand:** \_\_\_\_\_ **Grade:** \_\_\_\_\_

**Viscosity:** Min: \_\_\_\_\_ SUS/cSt @ \_\_\_\_\_ °F/°C

Max: \_\_\_\_\_ SUS/cSt @ \_\_\_\_\_ °F/°C

Normal: \_\_\_\_\_ SUS/cSt @ \_\_\_\_\_ °F/°C

**Critical Hydraulic Component Types:** (Check all that apply)

- |  |  |
|--|--|
| <input type="checkbox"/> Servo Valves                          | <input type="checkbox"/> Proportional Valves |
| <input type="checkbox"/> Vane and piston pumps/motors          | <input type="checkbox"/> Gear pumps/motors   |
| <input type="checkbox"/> Directional & pressure control valves | <input type="checkbox"/> Flow control valves |

**Water concentration:** Current % of water \_\_\_\_\_

Desired % of water \_\_\_\_\_

**Sentinel/PVS location related to reservoir** (reservoir above or below ground level & distance)

- 0-5 meters     5-10 meters     ≥10 meters

**System fluid operating temperature:** \_\_\_\_\_ °F/°C

**Voltage options:**  230 VAC, 3P 60Hz     380 VAC, 3P 50Hz     415 VAC, 3P 50Hz  
 460 VAC, 3P 60Hz     575 VAC, 3P 60Hz

**System Volume:**  0-1000 gal - Sentinel or PVS185     1000-3000 gal - PVS600  
 3000-7000 gal     7000-9000 gal  
 >9000 gal

**Any previous filtration problems with the application?**

- Gelling     High contamination levels     High ambient environment

**Sentinel model selected:** \_\_\_\_\_



**Hydraulic & Fuel Filtration Division**  
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Last updated August 4th, 2023

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# Par-Test™

Fluid Analysis



ENGINEERING YOUR SUCCESS.

# Par-Test™

## Fluid Analysis

Par-Test kits are an easy and effective way to analyze system fluids and are a critical tool for any preventative maintenance program.

Par-Test is a complete Laboratory analysis, performed on a small volume of fluid. The Par-Test kit includes a pre-cleaned bottle, mailing container with a pre-address label, sample information datasheet (this is to be completely filled out by end user; to receive lab results, email must be included) and the analysis.

### Analysis Includes:

- Particle Count
- Photomicrograph
- Free Water Analysis
- Spectrometric Analysis
- Viscosity Analysis
- Water Analysis (PPM)
- Neutralization Analysis (Acid Number)



Description	Part Number
Fluid Test Kit (Carton of 10 test bottles)	947754

Fluid analysis is able to identify potential problems that cannot be detected by human senses. A comprehensive fluid analysis program can help prevent major hydraulic or lube oil system failures.

Fluid sample for Par-Test involves important steps to insure you are getting a representative sample. Often, erroneous sample procedures will disguise the true nature of the system fluid.

A complete sampling procedure is detailed on the back of this brochure. There also is a National Fluid Power Association standard (NFPA T2.9.1-1972) and an American National Standards Institute Standard (ANSI B93.13-1972) for extracting samples from a fluid power system.

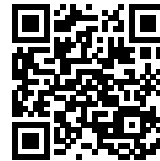
# Par-Test™

## Fluid Analysis

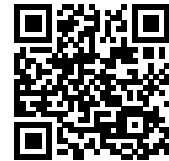


WebCheck App Icon

Par-Test results are available through the lab's WebCheck software, and accessible via PC or Android or iOS-based mobile device using the available mobile app.



Available  
Android Store



Available  
Apple Store

Every Par-Test bottle comes with its own mailer bag, mailing label (postage not included), and test submittal form. The datasheet form must be filled out for the very first Par-Test sample sent in by a customer or new user. After the first submission, a WebCheck profile is set up for that user and the results are emailed to the email provided on the submittal form. After the first sample submission the WebCheck software allows users with profiles to enter new sample information and check previous analysis reports via the mobile app and online via a PC.

Once a user profile has been set up, a customer then has the capability to track multiple specific assets and see the historical trending data that the Par-Test samples are providing. An asset can be QR coded and new samples can have their information uploaded and submitted via the mobile app by scanning an asset's QR code. The physical sample must still be mailed in. However, the WebCheck software allows for all the paperwork to be digital, saving users time entering sample information, as well as finding historical data.

### Streamlined Sample Kit



### Companion App



### Subscription Reports




### Unique Asset Tag





# Par-Test™

## Fluid Analysis



### OIL ANALYSIS REPORT



**ISO**  


Area: **AREA I [500168796]**  
 Machine ID: **TOLHURST S1001A (S/N C-48-8)**  
 Component: **Hydraulic System**  
 Fluid: **ESSO NUTO H ISO 68 (20 GAL)**

#### DIAGNOSIS

**Recommendation**  
 We recommend you service the filters on this component. Resample at the next service interval to monitor.

**Wear**  
 All component wear rates are normal.

**Contamination**  
 There is a high amount of particulates present in the oil.

**Fluid Condition**  
 The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

SAMPLE INFORMATION		method	limit/base	current	history 1	history 2
Sample Number	Client Info			<b>WC0487758</b>	WC0428785	WC0395564
Sample Date	Client Info			<b>30 Jul 2020</b>	08 Apr 2020	09 Jan 2020
Machine Age	hrs	Client Info		<b>0</b>	0	0
Oil Age	hrs	Client Info		<b>0</b>	0	0
Oil Changed	Client Info			<b>N/A</b>	N/A	N/A
Sample Status				<b>ABNORMAL</b>	ABNORMAL	ABNORMAL

WEAR METALS		method	limit/base	current	history 1	history 2
Iron	ppm	ASTM D5185m	>20	<b>1</b>	1	1
Chromium	ppm	ASTM D5185m	>20	<b>0</b>	0	0
Nickel	ppm	ASTM D5185m	>20	<b>0</b>	0	0
Titanium	ppm	ASTM D5185m		<b>0</b>	0	0
Silver	ppm	ASTM D5185m		<b>0</b>	<1	0
Aluminum	ppm	ASTM D5185m	>20	<b>0</b>	0	0
Lead	ppm	ASTM D5185m	>20	<b>0</b>	0	0
Copper	ppm	ASTM D5185m	>20	<b>&lt;1</b>	<1	<1
Tin	ppm	ASTM D5185m	>20	<b>0</b>	0	0
Antimony	ppm	ASTM D5185m		<b>0</b>	0	0
Vanadium	ppm	ASTM D5185m		<b>0</b>	0	0
Cadmium	ppm	ASTM D5185m		<b>0</b>	0	0

ADDITIVES		method	limit/base	current	history 1	history 2
Boron	ppm	ASTM D5185m	0	<b>0</b>	10	0
Barium	ppm	ASTM D5185m	0	<b>0</b>	<1	<1
Molybdenum	ppm	ASTM D5185m	0	<b>0</b>	0	0
Manganese	ppm	ASTM D5185m		<b>0</b>	0	0
Magnesium	ppm	ASTM D5185m	5	<b>0</b>	0	<1
Calcium	ppm	ASTM D5185m	50	<b>49</b>	59	51
Phosphorus	ppm	ASTM D5185m	330	<b>321</b>	352	326
Zinc	ppm	ASTM D5185m	420	<b>436</b>	491	408
Sulfur	ppm	ASTM D5185m	3100	<b>5921</b>	6311	8230

CONTAMINANTS		method	limit/base	current	history 1	history 2
Silicon	ppm	ASTM D5185m	>15	<b>0</b>	<1	<1
Sodium	ppm	ASTM D5185m		<b>&lt;1</b>	0	<1
Potassium	ppm	ASTM D5185m	>20	<b>&lt;1</b>	<1	<1

FLUID CLEANLINESS		method	limit/base	current	history 1	history 2
Particles >4µm		ASTM D7647	>5000	<b>▲ 88678</b>	▲ 57770	▲ 40677
Particles >6µm		ASTM D7647	>1300	<b>▲ 29926</b>	▲ 14689	▲ 9263
Particles >14µm		ASTM D7647	>160	<b>▲ 2782</b>	▲ 408	▲ 308
Particles >21µm		ASTM D7647	>40	<b>▲ 841</b>	▲ 67	▲ 56
Particles >38µm		ASTM D7647	>10	<b>▲ 44</b>	5	9
Particles >71µm		ASTM D7647	>3	<b>▲ 3</b>	0	0
Oil Cleanliness		ISO 4406 (c)	>19/17/14	<b>▲ 24/22/19</b>	▲ 23/21/16	▲ 23/20/15

FLUID DEGRADATION		method	limit/base	current	history 1	history 2
Acid Number (AN)	mg KOH/g	ASTM D8045	.40	<b>0.273</b>	0.330	0.312

### Diagnosis / Alerts

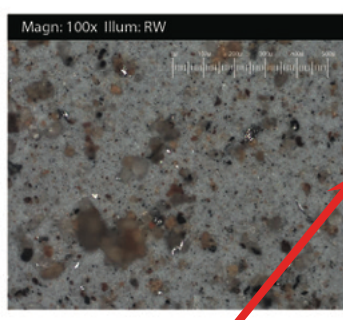
These are quick statements or alerts about any unusual results from one for the tests reported on this page.

### Spectrometric Analysis

Wear metals and additives are analyzed to help determine the condition of the fluid. The spectrometric test is limited to identifying particles below 5-7 micron in size. Base line (new) fluid samples should be sent in for each different fluid to be analyzed. This will be used to determine the status.

### A photomicrograph

of fluid (20ml) magnified 100X. This analysis gives a quick glance at the contamination present in the fluid. The photo has a reference scale in the top right where every dash is 20 microns in size.



### Particle Counts and ISO Code

Results are reported over 6 different particle size ranges and expressed as an ISO code (modified). The counts are per milliliter of fluid and the reporting is cumulative. For example – The particle count in the > 2 micron row includes the number of particles greater than 5, 10, 15, 25 and 50 microns as well as particles between 2-5 microns in size. Particle resuspension method is utilized for water-based fluid samples.

### Acid Number

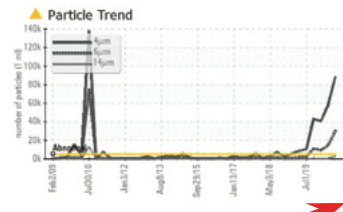
Referred to as the Acid Number, this titration test measures the acid level of the sample fluid. The production of acidic material causes oxidation degradation or aging of most fluids. The activity is promoted by elevated temperatures, presence of entrained metal particles, and intimate contact with air. It is the rate of increase of the Total Acid Number (TAN) during any given time period that is significant, not just the absolute value.

# Par-Test™

## Fluid Analysis



### OIL ANALYSIS REPORT



VISUAL	method	limit/base	current	history 1	history 2
White Metal	scalar	*Visual	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE
Precipitate	scalar	*Visual	NONE	NONE	NONE
Silt	scalar	*Visual	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.05	NEG	NEG
Free Water	scalar	*Visual	NEG	NEG	NEG

FLUID PROPERTIES	method	limit/base	current	history 1	history 2
Visc @ 40°C	cSt	ASTM D445	68.8	65.7	65.5

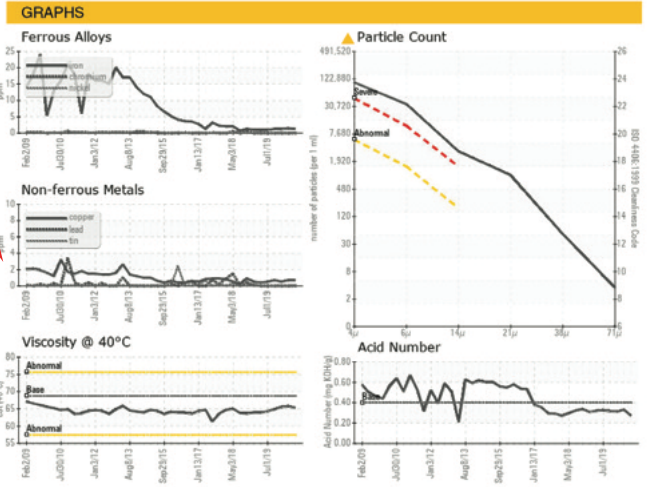
SAMPLE IMAGES	method	limit/base	current	history 1	history 2
Color					
Bottom					

### Water Analysis

Water in a hydraulic system can cause cavitation and premature wear that can lead to catastrophic failures of equipment in some cases. Both Free Water and the PPM of Emulsified Water are analyzed and presented.

### Viscosity Analysis

Viscosity is a very important property of a fluid in terms of system performance. Viscosity expresses the internal friction between molecules in the fluid. Typically, a breakdown in viscosity will be seen as an increase.



Sample No. : WC1234567  
 Lab Number : 01234567  
 Unique Number : 12345678  
 Test Package : IND 2

Received : 27 Aug 2020  
 Diagnosed : 28 Aug 2020  
 Diagnostician : Don Baldrige

Cusany Logistics Inc.  
 1212 Industrial Place  
 Centerville, OH  
 USA 75900  
 Contact: Jim Leduc  
 abc123@cusanylogisticsinc.com  
 T: (305)555-1212  
 F: (305)555-1222

To discuss this sample report, contact Customer Service at 1-800-237-1369.  
 \* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.  
 Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)

Report Id: CUSANY [WUSCAR] 01234567 (Generated: 01/04/2023 10:49:16) Rev: 1

Contact/Location: Sarah Smith - Base Plant  
 Page 2 of 2

### Graphs

The graphs provided on the analysis report allow for easily identifying trends over the lifecycle of a piece of equipment.

The graphs provide historical trends for Particle Count, Ferrous Alloys, Non-Ferrous Metals, and Acid Number.

The Viscosity and Particle Count graphs also provide references to abnormal and severe results.

# Par-Test™

## Fluid Analysis

### SAMPLING PROCEDURE

Obtaining a fluid sample for analysis involves important steps to make sure you are getting a representative sample. Often erroneous sampling procedures will disguise the true nature of system cleanliness levels. Use one of the following methods to obtain a representative system sample.

#### I. For systems with a sampling valve

- A. Operate system for at least 1/2 hour.
- B. With the system operating, open the sample valve allowing 200 ml to 500 ml (7 to 16 ounces) of fluid to flush the sampling port. (The sample valve design should provide turbulent flow through the sampling port.)
- C. Using a wide mouth, pre-cleaned sampling bottle, remove the bottle cap and place in the stream of flow from the sampling valve. Do NOT “rinse” out the bottle with initial sample.
- D. Close the sample bottle immediately. Next, close the sampling valve. (Make prior provision to “catch” the fluid while removing the bottle from the stream.)
- E. Tag the sample bottle with pertinent data; include date, machine number, fluid supplier, fluid number code, fluid type, and time elapsed since last sample (if any).

#### II. Systems without a sampling valve

There are two locations to obtain a sample in a system without a sampling valve: in-tank and in the line. The procedure for both follows:

##### A. In the Tank Sampling

1. Operate the system for at least 1/2 hour.
2. Use a small hand-held vacuum pump to extract sample. Insert sampling device into the tank to one half of the fluid height. You will probably have to weight the end of the sampling tube. Your objective is to obtain a sample in the middle portion of the tank. Avoid the top or bottom of the tank. Do not let the syringe or tubing come in contact with the side of the tank.
3. Put extracted fluid into an approved, pre-cleaned sample bottle as described in the previous sampling valve method.
4. Cap immediately.
5. Tag with information as described in sampling valve method.

##### B. In-line Sampling

1. Operate the system for at least 1/2 hour.
2. Locate a suitable valve in the system where turbulent flow can be obtained (ball valve is preferred). If no such valve exists, locate a fitting which can be easily opened to provide turbulent flow (tee or elbow).
3. Flush the valve or fitting sample point with a filtered solvent. Open valve or fitting and allow adequate flushing. (Take care to allow for this step. Direct sample back to tank or into a large container. It is not necessary to discard this fluid.)
4. Place in an approved, pre-cleaned sample bottle under the stream of flow per sampling valve methods.
5. Cap sample bottle immediately.
6. Tag with important information per the sampling valve method.

Note: Select a valve or fitting where the pressure is limited to 200 PSIG (14 bar) or less.



Hydraulic & Fuel Filtration Division

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Last updated August 4th, 2023

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# DuraClean™

## Premium Hydraulic Fluid



ENGINEERING YOUR SUCCESS.

# Parker DuraClean™

Starts Clean. Stays Clean.

DuraClean™ hydraulic fluid was developed with a totally unique 'Clean Technology.' This fluid innovation keeps harmful deposits from settling on components. These deposits can lead to system damage, component replacement, unanticipated downtime and compromised performance. Parker DuraClean™ makes it possible for hydraulic systems to 'Start Clean and Stay Clean.'

Durable performance allows the formulation to provide excellent protection of components even after the fluid has been used extensively. Varnish protection solutions provide proven performance and viscosity retention in wide temperature range, setting Parker DuraClean™ apart from competitive fluids.

## Performance Features

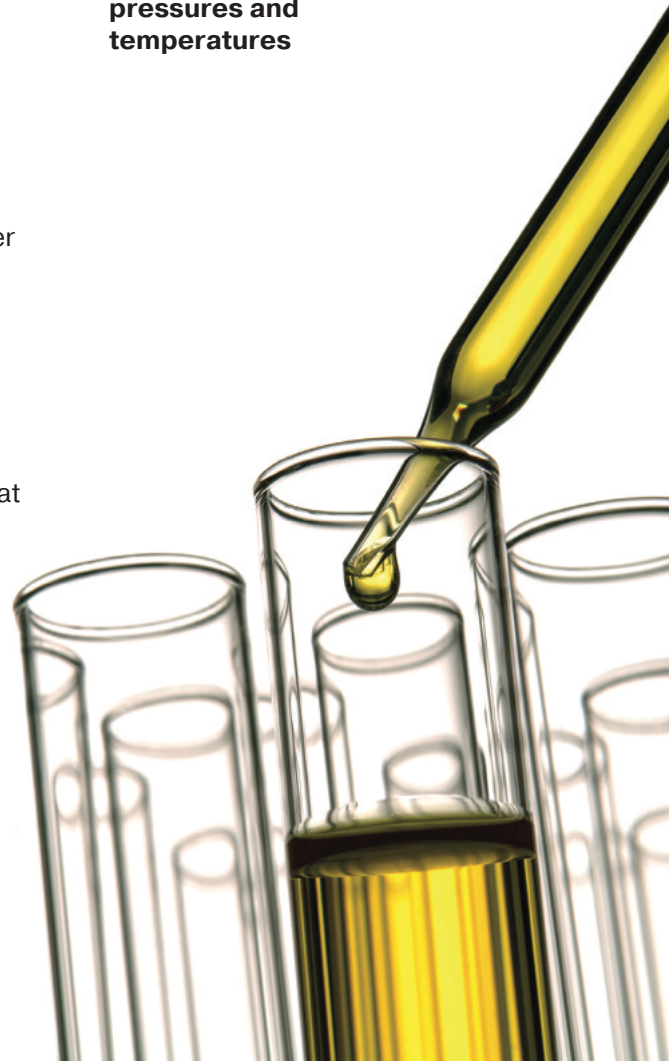
- ISO 46, all season, multigrade hydraulic fluid
- Replaces ISO 32, 46, and 68 monogrades
- API Group II base oil extends oil life
- High viscosity index for wide operating temperature ranges
- Outstanding oxidation life to maximize component life
- Prevents varnish formation
- Clean, as packaged, to ISO 17/15/12 cleanliness standard
- Special formulation that allows for rapid air release and water separation
- Excellent filterability to minimize filter blockage
- Outstanding acrylate anti-foam agent contains no silicones, which can lead to inaccurate particle counts
- Excellent shear stability for stable viscosity over time
- Superior thermal stability for uncompromised performance at high temperatures
- Parker gold dye for easy identification
- Formulated to help extend the life of hoses and seals

## Performance Approvals

- Parker Hannifin HF-0 (Denison HF-0)
- Eaton Vickers brochure 03-401-2010 (M-2950-S and I-286-S)
- Cincinnati Machine P-70
- Meets DIN 51524 Part 3 requirements
- Meets US Steel 127

## Applications

- **Drain-and-change for most industrial and mobile hydraulic systems specifying mineral-based oil**
- **Top-treat for replenishing hydraulic systems already using VG 32, 46, and 68 hydraulic oils**
- **Wide operating temperature range requirements**
- **High performance hydraulic power units and equipment**
- **Systems with high pressures and temperatures**



# Parker DuraClean™

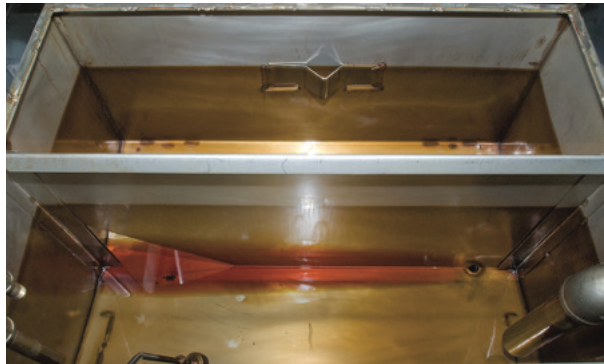
## DuraClean™ vs. Varnish

	Without DuraClean™	With DuraClean™
<b>Oil Flow</b>	Leaves critical system components starved for lubrication and leads to part failure	Keeps system protected and extends component life
<b>Filters</b>	Develops plugged filters which forces fluids to bypass filters increasing contaminants and excessive wear and necessitates extra filter changes	Protects system from contaminants and plugged filters
<b>Valves</b>	Creates loss of system control which has a negative impact on productivity and results in downtime for cleaning and repairs	Maintains system cleanliness and keeps valves free from damaging varnish
<b>Friction</b>	Creates higher friction causing increases in fuel and energy consumption, component wear and lower productivity	Improves system efficiency, extends component life and maintains productivity
<b>Thermal Stability</b>	Promotes oxidation of fluid and thermal breakdown, creating varnish and increasing wear	Keeps system operating at cooler temperatures allowing the oil and the components to last longer
<b>Varnish Protection</b>	Increases the need for frequent cleaning and repairs	Minimizes the need for frequent cleaning and repairs
	<b>Varnish</b>	<b>No Varnish</b>

# Parker DuraClean™

DuraClean™ vs. Varnish

## Without Parker DuraClean™ – Varnish

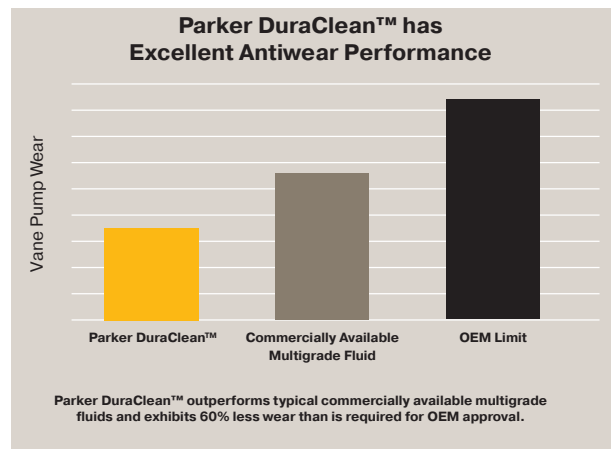
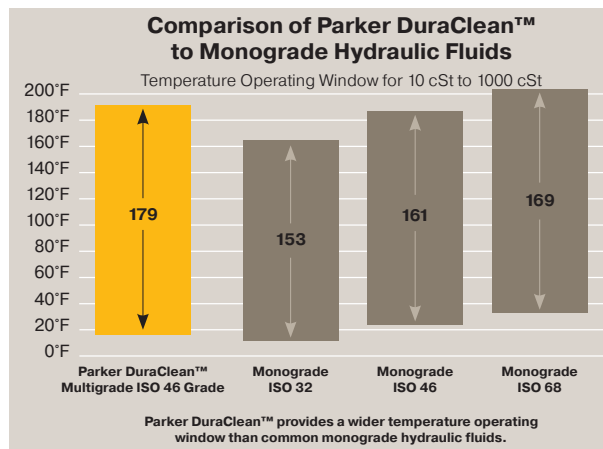


Varnish is attracted to metal surfaces, this results in an overall decrease in productivity.

