Hydraulic and Lube Filtration Products

Catalog 2300-16

Parker

ENGINEERING YOUR SUCCESS.

The Parker Hannifin Filtration Group assures:

- Consistent quality
- Technical innovation
- Premier customer service

Parker's technical resources provide the right filtration technologies that conform to your requirements. That's why thousands of manufacturers and equipment users around the world rely on Parker Filtration products and people.

Worldwide Sales and Service

Parker operates sales and service centers in major industrial areas worldwide. Call 1-800-C-PARKER for more information.

Hydraulic, Lubrication & Coolant Filtration

High-performance filtration systems for production machinery in industrial, mobile and military/marine.

Compressed Air & Gas Filtration

Complete line of compressed air/gas filtration products; coalescing, particulate and adsorption filters in many applications in many industries.

Process & Chemical Fluid Filtration

Liquid filtration systems for beverage, chemical and food processing; cosmetic, paint, water treatment; photo-processing; and micro-chip fabrication.

Fuel Conditioning & Filtration

Parker air, fuel and oil filtration systems provide quality protection for engines operating in any environment, anywhere in the world.

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

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Hydraulic & Fuel Filtration Division

Your prescription for total system health.

Dedicated to the long term health and reliability of mission critical assets, Parker Hydraulic & Fuel Filtration Division offers you innovative products that cover your diagnostic, therapeutic and preventive needs.

Total System Health Management

Diagnostic

Monitors
Detects
Alerts

Therapeutic

Supports
Improves
Fortifies

Preventive

Long Term Defense
Long Term Value
Reduced Cost of Ownership

Your Trusted Partner in Total System Health Management

12AT/50AT Series

Spin-On Filters

ENGINEERING YOUR SUCCESS.

12AT/50AT Series

Spin-On Filters

Applications for Spin-On Filters

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

Often, economic conditions dictate what type of filter is used on a piece of equipment. When costs are tight, you need a filter that is inexpensive, yet uncompromising in performance and quality. Parker's spin-on filters fit that need. They are built to fit demanding design parameters in today's mobile and industrial equipment. No compromising.

Mounting
- 2 or 6 hole pattern for flexibility

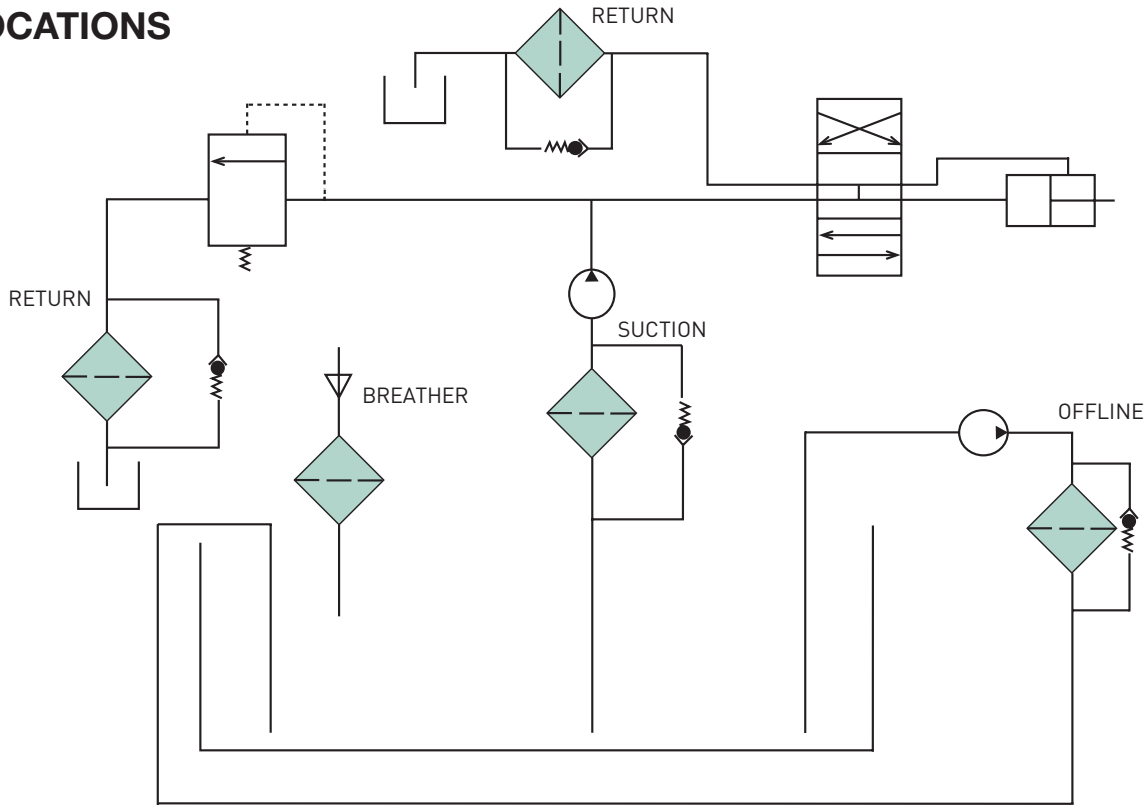
Indicator Gauge
- Shows at a glance when the canister needs changing

Ports
- Both NPT and SAE straight thread available

Disposable Canister
- No mess, oil is contained inside
- Easy to handle
- Single and double lengths for longer life

Interchangeability
- Parker canisters fit many competitors' heads. Contact Hydraulic Filter Division for part numbers

TYPICAL LOCATIONS



12AT/50AT Series

Spin-On Filters

Typical Element Performance: 12AT

Media Code	Filter Media	Beta Ratios	Particle Size/Efficiency
25C	Cellulose	B_{25}=2	25 / 50%
10C	Cellulose	B_{10}=2	10 / 50%
03C	Cellulose	B_{3}=2	3 / 50%
20B	Microglass	B_{20}=75	20 / 98.7%
10B	Microglass	B_{10}=75	10 / 98.7%

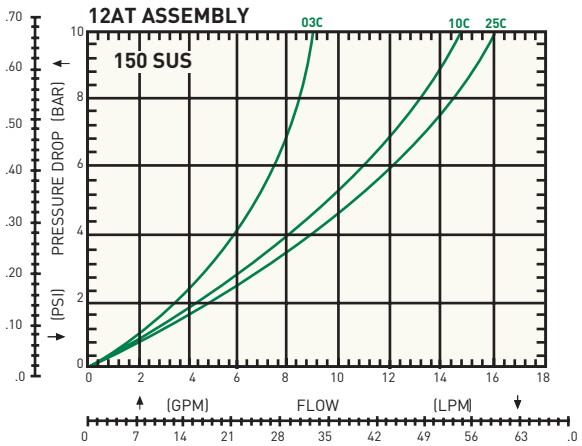
Actual results are dependent on system flow rates, fluid viscosities, and other parameters.

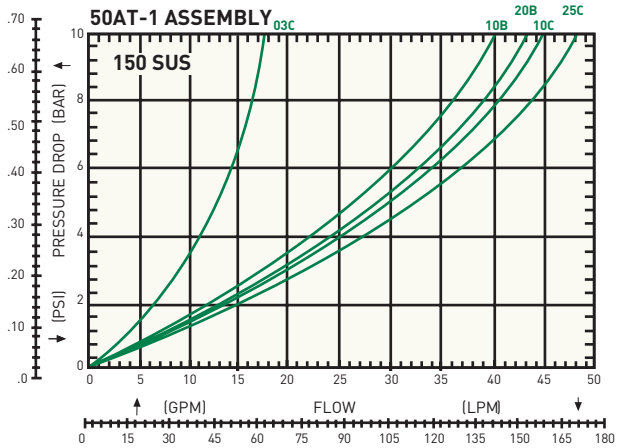
Typical Element Performance: 50AT

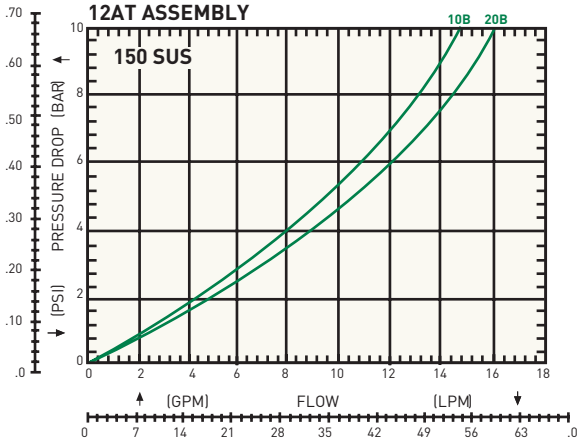
Media Code	Filter Media	Beta Ratios	Particle Size/Efficiency
25C	Cellulose	B_{25}=2	25 / 50%
10C	Cellulose	B_{10}=2	10 / 50%
03C	Cellulose	B_{3}=2	3 / 50%
20B	Microglass	B_{20}=75	20 / 98.7%
10B	Microglass	B_{10}=75	10 / 98.7%
10C-2	Cellulose	B_{10}=2	10 / 50%
20B-2	Microglass	B_{20}=75	20 / 98.7%
10B-2	Microglass	B_{10}=75	10 / 98.7%
03B-2	Microglass	B_{3}=75	3 / 98.7%

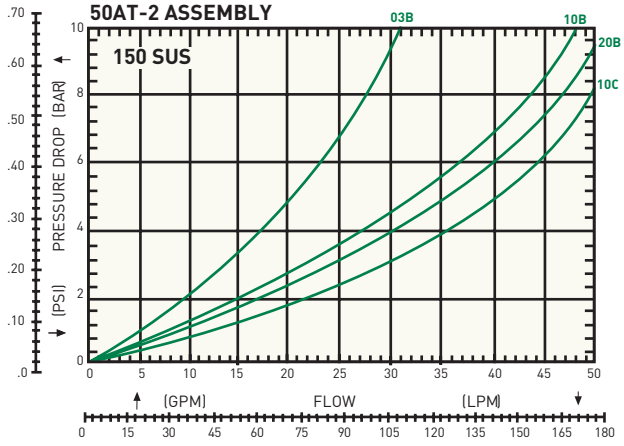
Actual results are dependent on system flow rates, fluid viscosities, and other parameters.

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









12AT/50AT Series

Spin-On Filters

Installation and Specification Data Model 12AT

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 psi

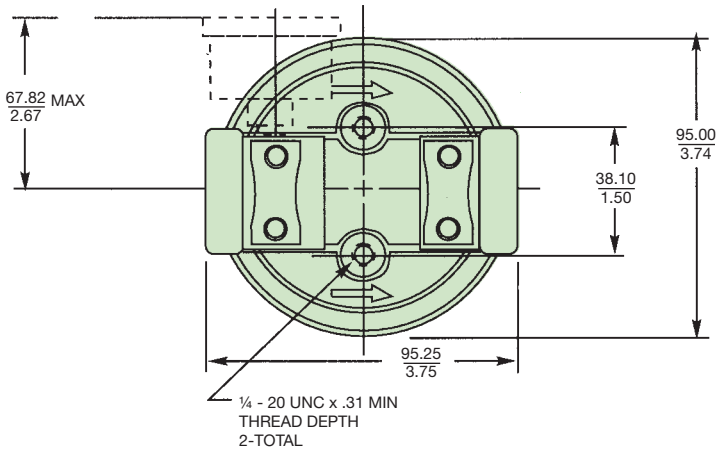
Gauge: Color coded vacuum

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

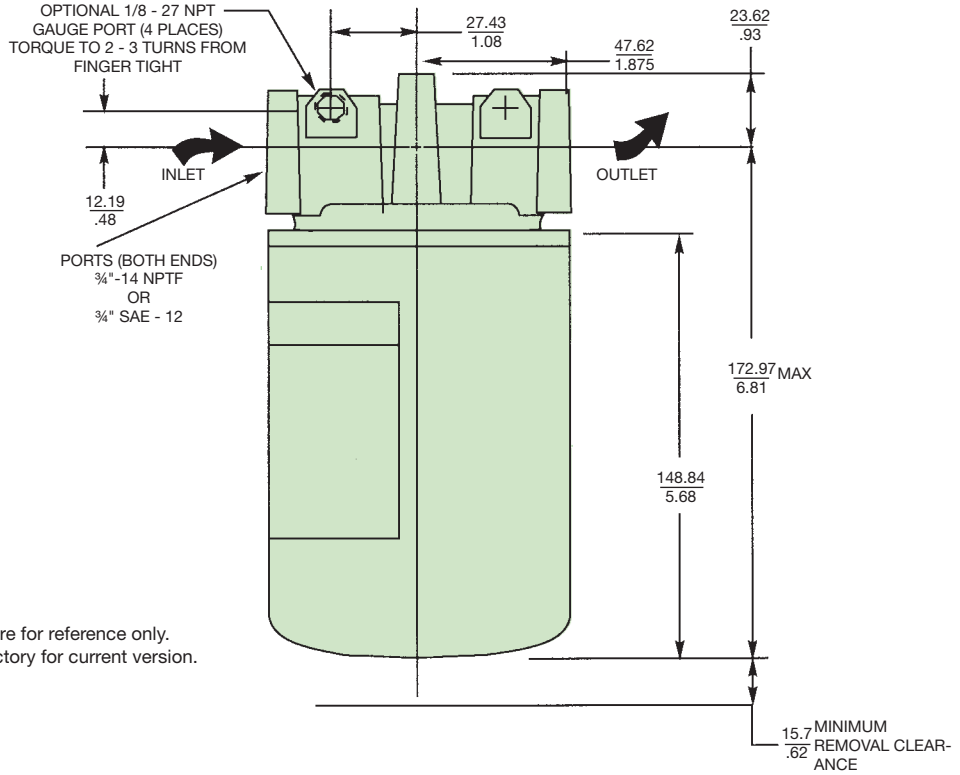
Vacuum Switch: Normally open
5" +/- 1" Hg
1.0 Amp @ 120 VAC

Filter Material:
Head: Aluminum
Canister: Low Carbon Steel

Shipping Weights (approximate):
1.6 lbs.



Linear Measure: millimeter / inch



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

12AT/50AT Series

Spin-On Filters

Installation and Specification Data Model 50AT

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 psi

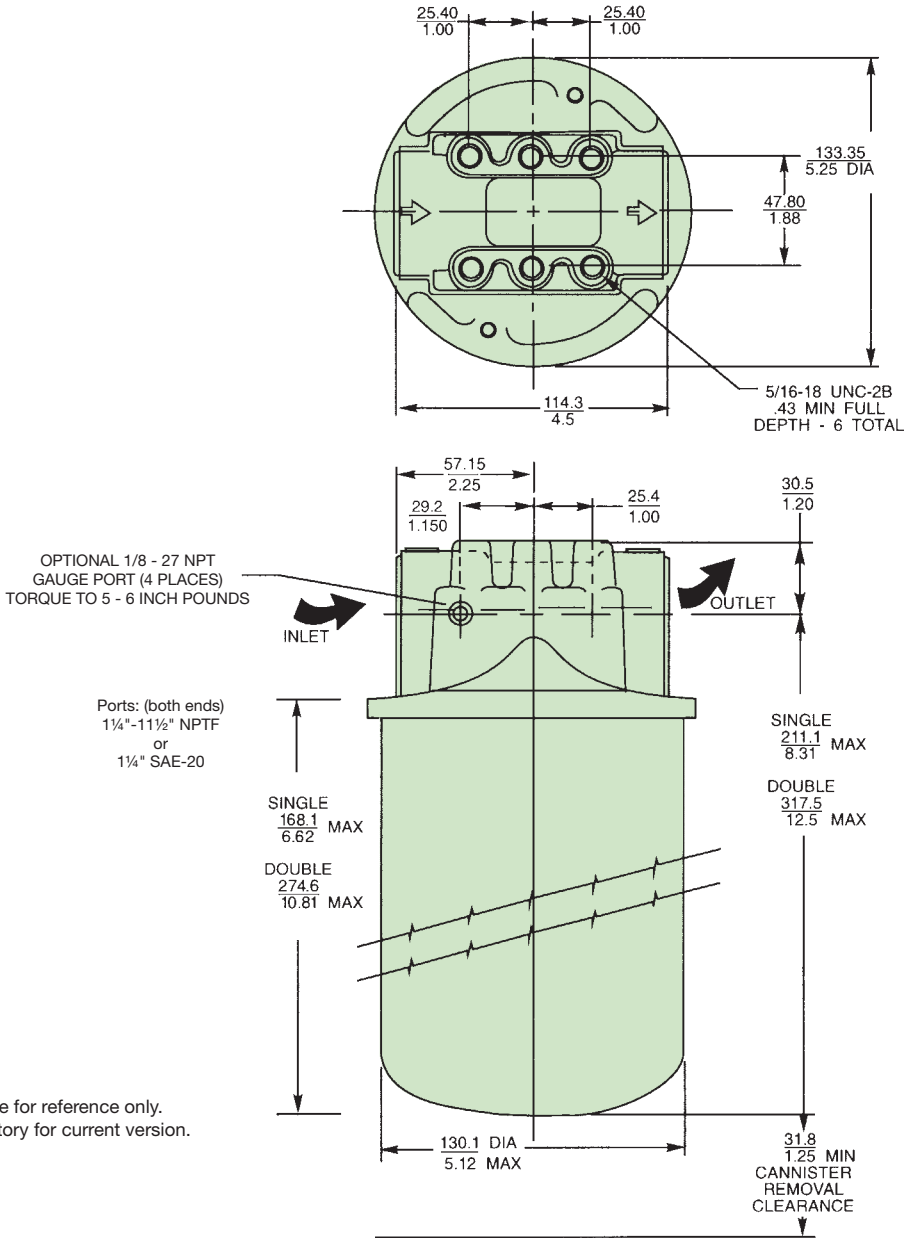
Gauge: Color coded vacuum

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: 3.7 lbs.
Double length: 5.3 lbs.



Linear Measure: millimeter / inch

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

12AT/50AT Series

Spin-On Filters

Reservoir Breather Assemblies 12AT and 50AT

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.

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_2O).

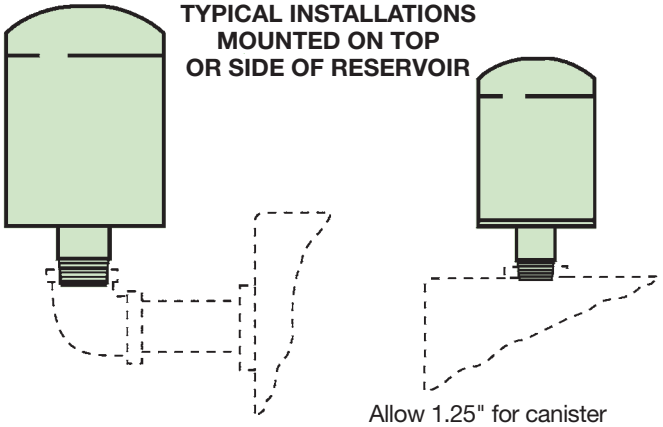
A pipe flange, weld collar, etc. may be used to connect the adapter kit to the reservoir. Make sure that air is not able to leak around the adapter. When mounting on the side of the reservoir, make sure the installation is above the surface of the fluid.

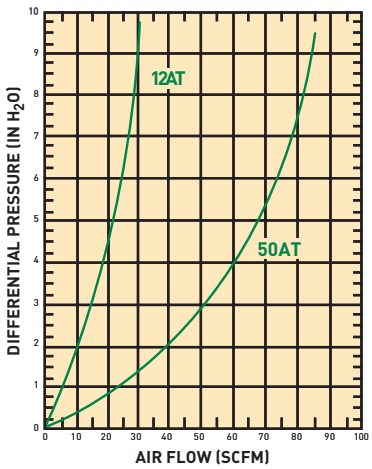
Recommended canister change out is after 500 hours of operation. More frequent replacement may be required when operated in heavily contaminated areas such as grinding operations, primary metal mills, and on mobile equipment. Under such conditions, increase replacement frequency to every 250 hours.

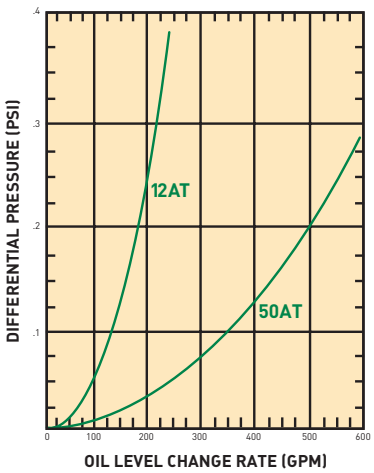
Graphs are for 03C canisters only. Total pressure drop across canister, adapter, and pipe may be found by adding pressure drops below:

+ 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.

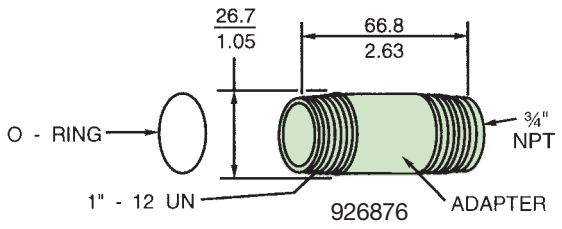
TYPICAL INSTALLATIONS MOUNTED ON TOP OR SIDE OF RESERVOIR



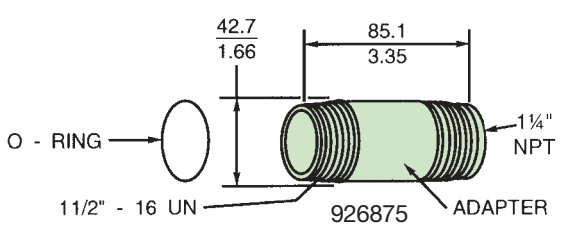




12AT



50AT



12AT/50AT Series

Spin-On Filters

Filter Service

Filter canisters need to be replaced when the pressure gauge reads the filter bypass setting. For example, if a 12AT filter has a 25 psi bypass valve, it needs to be replaced when the pressure gauge reads 25 psi. If no indicator of any kind is used, replace the canister after the first 50 hours of operation, and every 250 hours thereafter. More frequent replacement could be required depending on operating conditions.

When servicing a 12AT or 50AT filter, use the following procedure:

A. Shut down the main system and release pressure in the filter line.
B. Unthread the canister and discard it along with the accompanying seal. A strap wrench may be required.
C. Apply a small amount of lubricant to the new canister seal.
D. Install the new canister and hand tighten 3/8 to 1/2 turn after gasket makes contact with head.

Accessory Parts List

Description	12AT	50AT
Gauge - 15 psi	936911	936911
Gauge - 25 psi	936912	936912
Pressure switch-25 psi	926923	926923
Vacuum switch	926949	926949
Breather adapter kit	926876	926875
Vacuum gauge	936909	936909

Replacement Canisters

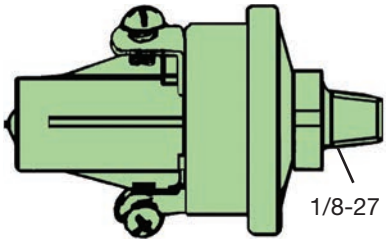
Media	12AT	50AT	50AT-2
25C	925023	926170	N/A
10C	921999	926169	927736
03C	926543	926541	N/A
20B	928764	928767	929446
10B	928763	928766	929445
03B	N/A	934200	932073

Indicator Gauge (15 PSI)

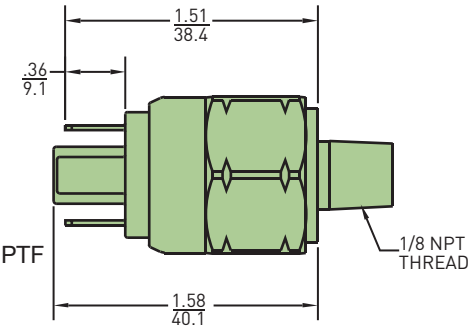
Indicator Gauge (25 PSI)

926923 - 2-pin normally open switch

Vacuum Switch



Pressure Switch



Linear Measure = inches / mm

12AT/50AT Series

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
	50AT	2	10C	N	25	DD	N

BOX 1: Seals

Symbol	Description
None	**Nitrile**

BOX 2: Filter Series

Symbol	Description
12AT	**Spin-in (3/4" nom)**
50AT	**Spin-on (1-1/4" nom)**

BOX 3: Length

Symbol	Description
None	**Single**
2	Double (50AT only)

BOX 4: Media

Symbol	Description
25C*	**Cellulose**
10C	**Cellulose**
03C*	Cellulose
20B	Microglass
10B	Microglass
03B**	Microglass

* Not available in 50AT-2
** Not available in 12AT

BOX 5: Indicator

Symbol	Description
N	**None**

BOX 6: Bypass Setting

Symbol	Description
25	**25 psid**
15	15 psid
3	3 psid
X	No bypass

BOX 7: Options

Symbol	Description
	12AT
BB	**3/4" NPTF**
MM	**SAE-12**
	50AT
DD	**1-1/4" NPTF**
OO	**SAE-20**

BOX 8: Gauge Port

Symbol	Description
N	**None**
H	**Inlet & Outlet, both sides (all ports drilled & tapped)**

Please note the bolded options reflect standard options with a reduced lead time.

NOTE: Gauges must be ordered separately.

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 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.

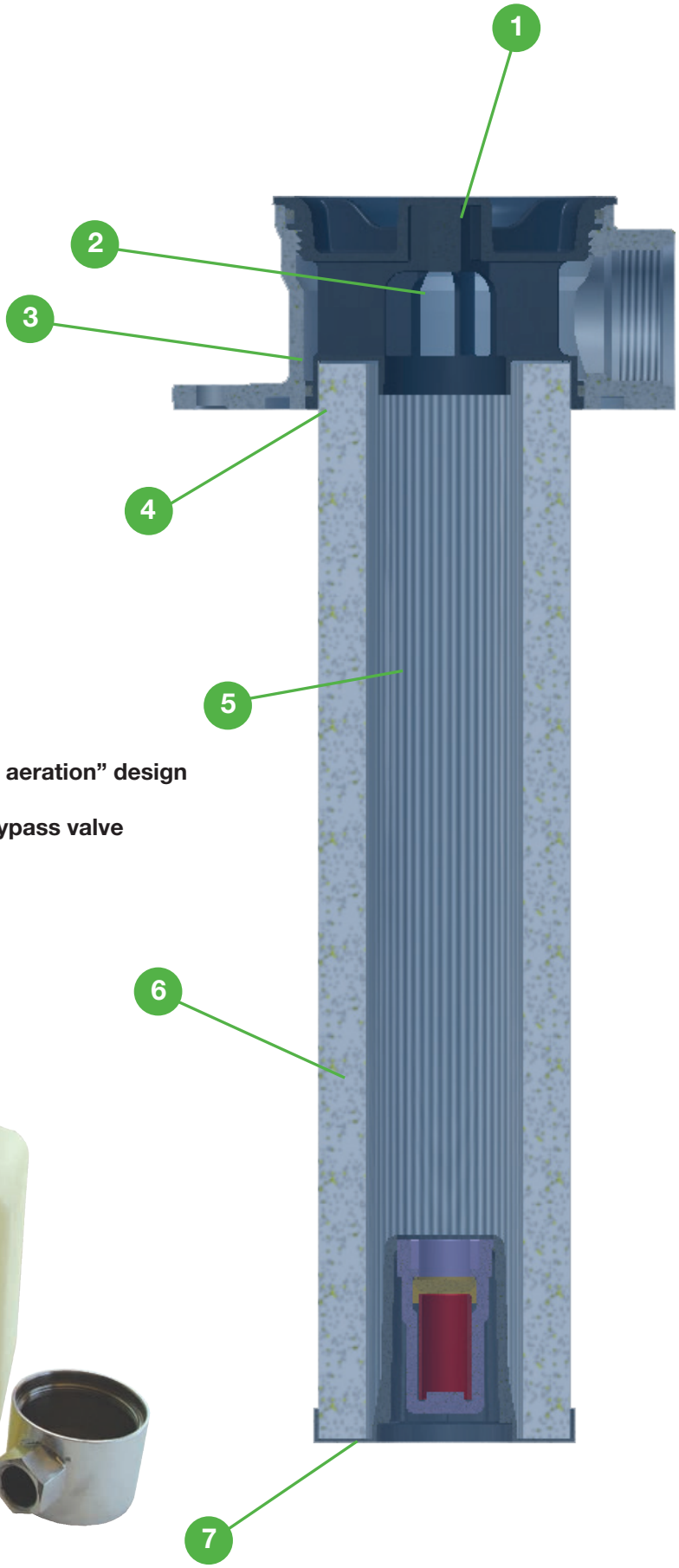
Typical Applications

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

The PT Series filter combines high efficiency Microglass filtration with low cost installation featured in a new patented element design.

PT Series

Features



1. **Easy element assembly removal**
2. **Unique high flow top end cap**
3. **Lightweight cast aluminum head**
4. **Patented 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

Patented 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

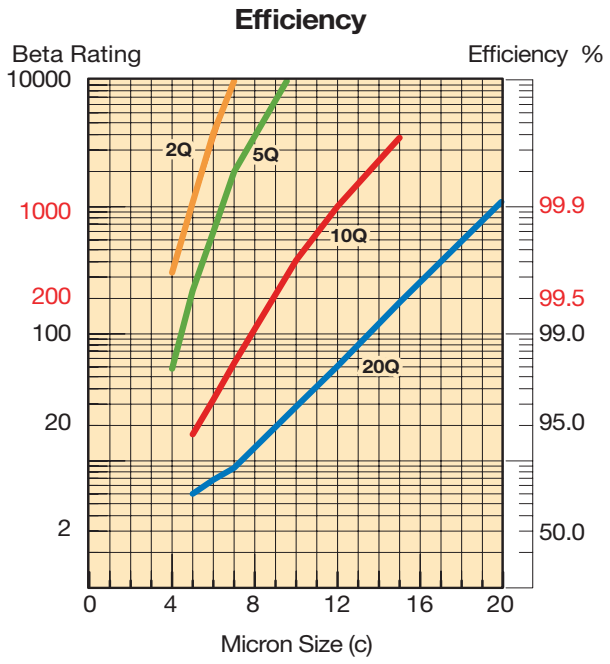
Lower maintenance costs

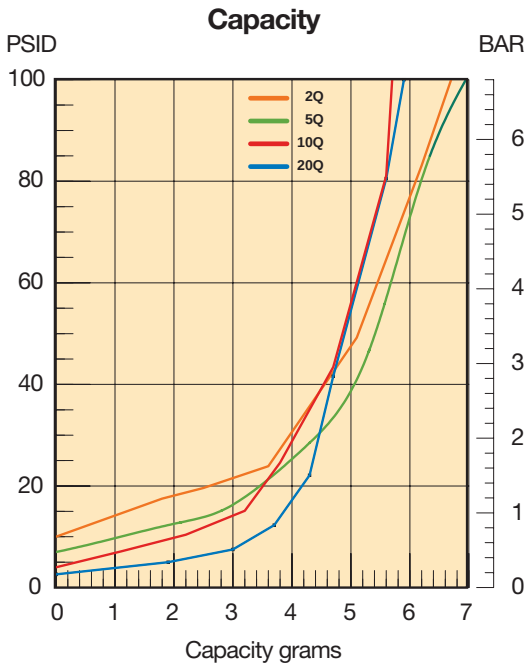
Premium Microglass Media
Superior dirt holding capacity and efficiency

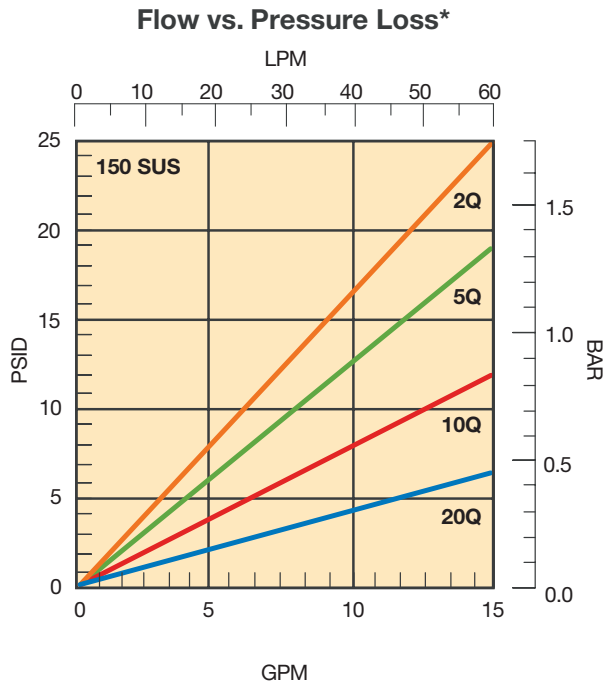
Less maintenance and downtime

PT Series

PT2-1 Element Performance





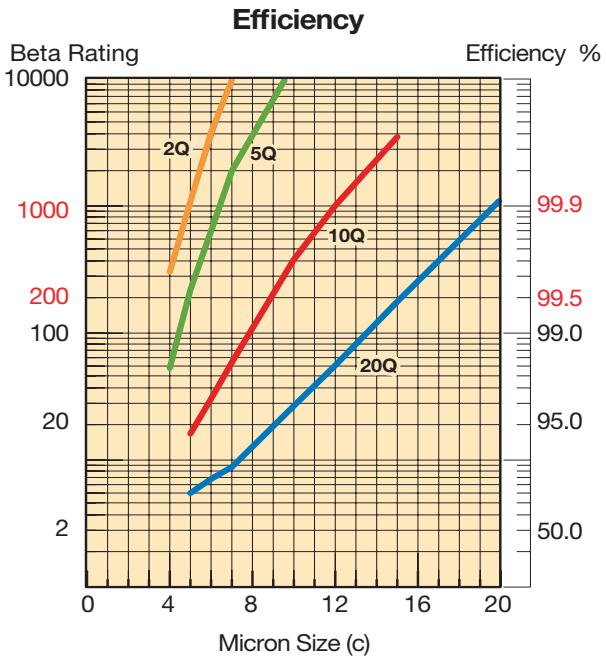


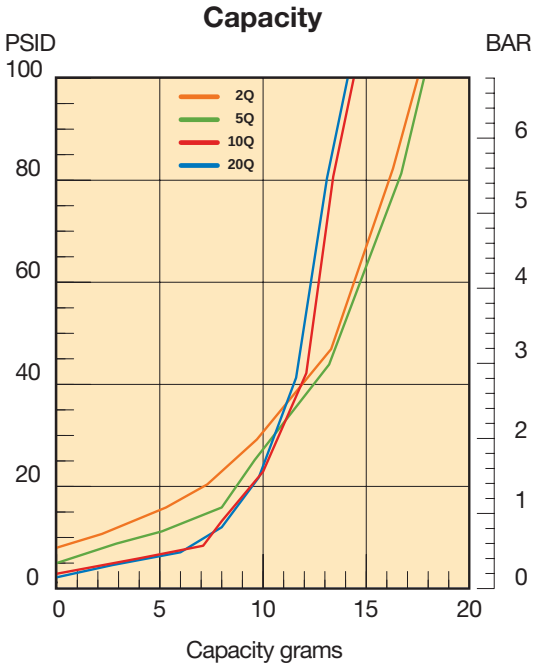
Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 100 psid terminal - 10 mg/L BUGL.
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

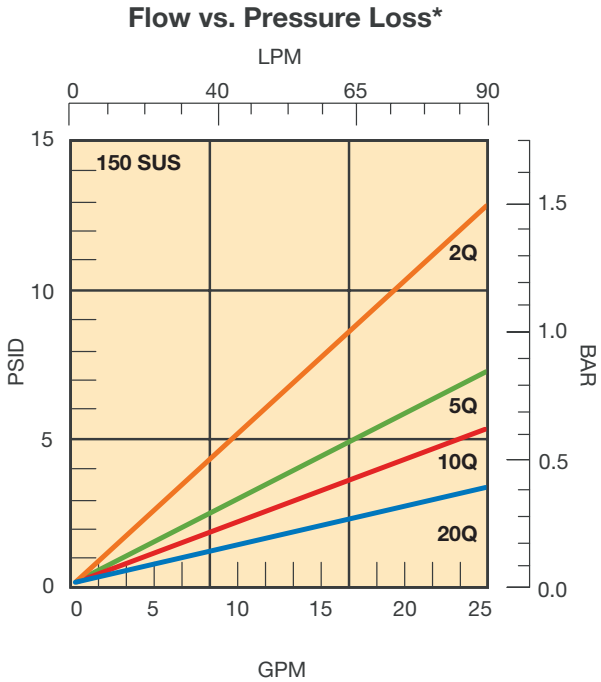
*Note: Pressure drop calculations are based on SAE-12 porting.