## With Parker DuraClean™ – No Varnish



Parker DuraClean™ prevents the harmful build-up of varnish, keeping systems clean and operating at peak efficiency.



If a hydraulic system is dirty, simply using Parker DuraClean will not clean it up, but it will effectively prevent the formation of varnish in a clean system and keep the delicate balance of additive performance intact.

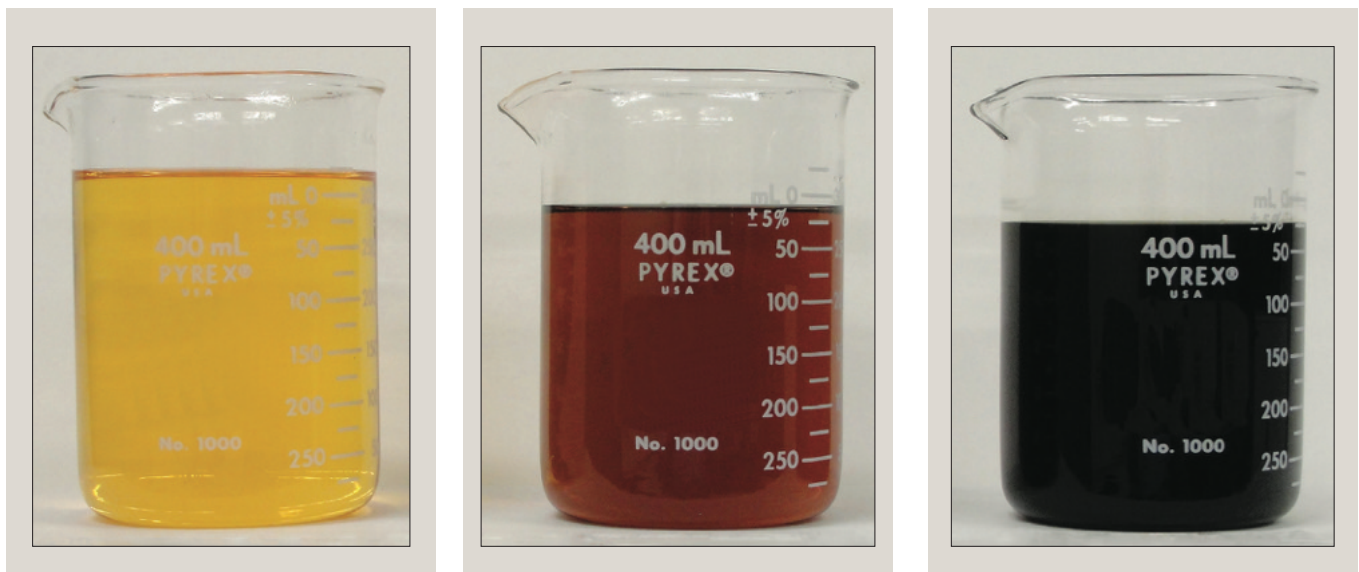
# Visual Representation of New Fluid Cleanliness

vs.

# Fluid Oxidation After 1,300 Hours



Initial samples taken directly from a 5 gallon pail



Same samples after 1,300 hours of exposure @ 200°F

Lab Report #8090 On-File

# Parker DuraClean™

## Specifications

Typical Properties	Test Method	
ISO Grade		Multigrade 46
Appearance		Parker Gold
Specific Gravity @ 15°C	D4052	.867
Flash Point (COC) °F(°C)	D92	413 (212)
Pour Point °F(°C)	D97	-43 (-42)
Viscosity	D445	
cSt @ 40°C		44.30
cSt @ 100°C		7.65
Viscosity Index	D2270	<b>141</b>
Acid Number, mg KOH/g TAN	D664	0.6
Oxidation, hrs.	D943	<b>5500 - 6000 Typical</b>
Rust Test	D665A/D665B	Pass
Denison Filterability		
Dry, time in seconds		172 (600 maximum limit)
Wet, time in seconds		202 (344 maximum limit)
Thermal Stability, sludge in mg		<b>2.5</b> (25 maximum limit)
Shear Stability	KRL	
% viscosity loss after 20 test hours		<b>4.3</b> (15 maximum limit)

## Ordering Information

Package Size	Part Number	Minimum Order Qty.
Jug (2 1/2 gal.)	942180	72
Pail (5 gal.)	941907	24
Drum (55 gal.)	942125	4
Tote (275 gal.)	942126	1

Other volumes may be available. Please consult factory.



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## Reservoir Accessories

Filler Breathers, Strainers, Diffusers,  
Fluid Level/Temperature Gauges



ENGINEERING YOUR SUCCESS.

# Reservoir Accessories

## Non-Metallic Filler Breathers

Anti-Splash Design

### Specifications

#### Materials:

Body: Non-corrodible glass filled nylon

Valve: Nylon/Nitrile

Dipstick: ABS, acetal Hi/Lo indicators

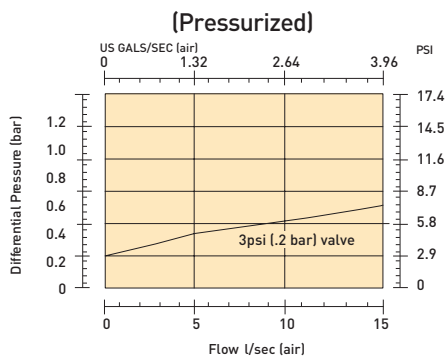
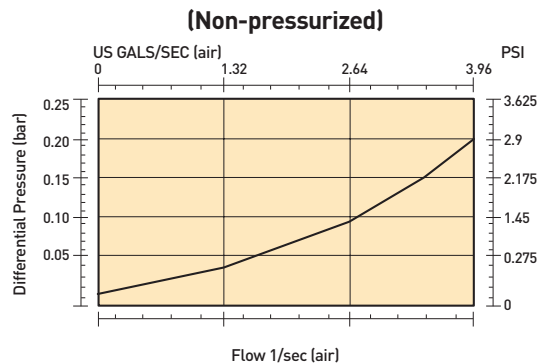
**Filtration Element:** Expanded polyurethane foam, 10 micron

**Operating Temperatures:** -22°F (-30°C) to 195°F (90°C)

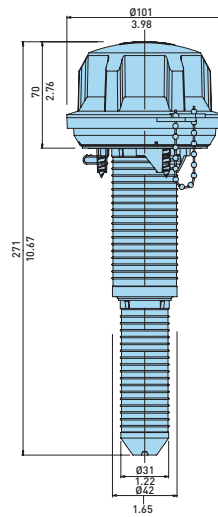
**Seals:** Nitrile (single-hole), cork gasket (six-hole)

**Pressurization Options:** 3 psi (0.2 bar)

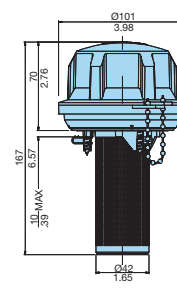
**Dipstick<sup>1</sup>:** (optional) 7.9 in. (200 mm) or 15.8 in. (400 mm) lengths with adjustable Hi/Lo indicators



Telescopic Strainer



Single-Hole Option



Six-Hole Option



TANK MOUNTING HOLE 0.63  
NOTE: REFER TO UCC PRODUCTION INSTRUCTIONS FOR ASSEMBLY DETAILS AND PACKING REQUIREMENTS

Linear Measurement =  $\frac{\text{mm}}{\text{in}}$

### Non-pressurized

Single-Hole Part Number	Six-Hole Part Number	Micron Rating	Description	Screws*
AB98210011	AB.98810011.UC	10	Filler breather w/ 3.7" (95 mm) strainer	(6)-#10x.5
AB98210021	AB.98810021.UC	10	Filler breather w/ telescopic strainer	(6)-#10x.5

### Pressurized

Single-Hole Part Number	Six-Hole Part Number	Micron Rating	Description	Screws*
Not available	AB.98812021.UC	10	3 psi (.2 bar) with telescopic strainer	(6)-#10x.5

### Dipsticks

Part Number	Description
B68206	Pack of (10) x 7.9"
B68207	Pack of (10) x 15.8"

\* Mounting screws for six-hole only  
1 Dipstick cannot be used with the compact breather series

Drawings are for reference only.  
Contact factory for current version.

# Reservoir Accessories

## Non-Metallic Breathers

### Threaded Type

#### Specifications

##### Materials:

Body: Nylon 66

Valve: Nylon/Nitrile

Dipstick: ABS, acetal Hi/Lo indicators

**Filtration Element:** Expanded polyurethane foam, 10 micron

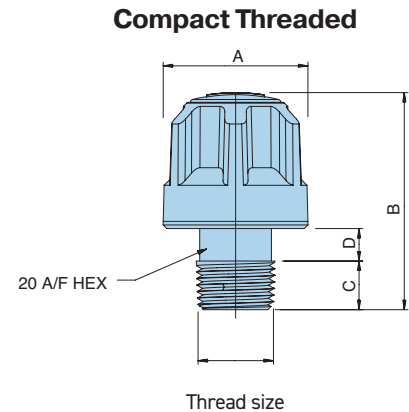
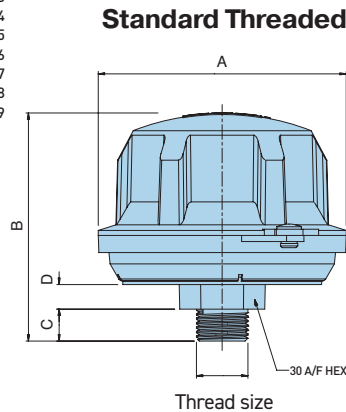
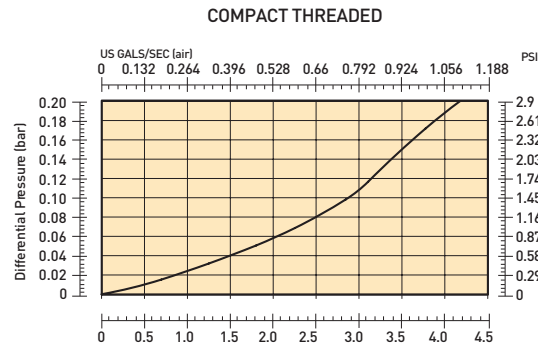
**Operating Temperatures:** -22°F (-30°C) to 195°F (90°C)

**Seals:** Nitrile

**Pressurization Options:** 3 psi (0.2 bar)

**Dipstick<sup>1</sup>:** (optional) 7.9 in. (200 mm) or 15.8 in. (400mm) lengths with adjustable Hi/Lo indicators

### Anti-Splash Design



#### Compact Threaded (dimensions inches(mm))

Single-Hole Part Number	Micron Rating	Thread	Pressure	A	B	C	D
943296*	10	1/4" NPT	non-pressurized	1.6 (40)	2.2 (57)	.55 (14)	.24 (6)
943298*	10	1/2" NPT	non-pressurized	1.6 (40)	2.4 (60)	.53 (13.5)	.35 (9)
942642*	10	3/4" NPT	non-pressurized	1.6 (40)	2.4 (60)	.55 (14)	.35 (9)
943297	10	3/8" NPT	non-pressurized				

#### Standard Threaded (dimensions inches(mm))

Single-Hole Part Number	Micron Rating	Thread	Pressure	A	B	C	D
AB.98410201.UC	10	3/4" NPT	non-pressurized	4.0 (101)	3.8 (95)	.63 (16)	.39 (10)
AB.98412201.UC	10	3/4" NPT	3 psi (.2 bar)				

#### Dipsticks

Part Number	Description
B68206	Pack of (10) x 7.9"
B68207	Pack of (10) x 15.8"

\* Pack of (10) pieces  
 1 Dipstick cannot be used with the compact breather series

Drawings are for reference only.  
 Contact factory for current version.

# Reservoir Accessories

## Metal Filler Breathers

### Flange Type

#### Specifications

##### Materials:

Cap & Plate: Nickel chrome plated steel

Valve: Nylon/Nitrile

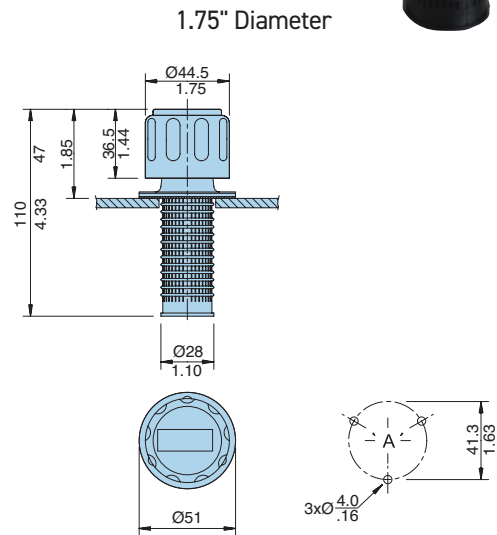
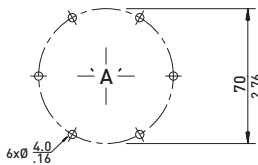
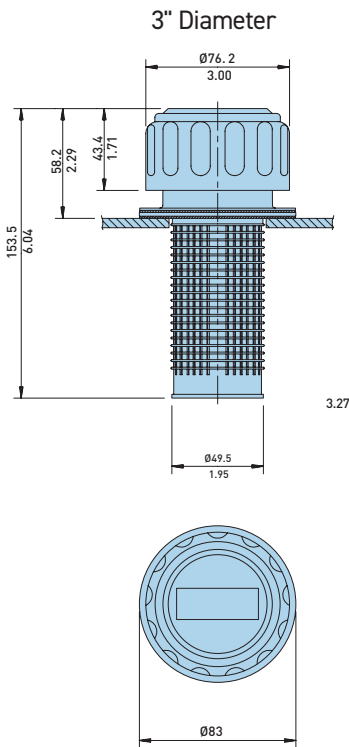
**Gasket:** Cork

**Filtration Element:** Expanded polyurethane foam, 10 micron

**Operating Temperatures:** -22°F (-30°C) to 195°F (90°C)

**Seals:** Nitrile

**Pressurization Options:** none, 5 psi (0.35 bar)



Linear Measurement =  $\frac{\text{mm}}{\text{in}}$

Drawings are for reference only.  
Contact factory for current version.

#### Flange type, Non-pressurized (dimensions inches(mm))

Part Number	Cap Assembly	Micron Rating	Air Flow	Description	Screws
AB116310	CAP.1163.10	10	2 gal/sec (7.5 l/sec)	3 (76) diameter	(6)-#10x.5
5561	NA	10	2 gal/sec (7.5 l/sec)	3 (76) diameter w/ lock lug	(6)-#10x.5
AB.1380.10	CAP.1380.40	10	1.3 gal/sec (5 l/sec)	1.75 (44.5) diameter	(6)-#10x.5

#### Flange type, Pressurized (dimensions inches(mm))

Part Number	Cap Assembly	Micron Rating	Air Flow	Description	Screws
PAB.1730.10.5	CAP.1730.40.5	10	2 gal/sec (7.5 l/sec)	5 psi (.35 bar), 3" (76mm) diameter	(6)-#10x.5

# Reservoir Accessories

## Metal Breathers

### Threaded Type

#### Specifications

##### Materials:

Cap & Plate: Nickel chrome plated steel

Valve: Nylon/Nitrile

Gasket: Cork

Filtration Element: Expanded polyurethane foam, 10 micron

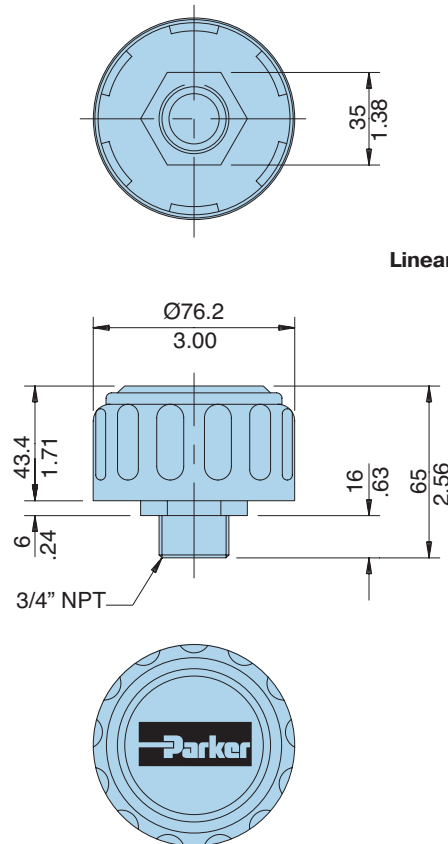
Operating Temperatures: -22°F (-30°C) to 195°F (90°C)

Seals: Nitrile

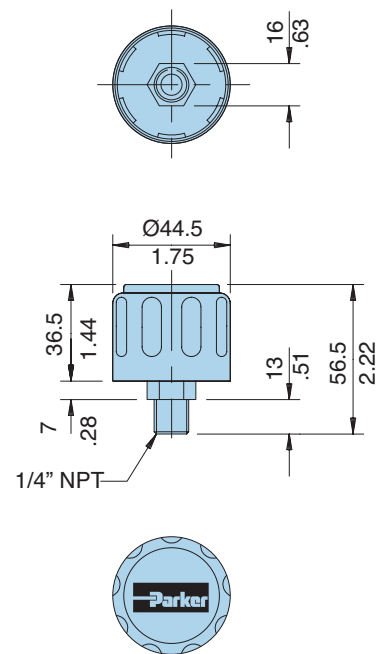
Pressurization Options: none, 5 psi (0.35 bar)



3/4" Threaded



1/4" Threaded



Linear Measurement  $\frac{\text{mm}}{\text{in}}$

Drawings are for reference only.  
Contact factory for current version.

#### Threaded, Non-pressurized (dimensions inches(mm))

Single-Hole Part Number	Micron Rating	Thread	Air Flow	Description
SAB.1562.10.NPT	10	3/4" NPT	1.3 gal/sec. (5 l/sec)	3 (76) diameter
SAB.1563.10.NPT	10	1/4" NPT	0.7 gal/sec. (2.5 l/sec)	1.75 (44.5) diameter

# Reservoir Accessories

## Breathers - Spin-On Type



### Specifications

**Materials:** Canister: Low Carbon Steel  
**Multi-layer Filtration:** 2 diffusion filters, activated carbon filter, 3 $\mu$  PTFE filter, 100 $\mu$  stainless steel filter  
**Operating Temperatures:** -40°F (-40°C) to 302°F (150°C)  
**Seals:** None

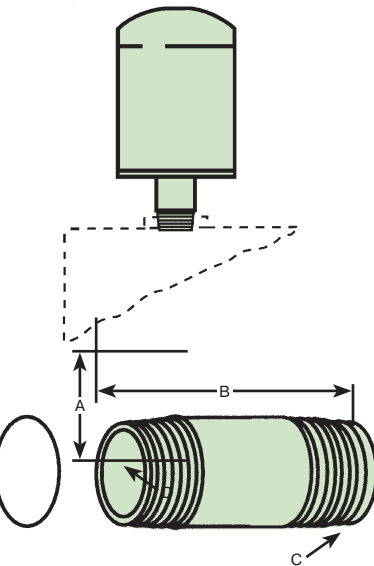
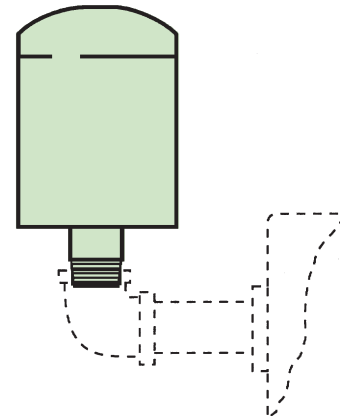
### Sizing

Select the proper size canister for the maximum rate of reservoir draw down or air exchange rate. As a rule of thumb, clean pressure drop should be limited to 0.18 psid (5" H<sub>2</sub>O).

A pipe flange, weld collar, etc. may be used to connect the adapter kit to the reservoir. Make sure that air is not able to leak around the adapter. When mounting on the side of the reservoir, make sure the installation is above the surface of the fluid.

Recommended canister change out is after 500 hours of operation. More frequent replacement may be required when operated in heavily contaminated areas such as grinding operations, primary metal mills, and on mobile equipment. Under such conditions, increase replacement frequency to every 250 hours.

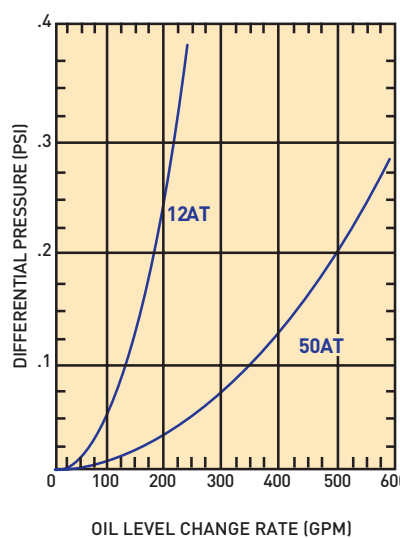
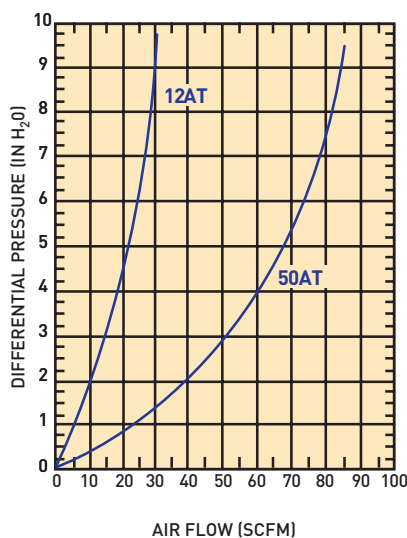
### Typical Installations mounted on side or top of reservoir



Model	Air Rating*	Canister	Adapter Kit
12AT-03C	1 micron	926543	926876
12AT-10C	2 micron	921999	926876
12AT-25C	5 micron	925023	926876
50AT-03C	1 micron	926541	926875
50AT-10C	2 micron	926169	926875
50AT-25C	5 micron	926170	926875

\* 99% Removal efficiency for particles larger than the stated size in air.

Graphs are for 03C canisters only.