PT Series

PT2-2 Element Performance





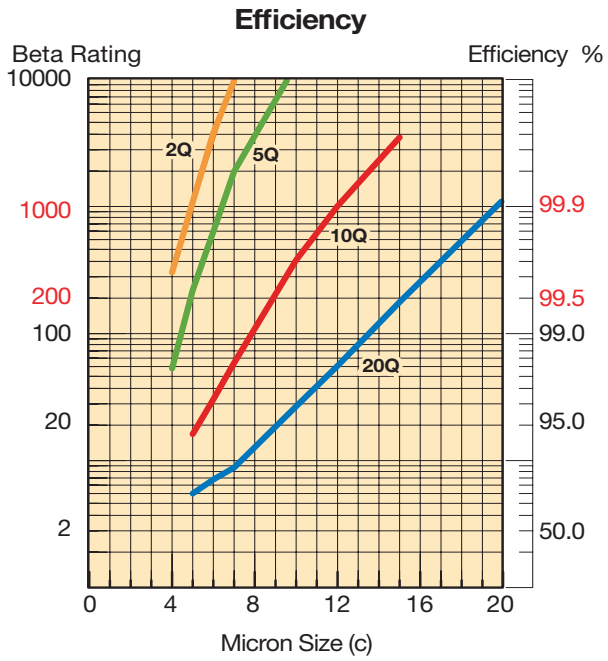


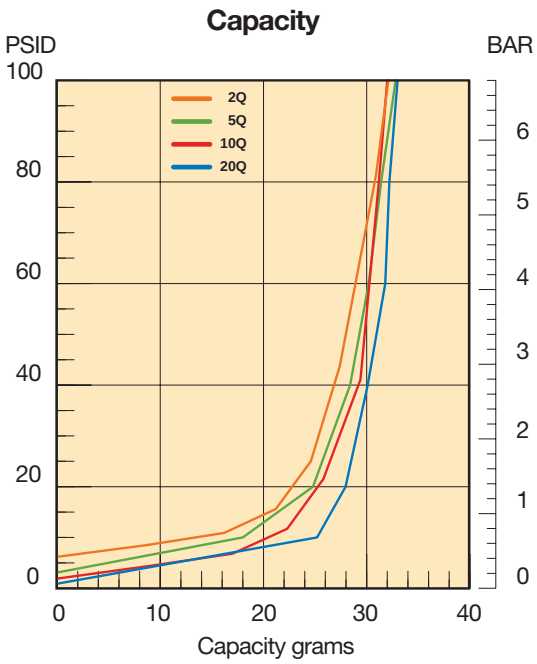
Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL.
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

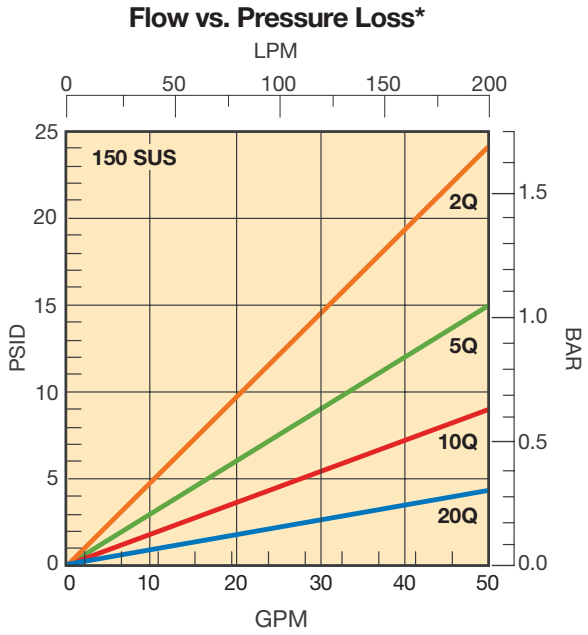
*Note: Pressure drop calculations are based on SAE-12 porting.

PT Series

PT4-1 Element Performance





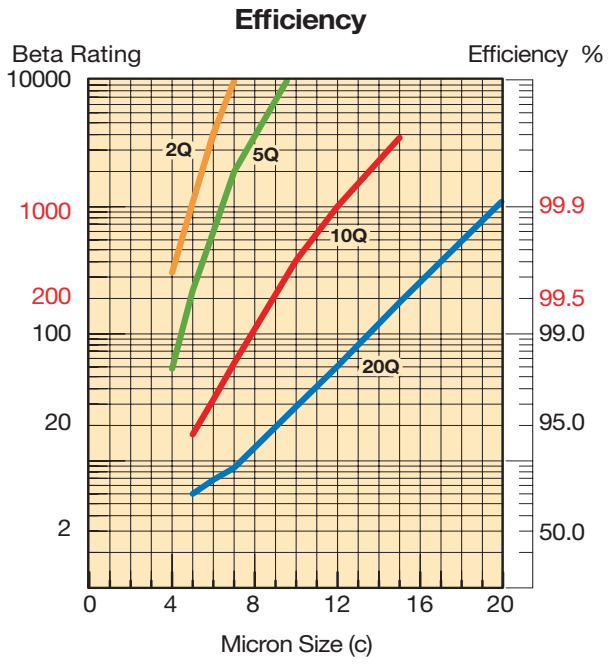


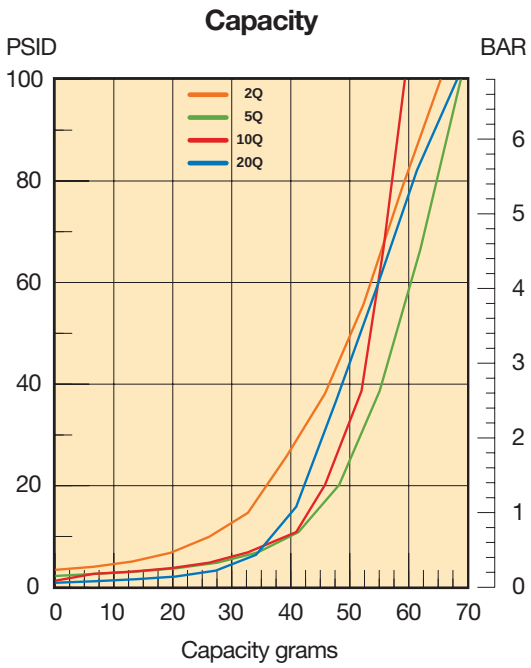
Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL.
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

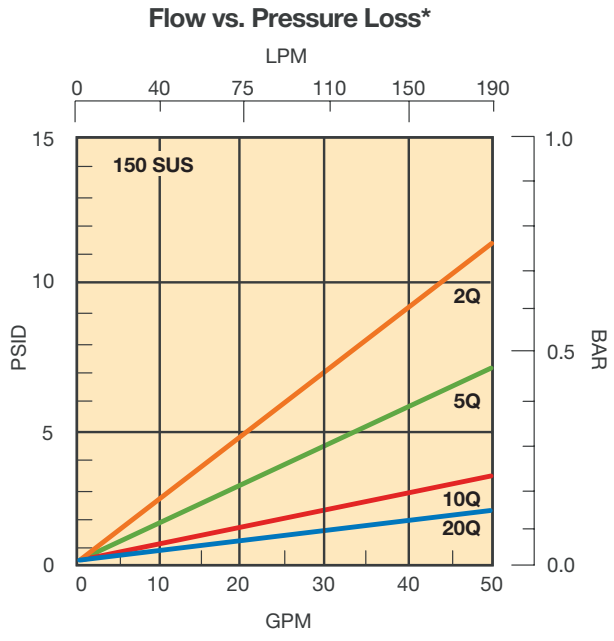
*Note: Pressure drop calculations are based on SAE-16 porting.

PT Series

PT4-2 Element Performance





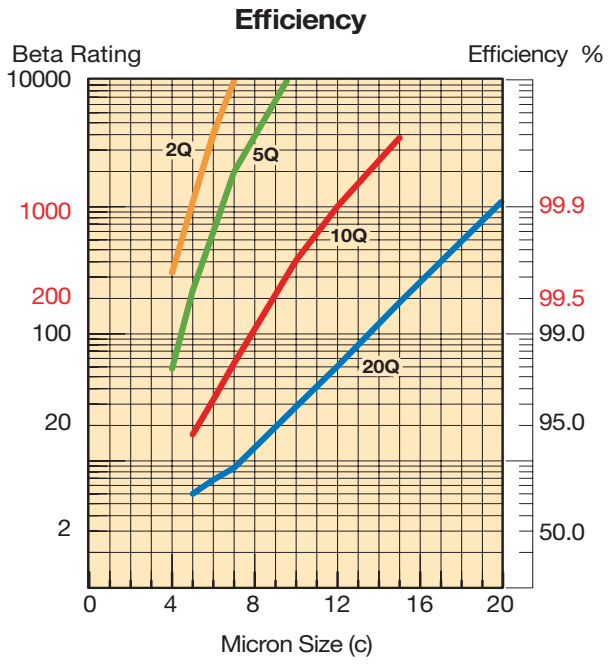


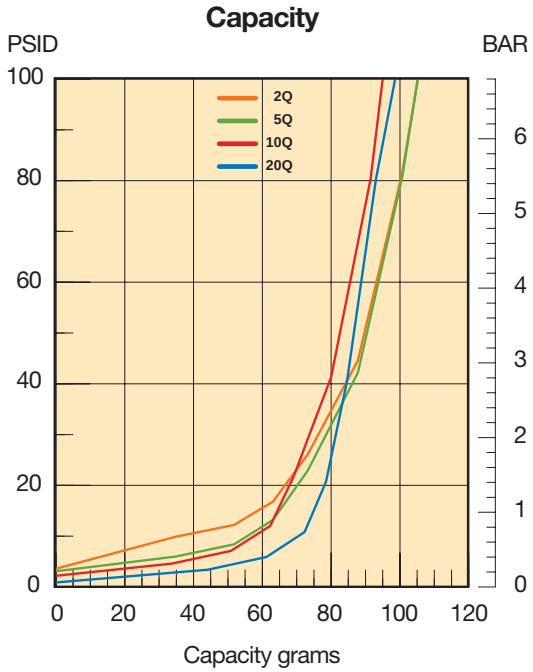
Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 100 psid terminal - 10 mg/L BUGL.
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

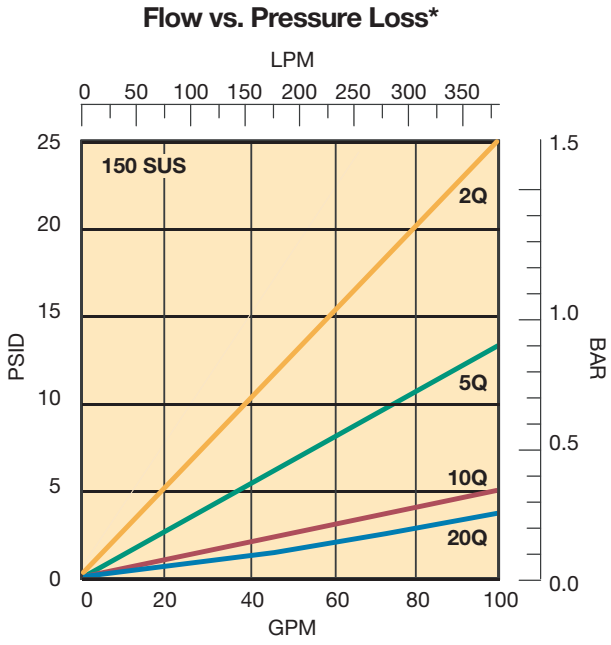
*Note: Pressure drop calculations are based on SAE-16 porting.

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 on pages 264-265 for relationship to test standard ISO 4572.

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

PT Series

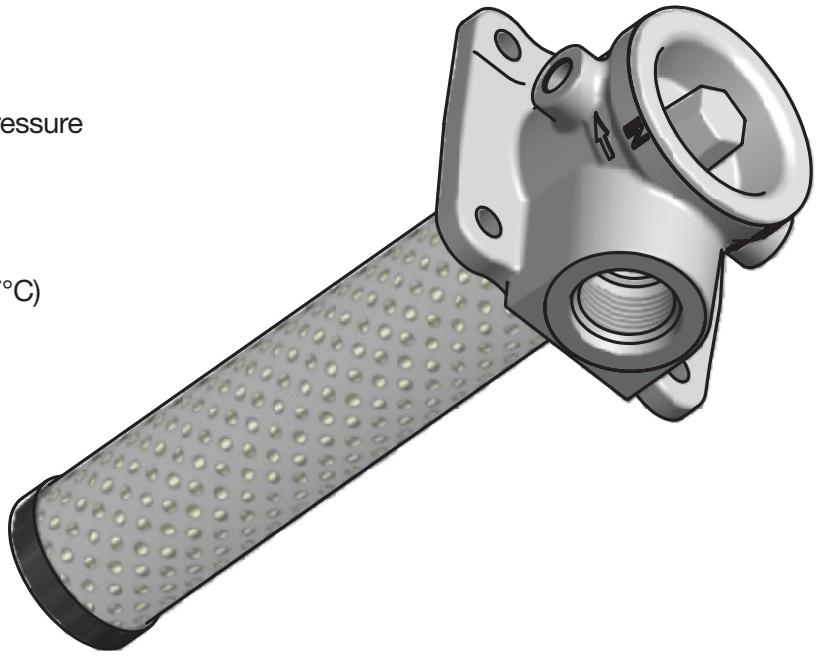
Specifications - PT2

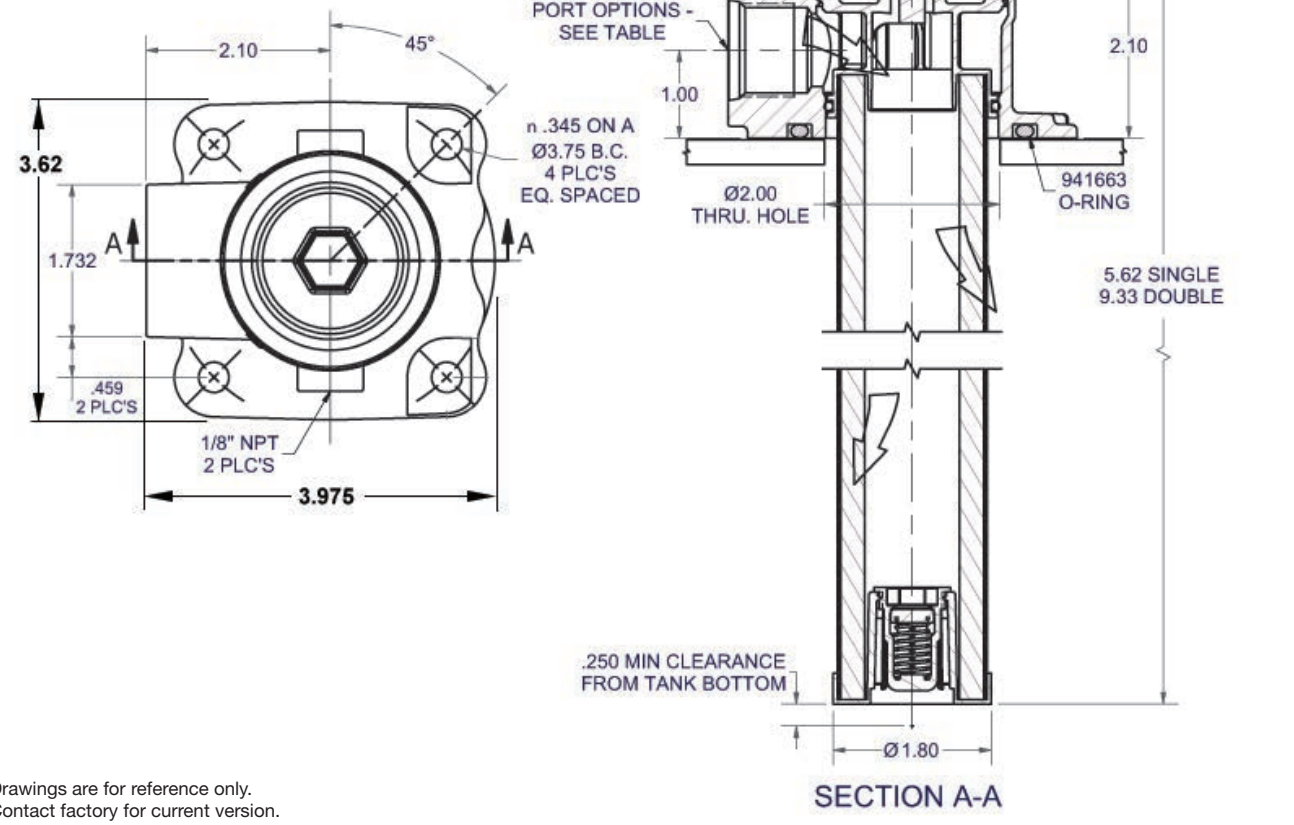
Pressure Rating:
Maximum Allowable Operating Pressure (MAOP): 150 psi (10.3 bar)

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

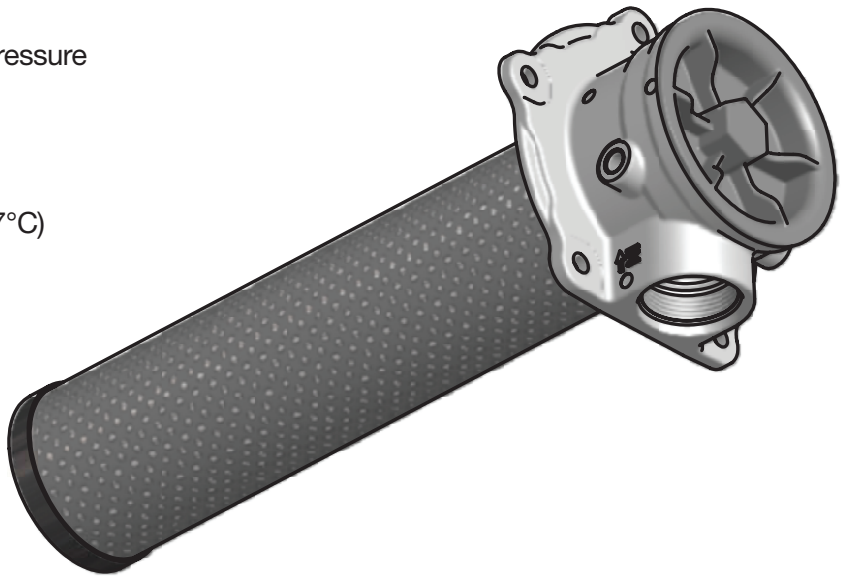
Specifications - PT4

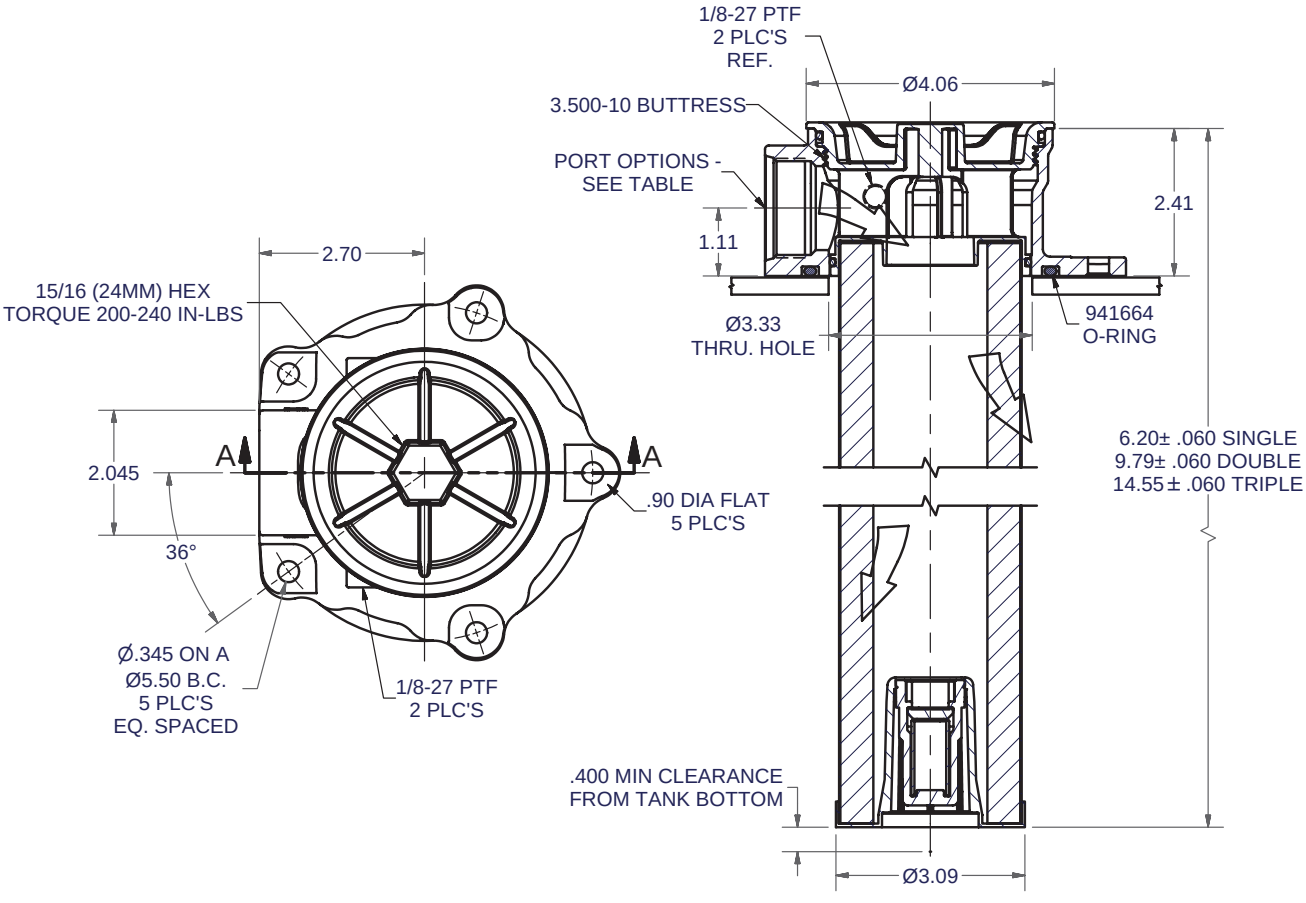
Pressure Rating:
Maximum Allowable Operating Pressure (MAOP): 150 psi (10.3 bar)

Element Burst Rating: 150 psid

Operating Temperatures:
Buna: -40°F (-40°C) to 225°F (107°C)

Materials:
Tank Flange: aluminum
Endcaps: nylon



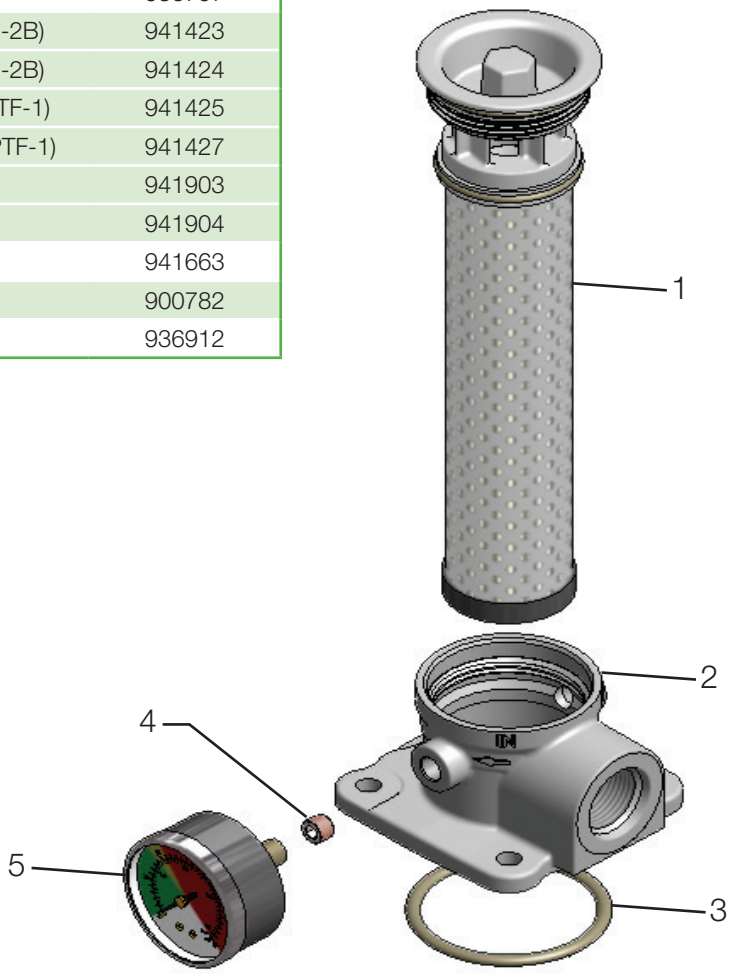


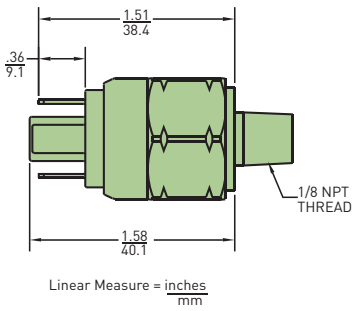
Drawings are for reference only.
Contact factory for current version.

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	941663
4	1/8-27 PIPE PLUG	900782
5	1/8-27 PRESSURE GAUGE	936912



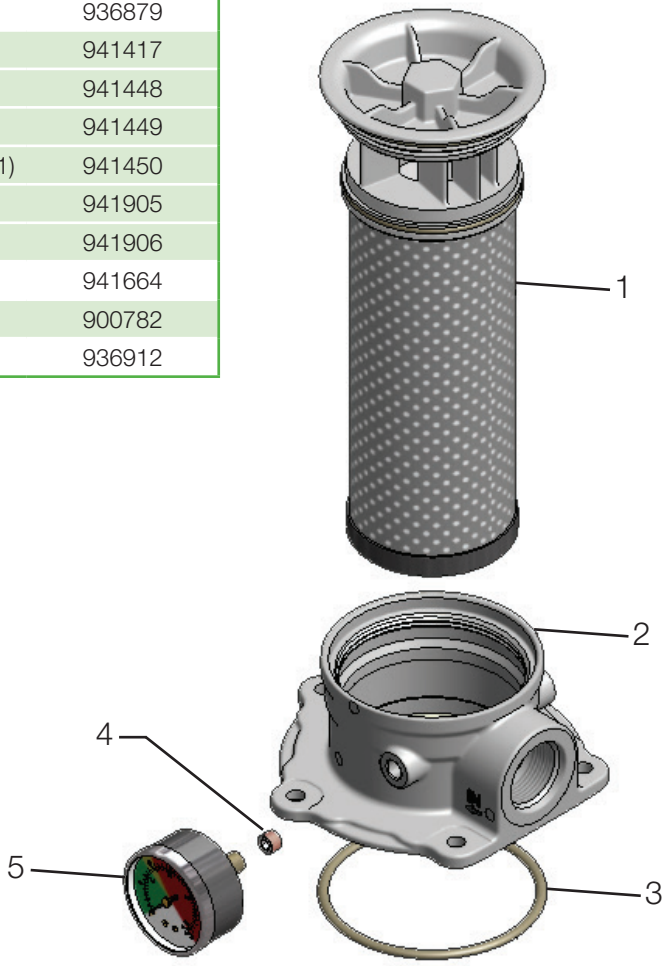


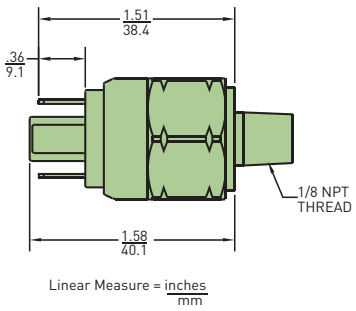
926923
2-pin normally open switch

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)	941417
	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

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

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

BOX 4: Seals	
Symbol	**Description**
B	**Nitrile**
V	Fluorocarbon

BOX 5: Indicator	
Symbol	**Description**
P	**Plugged Ports**
G	Pressure Gauge, 25 psi
S	Pressure switch

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

BOX 7: Ports	
Symbol	**Description**
	PT2
G12	**G3/4" BSPP[2]**
G16	G1 BSPP[2]
N12	3/4" NPT
N16	1" NPT
S12	SAE-12
S16	**SAE-16**
	PT4
G16	G1" BSPP[2]
G20	G1-1/4" BSPP[2]
N16	1" NPT
N20	1-1/4" NPT
S16	SAE-16
S20	**SAE-20**

BOX 7: Options	
Symbol	**Description**
1	**None**
W[3]	Steel weld ring

Notes:

1. **The filters include the element you select already installed.**
2. **When "G12", "G16" or "G20" are selected in Box 7, "P" must be selected in Box 5. BSPP Gauge and Switch are available as separate accessory components.**
3. **When "W" is selected in Box 8, the PT2 port options are "N12" and "S12"; the PT4 port options are "N16" and "S16".**

Please note the bolded options reflect standard options with a reduced lead time.

KLT and KLS Series

Tank Top Return Line Filters

Parker

ENGINEERING YOUR SUCCESS.

KLT/KLS Series

Tank Top Return Line Filters

Applications for KLT and KLS Filters

- **Mobile Equipment**
- **Construction, Refuse**
- **Industrial Power Units**
- **Machine Tool**
- **Oil Field**

Parker's KLS /KLT Tank Top Return Line Filters are ideally suited for Mobile and Industrial medium to high flow return applications, from 30 to 120 GPM. This cost-effective, in-tank filter series provides maximum flow and dirt holding capacity for longer filter element life in a simple, easy-to-install-and-service assembly.

The generous element size with extensive media area ensures continuous filtration during cold start up conditions. The inside-to-out flow path with closed bottom provides additional assurance that all contaminants remain captured during element service removal.

The filters have a pressure rating of 150 psi static, a temperature range of -40˚F to 225˚F, and are available in a wide range of the latest Microglass media in 2, 5, 10 and 20 micron for all system cleanliness requirements. Bypass valves are built into the element to ensure further performance integrity. A new bypass is provided with each element change.

This rugged design meets the needs for the demanding applications in mobile off-highway and on-highway applications for construction equipment, logging, refuse vehicles, mining, oil and gas recovery, marine, and industrial power units.

Feature	Advantage	Benefit
• Tank top mounted filter	• Saves space and reduces mounting hardware	• Lower cost, easy to integrate • KLS model directly retrofits competitive housing
• Two-piece head and element construction perforated with metal outer wrap	• No bowl required • Provides excellent flow diffusing, eliminating aeration	• Reduced cost and assembly weight • Improved performance
• High efficiency Microglass media maximizing filtration area	• Combines high particle capture efficiency with high dirt holding capacity and lower ΔP	• Cleaner fluids, longer lasting with fewer service intervals • Continuous filtration for cold start ups • Lower operating costs
• Element design includes intergral disposable bypass valve with closed bottom end cap	• New bypass with each element change • Ensures captured contaminants are removed with each element change	• Ensures reliable bypass performance • No leakage • Cleaner fluids reduce risk for contamination during service
• Magnetic prefiltration	• Removes large ferrous contaminants	• Extends element life • Visual indication of component wear
• Fill and gauge ports	• Add fluid through high performance filter media • Gauge ports allow for added instrumentation	• Initial fluid integrity extends system component life • Monitor element life

KLT/KLS Series

Specifications

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

Operating Temperatures:
-40°F (-40°C) to 225°F (107°C)

Element Burst Rating:
150 psid (10.3 bar)

Filtration Rating:
2, 5, 10 & 20 Microns at Beta > 200

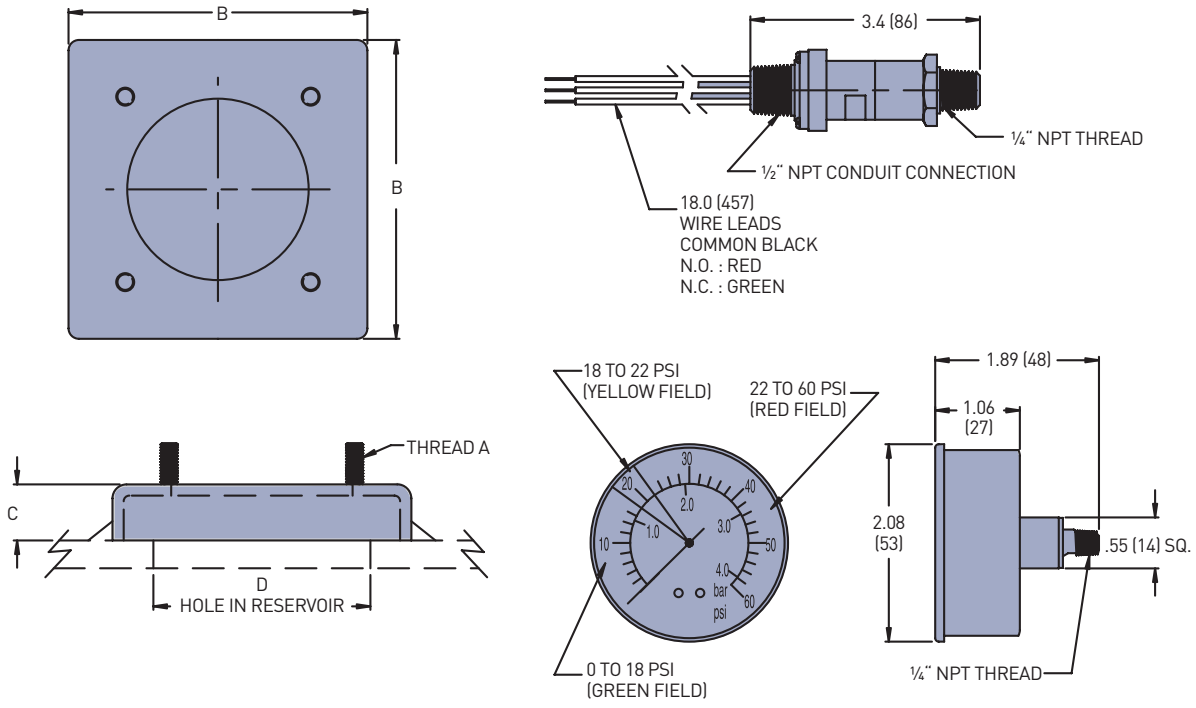
Element Condition Indicators:
Gauge: 0-60 psi color coded
Switch: SPDT 5A @ 24 VDC and 250 VAC

Materials:
Head & Cover: Cast Aluminum Alloy
Bypass Valve: Nylon
Filter Media: Microglass
Element End Caps: Nylon

Weights (approximate):

KLT-2	3 lbs.	(1.36 kg)
KLT-4	4 lbs.	(1.81 kg)
KLT(S)-7	8 lbs.	(3.63 kg)
KLT(S)-8	10 lbs.	(4.54 kg)

KLT Weld Plate Drawings



Linear Measure: inch (mm)

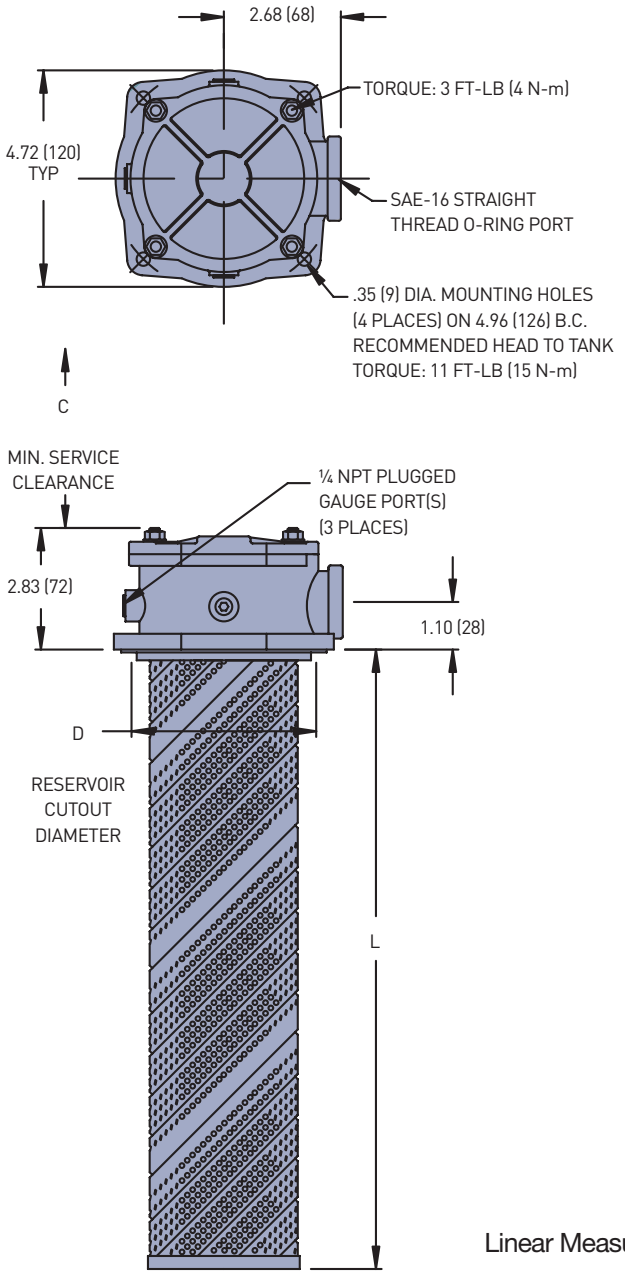
Dimension	KLT Filter Model	
	KLT-2/KLT-4	KLT-7/KLT-8
A	5/16-18 UNC-2A	3/8-16 UNC-2A
B	5.33 (135)	7.15 (182)
C	1.00 (25)	1.00 (25)
D	4.50/3.75 (114/95)	6.25/5.50 (159/140)