	12AT	50AT
PN	926876	926875
A	26.70 (1.05)	42.70 (1.66)
B	66.80 (2.63)	85.10 (3.35)
C	3/4" NPT	1-1/4" NPT
D	1"-12 UN	1-1/2"-16 UN

Allow 1.25" for canister removal clearance

Linear Measure:  $\frac{\text{millimeter}}{\text{inch}}$

# Reservoir Accessories

## Diffusers

### Specifications

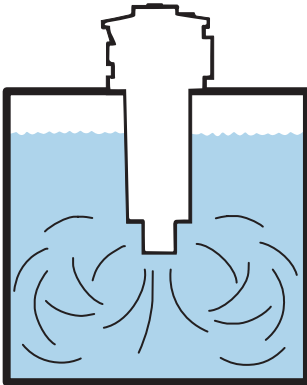
**Operating Temperatures:** 195°F (90°C) maximum

**Materials:** Body & end cap: Zintec  
Head: glass-filled nylon

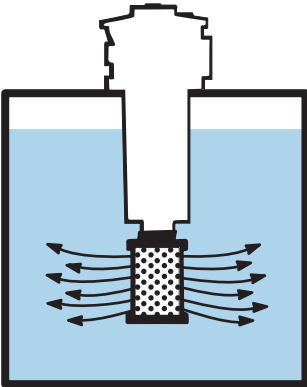
**Weight:** See chart below

### Benefits:

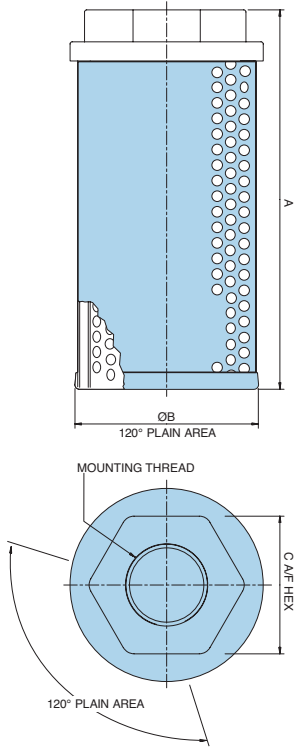
Installing a diffuser in a hydraulic reservoir is a simple change that can make a dramatic difference in system efficiency. With special concentric tubes designed with discharge holes 180° opposed, fluid aeration, foaming and reservoir noise are reduced. Pump life is also extended by reducing cavitation to the pump inlet. The effects of fitting a system with a diffuser are shown below.



Flow without diffuser



Flow with diffuser fitted



Part Number	Thread (NPT)	Nominal Flow gpm (lpm)	Length A inch (mm)	Diameter B Inch (mm)	HEX C inch (mm)	Weight lbs (kg)
2250	3/4"	13 (50)	4.7 (120)	2.4 (62)	1.81 (46)	0.60 (0.27)
2251	1"	30 (114)	5.0 (127)	3.4 (86)	2.17 (55)	0.93 (0.42)
2252	1 1/2"	60 (227)	7.0 (178)	3.4 (86)	2.56 (65)	1.23 (0.56)
2253	2"	120 (454)	9.5 (242)	3.4 (86)	2.95 (75)	1.52 (0.69)

# Reservoir Accessories

## Fluid Level/Temperature Gauges

### Specifications

**Materials:**

Lens: Transparent polyamide

Lens base: Nylon 66

Shroud: High impact polystyrene (no aluminum content)

**Seals:** Nitrile

**Maximum Operating Pressure:** 14.7 psi (1 bar)

**Operating Temperatures:** -22°F (-30°C) to 195°F (90°C)

**Thermometer Range:** 90°F to 210°F (30°C to 90°C)

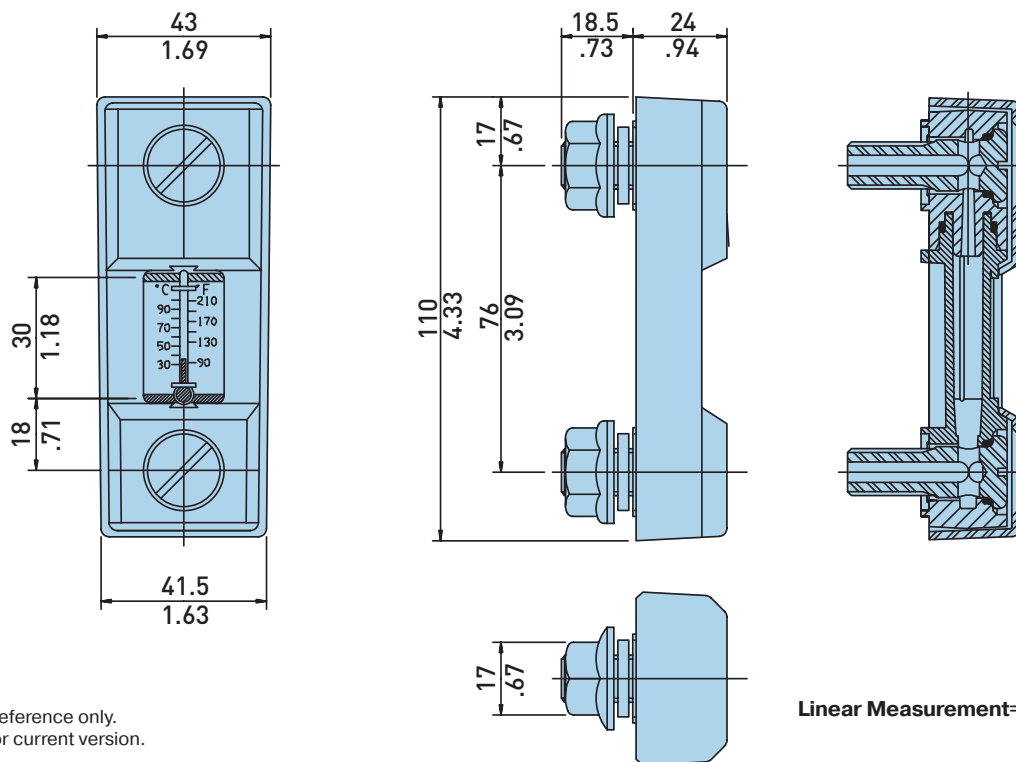
**Indicator:** Blue alcohol

**Fluid Compatibility:** Mineral and petroleum based fluids

**Mounting:** Front or rear fixing, two holes (M10)



### Length 3



Drawings are for reference only.  
Contact factory for current version.

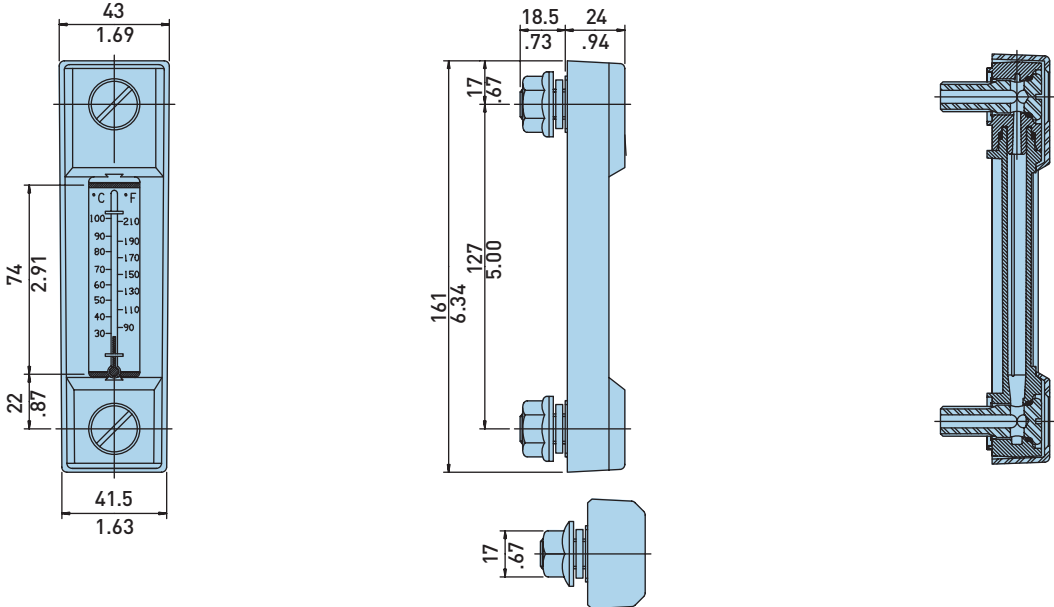
Linear Measurement— $\frac{\text{mm}}{\text{in}}$

Part Number	Thread	Length	Description
FL69121	M10	3	Fluid level and temperature
FL69221	M10	5	Fluid level and temperature
FL69321	M10	10	Fluid level and temperature

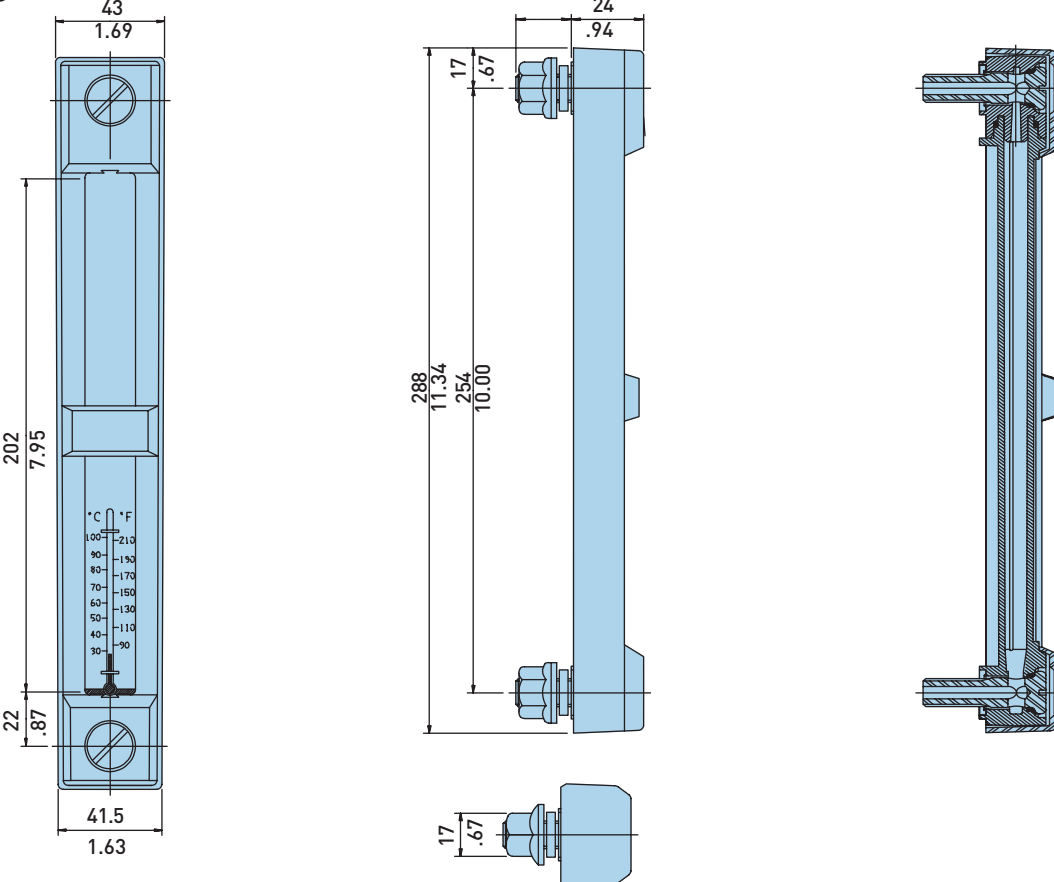
# Reservoir Accessories

## Fluid Level/Temperature Gauges

### Length 5



### Length 10



Linear Measurement  $\frac{\text{mm}}{\text{in}}$

Drawings are for reference only. Contact factory for current version.

# Reservoir Accessories

## Suction Strainers

### Specifications

#### Materials:

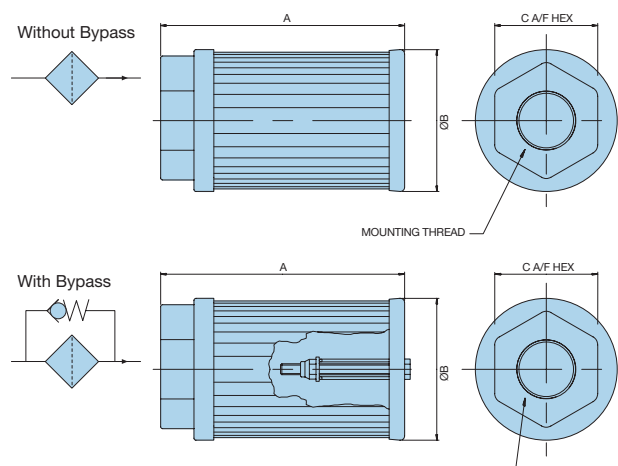
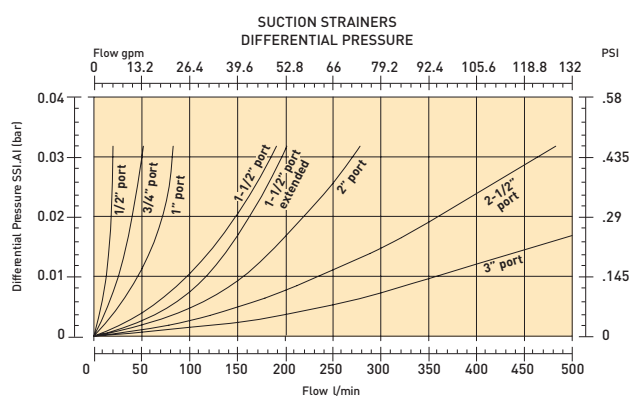
Media: Stainless steel  
 Tube and endcap: Zintec  
 Head: glass filled nylon

**Filtration Element:** 100 mesh (149 micron)

**Operating Temperatures:** 195°F (90°C) maximum

**Bypass:** None, 3 psi (0.2 bar)

**Weight:** See chart below



Part Number With Bypass	Bypass	Port (NPT)	Nominal Flow GPM (LPM)	Length "A" Inch (mm)	Diameter "B" Inch (mm)	BSPF Fitting
937480	No	1/2"	5 (19)	4.125 (104.8)	1.90 (48.3)	No
937481	Yes	1/2"	5 (19)	4.125 (104.8)	1.90 (48.3)	No
937482	No	3/4"	8 (30)	3.55 (90.2)	2.67 (67.8)	No
937483	Yes	3/4"	8 (30)	3.55 (90.2)	2.67 (67.8)	No
937484	No	1"	10 (38)	5.25 (133.4)	2.67 (67.8)	No
937485	Yes	1"	10 (38)	5.25 (133.4)	2.67 (67.8)	No
937488	No	1-1/2"	30 (114)	8.01 (203.5)	3.47 (88.4)	No
937489	Yes	1-1/2"	30 (114)	8.01 (203.5)	3.47 (88.4)	No
937490	No	1-1/2"	50 (189)	9.85 (250.2)	4.00 (101.6)	No
937491	Yes	1-1/2"	50 (189)	9.85 (250.2)	4.00 (101.6)	No
937492	No	2"	50 (189)	9.85 (250.2)	4.00 (101.6)	No
937493	Yes	2"	50 (189)	9.85 (250.2)	4.00 (101.6)	No
937494	No	2-1/2"	75 (284)	10.10 (256.5)	5.17 (131.3)	No
937495	Yes	2-1/2"	75 (284)	10.10 (256.5)	5.17 (131.3)	No
937496	No	3"	100 (378)	11.50 (292.1)	5.17 (131.3)	No
937497	Yes	3"	100 (378)	11.50 (292.1)	5.17 (131.3)	No

# Reservoir Accessories

## Magnetic Suction Strainers

### Magnetic Suction Strainers

**Dual protection, without cavitation!**

Parker's new magnetic suction strainers offer dual protection to the pump inlet without risk of cavitation.

Powerful ceramic magnets located parallel to the pleated mesh attract and protect against damaging ferrous particles of all sizes.

The pleated stainless steel screen provides additional filtration protection for larger particles that would result in catastrophic failure.

The generous open area of the stainless steel pleated mesh screen eliminates the possibility of pump cavitation.



Parker's magnetic suction strainers are available in sizes ranging from one to three inches.

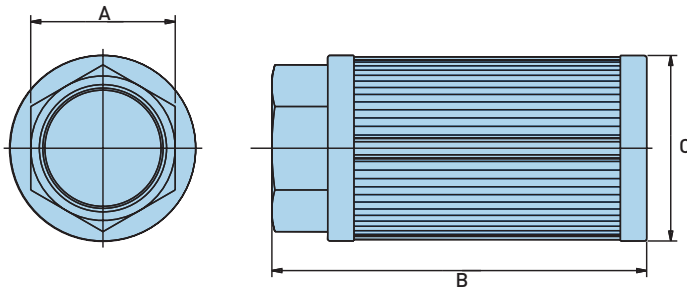
### Ordering Information

The information below shows the part numbers, specifications and dimensions of available suction strainers, to help you meet the needs of your specific application.

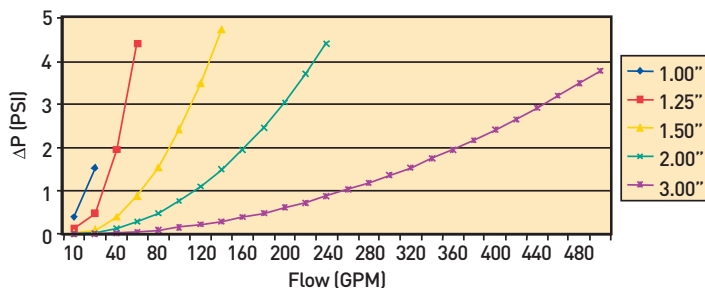
NOTE: All sizes are standard with 30 mesh screen (560 micron).

Part Number	NPT Connection	Flow GPM (LPM)	Dimensions			Approx. Shipping Weight lbs. (kg)
			A inches (mm)	B inches (mm)	C inches (mm)	
936547	1.00"	15 (55)	1.88 (47.75)	5.19 (131.83)	3.09 (78.49)	1.59 (0.72)
936548	1.25"	25 (95)	2.38 (60.45)	7.39 (187.71)	3.53 (89.66)	3.16 (1.43)
936549	1.50"	35 (135)	2.38 (60.45)	7.39 (187.71)	3.53 (89.66)	2.88 (1.31)
936550	2.00"	50 (190)	2.75 (69.85)	7.39 (187.71)	3.53 (89.66)	2.22 (1.01)
936551	3.00"	100 (380)	*	9.35 (237.49)	4.47 (113.54)	3.91 (1.77)

\*Part number 936551 features a 3" half coupling, not a hex nut.



Flow Vs. Pressure Loss



The rugged steel construction, combined with the generous filtration area, ensures reliable performance for suction applications



## Desiccant Breathers

Defends against moisture and particulate contamination

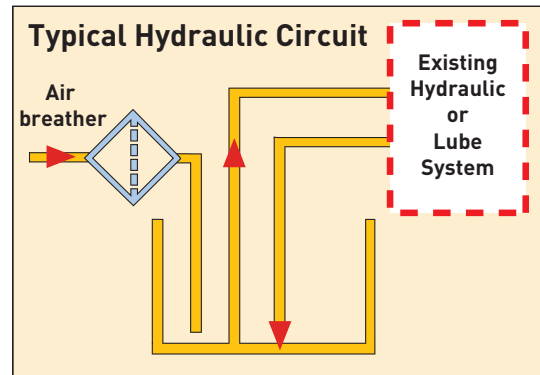


ENGINEERING YOUR SUCCESS.

# Desiccant Breathers

## Applications

- Reservoirs
- Mobile Equipment
- Gearboxes
- Transformers
- Storage Tanks
- Totes
- 55 Gallon Drums



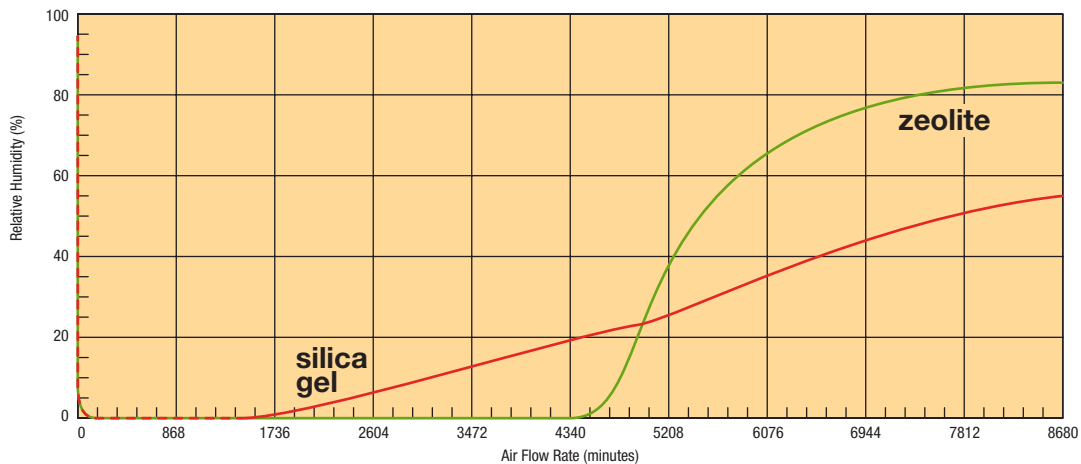
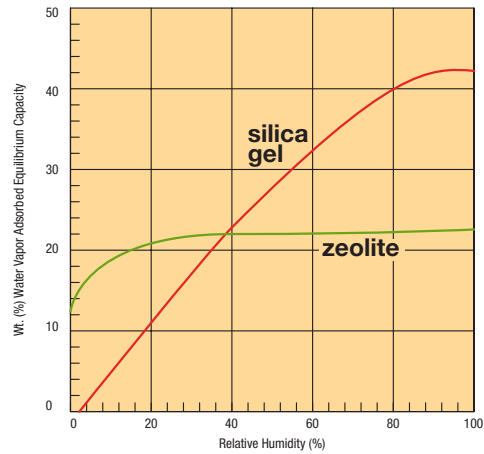
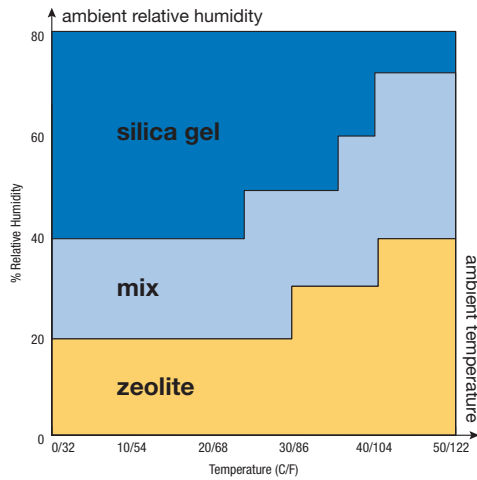
The Hydraulic and Fuel Filtration Division’s desiccant breather portfolio offers a wide selection of breather designs and desiccant types to deliver optimum performance. Reservoirs open to atmosphere are subject to an array of ambient conditions and require clean dry air on demand.