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

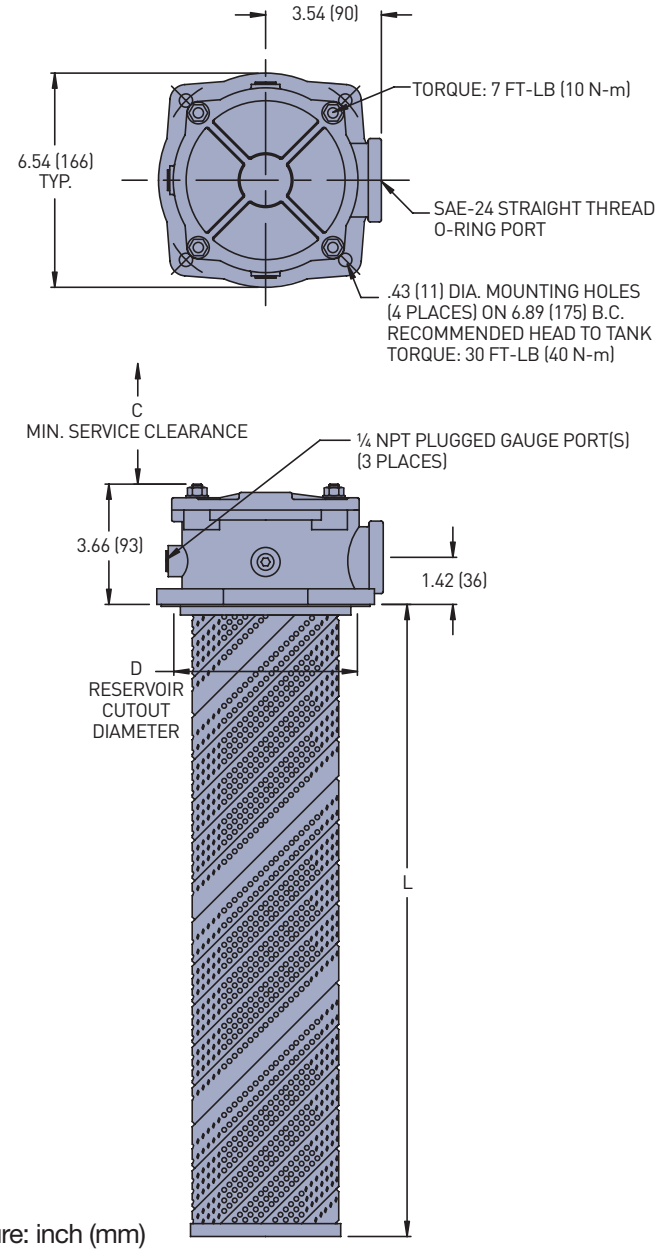
KLT Series

Dimensional Drawings

KLT 2 / KLT 4



KLT 7 / KLT 8



Linear Measure: inch (mm)

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

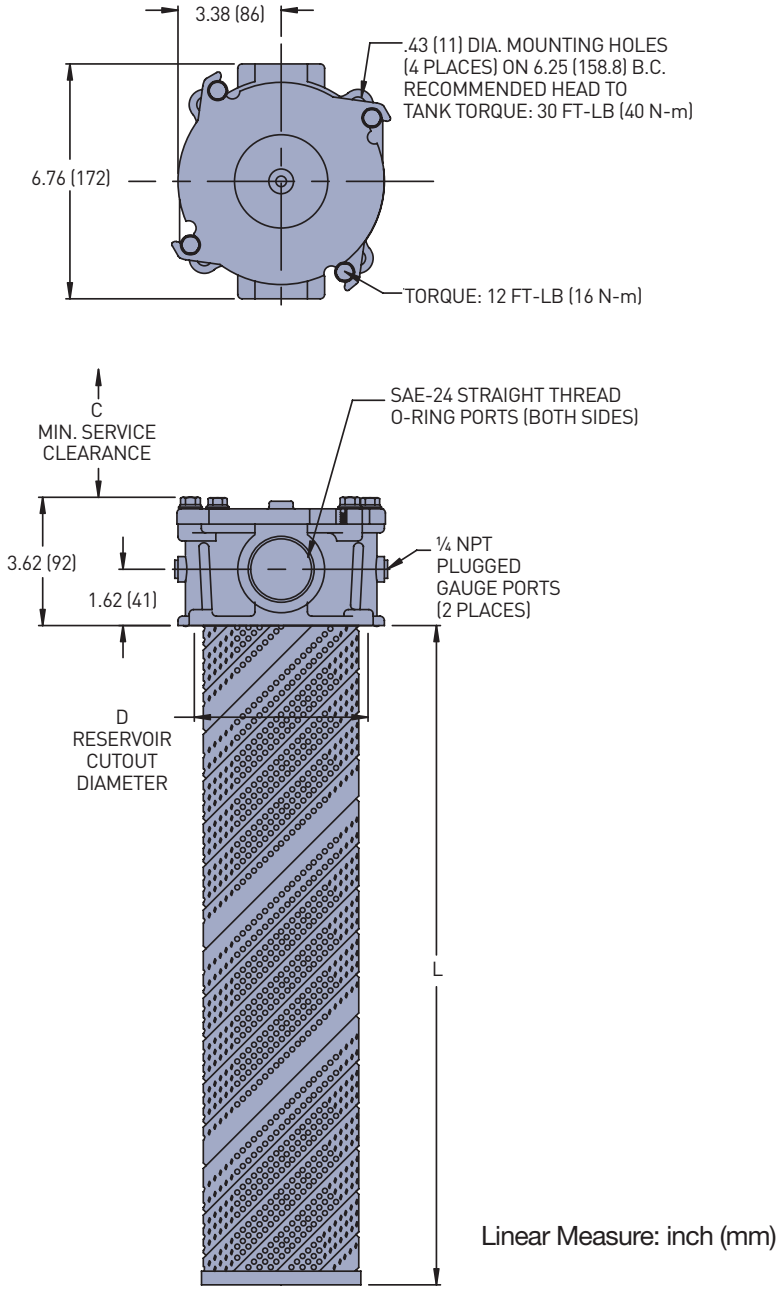
Dimensions	KLT Filter Model	
	KLT-2	KLT-4
C	5.75 (146)	9.50 (241)
L	4.16 (106)	7.75 (197)
D	3.6 (93) / 3.56 (90)	

Dimensions	KLT Filter Model	
	KLT-7	KLT-8
C	13.00 (330)	19.25 (489)
L	11.46 (291)	17.70 (450)
D	5.36 (136) / 5.26 (133)	

KLT Series

Dimensional Drawings

KLS 7 / KLS 8



Linear Measure: inch (mm)

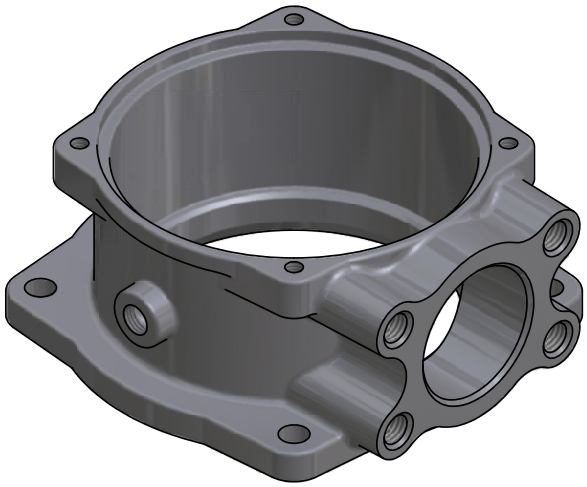
Dimensions	KLS Filter Model	
	KLS-7	KLS-8
C	13.00 (330)	19.25 (489)
L	11.46 (291)	17.70 (450)
D	5.00 (127) / 4.80 (122)	

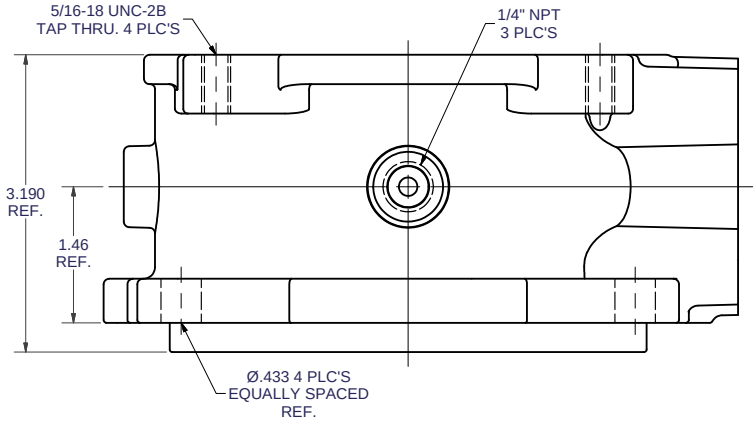
Drawings are for reference only.
Contact factory for current version.

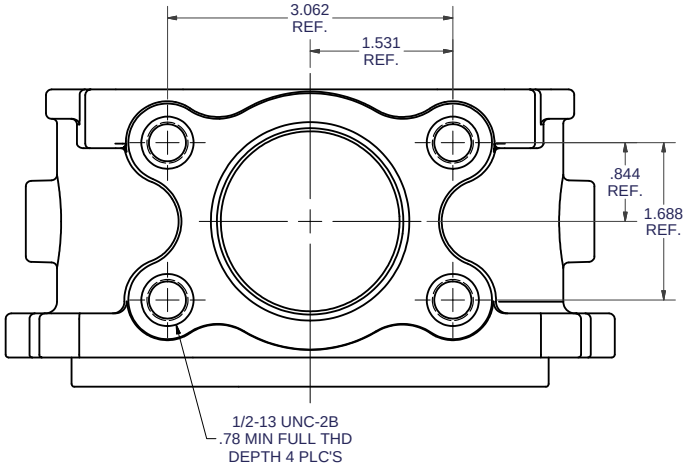
KLT Series

Dimensional Drawing

KLT with 2” Port



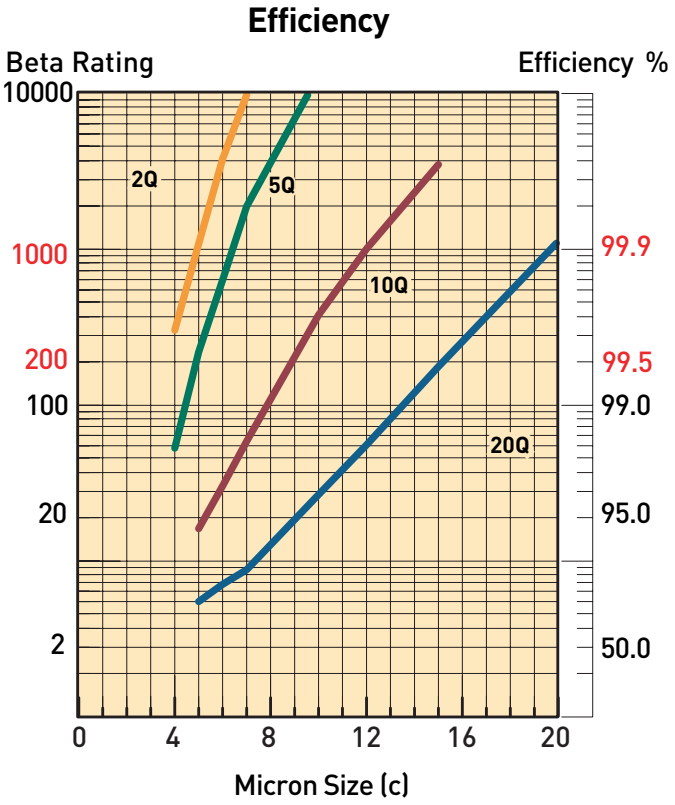


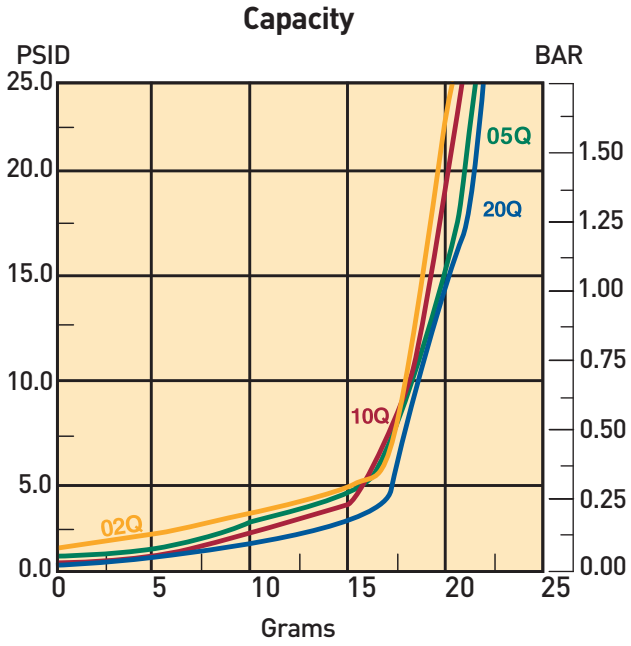


Drawings are for reference only.
Contact factory for current version.

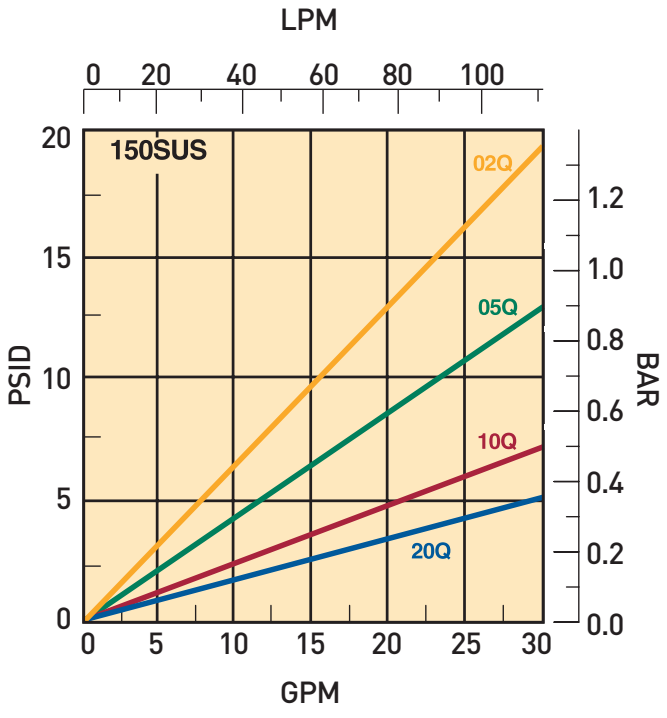
KLT Series

KLT-2 Element Performance



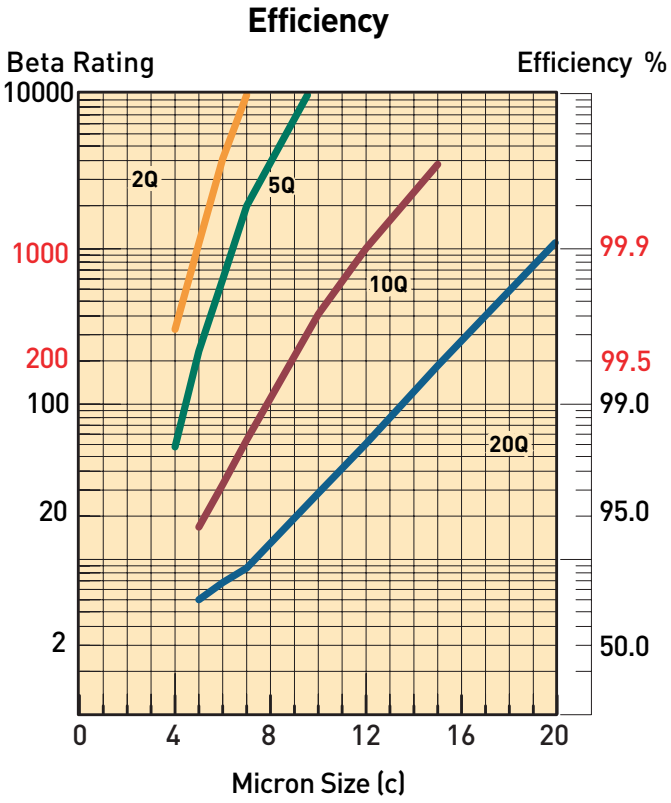


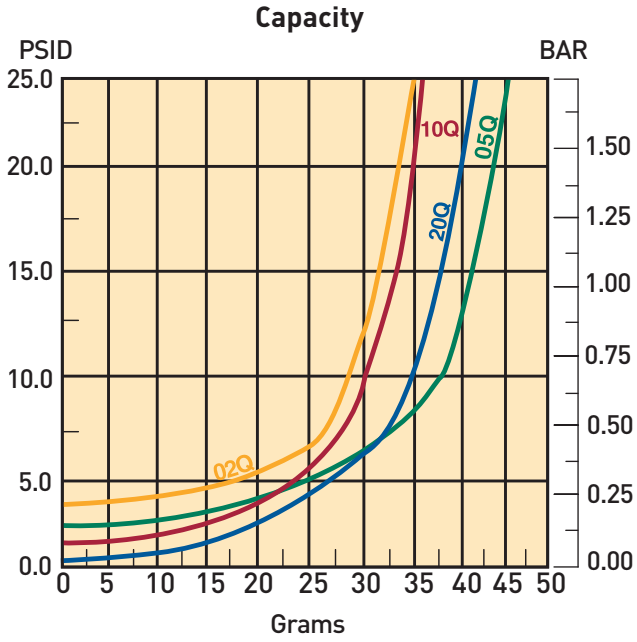
Multipass tests run @ 15 gpm to 25 psid terminal - 10 mg/L BUGL