	<p><b>EZ Dri</b> <i>Zeolite Breather</i></p>	<ul style="list-style-type: none"> <li>• Reduces head space Relative Humidity to as low as 5%</li> <li>• Excellent temperature resistance for &gt;100°F applications</li> <li>• Color indicating beads provide visual identification for service on demand</li> </ul>
	<p><b>TriCeptor</b> <i>Silica Gel Breather</i></p>	<ul style="list-style-type: none"> <li>• Reduces head space Relative Humidity to as low as 20%</li> <li>• Excellent performance in high humidity (&gt;40% RH) environments</li> <li>• Color indicating desiccant provides visual identification for service on demand</li> </ul>
	<p><b>Mobile</b> <i>Rugged Breather</i></p>	<ul style="list-style-type: none"> <li>• EZ Dri or TriCeptor options available</li> <li>• Clean, dry air on demand via high flow check valves to maximize breather life</li> <li>• Rugged construction to withstand the most demanding service</li> </ul>
	<p><b>TriCeptor Plus</b> <i>80% Silica Gel 20% Zeolite</i></p>	<ul style="list-style-type: none"> <li>• Clean, dry air on demand via high flow check valves to maximize breather life</li> <li>• Mixed desiccant provides the ultimate application flexibility</li> <li>• Reduces head space Relative Humidity to as low as 5%</li> <li>• Color indicating desiccant provides visual identification for service on demand</li> </ul>
	<p><b>TriCeptor Extended</b> <i>80% Silica Gel 20% Zeolite</i></p>	<ul style="list-style-type: none"> <li>• Double the capacity of a standard breather</li> <li>• Clean, dry air on demand via high flow check valves to maximize breather life</li> <li>• Mixed desiccant provides the ultimate application flexibility</li> <li>• Reduces head space Relative Humidity to as low as 5%</li> <li>• Color indicating desiccant provides visual identification for service on demand</li> <li>• Integrated oilmist coalescer protects the desiccant from hydrocarbon contaminants</li> </ul>
	<p><b>ClearConnect</b> <i>Wired Relative Humidity Sensor</i></p>	<ul style="list-style-type: none"> <li>• Relative humidity sensor provides realtime system monitoring</li> <li>• Clean, dry air on demand via high flow check valves to maximize breather life</li> <li>• Standard or extended sizes to meet desired service intervals</li> <li>• Clear silica gel desiccant offers up to a 20% improvement in absorption capacity</li> </ul>

# Desiccant Breathers

## Selection Guide

Features	EZ Dri	TriCeptor	EZ Dri Mobile	TriCeptor Mobile	TriCeptor Plus	TriCeptor Extended	ClearConnect
Zeolite	X		X	X	X	X	
Color Indicating Silica Gel		X		X	X	X	
Clear Silica Gel							X
Mechanical Adsorption		X		X	X	X	X
1" Multi Fit Threaded Connection	X	X			X		X
1" FNPT Connection						X	X
1 1/2" SAE Connection			X	X			
Clean Air on Demand via high flow check valves				X	X	X	X
Wired Relative Humidity Sensor							X
Rugged Construction			X	X			
Increased Desiccant Volume						X	X
External Ribbing for Change Out	X	X			X		X
Integrated Stand Pipe	X	X	X	X	X	X	X
Honeycomb to Capture Oil Mist						X	X
Headspace RH% Minimized (<5%)	X		X		X	X	
Good for low humidity environments (<40%)	X		X		X	X	
Good for high humidity environments (>40%)		X		X	X	X	X



# E Z Dri

## Features

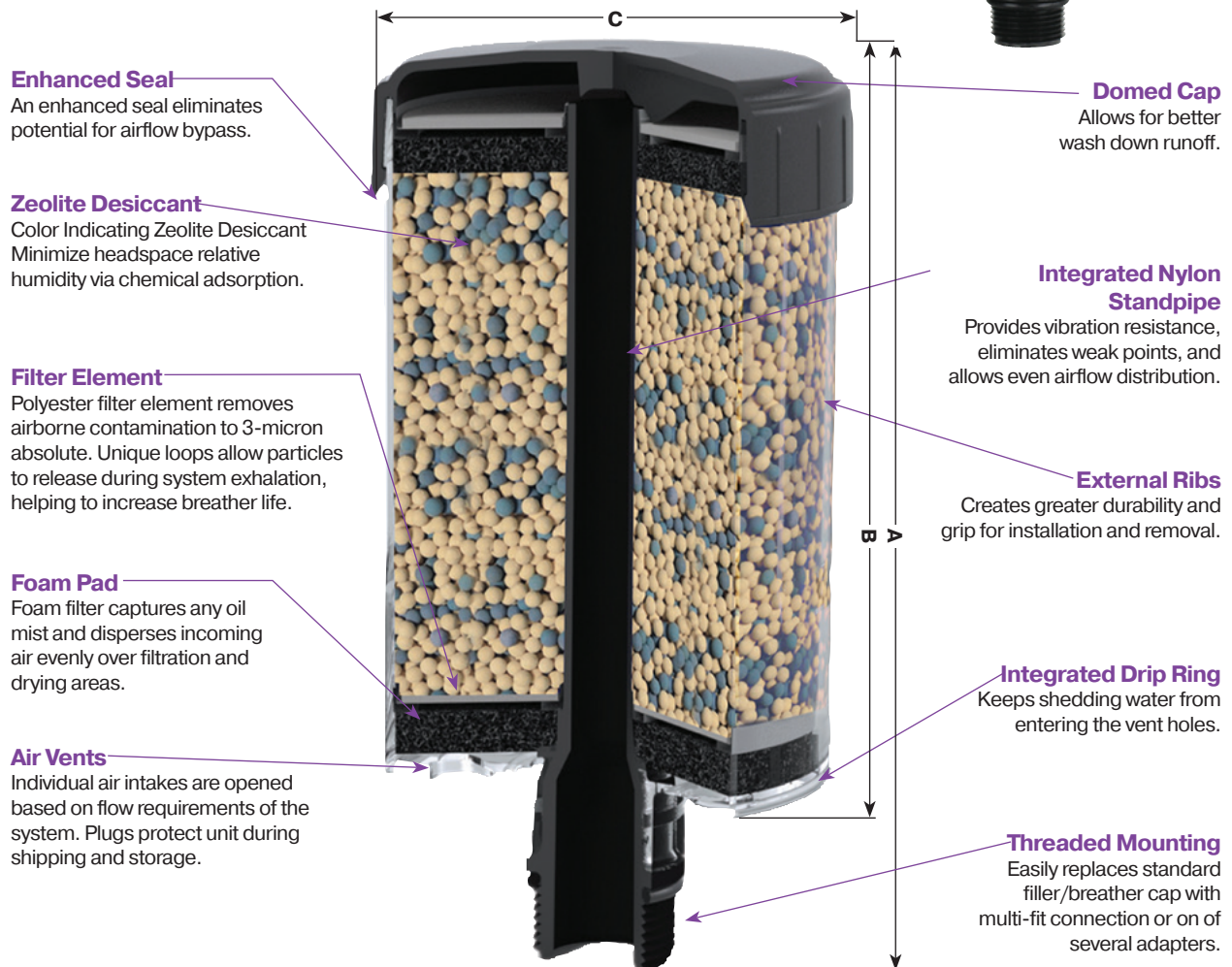
### Materials:

Housing: Polycarbonate, Nylon 6/6 30% Glass Filled, Polypropylene

**Filter Efficiency:** 3 $\mu$  absolute ( $\beta_3 \geq 200$ )

**Operating Temperatures:** -20°F (-29°C) to 200°F (93°C)

**Seals:** Nitrile, PVC



Part Number	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty
934330	6.00/152	5.33/135	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
934331	8.00/203	7.33/186	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
934332	10.00/254	9.33/237	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs

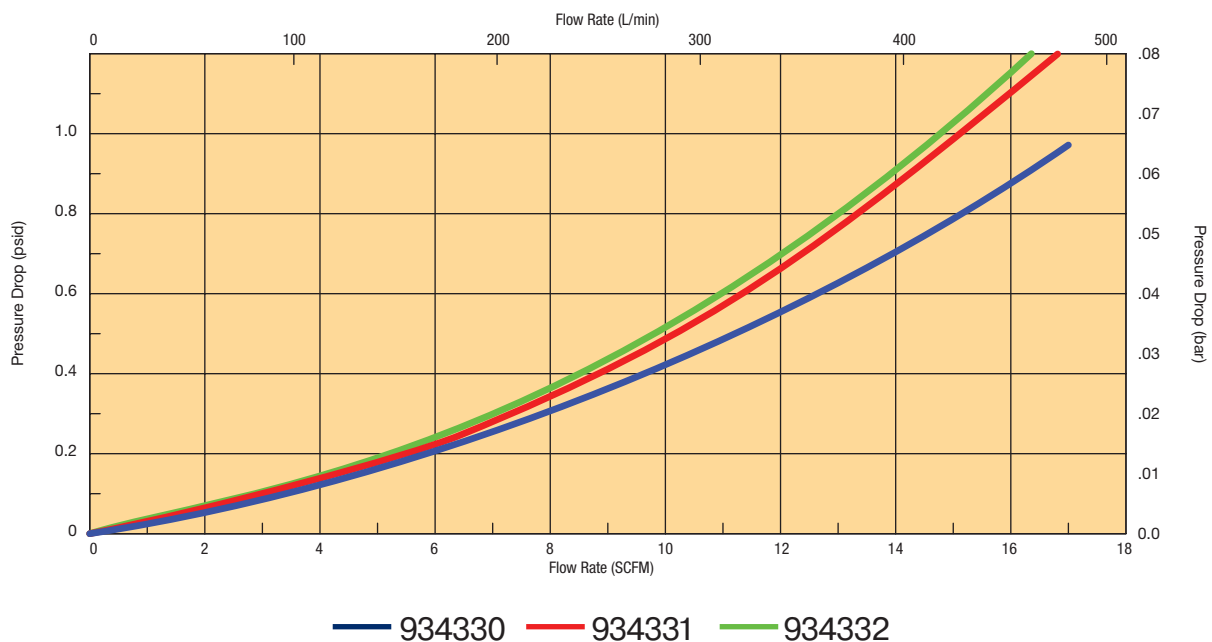
# E Z Dri

## Specifications

General Data	934330	934331	934332
Amount of ZEOLITE	0.83 lbs	1.33 lbs	1.81 lbs
	.376 kg	.603 kg	0.82 kg
Adsorption Capacity	84 ml	157 ml	209 ml
	2.8 fl oz	5 fl oz	7.1 fl oz
Net Weight of Unit	0.5 kg	0.8 kg	1.1 kg
	1.2 lbs	1.8 lbs	2.5 lbs
Filtration Area	8.4 in <sup>2</sup> / 54.2 cm <sup>2</sup>	8.4 in <sup>2</sup> / 54.2 cm <sup>2</sup>	8.4 in <sup>2</sup> / 54.2 cm <sup>2</sup>
Direction of Flow	Bidirectional	Bidirectional	Bidirectional
Operating Temp Range	-40°F to 302°F / -40°C to 150°C	-40°F to 302°F / -40°C to 150°C	-40°F to 302°F / -40°C to 150°C
Maximum Air Flow Rate	15 SCFM	15 SCFM	15 SCFM

### Air Flow Performance

The curves below show the air flow performance of the E Z Dri breathers. To ensure the longest life possible, the initial clean pressure drop should not exceed 1.0 psid (.07 bar).



# TriCeptor

## Features

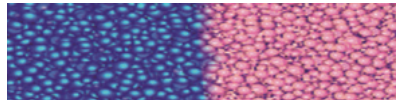
### Materials:

Housing: Polycarbonate, Nylon 6/6 30% Glass Filled, Polypropylene

**Filter Efficiency:** 3 $\mu$  absolute ( $\beta_3 \geq 200$ )

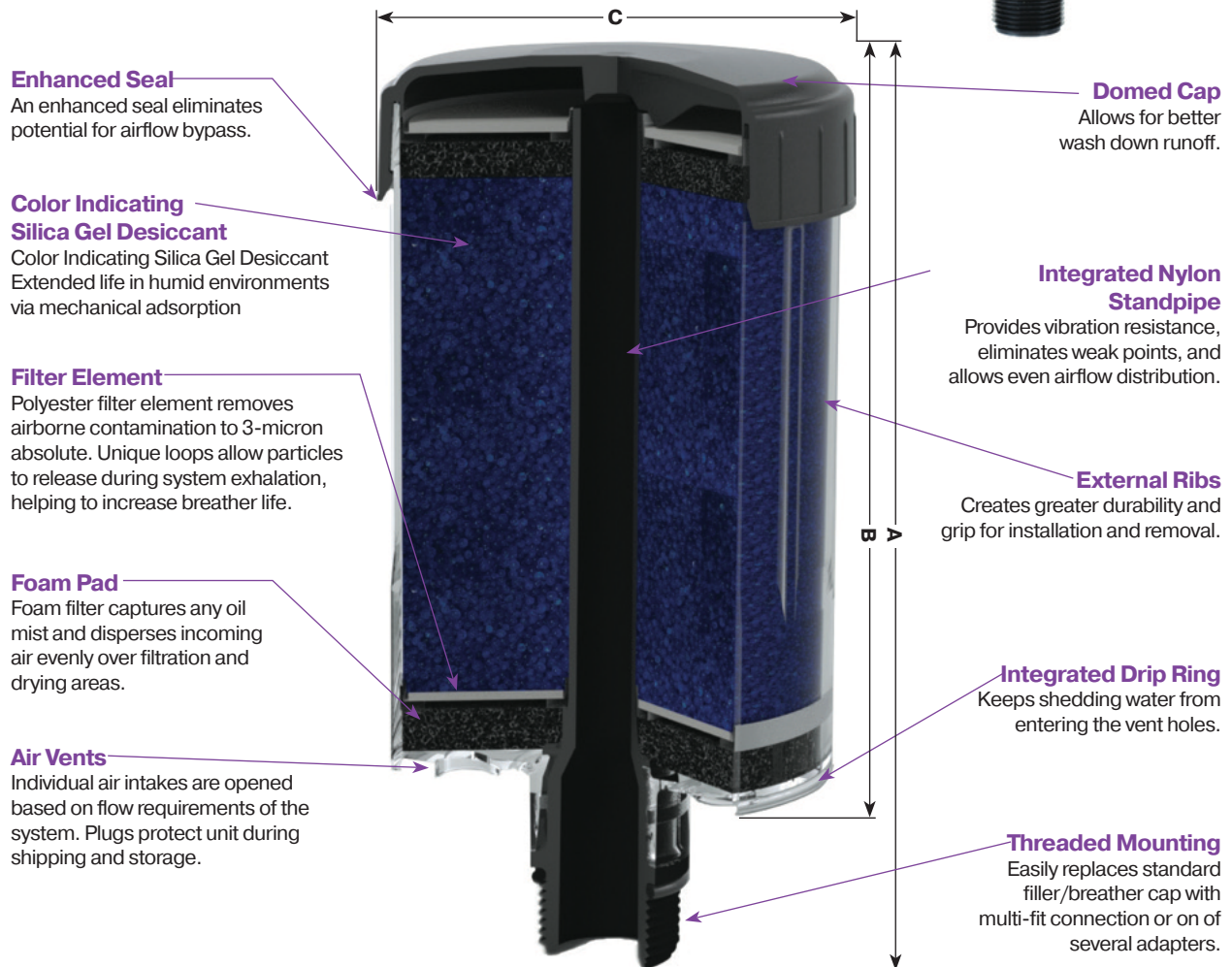
**Operating Temperatures:** -20°F (-29°C) to 200°F (93°C)

**Seals:** Nitrile, PVC



Active

Replace



Part Number	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty
934330T	6.00/152	5.33/135	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
934331T	8.00/203	7.33/186	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
934332T	10.00/254	9.33/237	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs

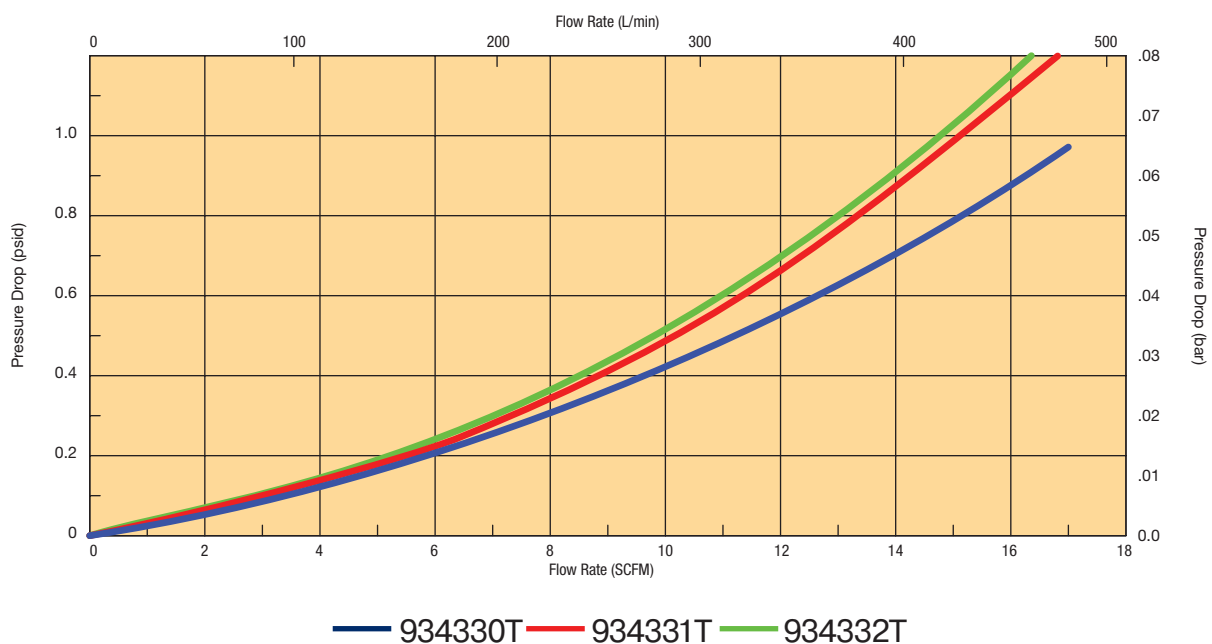
# TriCeptor

## Specifications

General Data	934330T	934331T	934332T
Amount of Silica Gel	0.8 lbs	1.4 lbs	2.0 lbs
	0.4 kg	0.6 kg	0.9 kg
Adsorption Capacity	4.9 fl oz	8.7 fl oz	12.4 fl oz
	146 ml	257 ml	365 ml
Net Weight of Unit	1.2 lbs	1.9 lbs	2.6 lbs
	0.5 kg	0.9 kg	1.2 kg
Direction of Flow	Bidirectional	Bidirectional	Bidirectional
Operating Temp Range	-20°F to 200°F / -29°C to 93°C	-20°F to 200°F / -29°C to 93°C	-20°F to 200°F / -29°C to 93°C
Maximum Air Flow Rate	16 SCFM	16 SCFM	16 SCFM

### Air Flow Performance

The curves below show the air flow performance of the TriCeptor breathers. To ensure the longest life possible, the initial clean pressure drop should not exceed 1.0 psid (.07 bar).



# E Z Dri Mobile

## Features and Specifications

### Materials:

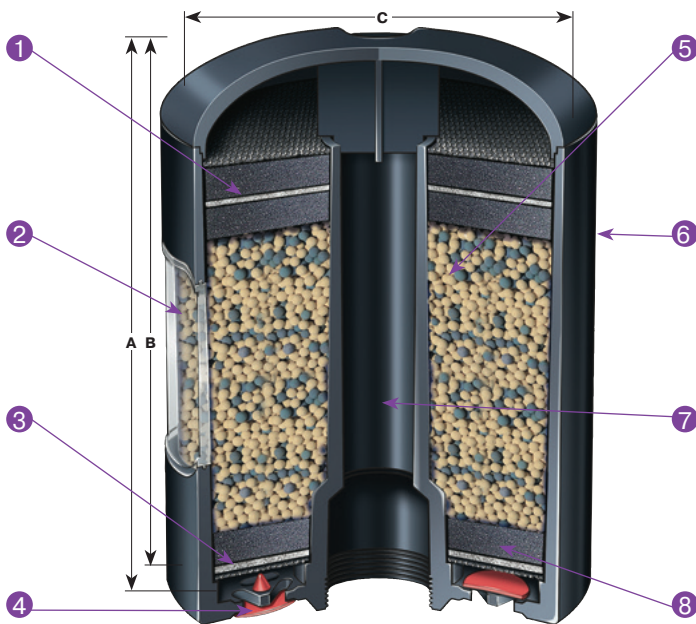
Casing: Polycarbonate/Polybutylene Terephthalate, Aluminum, Polyurethane, Polycarbonate  
Stand pipe: Polycarbonate tube

**Multi-layer Filtration:** Foam pad filter, 3µ polyester filter, 0.3µ PTFE filter,  
**Operating Temperatures:** -40°F (-40°C) to 300°F (149°C)

**Seals:** None



Active Replace



- 1 **Filter Element** - Second particulate filter element protects against migration of desiccant.
- 2 **Visual Indicator** - Windows on two sides of breather allow for easy monitoring of desiccant.
- 3 **Filter Element** - ePTFE filter removes airborne contamination to 0.3 absolute.
- 4 **Quad Check Valves** - Check-valves provide system pressurization, protecting system integrity and extending product life.
- 5 **Water Vapor Adsorbent** - Color-indicating zeolite adsorbs water from incoming air.
- 6 **Rugged Housing** - PC/PBT allow maximizes chemical compatibility at the surface and impact resistance at the core.
- 7 **Integrated Standpipe** - Resilient construction provides durability and allows oil mist to coalesce and drain back into the reservoir.
- 8 **Foam Pad** - Foam filter captures any oil mist and disperses incoming air evenly over filtration and drying areas.



941655

### General Data

Amount of Desiccant	1.59 lbs / 0.72 kg
Adsorption Capacity	6.1 fl oz / 176 ml
Net Weight of Unit	3.2 lbs / 1.5 kg
Direction of Flow	Bidirectional
Operating Temperature Range	-40°F to 300°F / -40°C to 150°C
Maximum Flow Rate	15 SCFM

### Unit Material Data

Material	Nylon and MXD6
Maximum Operating Temperature	300°F/149°C
Melting Point	320°F/160°C
Check Valve Adapter	Zinc Plated Steel

### Filter Media

Material	EPTFE
Porosity	3.5-7.5 ft/min @ 0.5 in - H <sub>2</sub> O (ASTM D 373)
Filtration Efficiency	Beta 200 @ 0.3µ (IES-RP-CCo21.1)

### General Data

Apparent Bulk Density	700-800 kg/m <sup>3</sup>
Average Particle Diameter	0.145"/3.68 mm
Specific Heat	0.25 BTU/lb F
Nominal Mesh Range	4x8
Average Crush Strength	35 lbs/15.9 kg

Part Number	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty*
941655	6.34/158.5	6.17/156.7	5.1/129.5	1 1/2" - 16 UN Female Thread	1 pc

\* Must be ordered in multiples of six (6).

# TriCeptor Mobile

## Features and Specifications

### Materials:

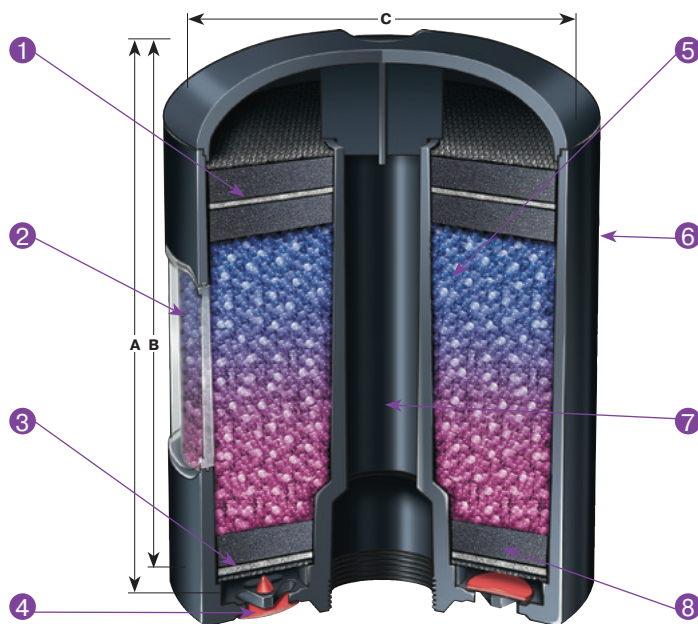
Casing: Polycarbonate/Polybutylene Terephthalate, Aluminum, Polyurethane, Polycarbonate  
Stand pipe: Polycarbonate tube

**Multi-layer Filtration:** Foam pad filter, 3μ polyester filter, 0.3μ PTFE filter,  
**Operating Temperatures:** -40°F (-40°C) to 300°F (149°C)

**Seals:** None



**941655T**



- 1 **Filter Element** - Second particulate filter element protects against migration of desiccant.
- 2 **Visual Indicator** - Windows on two sides of breather allow for easy monitoring of desiccant.
- 3 **Filter Element** - ePTFE filter removes airborne contamination to 0.3 absolute.
- 4 **Quad Check Valves** - Check-valves provide system pressurization, protecting system integrity and extending product life.
- 5 **Water Vapor Adsorbent** - Color-indicating silica gel adsorbs water from incoming air.
- 6 **Rugged Housing** - PC/PBT allow maximizes chemical compatibility at the surface and impact resistance at the core.
- 7 **Integrated Standpipe** - Resilient construction provides durability and allows oil mist to coalesce and drain back into the reservoir.
- 8 **Foam Pad** - Foam filter captures any oil mist and disperses incoming air evenly over filtration and drying areas.

### General Data

Amount of Desiccant	1.75 lbs / 0.79 kg
Adsorption Capacity	10.7 fl oz / 315 ml
Net Weight of Unit	3.3 lbs / 1.5 kg
Direction of Flow	Bidirectional
Operating Temperature Range	-40°F to 300°F/ -40°C to 150°C
Maximum Flow Rate	16 SCFM

### Unit Material Data

Material	Nylon and MXD6
Maximum Operating Temperature	300°F/148.9°C
Melting Point	320°F/160°C
Check Valve Adapter	Zinc Plated Steel

### Filter Media

Material	EPTFE
Porosity	3.5-7.5 ft/min @ 0.5 in - H <sub>2</sub> O (ASTM D 373)
Filtration Efficiency	Beta 200 @ 0.3μ (IES-RP-CCo21.1)

### General Data

Apparent Bulk Density	700-800 kg/m <sup>3</sup>
Average Particle Diameter	0.145"/3.68 mm
Specific Heat	0.25 BTU/lb F
Nominal Mesh Range	8x12
Average Crush Strength	35 lbs/15.9 kg

Part Number	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty*
941655T	6.34/158.5	6.17/156.7	5.1/129.5	1 1/2" - 16 UN Female Thread	1 pc

\* Must be ordered in multiples of six (6).

# TriCeptor Plus

## Features

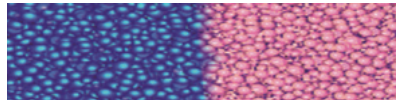
### Materials:

Housing: Polycarbonate, Nylon 6/6 30% Glass Filled, Polypropylene

**Filter Efficiency:** 3 $\mu$  absolute ( $\beta_3 \geq 200$ )

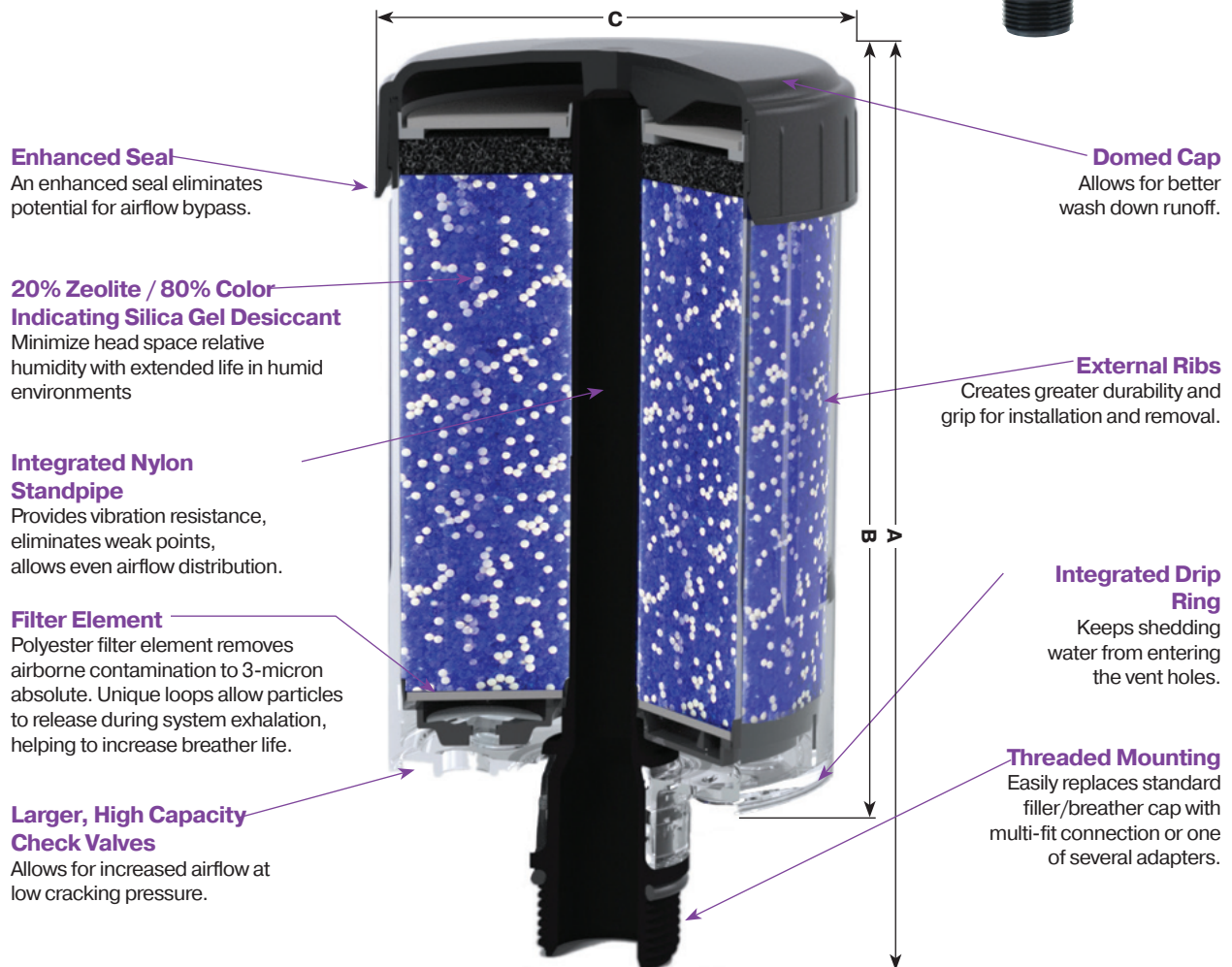
**Operating Temperatures:** -20°F (-29°C) to 200°F (93°C)

**Seals:** Nitrile, PVC



Active

Replace



Part Number	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty
947333	6.00/152	5.33/135	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
947334	8.00/203	7.33/186	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
947335	10.00/254	9.33/237	4.10/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs

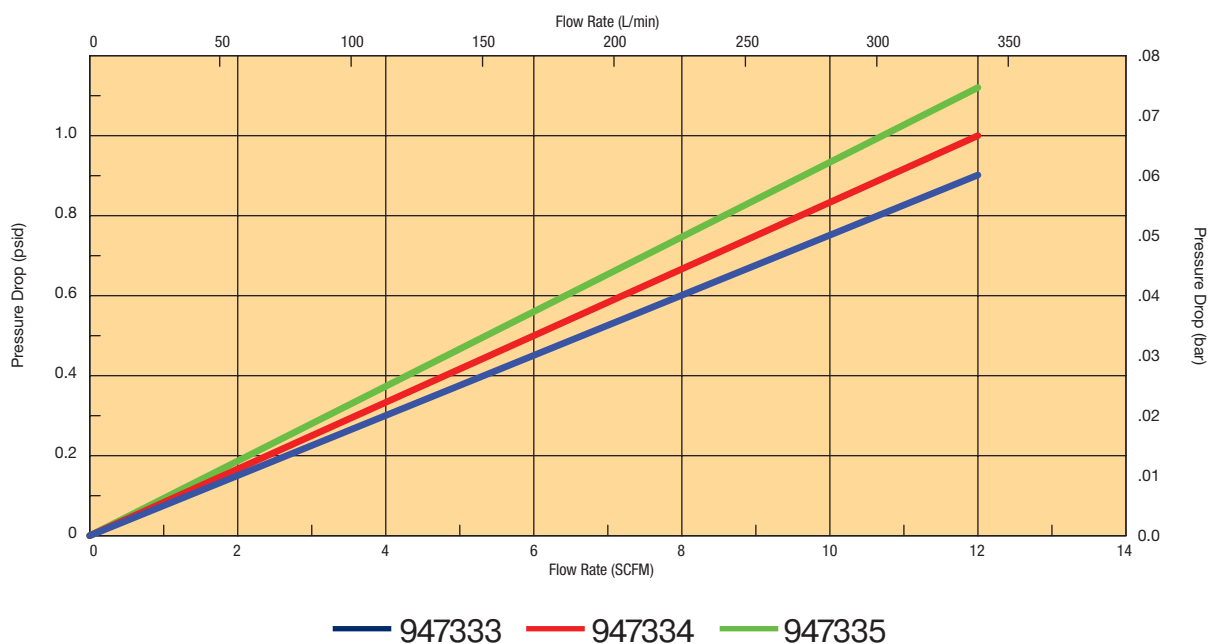
# TriCeptor *Plus*

## Specifications

General Data	947333	947334	947335
Amount of ZEOLITE	0.16 lbs	0.28 lbs	0.40 lbs
	0.07 kg	0.13 kg	0.18 kg
Amount of Silica Gel	0.64 lbs	1.12 lbs	1.60 lbs
	0.29 kg	0.51 kg	0.73 kg
Adsorption Capacity	4.7 fl oz	8.3 fl oz	11.8 fl oz
	139 ml	246 ml	349 ml
Net Weight of Unit	1.2 lbs	1.9 lbs	2.6 lbs
	0.54 kg	0.86 kg	1.18 kg
Direction of Flow	Bidirectional	Bidirectional	Bidirectional
Operating Temp Range	-20°F to 200°F / -29°C to 93°C	-20°F to 200°F / -29°C to 93°C	-20°F to 200°F / -29°C to 93°C
Maximum Flow Rate	12 SCFM	11 SCFM	10 SCFM

### Air Flow Performance

The curves below show the air flow performance of the TriCeptor *Plus* breathers. To ensure the longest life possible, the initial clean pressure drop should not exceed 1.0 psid (.07 bar).



# TriCeptor *Extended*

## Features

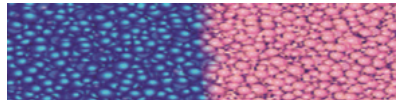
### Materials:

Housing: Polycarbonate, Nylon 6/6 30% Glass Filled, Polypropylene

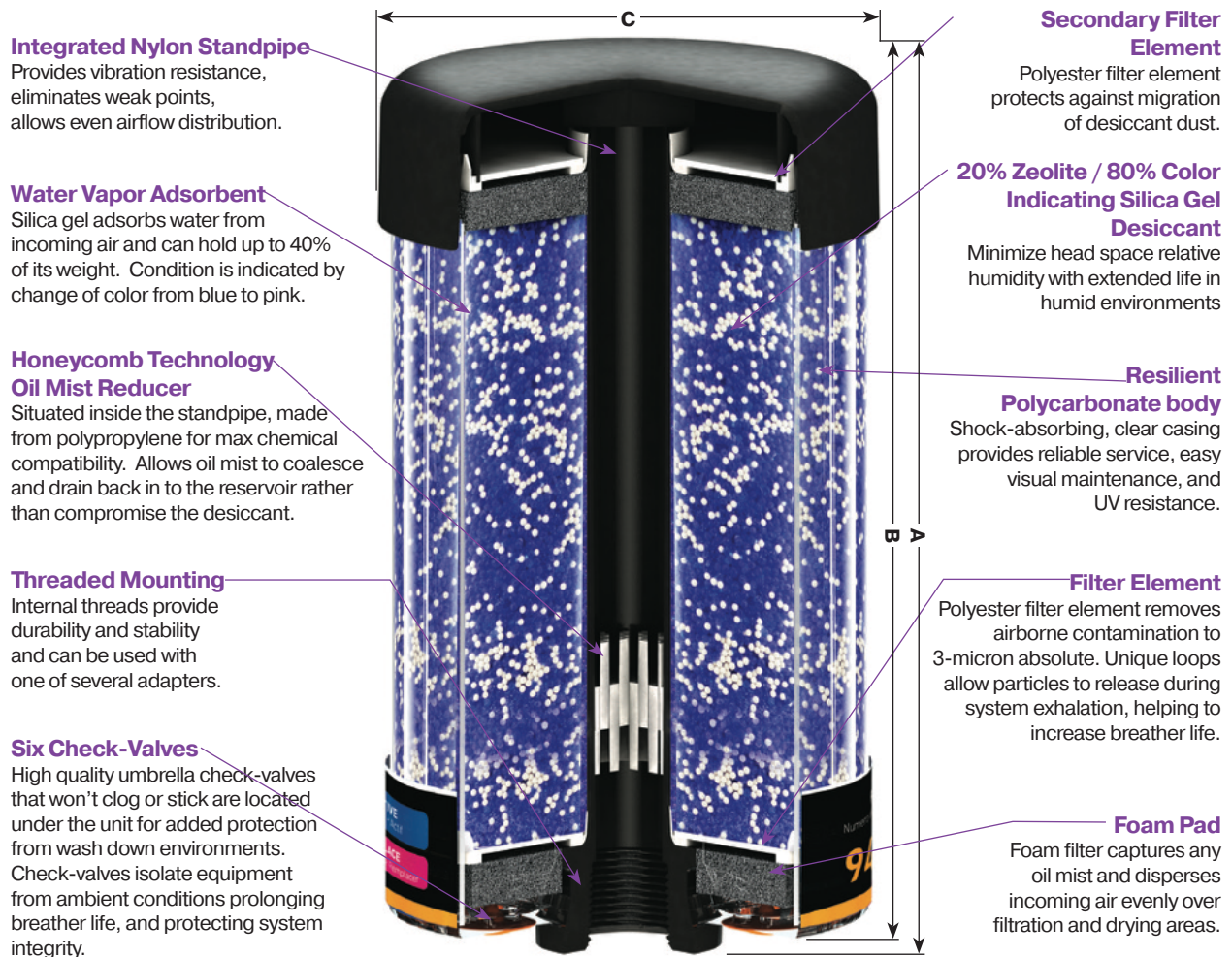
**Filter Efficiency:** 3μ absolute ( $\beta_3 \geq 200$ )

**Operating Temperatures:** -20°F (-29°C) to 200°F (93°C)

**Seals:** Nitrile, PVC



Active      Replace



Part Number	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty
947336	6.40/163	6.02/153.34	5.66/143.88	1" Female (FNPT)	6 pcs
947337	8.20/208	7.82/198.34	5.66/143.88	1" Female (FNPT)	6 pcs
947338	10.00/254	9.62/244.34	5.66/143.88	1" Female (FNPT)	6 pcs

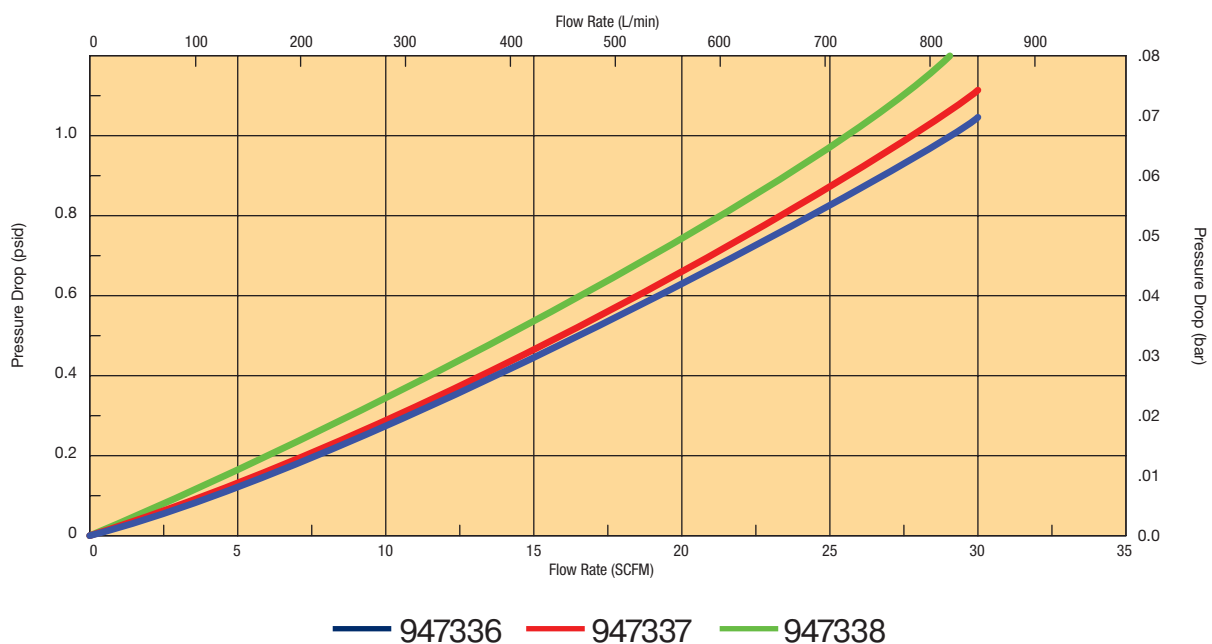
# TriCeptor *Extended*

## Specifications

General Data	947336	947337	947338
Amount of ZEOLITE	0.42 lbs	0.64 lbs	0.84 lbs
	0.19 kg	0.29 kg	0.38 kg
Amount of Silica Gel	1.68 lbs	2.56 lbs	3.35 lbs
	0.76 kg	1.16 kg	1.52 kg
Adsorption Capacity	12.8 fl oz	18.9 fl oz	25.0 fl oz
	379 ml	558 ml	738 ml
Net Weight of Unit	3.5 lbs	4.8 lbs	5.9 lbs
	1.59 kg	2.18 kg	2.68 kg
Direction of Flow	Bidirectional	Bidirectional	Bidirectional
Operating Temp Range	-20°F to 200°F / -29°C to 93°C	-20°F to 200°F / -29°C to 93°C	-20°F to 200°F / -29°C to 93°C
Maximum Flow Rate	26 SCFM	25 SCFM	24 SCFM

### Air Flow Performance

The curves below show the air flow performance of the TriCeptor *Extended* breathers. To ensure the longest life possible, the initial clean pressure drop should not exceed 1.0 psid (.07 bar).



# ClearConnect

## Features

### Materials:

Housing: Polycarbonate, Nylon 6/6 30% Glass Filled, Polypropylene

Filter Media: Polyurethane, polyester

**Filter Efficiency:** 3 $\mu$  absolute ( $\beta_3 \geq 200$ )

**Operating Temperatures:** -20°F (-29°C) to 158°F (70°C)

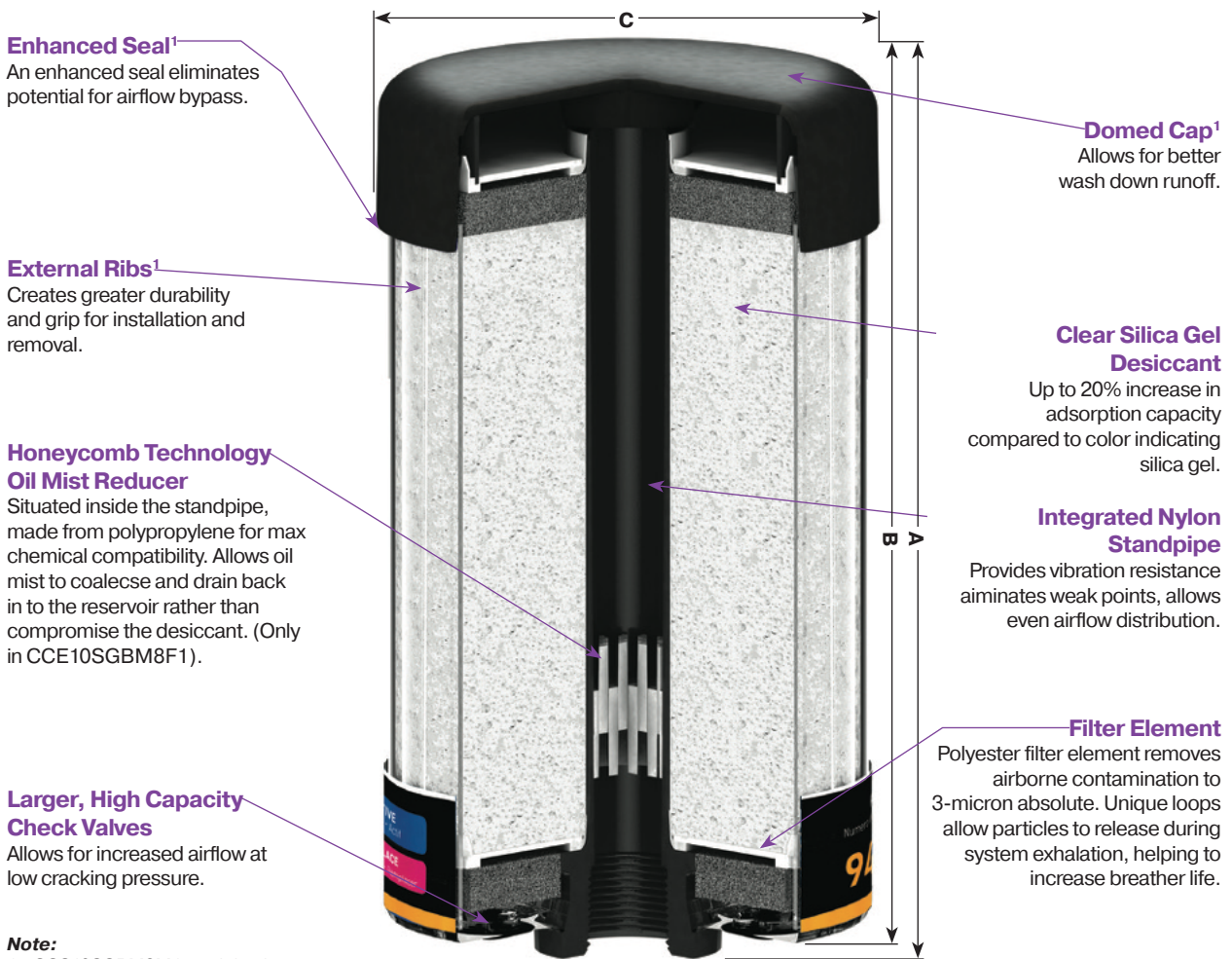
**Seals:** Nitrile, PVC

### Net Weight of Units:

947339 - 2.7 lbs (1.22 kg) CCS10SGBM8M1 - 2.8 lbs (1.27 kg)

947340 - 5.9 lbs (2.68 kg) CCE10SGBM8F1 - 6.0 lbs (2.72 kg)

### Relative Humidity Sensor



### Note:

1 - CCS10SGBM8M1 model only

Breather with Sensor	A (in/mm)	B (in/mm)	C (in/mm)	Thread	Qty
CCS10SGBM8M1	10/253	9.3/237	4.1/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	1 pcs
CCE10SGBM8F1	10/253	9.6/243	5.7/144	1" Female (FNPT)	1 pcs
<b>Replacement Breather</b>					
947339	10/253	9.3/237	4.1/104	1" multi-fit male thread with o-ring seal compatible with 1" NPT; 1" NPSM; 1" BSPT; 1" BSPP	6 pcs
947340	10/253	9.6/243	5.7/144	1" Female (FNPT)	6 pcs

# ClearConnect

## Specifications



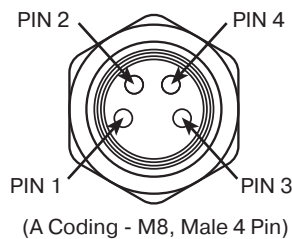
### Materials & Components

Casing	Polycarbonate, Steel (ball plunger)
Cap	Thermoplastic elastomers (TPE), Steel (screws)
Circuit Board	LED lights, FR4 Fiberglass
M8 Connector	Polyamide 67 GF340, Silicone and Nickel Plated Copper Alloy