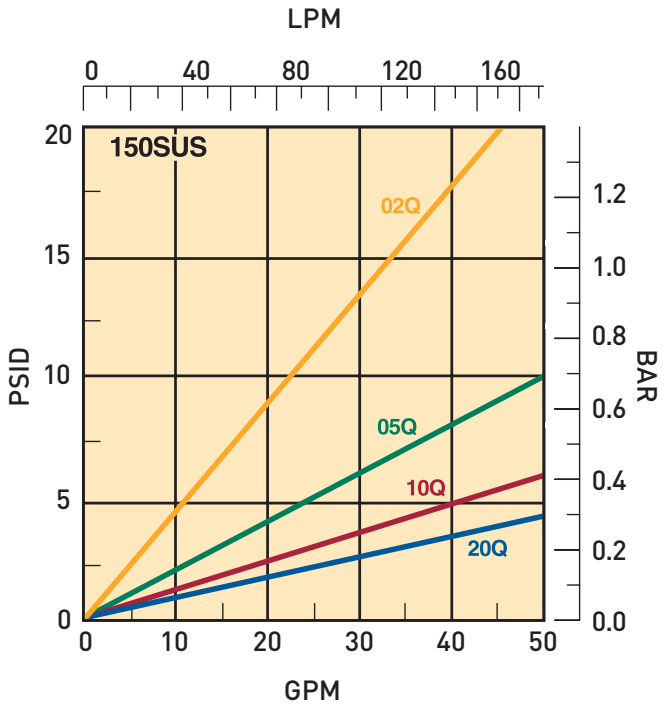
KLT Series

KLT-4 Element Performance



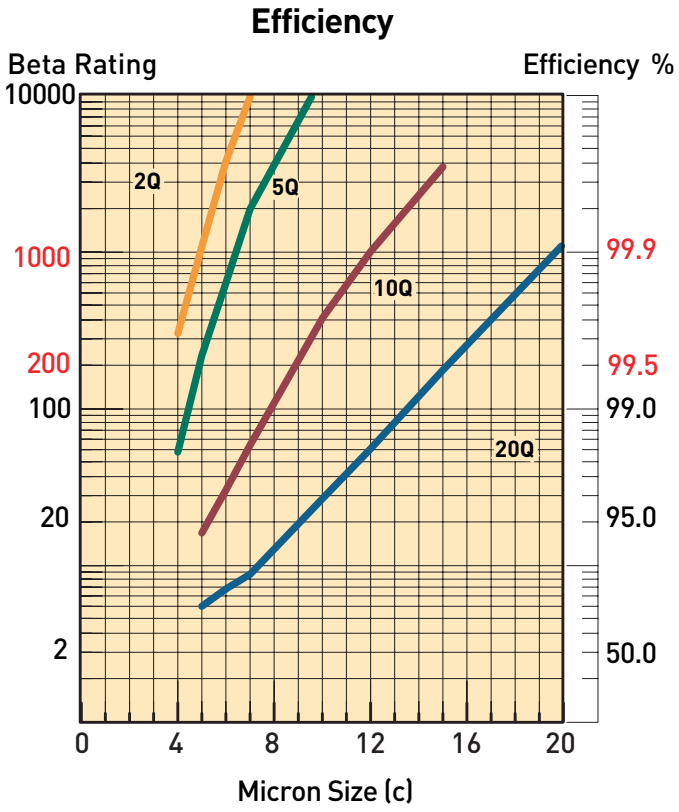


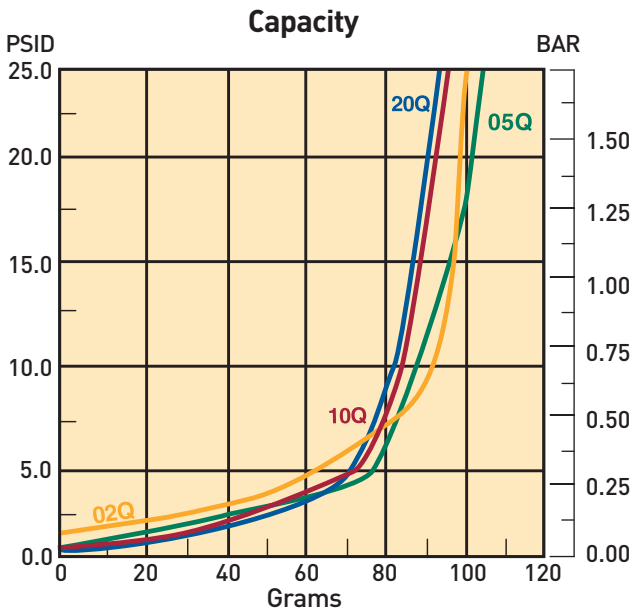
Multipass tests run @ 30 gpm to 25 psid terminal - 10 mg/L BUGL



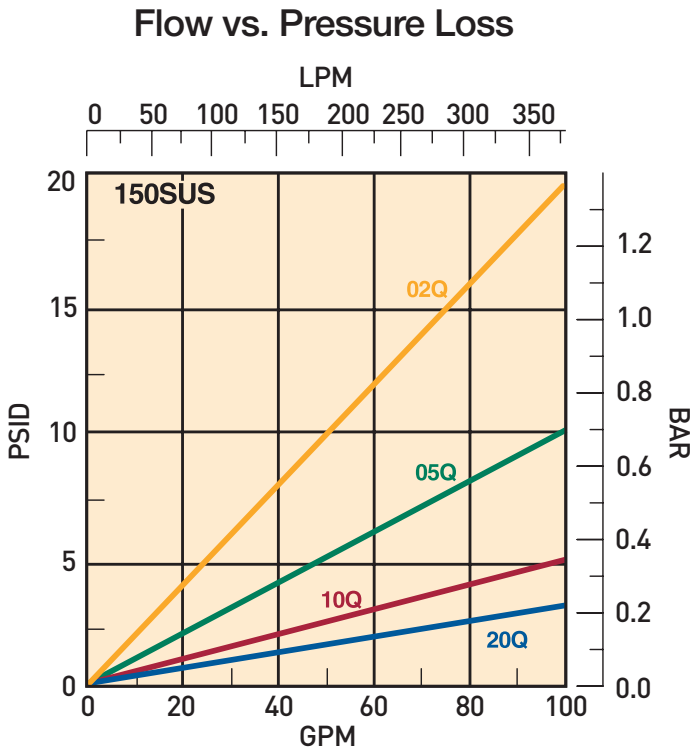
KLT/KLS Series

KLT/KLS-7 Element Performance



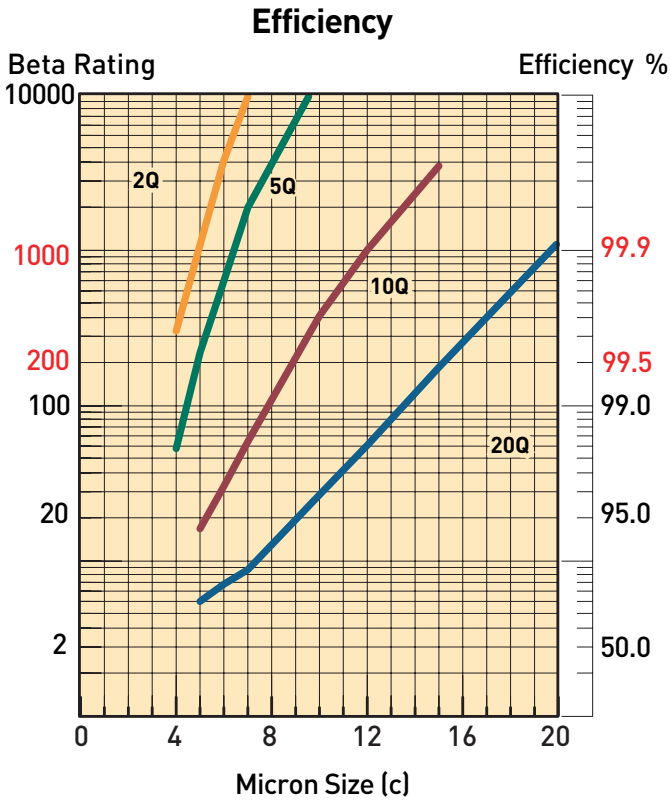


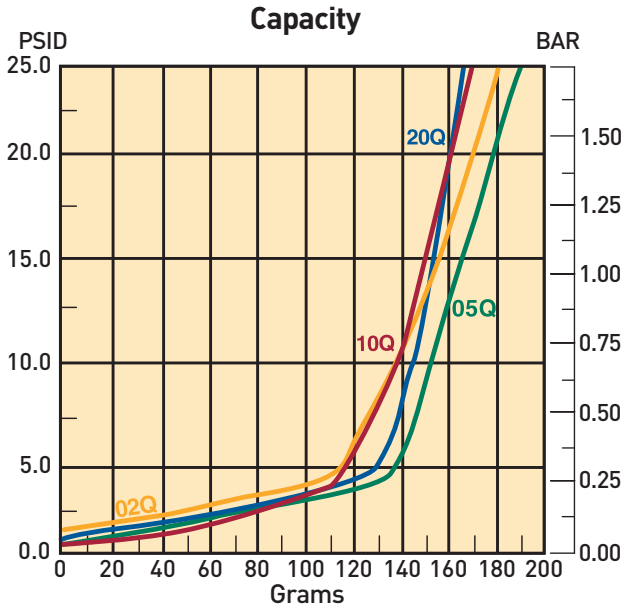
Multipass tests run @ 50 gpm to 25 psid terminal - 10 mg/L BUGL



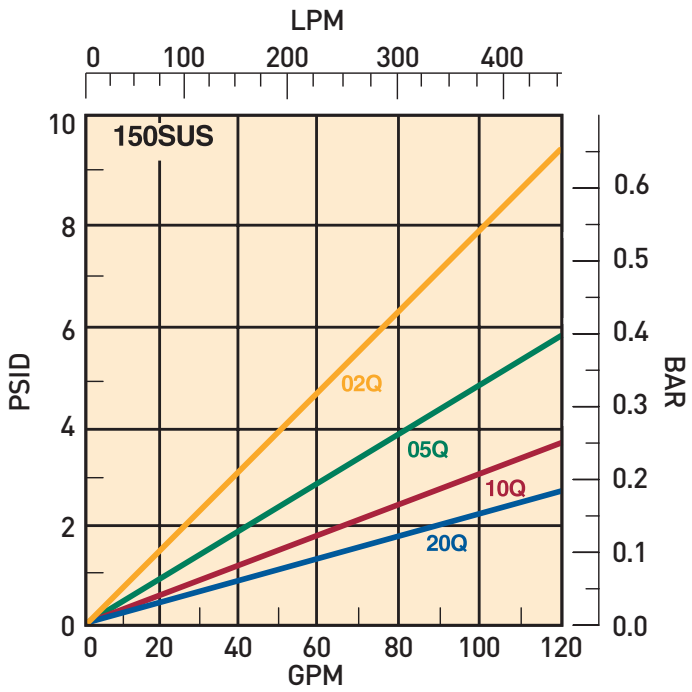
KLT/KLS Series

KLT/KLS-8 Element Performance



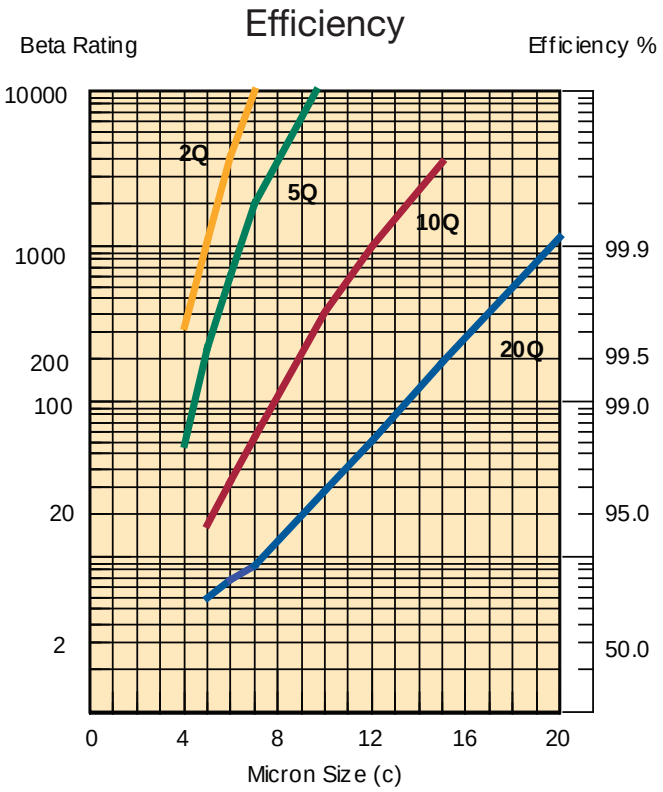


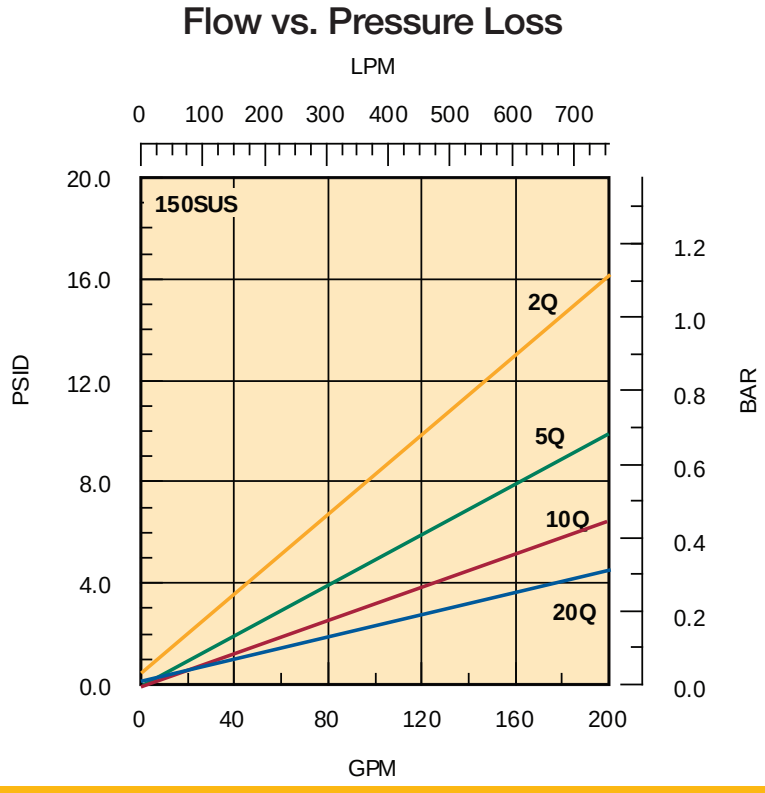
Multipass tests run @ 70 gpm to 25 psid terminal - 10 mg/L BUGL



KLT/KLS Series

KLT with 2” Port - Element Performance





KLT and KLS Series

Operating and Maintenance Instructions

A. Mounting

1. Standard mounting.
   a. Cut proper size hole in the top of the reservoir.
   b. Drill holes for studs within the proper bolt circle.
   c. Set the filter into the cutout hole and secure with proper size bolts, nuts and lock washers.
   d. Torque nuts in accordance with drawing.
2. Mounting procedure using weld plate.
   a. Rough cut proper size hole in the top of reservoir.
   b. Weld the weld plate concentric to the rough cut hole.
   c. Mount the filter onto the studs and secure with nuts and lock washers.
   d. Torque nuts in accordance with drawing.
3. Utilize proper fittings.

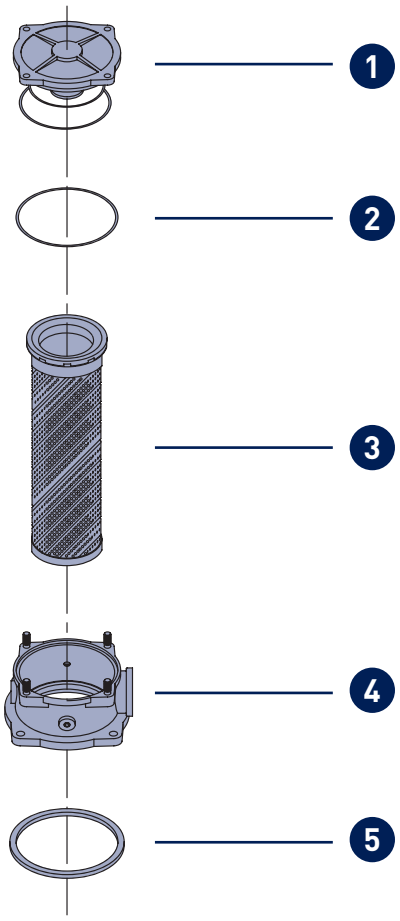
B. Start-Up

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

C. 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.



Parts List

Index	Description	Part Number	Quantity
1	Cover Assembly (Includes Cover o-ring)		
	KLT2/KLT4	937049	1
	KLT7/KLT8	937047	1
	KLS7/KLS8	937048	1
2	Cover o-ring		
	KLT2/KLT4, Nitrile	N72239	1
	KLT2/KLT4, FKM	V72239	1
	KLT7/KLT8, Nitrile	N72251	1
	KLT7/KLT8, FKM	V72251	1
	KLS7/KLS8, Nitrile	N72251	1
	KLS7/KLS8, FKM	V72251	1
3	Element (see How to Order page)		
4	Filter Head (Includes gauge plugs & studs)		
	KLT2/KLT4 (S16)	5841216	1
	KLT7/KLT8 (S24)	5841224	1
	KLS7/KLS8 (S24)	937318	1
	KLS7/KLS8 (2" Flange)	942157	1
	Bolts purchased separately	926633 *(Bolts)*	4
5	Tank Gasket		
	KLT2/KLT4	108x98x5.5B	1
	KLT7/KLT8	152x136x6B	1
	KLS7/KLS8 (O-Ring)	N72355 (C.F.)	1
Not Shown	Weld Plate		
	KLT2/KLT4	300041	1
	KLT7/KLT8	300042	1
Not Shown	Pressure Switch	NS-1C-19R/EL	1
Not Shown	Pressure Gauge	936913	1

C.F. = Consult Factory

D. 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.

E. Before Installing a New Element Cartridge

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

F. To Install a New Element Cartridge

1. Lubricate all seals.
2. Mount new filter cartridge.
3. Re-install the cover.
4. Torque the cover nuts per drawing.

Perform procedures B1 and B2 to ensure no leaks are present.