### Power

Supply Voltage	9-28 V DC
Operational Current Rating	30 mA

Pin 1	Brown	9-28V DC
Pin 2	White	TXA (Low)
Pin 3	Black	TXB (High)
Pin 4	Blue	DC Reference
(Mark State)		



### Environment

13.56 MHz RFID (Module & Sensor-board communication)  
 Intended for indoor and outdoor use  
 Altitude up to 16,404 ft (5,000 m)  
 Maximum Relative Humidity: 100% at up to 158°F (70°C)  
 Dustproof/Waterproof (IP66)  
 Hazardous Ratings: Not rated for hazardous locations  
 FCC, CE, Reach, RoHS

### Connectivity/Data Output

A Coding - M8, 4 pin male  
 RS485 Half Duplex (Modbus)

### Data Storage

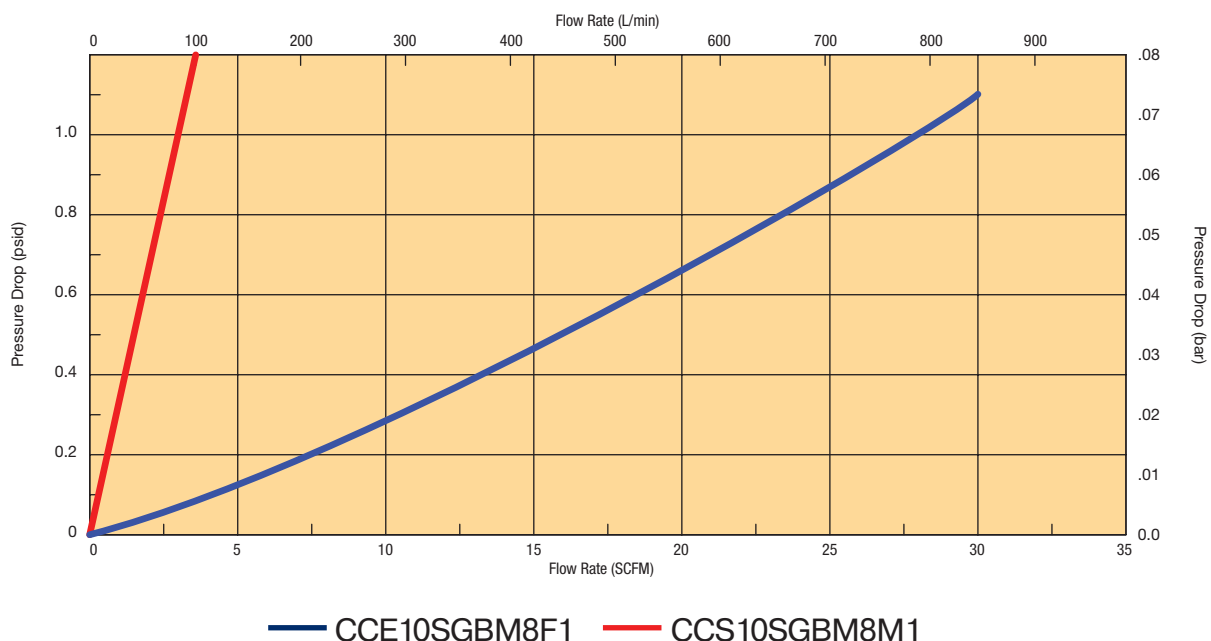
Data readings every 60 minutes  
 Stores 365 Half days of hourly data points

### Power/Data Cable

4 position connector with wire leads x 3m connected  
 breather cable assembly (sold separately)

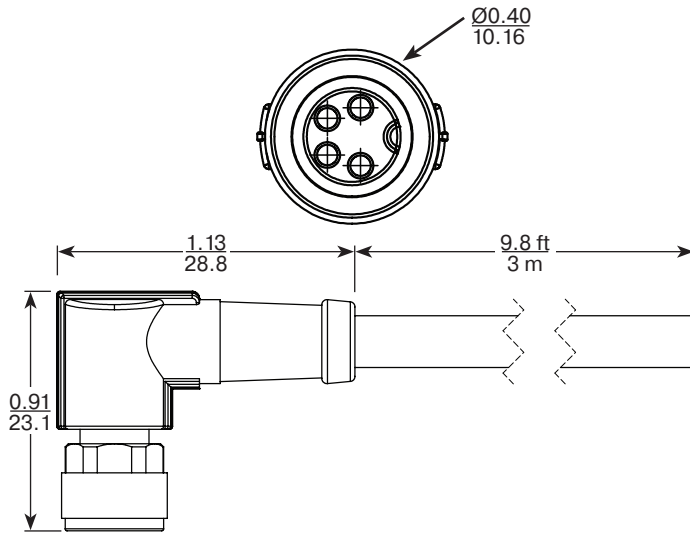
### Air Flow Performance

The curves below show the air flow performance of the ClearConnect breathers. To ensure the longest life possible, the initial clean pressure drop should not exceed 1.0 psid (.07 bar).



# Desiccant Breathers

## Accessories



### ClearConnect Power/Data Cable

**Length:** 3 Meters

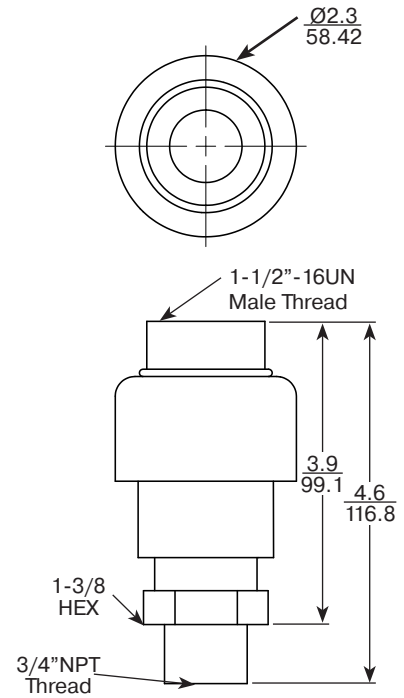
**Connection:** A Coding - M8, 4 Pin

**Recommended Torque:** 0.4Nm

**Temperature Range:** 23°F to 176°F (-5°C to 80°C)

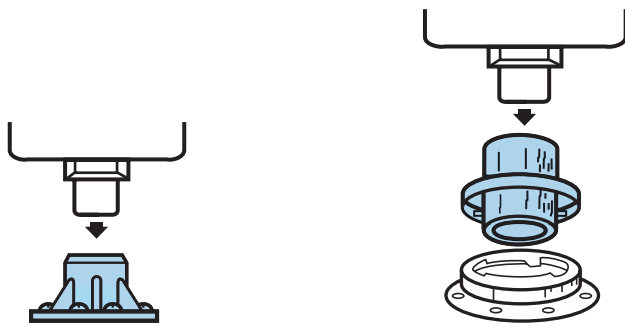
Part Number	Description	Qty
947341	Power/Data Cable	1 pc

For use with ClearConnect



Part Number	Description	Qty
946056	Check Valve Adapter	1 pc

For use with Mobile Breathers

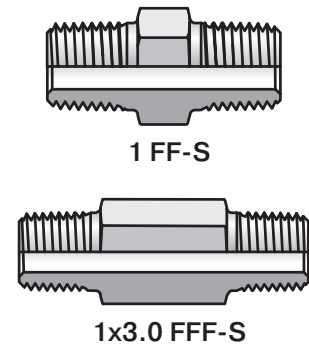


Part Number	Description	Qty
937546	Field Adapter	1 pc

For use with E Z Dri, Triceptor, Triceptor *Plus*, Triceptor *Extended* and ClearConnect

Part Number	Description	Qty
937463	Flange Adapter	1 pc

For use with E Z Dri, Triceptor, Triceptor *Plus*, Triceptor *Extended* and ClearConnect



Part Number	Description	Qty
1 FF-S	2.34" Pipe with 1" NPT connections	1 pc
1x3.0 FFF-S	3" Pipe with 1" NPT connections	1 pc

Please contact Parker Tube Fittings Division at [tfd.support@support.com](mailto:tfd.support@support.com) or call 614.279.7070

inches  
mm

Drawings are for reference only.  
Contact factory for current version.

# Desiccant Breathers

## Maintenance

	Installation	Disposal
<b>E Z Dri</b> <i>Zeolite Breather</i>	<ol style="list-style-type: none"> <li>1. Remove safety cap from bottom of standpipe</li> <li>2. Remove caps from bottom vent holes</li> <li>3. Mount breather to the tank or reservoir using the adapter best suited for the application</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify the breather is fully saturated - all blue beads will be beige in color</li> <li>2. Remove breather from gearbox, tank, reservoir, or other application</li> <li>3. Remove and save the adapter fitting to be used with a new breather</li> <li>4. Verify and dispose of breather in accordance with your state and local environmental control regulations</li> </ol>
<b>TriCeptor</b> <i>Silica Gel Breather</i>  <b>TriCeptor Plus</b> <i>Mixed Desiccant Breather</i>	<ol style="list-style-type: none"> <li>1. Remove safety cap from bottom of standpipe</li> <li>2. Remove caps from bottom vent holes</li> <li>3. Mount breather to the tank or reservoir using the adapter best suited for the application</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify the breather is fully saturated - all blue beads will be pink in color</li> <li>2. Remove breather from gearbox, tank, reservoir, or other application</li> <li>3. Remove and save the adapter fitting to be used with a new breather</li> <li>4. Verify and dispose of breather in accordance with your state and local environmental control regulations</li> </ol>
<b>Mobile</b> <i>Rugged Breather</i>	<ol style="list-style-type: none"> <li>1. Remove safety cap from bottom of standpipe</li> <li>2. Mount breather to the tank or reservoir using the adapter best suited for the application</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify the breather is fully saturated</li> <li>2. Remove breather from gearbox, tank, reservoir, or other application</li> <li>3. Remove and save the adapter fitting to be used with a new breather</li> <li>4. Verify and dispose of breather in accordance with your state and local environmental control regulations</li> </ol>
<b>TriCeptor Extended</b> <i>Mixed Desiccant Breather</i>	<ol style="list-style-type: none"> <li>1. Remove safety cap from bottom of breather</li> <li>2. Mount breather to the tank or reservoir using the adapter best suited for the application</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify the breather is fully saturated - all blue beads will be pink in color</li> <li>2. Remove breather from gearbox, tank, reservoir, or other application</li> <li>3. Remove and save the adapter fitting to be used with a new breather</li> <li>4. Verify and dispose of breather in accordance with your state and local environmental control regulations</li> </ol>
<b>ClearConnect</b> <i>Wired Relative Humidity Sensor</i>	<ol style="list-style-type: none"> <li>1. Remove safety cap from bottom of breather</li> <li>2. Connect sensor communication module using provided wiring diagram</li> <li>3. Mount breather to the tank or reservoir using the adapter best suited for the application</li> <li>4. Install wired sensor communication module onto breather body</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify the breather is fully saturated - Change when breather life remaining is 0%.</li> <li>2. Remove sensor communication module from spent breather cartridge - slide toward top cap.</li> <li>3. Remove breather from gearbox, tank, reservoir, or other application</li> <li>4. Remove and save the adapter fitting to be used with a new breather</li> <li>5. Verify and dispose of breather in accordance with your state and local environmental control regulations</li> </ol>



Hydraulic & Fuel Filtration Division  
[www.parker.com/emhff](http://www.parker.com/emhff)

Last updated August 4th, 2023

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**PAR  GEL** <sup>TM</sup>  
Water Removal Filter Elements



ENGINEERING YOUR SUCCESS.

# PAR GEL™

## Water Removal Filter Elements

**Par-Gel filter elements are an effective tool in controlling water related problems in hydraulic power and lubrication systems.**

There is more to proper fluid maintenance than just removing particulate matter. You need to remove water as well. Parker has developed Par-Gel water removal elements to be used in combination with particulate filters to provide significant benefits.

- **Less component wear, consequently less component generated contaminants.**
- **Significant reduction of costly downtime and replacement of failed components.**
- **Increased efficiency of the system, thereby improving machine productivity.**
- **Less frequent replacement and disposal of contaminated fluid.**
- **Reduced chance of catastrophic failure.**

### **Water as a contaminant.**

Whether you use a mineral-base or synthetic fluid, each will have a water saturation point. Above this point, the fluid cannot dissolve or hold any more water. This excessive water is referred to as 'free' or emulsified water. As little as .03% (300 ppm) by volume can saturate a hydraulic fluid.

Many mineral-base and synthetic fluids, unless specifically filtered or treated in some way, will contain levels of water above their saturation point.



### **Water is everywhere!**

**Storage and handling.** Fluids are constantly exposed to water and water vapor while being handled and stored. For instance, outdoor storage of tanks and drums is common. Water settles on top of tanks and drums and infiltrates the container, or is introduced when

the container is opened to add or remove fluid.

**In-service.** Water can get by worn cylinder and actuator seals, or through reservoir openings. Water can come in contact with these entry points through water based cutting fluids or when water and/or steam are used for cleaning.

## Water Removal Filter Elements



Typical results of wear due to presence of particulate and water contamination.

Condensation is also a prime water source. As fluid cools in a reservoir, temperature drop condenses water vapor on inside surfaces, which in turn causes rust. Rust scale in the reservoir eventually becomes particulate contamination in the system.

### **Microbial growth as a contaminant.**

Once water enters a system, growth of microorganisms begins. Since water is one of the end products of the breakdown of hydrocarbon fluid, once started, the process is somewhat self-sustaining.

Slime is evidence of microbial growth, as is the apparent increase in viscosity of the fluid, obnoxious odor and discolored fluid. The results are: short fluid life, degraded surface finish and rapid corrosion.

### **Water generated damage and operating problems**

- **Corrosion**
- **Accelerated abrasive wear**
- **Bearing fatigue**
- **Additive breakdown**
- **Increased acid level**
- **Viscosity variance**
- **Electrical conductivity**

### **Forms of water in fluid**

- **Dissolved water**– below saturation point.
- **Free water**–emulsified or in droplets\*.

Water in the system creates oxides, slimes and resins. Corrosion is an obvious by-product and creates further contaminants in the system.

The effect is compounded, as you now have both particulate contaminant and water working together. The particulate contamination can be as simple as rust flaking from reservoir walls. Anti-wear additives break down in the presence of water and form acids. The combination of water, heat and dissimilar metals encourages galvanic action. Pitted and corroded metal surfaces and finishes result.

Further complications occur as temperature drops and the fluid has less ability to hold water. As the freeze point is reached, ice crystals form, adversely affecting total system function. Operating functions may become slowed or erratic.

Electrical conductivity becomes a problem when water contamination weakens insulating properties of fluid (decreases dielectric kV strength).

### **Testing your fluid for water.**

A simple 'crackle test' will tell you if there is water in your fluid. Simply take a metal dish or spoon with a small amount of fluid. Apply a flame under the container with a match. If bubbles rise and 'crackle' from the point of applied heat, you have free water.

**ParTest™** fluid analysis. For complete analysis, Parker offers Par-Test fluid analysis. Your Parker representative can supply you with a fluid container, mailing carton and appropriate forms to identify your fluid and its use. An independent lab performs complete spectrometric analysis, particle counts, viscosity and water content.

Results are sent directly to the requester.

*\* Excessive free water must be removed from the system before filtering is attempted. In systems with gross amounts of water ( 1% to 2% by volume), settling or vacuum dehydration should be considered before using Par-Gel filter elements.*

## Water Removal Filter Elements

Removing water. Using a Par-Gel water removal element is an effective way of removing free water contamination from your hydraulic system. It is highly effective at removing free water from mineral-base and synthetic fluids.

The Par-Gel filter media is a highly absorbent copolymer laminate with an affinity for water. However, hydraulic or lubrication fluid passes freely through it. The water is bonded to the filter media and forever removed from the system. It cannot even be squeezed out.

Parker technology and expertise at your disposal. Choosing the correct filters can save money and minimize problems caused by particulate and water contaminants in hydraulic and lubricating fluids.

Parker provides hard data and advice on choosing from a wide range of filter configurations, flow patterns and flow pressure capabilities.

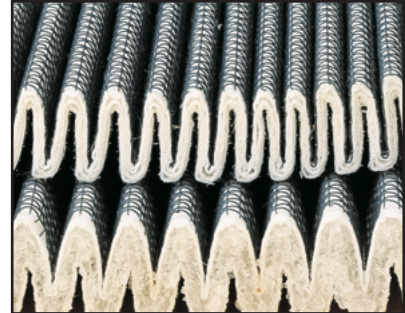


Photo above shows 'dry' Par-Gel filter media and the same media swollen with absorbed water.

How many filter elements will I need? Suppose you would like to remove water from contaminated oil stored in a 200 gallon tank. The tank is found to have 1000 ppm of water (very contaminated). The circulation rate will be 10 gpm for the 200 SUS fluid. Example: How many single length Moduflow™ elements will be needed to reduce the water to normal saturation levels. To find the answer, use the conversion charts and capacity curves for the Moduflow element.

1. 1000ppm start - 300ppm finish = 700ppm removed
2. 700ppm water x 0.0001 = 0.07%; 0.07% x 200 gallons = 0.14 gallons water total
3. Use the capacity curve for Moduflow element P/N 927584. Capacity = 80cc at 200 SUS & 10 gpm to pressure drop of 25 psid. (See graph)  
 $80\text{cc} \times 0.000264 \frac{\text{gal}}{\text{cc}} = 0.02 \text{ gallons/element}$
4. 0.14 gallons total water = 7 elements\*; 0.02 gallons/element

\*The replacement value of this fluid may range from \$600.00 to \$1400.00 (\$3 to \$7 gallon). At an estimated element cost of \$50.00 each, the savings realized would be from \$250.00 to \$1050.00!

Using Par-Gel filter elements saves money in fluid and replacement component costs. Also, the frequency of fluid disposal and the problems associated with it are greatly reduced.

Filter capacity. There are no accepted and approved water capacity testing or reporting standards. Consequently, there is virtually no way to compare one element capacity with another. It is also difficult to simulate a specific application in testing... making it hard to predict field performance.

Why the discrepancies? Water removal media capacity is the result of the interplay among four variables: flow rate, viscosity, bypass setting and the media itself. Here's an example: two identical elements, testing the same fluid, varying only the flow rate.

	Element A	Element A'
<b>Flow Rate</b>	3 gpm (11.4 lpm)	10 gpm (37.8 lpm)
<b>Viscosity</b>	75 SUS	75 SUS
<b>Test Capacity</b>	425 ml	360 ml

This is a 15% reduction in capacity, due to changing only the flow rate! Now, look at what happens when the test flow rate is the same and the viscosity is changed.

	Element B	Element B'
<b>Flow Rate</b>	20 gpm (75.7 lpm)	10 gpm (37.8 lpm)
<b>Viscosity</b>	75 SUS	75 SUS
<b>Test Capacity</b>	250 ml	550 ml

Twice the capacity can be achieved just by manipulating the test viscosity! Naturally, having a lower bypass valve setting limits the capacity. Since the life of the element is measured in pressure drop, using higher bypass valve settings will increase apparent life (all other conditions equal).

We recommend 25 psid bypass valves to get adequate life from Par-Gel filter elements. Capacity also depends on the media itself. That's why Parker spent two years researching the media used in Par-Gel filter elements. We tested all known media, and worked closely with our suppliers to achieve maximum water absorbency.



## Water Removal Filter Elements

Parker Par-Gel water removal filter elements are available in these standard Parker filter housings:

Filter Model Series	Length	Element Part Number
ILP-1	Single	927584
ILP-2	Double	940734
IL8-1	Single	929103
IL8-2	Double	929109
IL8-3	Triple	932006
40CN-1	Single	931412
40CN-2	Double	931414
80CN-1	Single	931416
80CN-2	Double	931418
Guardian®	Single	932019

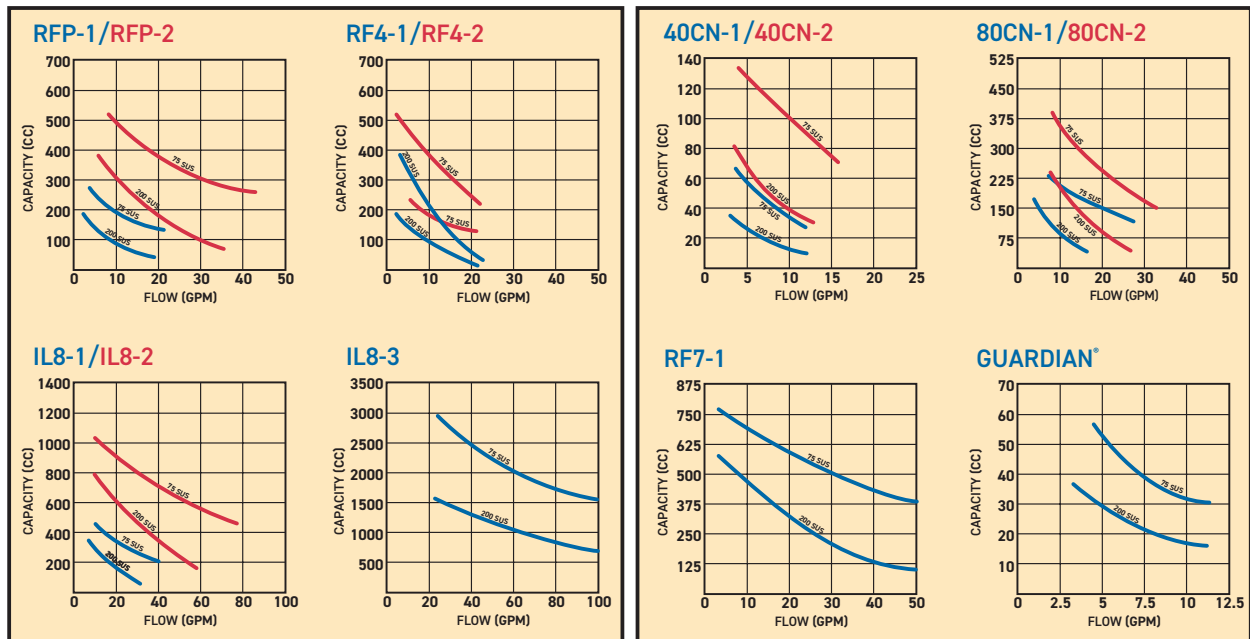
### Conversion Factors

If you have	Multiply by	To get
mg/l	0.00009	%
ppm	0.0001	%
ml	1.0	cc
cc	0.0338	fluid ounces
cc	0.00106	quarts
cc	0.000264	gallons

### Typical Saturation Points

Fluid	PPM	%
Hydraulic	300	0.03%
Lubrication	400	0.04%
Transformer	50	0.005%

## MULTI-PASS WATER CAPACITY



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Last updated August 4th, 2023

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# PAR FIT™ Elements

Competitive Interchanges



ENGINEERING YOUR SUCCESS.

# PAR FIT™ Elements

## Competitive Interchanges

An extensive range of competitively priced Parker quality replacement filter elements, PAR<>FIT interchange elements allow the users to acquire all their replacement elements from one quality source regardless of the original equipment manufacturer.