KLT and KLS Series

Tank Top Return Line 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
KTL	7	10Q	B	P	G	S24	1

BOX 1: Filter Series	
Symbol	**Description**
KLT	**Single port return-line filter**
KLS	**Dual port return-line filter (-7 and -8 models only)**

BOX 2: Filter Model	
Symbol	**Description**
2	**30 GPM (115 l/m nominal flow)**
4	**50 GPM (115 l/m nominal flow)**
7	**100 GPM (115 l/m nominal flow)**
8	**120 GPM (115 l/m nominal flow)**

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: Seals	
Symbol	**Description**
B	**Nitrile**
V	Fluorocarbon

Note: Nitrile tank gasket supplied.

BOX 5: Indicator	
Symbol	**Description**
P	**Plugged Ports**
G	**Pressure Gauge, 0-60 psig**
S	Pressure switch

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

Please note the bolded options reflect standard options with a reduced lead time.

BOX 7: Ports	
Symbol	**Description**
	KLT-2/4
S16	**SAE-16 (1-5/16" -12)**
	KLT-7/8
S24	**SAE-24 (1-7/8" -12)**
N24	**1-1/2" NPT**
Y32	**2" Code 61 Flange Face**
	KLS-7/8
S24	**2 x SAE-24 (1-7/8" -12)**
N24	**2 x 1-1/2" NPT**

BOX 7: Options	
Symbol	**Description**
1	**None**
TP	Weld plate (KLT only)

Notes:

1. **The filters include the element you select already installed.**
2. **When "G12", "G16" or "G20" are selected in Box 7, "P" must be selected in Box 5. BSPP Gauge and Switch are available as separate accessory components.**
3. **When "W" is selected in Box 8, the PT2 port options are "N12" and "S12"; the PT4 port options are "N16" and "S16".**

Replacement Elements

Element Code	Nitrile				Fluorocarbon			
	2	4	7	8	2	4	7	8
02Q	**936967Q**	**936968Q**	**936972Q**	**936976Q**	937266Q	937270Q	937274Q	937278Q
05Q	**936965Q**	**936969Q**	**936973Q**	**936977Q**	937267Q	937271Q	937275Q	937279Q
10Q	**936966Q**	**939970Q**	**936974Q**	**936978Q**	937268Q	937272Q	937276Q	937280Q
20Q	**936967Q**	**936971Q**	**936975Q**	**936979Q**	937269Q	937273Q	937277Q	937281Q
WR	937258	937259	937260	937261	CF	CF	CF	CF

CF = Consult Factory

Moduflow™ *Plus* Series

Low Pressure Filters

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

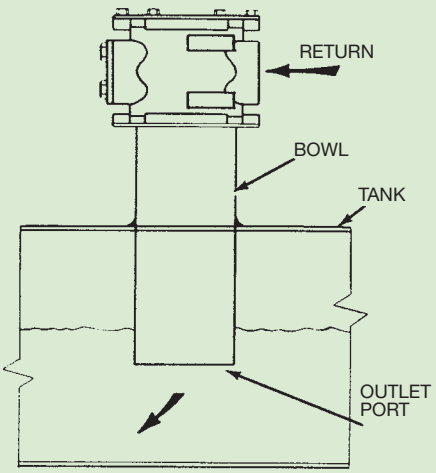
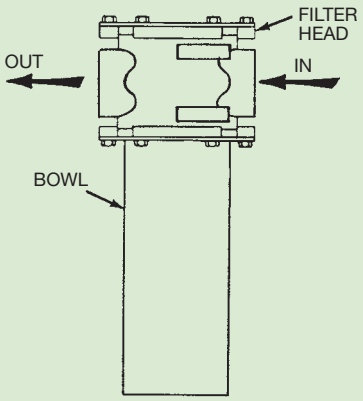
The newly designed closed bottom elements for the RFP and ILP models insures all contamination remains trapped within the element as the filter is serviced.

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.

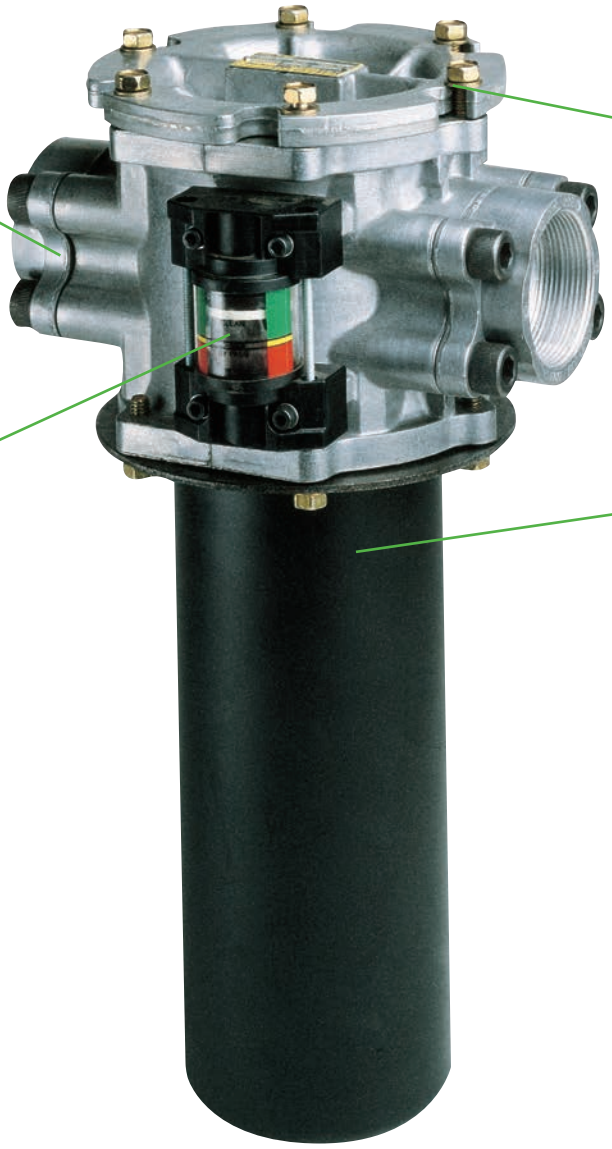
Parker's new patented Moduflow element was designed with built-in diverter and bypass valve, to meet your application needs.

Mounting / Porting Styles

RFP Return Filter	ILP In-Line Filter
	

Moduflow™ *Plus* Series

Features



Flanges
- NPT or SAE ¾" 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

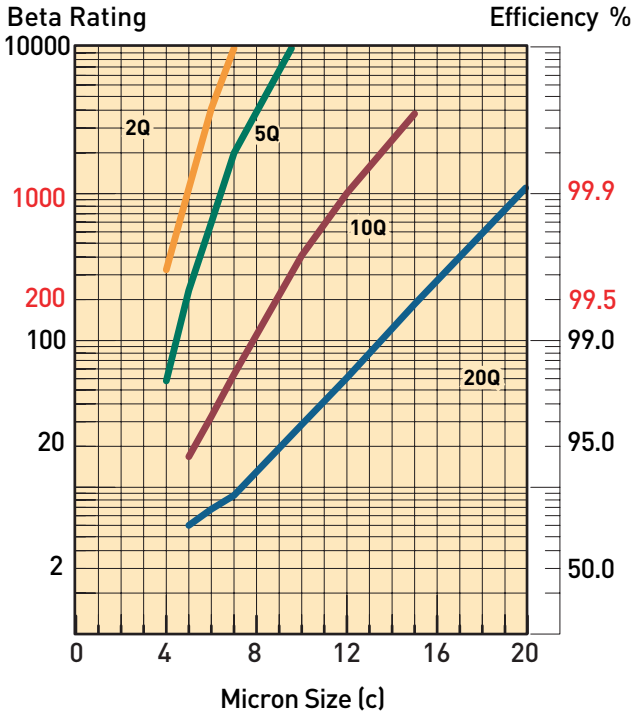
Element
(not visible)
- Available in high performance Microglass media
- Single or double length

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

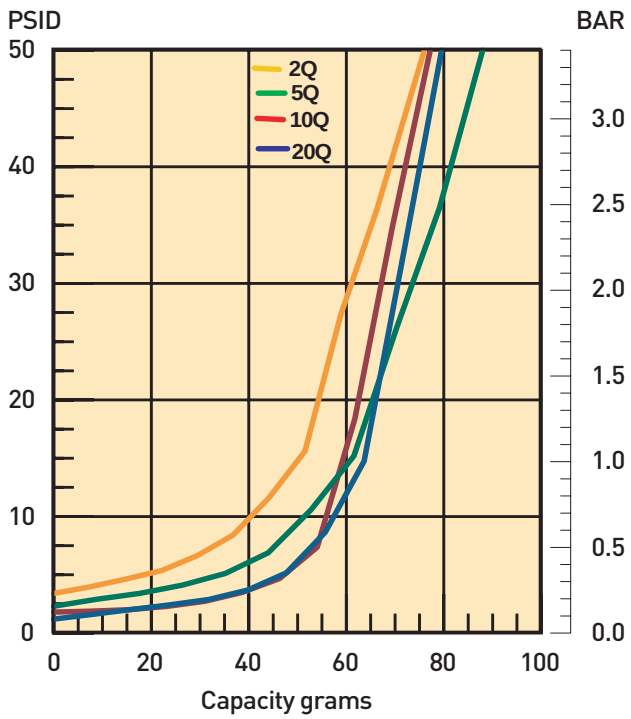
Moduflow™ *Plus* Series

RFP-1 and ILP-1 Element Performance

Efficiency

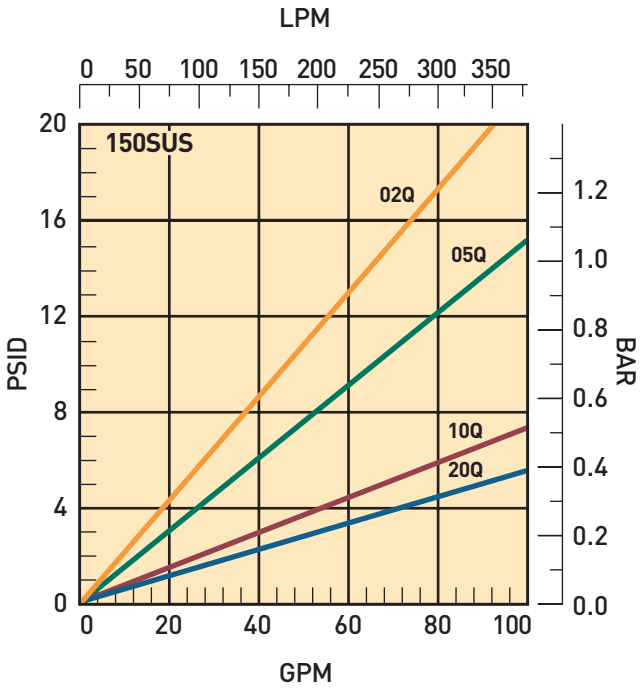


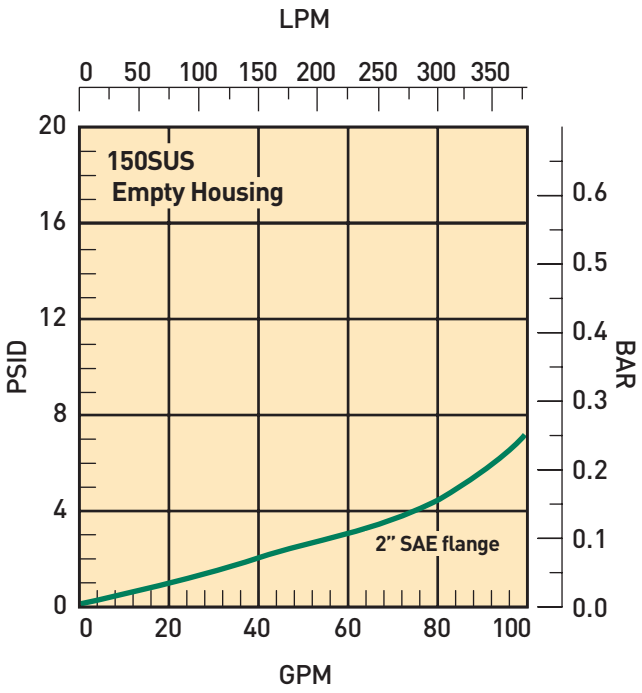
Capacity



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

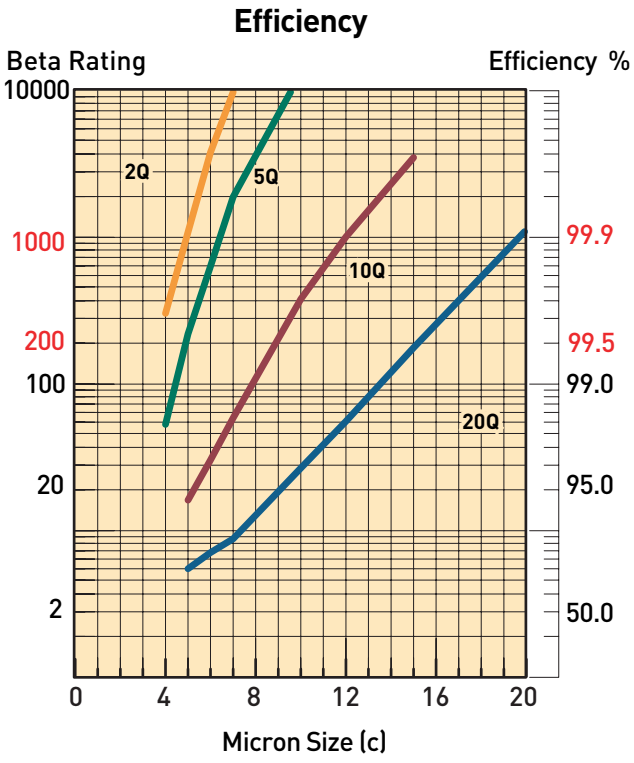
Flow vs. Pressure Loss

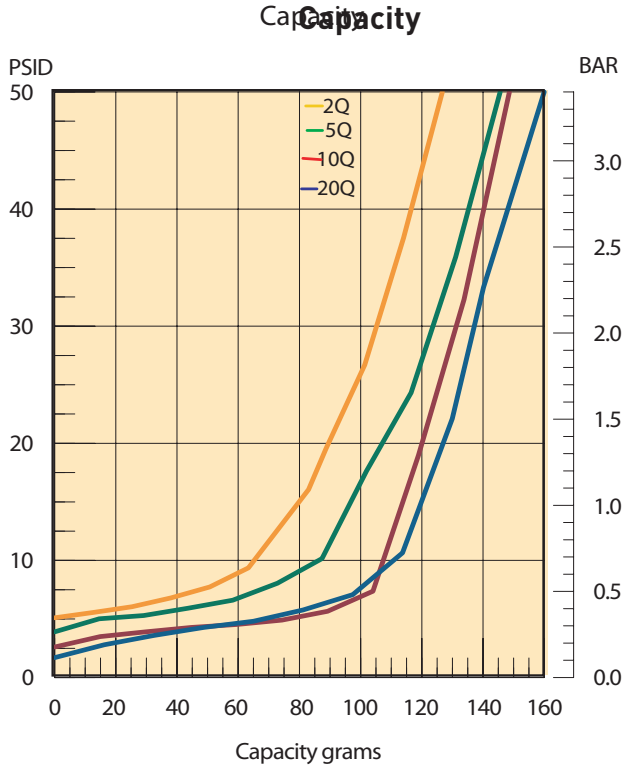




Moduflow™ *Plus* Series

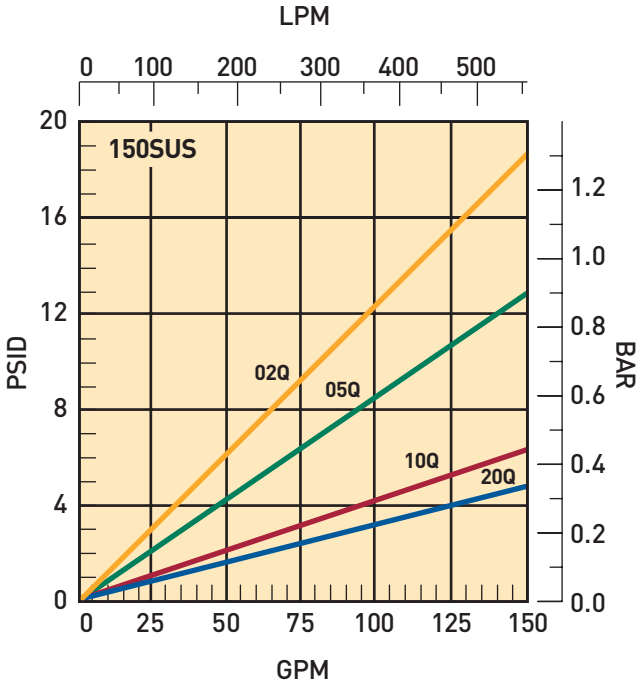
RFP-2 and ILP-2 Element Performance

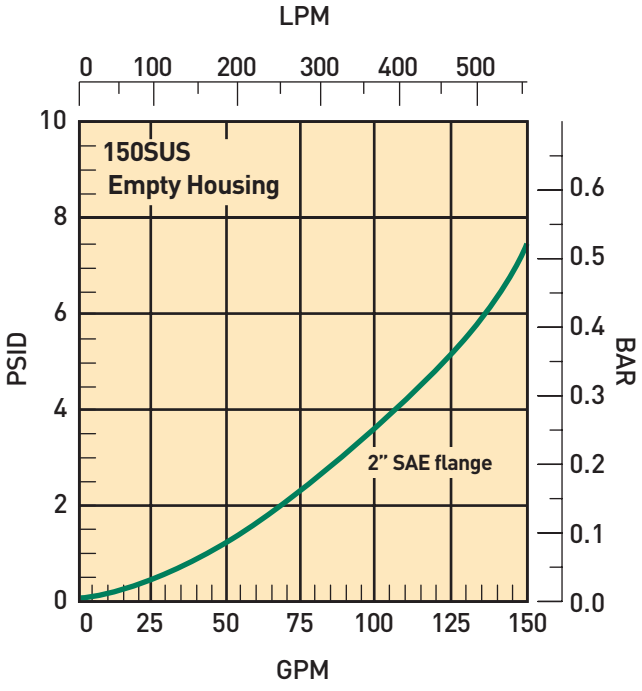




Multipass tests run @ 80 gpm to 50 psid terminal - 5mg/L BUGL

Flow vs. Pressure Loss





Moduflow™ *Plus* Series

Specifications: RFP, ILP

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)