PAR<>FIT competitive interchange elements must conform to all the same rigorous tests as the standard Parker replacement elements. The elements meet or exceed all specifications for the following tests:

ISO2941	Element Collapse/Burst Resistance
ISO2942	Fabrication Integrity
ISO2943	Material Compatibility
ISO3724	Flow Fatigue Resistance
ISO4572/ISO16889	Multipass Test

In addition to price and quality, the range of interchange elements available is key to a successful program for the user. Parker has worked diligently over the years to develop a range of elements that will meet this challenge. You can view the current list of PAR<>FIT interchange elements at [crossref.parker.com](http://crossref.parker.com)

### 26,000+ interchanges for a variety of competitors, including:

- |                      |                           |
|----------------------|---------------------------|
| • Pall               | • Hy-Pro                  |
| • Hydac              | • Internorman             |
| • Schroeder          | • Mahle                   |
| • MP Filtri          | • PTI                     |
| • Donaldson          | • Separation Technologies |
| • Stauff             | • Eaton Vickers           |
| • Cummins Filtration | • Zinga                   |
| • EPE                | • Many Others             |
| • Fleetguard         |                           |



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## Static Control Filter Elements

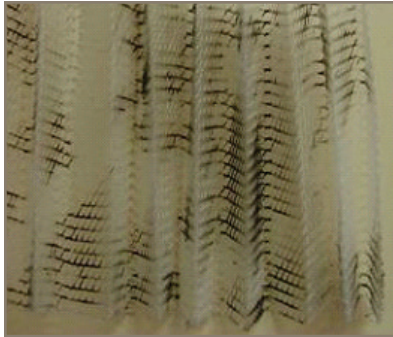


ENGINEERING YOUR SUCCESS.

# Static Control Filter Elements

## Why Use Parker Static Control Filter Elements

- **No compromise in efficiency, dirt holding capacity, or flow pressure drop**
- **No vessel modifications required - drop in solution**
- **Available in a wide variety of element configurations**



Burnt polymer pleat support mesh from arcing



Pitting on filter end-cap

Parker has developed a unique modified filter media technology to aid industry in controlling static build-up in non-conductive hydraulic and lubricating fluids.

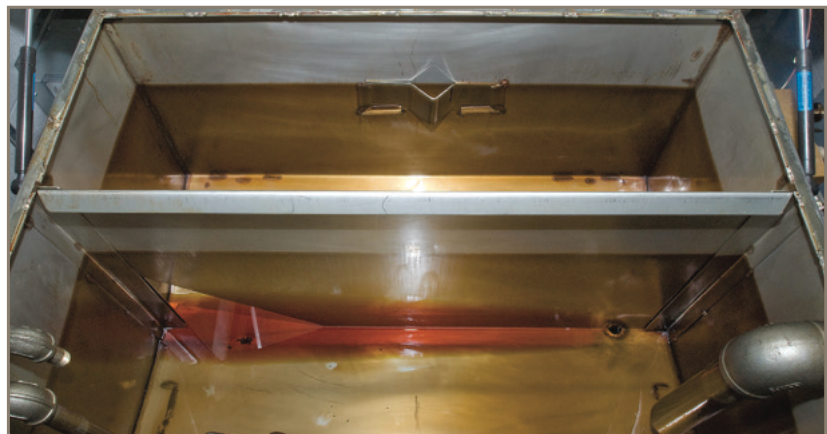
Parker's patent-pending, static control filter media reduces triboelectric charging that occurs in a fluid system equipped with typical filtration materials. Triboelectric charging can result in a sudden static discharge (sparks in the oil) that eventually causes varnish, and damages oil and system components. The discharge can also damage the filter element by burning and pitting the filter media. The static control filter material can be made available in a wide variety of element configurations.

## What can Varnish do to a System

- **Sticking servo-valves**
- **Plugged filters**
- **Build up on surfaces, heat exchangers, reservoir walls, and bearing surfaces**

Studies have suggested that varnish is formed due to the thermal and oxidative degradation of oil. It also has been suggested that the localized heat generated from a static charge discharge can reach several thousand degrees. Hot enough to cause localized thermal degradation of the oil. The static discharge can also cause pitting of metallic surfaces in a system.

Manufacturers of combustion turbines have recognized the relationship of static discharge causing thermal degradation and subsequent varnish formation to the extent that they have suggested turbine users to choose coarser filtration, including switching from Micro-glass to less efficient Cellulose filter media and also to decrease flow density by operating duplexing filter changeover valves in the center position. Parker Static Control filter elements eliminate these compromises and ensure proper system filtration performance.



Varnish is attracted to metal surfaces, this results in an overall decrease in productivity.

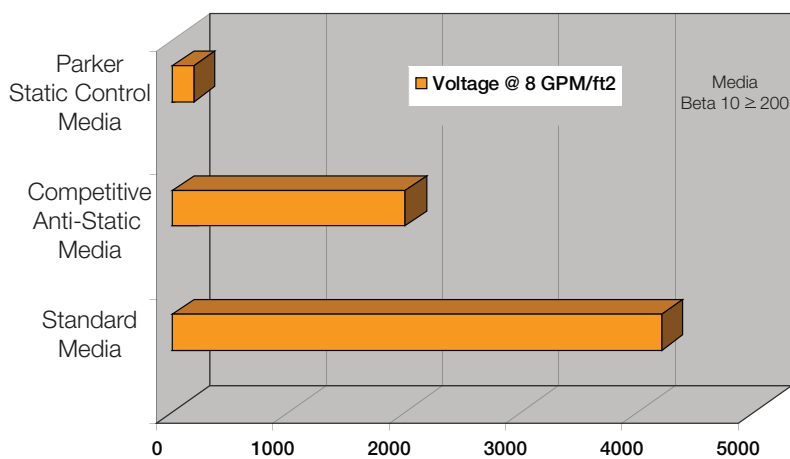
# Static Control Filter Elements

## Applications

- Turbine Lube Oil
- Control Systems
- High Flow Hydraulic Circuits
- Test Equipment
- Kidney Loops



## LABORATORY TEST RESULTS



## MEASURED DISCHARGE VOLTAGE

## Test Parameters

### Fluid Type

ISO 46 Ashless Hydraulic Oil

### Fluid Conductivity

< 100 pS/m

### Test Temperature

40°C (100°F)

### Filter Type

In-Line T-type Pressure

### Media Flow Density

8 GPM/FT<sup>2</sup> (320 LPM/M<sup>2</sup>)

Filter	2 Micron	10 Micron
RF4/50P-1	932668A	932670A
RF4/50P-2	932677A	932679A
IL8-2	933044A	933046A
IL8-3	932872A	932874A
15CN/15P-1	932610A	932612A
15CN/15P-2	932616A	932618A
40CN-2	932653A	932655A
40CN-3	926698A	926893A
80CN-1	932659A	932661A
80CN-2	932665A	932667A
80CN-3	933218A	933220A

Filter	2 Micron	10 Micron
30P-1	932622A	932624A
30P-2	932628A	932630A
30P-1-AX	933580A	933581A
30P-2-AX	933582A	933583A
MPD-1	935516A	935518A
MPD-2	935488A	933520A
15P-1-AX	933576A	933577A
15P-2-AX	933578A	933579A
718	934179A	933913A
736	934180A	933920A

### Note:

Replace "Q" with "A" when model coding an assembly with above static control filter elements.



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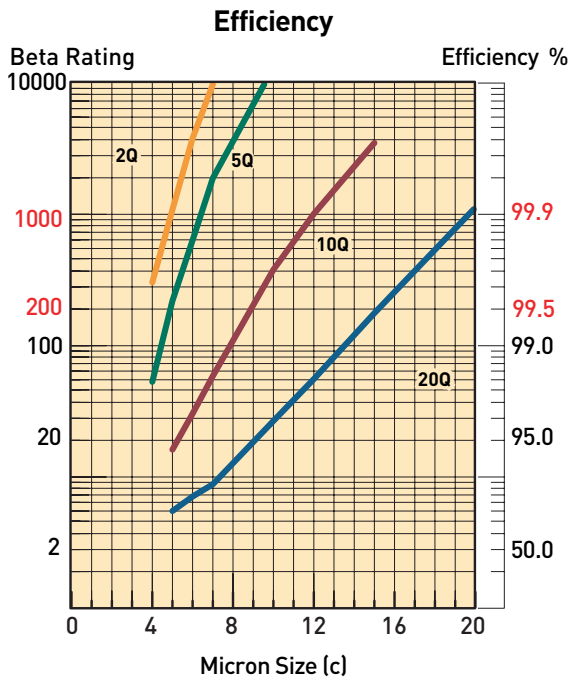
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# Appendix

## Interpreting Data

### Element Efficiency

For each configuration Parker reports on a log micron chart the actual test results for each Microglass media grade available. The information that can be obtained from reporting in this manner far exceeds previous methods. To read the charts simply follow a few quick steps as shown below.



#### To determine efficiency/beta rating at a Particular micron size:

1. Choose micron size from horizontal axis.
2. Follow line upward until it intersects the media grade of interest.
3. For the beta rating move left perpendicular until you intersect the vertical beta rating axis and record number.
4. For the efficiency rating just follow line across to the right until it intersects the efficiency axis and record number.

#### To determine which media can provide a particular beta rating:

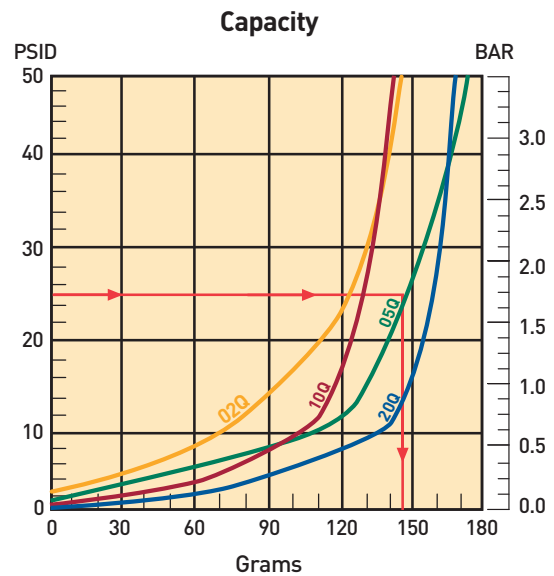
5. Choose beta rating desired on left vertical axis
6. Follow line horizontally across until it intersects media grade.
7. Move downward perpendicular until you intersect the horizontal "Micron Size" axis and record value. If micron value is too low repeat steps until a desired value is achieved.

### Element Capacity

Typically element capacities have been plotted on a differential vs grams chart to allow for best comparisons between different indicator/bypass settings and also other manufacturers. Although the construction of a given element remains constant, the actual capacity obtained in a application depends on several variables

- Viscosity
- Flow rate
- Contaminant Type
- Changeout pressure

Since it is not possible to test every possible combination, Parker tests per ISO4572 and ISO16889 which specifies fluid type, contaminant type and flow rate. Therefore the only variable that can be accounted for by the specifier would be changeout pressure. To accomplish this simply determine what indicator setting will be used to signal service is required. If no indicator will be used then use the bypass value for the specified filter.



#### To determine element capacity

1. Starting along the vertical differential pressure axis choose changeout setting.
2. Move horizontally across until line intersects the media grade desired.
3. Move perpendicular downward until line intersects horizontal axis "Grams" and record value.

# Appendix

## Interpreting Data

### Flow vs Pressure Loss

All performance curves are reported at a standard viscosity of 150 SUS (30 cSt) with element pressure curves independent of the housing. The purpose of reporting individually is to allow for adjustment to other operating viscosities. To adjust for a operating viscosity other than 150 SUS (30 cSt) please use the correction formula below.

### Viscosity Correction Formula

$$\begin{aligned} \text{PSID Element} &= \text{PSID from catalog} \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90} \\ \text{PSID Housing} &= \text{PSID from catalog} \times \frac{\text{New Specific Gravity}}{.90} \\ \text{PSID Assembly} &= \text{PSID Element} + \text{PSID Housing} \end{aligned}$$

### High Collapse Correction Factors

“QH” Elements (2000 psid) = 1.4 times reported loss

“QX” Elements (3000 psid) = 1.9 times reported loss

### High Collapse Elements

In most cases, filter assemblies are equipped with an internal bypass valve to limit the differential pressure across the element. In some critical applications it may be necessary to equip the filter with a “no bypass” valve which forces all fluid flow to pass through the element. When a filter is equipped with a “no bypass” valve, the element must be able to withstand much higher differential pressures in the event it is not serviced when indicated. Parker high collapse elements are able to withstand 2000 psid (“H” option) or 3000 psid (“X” option) due to their special construction. The high collapse elements are rated for the same efficiencies as the standard elements but also have a higher clean pressure loss.

The increase in pressure loss from standard collapse “Q” elements to high collapse “Q” elements varies from media grade and series. To insure adequate element life, a correction factor should be applied to the standard pressure loss curves. Below are the factors that should be applied to the standard element performance curves shown in this catalog. The pressure loss of “H” option elements (2000 psid collapse) may increase as much as 40% over the standard, and the “X” option 3000 psid collapse) as much as 90%.

# Appendix

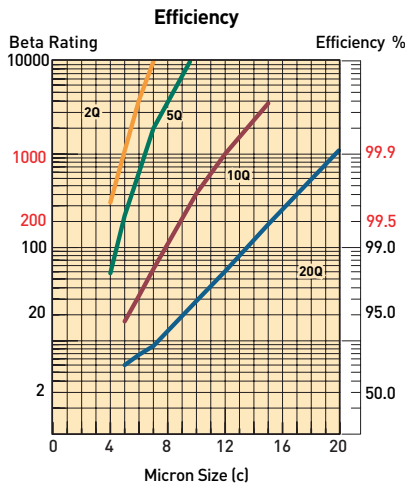
## Filter Media Types

### Microglass

The latest of our media lines, these elements have the highest capacity and efficiency available. The Microglass is referenced by a “Q” after the micron size ( i.e. 5Q ). Complete information is available for each element size in the catalog. The efficiency is plotted on a beta value versus micron size chart to enable one to find the rating at a specific micron size. The capacity is plotted on a pressure differential versus grams capacity chart. This allows one to find the capacity of the element at the filter’s specific bypass or indicator setting.



Flow data is performed at 150 SUS (32cSt) and plotted separately for the element and housing . Pressure loss for different viscosities can be calculated by using the formula on the opposite page.



### Cellulose

An economical type of media (denoted by a “C”) that provides nominal efficiency and capacity. The pore structure of paper media is not efficient for fine filtration or high capacity applications. The data provided for each individual element is limited to flow versus pressure loss. To the left is an efficiency chart which plots what would be considered typical for the various grades of cellulose media.

As shown in the chart, cellulose elements are not nearly as efficient as Microglass elements. They are rated for nominal filtration, typically 50% efficient at rated size. Due to the low particle capture efficiency of 20C cellulose elements, it is not practical to plot on the chart. The 20C elements could be considered a  $Beta_{20} = 2$  (50% efficient at 20 micron). The same limitations exist with the stainless steel mesh elements.

### Stainless Steel Woven Wire

Commonly referred to as “wire mesh” this filtration medium is typically used in suction filters due to the low flow restriction. Wire mesh elements are unique in that they are designed to be cleaned and reused. These elements are rated for efficiency based on the pore size diameter of the mesh and are denoted by a “W” after the micron rating. For example a 74W element would have a nominal rating of 74 micron based on the diameter of the mesh pores. This should not be confused with “mesh” ratings which are the number of wire strands per inch. Mesh ratings can be correlated to micron ratings, see “Micrometer Conversions” on page 224.

### General Comparison of Filter Media

Media Material	Capture Efficiency	Dirt Holding Capacity	Differential Pressure	Life in a System	Initial Cost
Fiberglass	High	High	Moderate	High	Moderate
Cellulose	Moderate	Moderate	High	Moderate	Low
Wire Mesh	Low	Low	Low	Moderate	High

# Appendix

## Definitions

### Absolute Rating:

The diameter of the largest hard spherical particle that will pass through a filter under specified test conditions. This is an indication of the largest opening in the filter element. Hydraulic and Fuel Filtration Division defines absolute as 99.5% removal (beta 200) at a given particle size.

### Absorb/Absorption:

The process of a fluid being taken into the pores of a solid.

### Adsorb/Adsorption:

To collect and hold a fluid on the surface of a solid.

### Beta Ratio:

The ratio of the number of particles of a given size and larger of a filter to the number of particles of the same size and larger downstream.

Beta Ratios/Efficiencies	
Beta Ratio (at a given particle size)	Capture Efficiency (at same particle size)
1.01	1.0%
1.1	9.0%
1.5	33.3%
2.0	50.0%
5.0	80.0%
10.0	90.0%
20.0	95.0%
75.0	98.7%
100	99.0%
200	99.5%
1000	99.9%

### Bubble Point:

Pressure drop in inches of water required to expel the first steady (continuous) stream of bubbles from a horizontal disc of wetted filter medium or a filter cartridge immersed in a liquid (usually alcohol). A bubble point test is used to test the integrity of cartridge construction to compare relative porosities of a filter media or monitor product consistency as a quality control method.

### Bypass:

Fluid flowing through a passage other than the filter medium and/or leakage around filter media seals.

### Burst:

An outward structural failure of the filter element caused by excessive differential pressure.

### Cleanliness Codes:

A representation of a fluids contamination level based on a series of index numbers that refer to a table of concentration values.

Cleanliness Level Correlation Table					
ISO Code	Particles/Milliliter			NAS 1638 (1964)	Disavowed SAE Level (1963)
	>2 Micrometers	>5 Micrometers	>15 Micrometers		
22/21/18	80,000	20,000	2,500	12	
22/20/18	40,000	10,000	2,500		
22/20/17	40,000	10,000	1,300	11	
22/20/16	40,000	10,000	640		
21/19/16	20,000	5,000	640	10	
20/18/15	10,000	2,500	320	9	6
19/17/14	5,000	1,300	160	8	5
18/16/13	2,500	640	80	7	4
17/15/12	1,300	320	40	6	3
16/14/12	640	160	40		
16/14/11	640	160	20	5	2
15/13/10	320	80	10	4	1
14/12/9	160	40	5	3	0
13/11/8	80	20	2.5	2	
12/10/8	40	10	2.5		
12/10/7	40	10	1.3	1	
12/10/6	40	10	.64		

### Collapse Pressure:

An inward structural failure of the filter element caused by excessive differential pressure.

### Contaminant:

Undesirable insoluble solid or gelatinous particles present in fluid.

### Crest:

The outer fold of a pleat.

### Differential Pressure/Pressure Drop:

Difference in pressure between two points in a system. In filters, this is typically measured between the inlet and outlet of the filter housing.

### Dissolved Water:

Water capable of being held by the fluid in solution. The amount held must be below the saturation point.

### Duplex Filter:

An assembly of two filters with valving for the selection of either element.

### Efficiency:

The ability of the filter element to remove particles from the filter stream.  
Efficiency =  $(1 - 1/\beta) \times 100$ .

# Appendix

## Definitions

**Effluent:**

The fluid that has passed through the filter.

**Filter Medium:**

The permeable material used for a filter that separates particles from a fluid passing through it.

**Flow Fatigue:**

The ability of a filter element to withstand structural failure of the filter medium due to flexing of the pleats caused by cyclic differential pressure.

**Free Water:**

Water droplets or globules in a system that tend to accumulate at the bottom of a system's fluid because it exceeds the solubility of the fluid.

**Influent:**

Fluid entering the inlet of a filter.

**In-Line Filter:**

A filter in which the inlet, outlet and element are in a straight axis.

**L-Type Filter:**

A filter in which the inlet and outlet port axis are at right angles, and the filter element axis is parallel to either port axis.

**Laminar Flow:**

Flow rate at which liquid is in a nonturbulent state (10ft/sec) and should not exceeded to maintain filtration integrity and consistency.

**Media Migration:**

Contamination of the effluent by fibers or other material of which the filter is constructed.

**Micron:**

A unit of length. Correct term is micrometer ( $\mu\text{m}$ ), which is .000039 inch. Human eye can see a 40 micrometer particle.

**Neutralization Number:**

A measure of the acidity or basicity of a fluid, this includes organic and inorganic acids or bases, or combination thereof.

**Nominal Rating:**

Micron size removed at a given efficiency under a manufacturer's defined test condition. An arbitrary term assigned by manufacturers which varies and has therefore depreciated in value.

**Pinched Pleat:**

A pleat closed off by excessive differential pressure or crowding, thus reducing the effective area of the filter element.

**Pleats:**

a series of folds in the filter medium usually of uniform height and spacing designed to maximize effective area.

**Pressure Line Filter:**

A filter located in a line conducting working fluid to a working device or devices.

**Return Line Filter:**

A filter located in the line which is conducting working fluid from working devices to a reservoir.

**Root:**

The inside fold of a pleat.

**Suction Filter:**

A filter located in the intake line of a pump where the fluid is below atmospheric pressure.

**T-Type Filter:**

A filter in which the inlet and outlet port axes are in a straight line, and the filter element axis is perpendicular to this line.

**Varnish:**

Materials generated by the hydraulic fluid due to oxidation, thermal instability, or other reactions. These materials are insoluble in the hydraulic fluid and are generally found as brownish deposits in the work surfaces.

**Y-Type Filter:**

A filter in which the inlet and outlet port axes are in a straight line, and the filter element is at an acute angle to this line.

# Appendix

## Micrometer Conversions

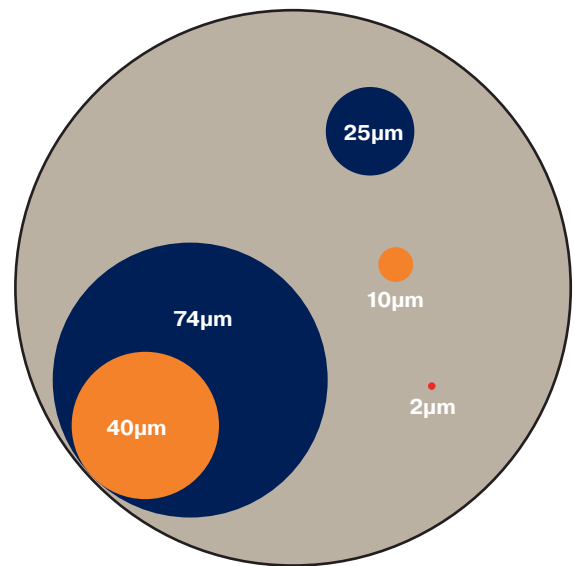
US and ASTM Std Sieve Number	Actual Opening (in)	( $\mu\text{m}$ )
10	0.0787	2000
12	0.0661	1680
14	0.0555	1410
16	0.0469	1190
18	0.0394	1000
20	0.0331	840
25	0.0280	710
30	0.0232	590
35	0.0197	500
40	0.0165	420
45	0.0138	350
50	0.0117	297
60	0.0098	250
70	0.0083	210
80	0.0070	177
100	0.0059	149
120	0.0049	125
140	0.0041	105
170	0.0035	88
200	0.0029	74
230	0.0024	62
270	0.0021	53
325	0.0017	44
400	0.00142	36
550	0.00099	25
625	0.00079	20
1,250	0.000394	10
1,750	0.000315	8
2,500	0.00097	5
5,000	0.000099	2.5
12,000	0.0000394	1

### Micrometer Comparisons

Substance	( $\mu\text{m}$ )
Table Salt	100
Human Hair (average dia)	50-70
White Blood Cell	25
Talcum Powder	10
Cocoa	8-10
Red Blood Cell	8
Bacteria (cocci)	2

Note: Lower limit of visibility (naked eye)—40 $\mu\text{m}$

Relative Size of Particles  
Magnification 500x



### Linear Equivalents

1 in = 25.4 mm = 25,400  $\mu\text{m}$   
 1 mm = 0.0394 in = 1,000  $\mu\text{m}$   
 1  $\mu\text{m}$  = 1/25,400 in = 0.001 mm  
 1  $\mu\text{m}$  =  $3.94 \times 10^{-5}$  in = 0.000039 in

### Formulas

Velocity (ft per sec) =  $\frac{0.4085 \times \text{gpm}}{d^2 \text{ (ID in)}}$

### Conversion Rates

1 cu ft = 7.48 gal  
 1 gal = 231 cu in  
 2 cu ft water = 62.42 lb  
 1 gal water = 8.34 lb  
 1 US gal = 0.833 imp gal  
 1 lb/in<sup>2</sup> = 2.31 ft of water = 2.036 in Hg  
 °F = 9/5(°C+32)

### Metric Conversion Formulas

mm = inches x 25.4  
 m = feet x 0.3048  
 cm<sup>3</sup> = cu in x 16.39  
 m<sup>3</sup> = cu ft x 0.028  
 kg = pounds x 0.454  
 kPa = psi x 6.895  
 lpm = gpm x 3.785  
 °C = 5/9 (°F-32)

# Appendix

## Measurement Conversion Tables

To Convert	Multiply by	To Obtain
<b>A</b>		
atmospheres	33.9	ft of water (at 4×C)
atmospheres	29.92	in mercury (at 0×C)
<b>B</b>		
barrels (US liquid)	31.5	gallons
barrels (oil)	42	gallons (oil)
bars	0.9869	atmospheres
bars	14.5	pounds/sq in
<b>C</b>		
centimeters	0.03281	feet
centimeters	0.3937	inches
centimeters	0.00001	kilometers
centimeters	0.01	meters
centimeters	0.01094	yards
centimeters	10,000	microns
cubic centimeters	0.00003531	cubic feet
cubic centimeters	0.06102	cubic inches
cubic centimeters	0.000001	cubic meters
cubic centimeters	0.001	liters
cubic centimeters	0.002113	pints (US liquid)
cubic centimeters	0.001057	quarts (US liquid)
cubic feet	28,320	cubic centimeters
cubic feet	1,728	cubic inches
cubic feet	0.02832	cubic meters
cubic feet	0.03704	cubic yards
cubic feet	7.48052	gallons (US liquid)
cubic feet	28.32	liters
cubic feet	59.84	pints (US liquid)
cubic feet	29.92	quarts (US liquid)
cubic feet/min	62.43	pounds water/min
cubic feet/min	1.698	cubic meters/hr
cubic feet/sec	448.831	gallons/min
cubic inches	16.39	cubic centimeters
cubic inches	0.0005787	cubic feet
cubic inches	0.00001639	cubic meters
cubic inches	0.00002143	cubic yards
cubic inches	0.004329	gallons
cubic inches	0.01639	liters
cubic meters	35.31	cubic feet
cubic meters	61,023	cubic inches
cubic meters	264.2	gallons (US liquid)
cubic meters	1000	liters
cubic meters/hour	4.4	gallons (US)/min
cubic meters/hour	0.588	cubic feet/min

To Convert	Multiply by	To Obtain
<b>F</b>		
feet	30.48	centimeters
feet	0.0003048	kilometers
feet	0.3048	meters
feet	304.8	millimeters
feet of water	0.0295	atmospheres
feet of water	0.8826	inches of mercury
feet of water	62.43	pounds/sq ft
feet of water	0.4335	pounds/sq in
feet/minute	0.01667	feet/second
<b>G</b>		
gallons	3,785	cubic centimeters
gallons	0.1337	cubic feet
gallons	231	cubic inches
gallons	3.785	liters
gallons (liq br imp)	1.20095	gallons (US liquid)
gallons (US)	0.83267	gallons (Imp)
gallons of water	8.337	pounds of water
gallons/min	0.002228	cubic feet/sec
gallons/min	0.06308	liters/sec
gallons/min	8.0208	cubic feet/hr
grams	0.001	kilograms
grams	0.002205	pounds
grams/cm	0.0056	pounds/in
grams/sq in	45.71	ounces/sq yd
<b>I</b>		
inches	2.540	centimeters
inches	0.02540	meters
inches	25.4	millimeters
inches of mercury	0.03342	atmospheres
inches of mercury	1.133	feet of water
<b>K</b>		
kilograms	2.2046	pounds
kilograms	0.009842	tons (long)
kilograms	0.001102	tons (short)
kilograms/sq cm	2,048	pounds/sq ft
kilograms/sq cm	14.22	pounds/sq in
kilograms/sq meter	0.00009678	atmospheres
kilograms/sq meter	0.00009807	bars
kilograms/sq meter	0.003281	feet of water
kilograms/sq meter	0.002896	inches of mercury
kilograms/sq meter	0.2048	pounds/sq ft
kilograms/sq meter	0.001422	pounds/sq in

# Appendix

## Measurement Conversion Tables

To Convert	Multiply by	To Obtain
<b>L</b>		
liters	0.2642	gallons (US liquid)
liters	2.113	pints (US liquid)
liters	1.057	quarts (US liquid)
liters/min	0.0005886	cubic ft/sec
liters/min	0.004403	gallons/sec
liters/hour	0.004403	gallons (US)/min
<b>M</b>		
meters	3.281	feet
meters	39.37	inches
meters	0.001	kilometers
meters/min	3.281	feet/min
meters/min	0.05468	feet/sec
microns	0.000001	meters
mils	0.00254	centimeters
mils	0.000083333	feet
mils	0.001	inches
mils	0.000000254	kilometers
<b>O</b>		
ounces	28.349	grams
ounces	0.0625	pounds
ounces (fluid)	1.805	cubic inches
ounces (fluid)	0.02957	liters
ounces/sq in	0.0625	pounds/sq in
ounces/sq yard	20.83	pounds/3000 sq ft
<b>P</b>		
pints (liquid)	0.125	gallons
pints (liquid)	0.4732	liters
pints (liquid)	0.5	quarts (liquid)
pounds	453.59	grams
pounds	16	ounces
pounds/sq ft	0.0004725	atmospheres
pounds/sq ft	0.01602	feet of water
pounds/sq ft	0.01414	inches of mercury
pounds/sq in	0.06804	atmospheres
pounds/sq in	2.307	feet of water
pounds/sq in	2.036	inches of mercury
pounds/sq in	0.0145	kilo pascals (kPa)
pounds/sq in	27.684	inches water column
pounds/3000 sq in	0.048	ounces/sq yard

To Convert	Multiply by	To Obtain
<b>Q</b>		
quarts (liquid)	0.03342	cubic feet
quarts (liquid)	57.75	cubic inches
quarts (liquid)	0.0009464	cubic meters
quarts (liquid)	0.25	gallons
quarts (liquid)	0.9463	liters
<b>S</b>		
square centimeters	0.001076	square feet
square centimeters	0.1550	square inches
square centimeters	0.0001	square meters
square feet	144	square inches
square feet	0.0929	square meters
square inches	0.006944	square feet
square inches	0.0007716	square yards
square meters	10.76	square feet
square meters	155	square inches
square meters	1.196	square yards
square yards	9	square feet
square yards	1,296	square inches
square yards	0.8361	square meters

# Appendix

## ISO Standards and their impact on Filter Performance Reporting and the Contamination Code.

The recent changes to ISO contamination and filtration standards were brought about to solve accuracy, traceability, and availability issues. It is important to remember that both real world hydraulic system cleanliness levels and actual system filter performance remain unchanged. However, the reporting of cleanliness levels and filter performance has changed due to the new particle counter calibration and multi-pass test procedures.

ISO 11171 is the new particle counter calibration method and utilizes calibration fluid made from ISO Medium Test Dust (ISO MTD) suspended in MIL-H-5606. The calibration fluid is traceable to the National Institute of Standards and Technology (NIST) and is designated by NIST as Standard Reference Material (SRM)2806. ISO 11171 is replacing ISO 4402 which is based on obsolete AC Fine Test Dust (ACFTD).

It is important to note that the ISO 11171 calibration method is based on a distribution of particles measured by their equivalent area diameter, whereas ISO 4402 is based on a distribution of particles measured by their longest chord. Also, the NIST work utilized scanning electron microscopy for particles below 10 um in size, whereas the sizing distribution on ACFTD utilized optical microscopy.

The new calibration method and resulting ISO code will typically produce a one to two level increase in the first digit (the >4um size range) of the three digit code. This is due to the greater number of particles in the small size range.

The remaining two digits will typically remain unchanged between old and new calibration methods, and should not impact previously established ISO cleanliness standards.

Table 1 below shows the approximate particle size relationship between the calibration methods.

ACFTD size (per ISO 4402:1991) um	NIST size (per ISO 11171:1999) um (c)
1	4.2
2	4.6
3	5.1
5	6.4
7	7.7
10	9.8
15	13.6
20	17.5
25	21.2
30	24.6
40	31.7

The ISO cleanliness code reporting method will also be affected.

Example: Former two-digit ISO 4406:1987  
5 um / 15 um  
 14 11

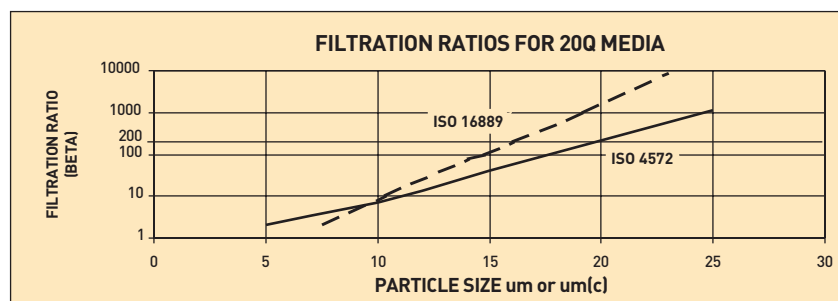
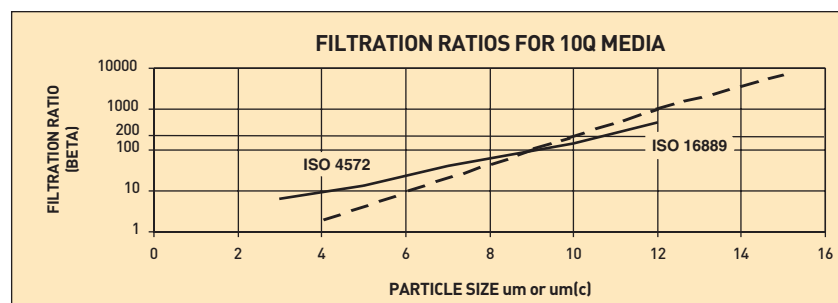
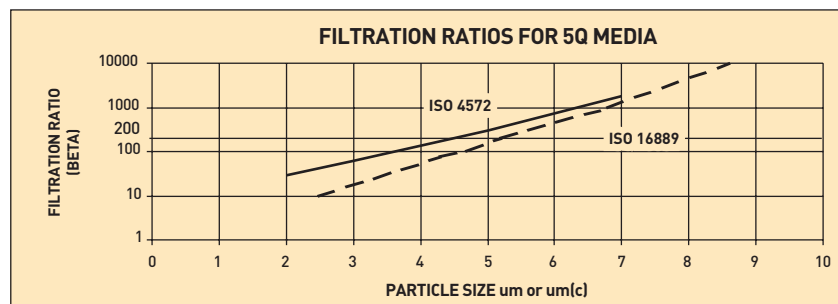
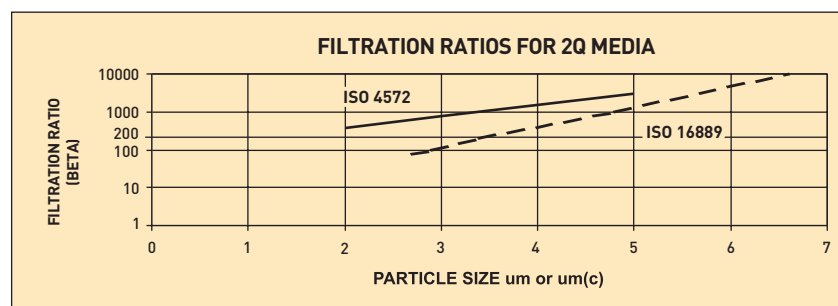
Former three-digit ISO code  
2 um / 5 um / 15 um  
 17 14 11

New three-digit **ISO 4406:1999**  
4 um (c) / 6 um (c) / 14 um (c)  
 18 14 11

# Appendix

## Changes to ISO Standards and their impact on Filter Performance Reporting and the Contamination Code, continued.

**ISO 16889** is the new multi-pass test standard for measuring filter performance and utilizes ISO MTD as the contaminant challenge. This standard is replacing ISO 4572 which utilized ACFTD. See the following graphs below for filtration beta ratio comparisons on our 2Q, 5Q, 10Q, and 20Q Microglass media. The graphs reflect multi-pass test results using ISO 4572 with ACFTD and the revised ISO 16889 using ISO MTD.



# Offer of Sale

**1. Definitions.** As used herein, the following terms have the meanings indicated.

"Buyer" means any customer receiving a Quote for Products.  
"Buyer's Property" means any tools, patterns, plans, drawings, designs, specifications materials, equipment, or information furnished by Buyer, or which are or become Buyer's property.  
"Confidential Information" means any technical, commercial, or other proprietary information of Seller, including, without limitation, pricing, technical drawings or prints and/or part lists, which has been or will be disclosed, delivered, or made available, whether directly or indirectly, to Buyer.

"Goods" means any tangible part, system or component to be supplied by Seller.  
"Intellectual Property Rights" means any patents, trademarks, copyrights, trade dress, trade secrets or similar rights.  
"Products" means the Goods, Services and/or Software as described in a Quote.  
"Quote" means the offer or proposal made by Seller to Buyer for the supply of Products.

"Seller" means Parker-Hannifin Corporation, including all divisions, subsidiaries and businesses selling Products under these Terms.

"Seller's IP" means patents, trademarks, copyrights, or other intellectual property rights relating to the Products, including without limitation, names, designs, images, drawings, models, software, templates, information, any improvements or creations or other intellectual property developed prior to or during the relationship contemplated herein.

"Services" means any services to be provided by Seller.  
"Software" means any software related to the Goods, whether embedded or separately downloaded.

"Special Tooling" means equipment acquired by Seller or otherwise owned by Seller necessary to manufacture Goods, including but not limited to tools, jigs, and fixtures.

"Terms" means the terms and conditions of this Offer of Sale.

**2. Terms.** All sales of Products by Seller will be governed by, and are expressly conditioned upon Buyer's assent to, these Terms. These Terms are incorporated into any Quote provided by Seller to Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms or conditions of purchase. Any Quote made by Seller to Buyer shall be considered a firm and definite offer and shall not be deemed to be otherwise despite any language on the face of the Quote. Seller reserves all rights to accept or reject any purported acceptance by Buyer to Seller's Quote if such purported acceptance attempts to vary the terms of the Quote. If Seller ships Products after Buyer issues an acceptance to the Quote, any additional or different terms proposed by Buyer will not become part of the parties' business relationship unless agreed to in a writing that is signed by an authorized representative of Seller, excluding email correspondence. If the transaction proceeds without such agreement on the part of Seller, the business relationship will be governed solely by these Terms and the specific terms in Seller's Quote.

**3. Price; Payment.** The Products set forth in the Quote are offered for sale at the prices indicated in the Quote. Unless otherwise specifically stated in the Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices for any reason and at any time by giving ten (10) days prior written notice. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2020). All sales are contingent upon credit approval and full payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Under any circumstances, Buyer may not withhold or suspend payment of any amounts due and payable as a deduction, set-off or recoupment of any amount, claim or dispute with Seller. Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law. Seller reserves the right to require advance payment or provision of securities for first and subsequent deliveries if there is any doubt, in Seller's sole determination, regarding the Buyer's creditworthiness or for other business reasons. If the requested advance payment or securities are not provided to Seller's satisfaction, Seller reserves the right to suspend performance or reject the purchase order, in whole or in part, without prejudice to Seller's other rights or remedies, including the right to full compensation. Seller may revoke or shorten any payment periods previously granted in Seller's sole determination. The rights and remedies herein reserved to Seller are cumulative and in addition to any other or further rights and remedies available at law or in equity. No waiver by Seller of any breach by Buyer of any provision of these terms will constitute a waiver by Seller of any other breach of such provision.

**4. Shipment; Delivery; Title and Risk of Loss.** All delivery dates are approximate, and Seller is not responsible for damages or additional costs resulting from any delay. All deliveries are subject to our ability to procure materials from our suppliers. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the carrier at Seller's facility. Unless otherwise agreed prior to shipment and for domestic delivery locations only, Seller will select and arrange, at Buyer's sole expense, the carrier and means of delivery. When Seller selects and arranges the carrier and means of delivery, freight and insurance costs for shipment to the designated delivery location will be prepaid by Seller and added as a separate line item to the invoice. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions. Buyer shall not return or repackage any Products without the prior written authorization from Seller, and any return shall be at the sole cost and expense of Buyer.

**5. Warranty.** The warranty for the Products is as follows:

(i) Goods are warranted against defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the date of completion of the Services; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer: EXEMPTION CLAUSE: DISCLAIMER OF WARRANTY, CONDITIONS, REPRESENTATIONS: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY, CONDITION, AND REPRESENTATION, PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, CONDITIONS, AND REPRESENTATIONS, WHETHER STATUTORY, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE RELATING TO DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED, UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER. THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH-RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".

**6. Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

**7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCTS, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES INCLUDING ANY LOSS OF REVENUE OR PROFITS, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

**8. Confidential Information.** Buyer acknowledges and agrees that Confidential Information has been and will be received in confidence and will remain the property of Seller. Buyer further agrees that it will not use Seller's Confidential Information for any purpose other than for the benefit of Seller and shall return all such Confidential Information to Seller within thirty (30) days upon request.

**9. Loss to Buyer's Property.** Buyer's Property will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using Buyer's Property. Also, Seller shall not be responsible for any loss or damage to Buyer's Property while it is in Seller's possession or control.

**10. Special Tooling.** Seller may impose a tooling charge for any Special Tooling. Special Tooling shall be and remain Seller's property. In no event will Buyer acquire any interest in the Special Tooling, even if such Special Tooling has been specially converted or adapted for manufacture of Goods for Buyer and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property owned by Seller in its sole determination at any time.

**11. Security Interest.** To secure payment of all sums due from Buyer, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect Seller's security interest.

**12. User Responsibility.** Buyer, through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and any technical information provided with the Quote or the Products, such as Seller's instructions, guides and specifications. If Seller provides options of or for Products based upon data or specifications

provided by Buyer, Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event Buyer is not the end-user of the Products, Buyer will ensure such end-user complies with this paragraph.

**13. Use of Products, Indemnity by Buyer.** Buyer shall comply with all instructions, guides and specifications provided by Seller with the Quote or the Products. If Buyer uses or resells the Products in any way prohibited by Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Further, Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, arising out of or in connection with: (a) improper selection, design, specification, application, or any misuse of Products; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of Buyer's Property; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing, tampering with or repackaging the Products; or (e) Buyer's failure to comply with these Terms, including any legal or administrative proceedings, collection efforts, or other actions arising from or relating to such failure to comply. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

**14. Cancellations and Changes.** Buyer may not cancel or modify, including but not limited to movement of delivery dates for the Products, any order for any reason except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage and any additional expense. Seller, at any time, may change features, specifications, designs and availability of Products.

**15. Assignment.** Buyer may not assign its rights or obligations without the prior written consent of Seller.

**16. Force Majeure.** Seller is not liable for delay or failure to perform any of its obligations by reason of any events or circumstances beyond its reasonable control. Such circumstances include without limitation: accidents, labor disputes or stoppages, government acts or orders, acts of nature, pandemics, epidemics, other widespread illness, or public health emergency, cyber related disruptions, cyber-attacks, ransomware sabotage, delays or failures in delivery from carriers or suppliers, shortages of materials, sudden increases in the price of raw material or components, shutdowns or slowdowns affecting the supply of raw materials or components, or the transportation thereof, oil shortages or oil price increases, energy crisis, embargo or fuel interruption, war (whether declared or not) or the serious threat of same, riots, rebellions, acts of terrorism, embargoes, fire or any reason whether similar to the foregoing or otherwise. Seller will resume performance as soon as practicable after the event of force majeure has been removed. All delivery dates affected by an event of force majeure shall be tolled for the duration of such event of force majeure and rescheduled for mutually agreed dates as soon as practicable after the event of force majeure ceases to exist. The right to allocate capacity is in the Seller's sole discretion. An event of force majeure shall not include financial distress, insolvency, bankruptcy, or other similar conditions affecting one of the parties, affiliates and/or sub-contractors. An event of force majeure in the meaning of these Terms means any circumstances beyond Seller's control that permanently or temporarily hinders performance, even where that circumstance was already foreseen. Buyer shall not be entitled to cancel any orders following its claim of an event of force majeure.

**17. Waiver and Severability.** Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice either party's right to enforce that provision in the future. Invalidation of any provision of these Terms shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

**18. Duration.** Unless otherwise stated in the Quote, any agreement governed by or arising from these Terms shall: (a) be for an initial duration of one (1) year; and (b) shall automatically renew for successive one-year terms unless terminated by Buyer with at least 180-days written notice to Seller or if Seller terminates the agreement pursuant to Section 19 of these Terms.

**19. Termination.** Seller may, without liability to Buyer, terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms, (b) becomes or is deemed insolvent, (c) appoints or has appointed a trustee, receiver or custodian for all or any part of Buyer's property, (d) files a petition for relief in bankruptcy on its own behalf, or one is filed against Buyer by a third party, (e) makes an assignment for the benefit of creditors; or (f) dissolves its business or liquidates all or a majority of its assets.

**20. Ownership of Rights.** Buyer agrees that (a) Seller (and/or its affiliates) owns or is the valid licensee of Seller's IP and (b) the furnishing of information, related documents or other materials by Buyer to Seller does not grant or transfer any ownership interest or license in or to Seller's IP to Buyer, unless expressly agreed in writing. Without limiting the foregoing, Seller retains ownership of all Software supplied to Buyer. In no event shall Buyer obtain any greater right in and to the Software than a right in a license limited to the use thereof and subject to compliance with any other terms provided with the Software. Buyer further agrees that it will not, directly or through intermediaries, reverse engineer, decompile, or disassemble any Software (including firmware) comprising or contained within a Product, except and only to the extent that such activity may be expressly permitted, either by applicable law or, in the case of open source software, the applicable open source license.

**21. Indemnity for Infringement of Intellectual Property Rights.** Seller is not liable for infringement of any Intellectual Property Rights except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third-party claim that one or more of the Products infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by Seller to Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer (including Seller's use of Buyer's Property); or (ii) directed to any Products for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for claims of infringement of Intellectual Property Rights.

**22. Governing Law.** These Terms, the terms of any Quote, and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

**23. Entire Agreement.** These Terms, along with the terms set forth in the Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale and purchase. In the event of a conflict between any term set forth in the Quote and these Terms, the terms set forth in the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. No modification to these Terms will be binding on Seller unless agreed to in a writing that is signed by an authorized representative of Seller, excluding email correspondence, "clickwrap" or other purported electronic assent to different or additional terms. Sections 2-25 of these Terms shall survive termination or cancellation of any agreement governed by or arising from these Terms.

**24. No "Wrap" Agreements/No Authority to Bind.** Seller's clicking any buttons or any similar action, such as clicking "I Agree" or "Confirm", to utilize Buyer's software or webpage for the placement of orders, is NOT an agreement to Buyer's Terms and Conditions. NO EMPLOYEE, AGENT OR REPRESENTATIVE OF SELLER HAS THE AUTHORITY TO BIND SELLER BY THE ACT OF CLICKING ANY BUTTON OR SIMILAR ACTION ON BUYER'S WEBSITE OR PORTAL.

**25. Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer represents that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Products from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws. Buyer agrees to promptly and reliably provide Seller all requested information or documents, including end-user statements and other written assurances, concerning Buyer's ongoing compliance with Export Law.



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