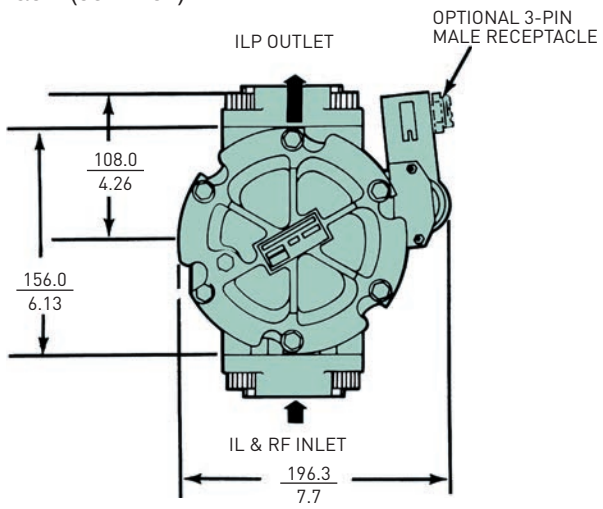
Weight (approximate):
Single: 20 lbs. (9.1 kg)
Double: 25 lbs. (11.3 kg)

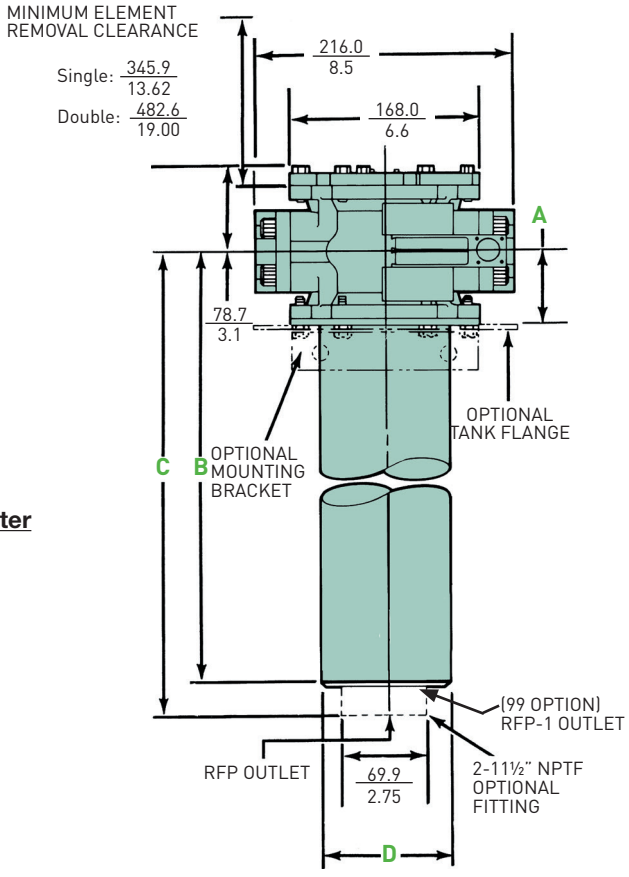
Indicators:
Visual (optional)
Electrical (optional) 15A @ 250VAC / .5A @ 125 VDC
Electrical ("D" option) 5A @ 250VAC / 3A @ 28 VDC

Color Coding:
White (normally closed)
Red (normally open)
Black (common)

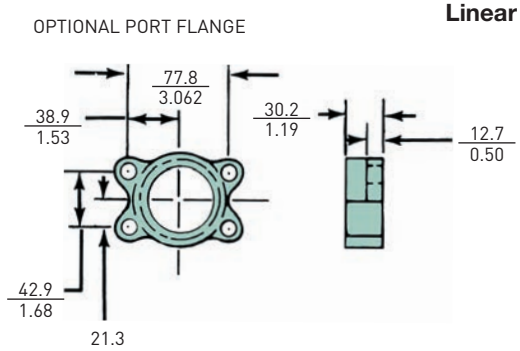
	Dimensions: mm/inch			
Model	**A**	**B**	**C**	**D**
RFP-1 with optional 2" fitting	68.3 2.69	–	390.0 15.37	117.1 4.61
RFP-1 without optional 2" fitting	65.0 2.56	378.0 14.87	–	114.0 4.50
RFP-2 with optional 2" fitting	68.3 2.69	–	625.0 24.61	117.1 4.61
RFP-2 without optional 2" fitting	68.3 2.69	612.0 24.11	–	114.0 4.50
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

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





Linear Measure: millimeter / inch



Moduflow™ *Plus* Series

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

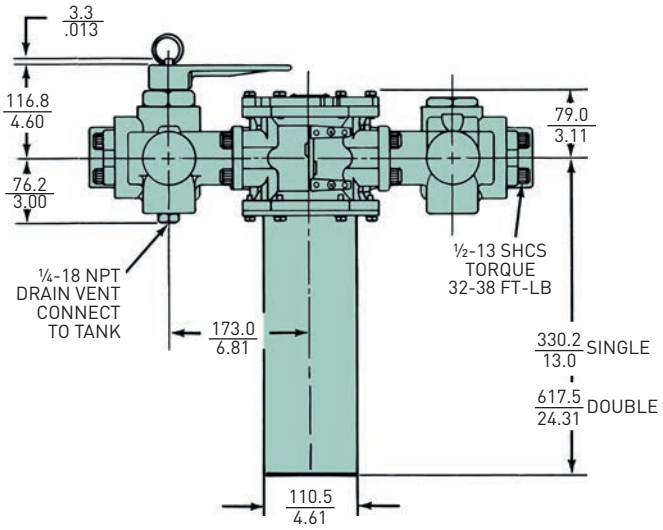
Operating Temperatures:
Nitrile: -40°F to 225°F (-40°C to 107°C)
Fluorocarbon: -15°F to 275°F (-26°C to 135°C)

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

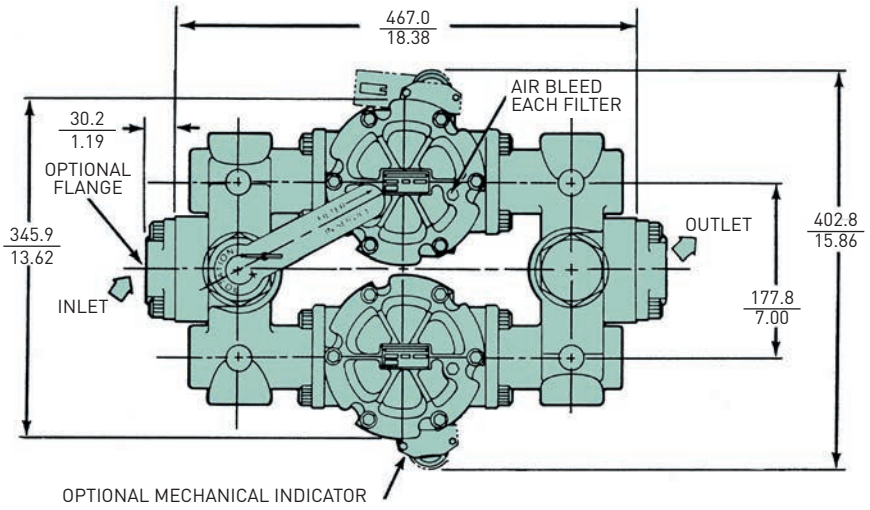
Indicators:
Visual (optional)
Electrical (optional) 15A @ 250VAC / .5A @ 125 VDC
Electrical ("D" option) 5A @ 250VAC / 3A @ 28 VDC

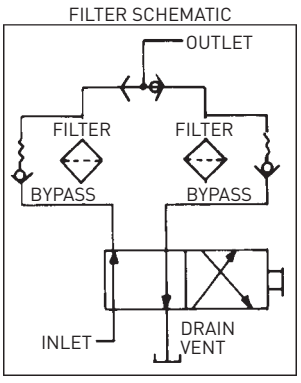
Color Coding:
White (normally closed)
Red (normally open)
Black (common)

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



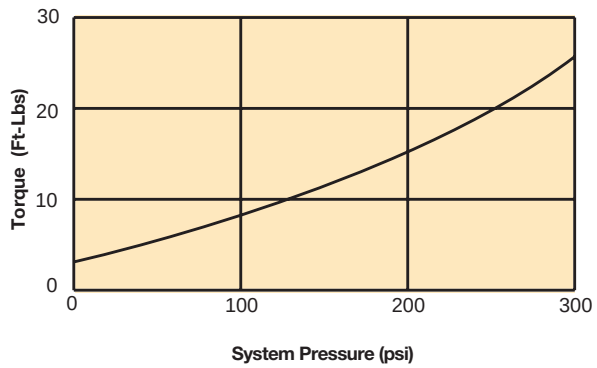
Linear Measure: millimeter / inch



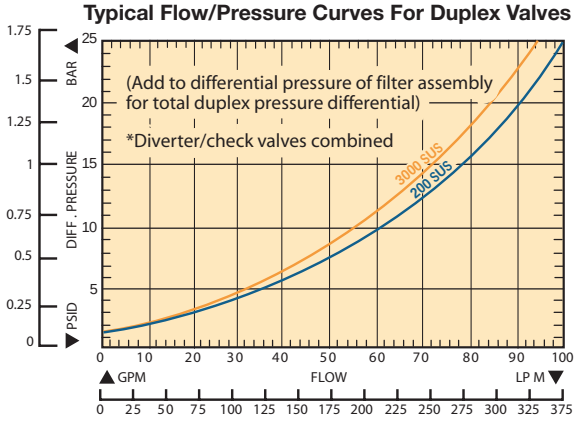


BOTH CHECK VALVES MOVE SAME DIRECTION

Approximate handle torque required for changeover.



Typical Flow/Pressure Curves For Duplex Valves

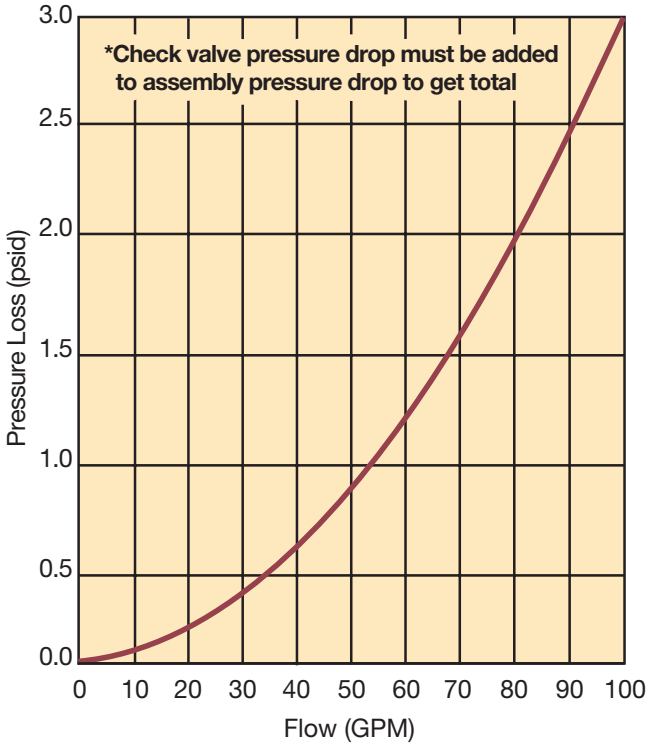


Moduflow™ *Plus* Series

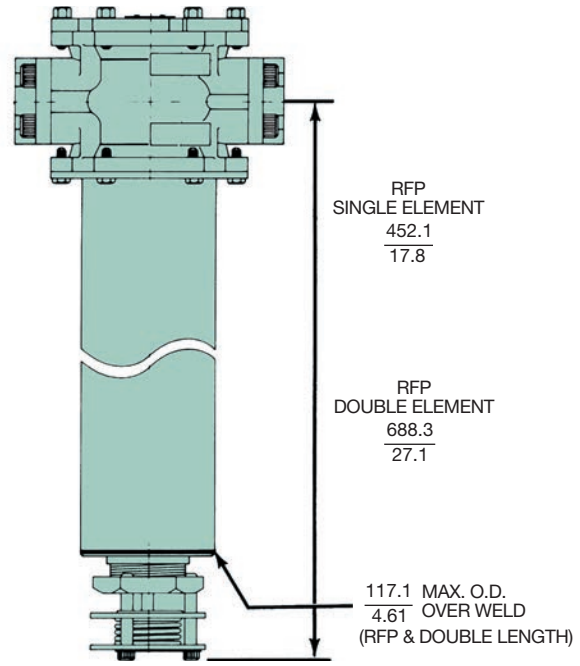
Specifications

For return line applications (RFP), the fluid returning to the reservoir holds the check valve open. When the system is shut down, the check valve closes automatically.

Check Valve Flow/Pressure Drop



Linear Measure: millimeter / inch



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

Moduflow™ *Plus* Series

Specifications

Lower Cost than many single unit filters.

Moduflow™ Manifold Extended Filter Range

Use Model MM Manifold to handle return line flows up to 130 gpm.

- **Rated static pressure:** 300 psi
- **Typical burst pressure:** 900 psi
- **Easily mounted on ModuFlow™**

High Flows At Low Cost

The model MM manifold 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 RFP-2 or ILP-2 filters, this manifold will allow flows up to 130 gpm in return lines (15 fps velocity).
Note: The Model MM manifold is not applicable to suction lines due to its pressure drop characteristics.

When used with two Moduflow™ filters, the total cost is often less than a single unit filter rated for 130 gpm flow. Tank-top mounted (Model RFP) filters will require only one manifold on the filter inlet pports. In-line mounted (Model ILPav) filters will require two manifolds, one on the inlet and one on the outlet ports.

Multiple Uses

Although designed for manifold ModuFlow™ filters, the Model MM can be used in a variety of applications which require:

- **Splitting flow between components**

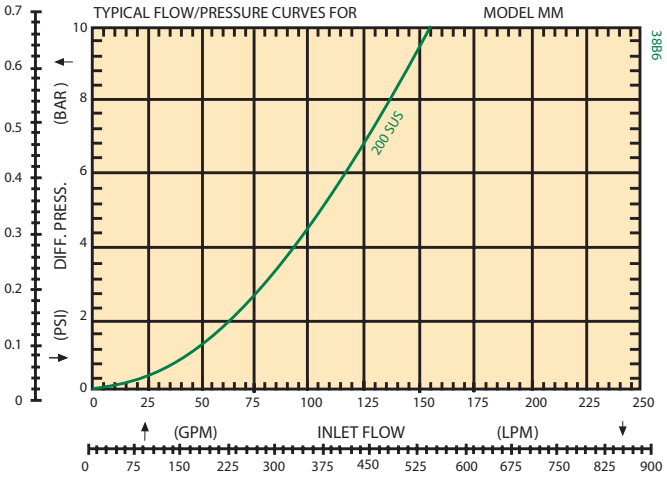
Such applications are frequently encountered on mobile equipment, machine tools, and large lubricating
systems. In such applications, use of a manifold can often reduce total piping and installation costs.

Proven Reliability

The rugged design of the Model MM manifold has been proven in demanding mobile equipment applications, At the factory, we have cycle tested the Model MM through the full range of rated flow and pressure to insure reliable service.

Parker Filter Division maintains the same high standards in delivery, quality, and service. Considering this, plus features, flexibility, price, and performance, the Model MM manifold is a valuable addition to your fluid power component list.

FLOW/PRESSURE CURVE



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

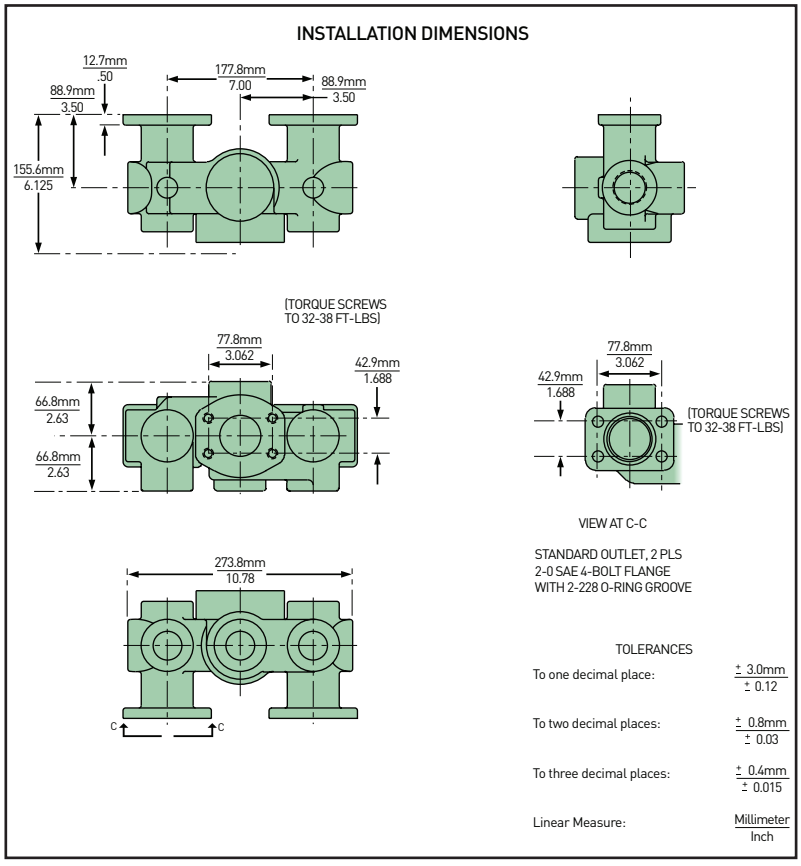
Outlet port o-rings (2 required):
Nitrile: P/N N72228
Fluorocarbon: P/N V92228

How to order manifolds

Part Number	Description
926466	Moduflow Manifold

* Tank-top mounted RFP filters will require one manifold on filter inlets: in-line mounted ILP filters will require two manifolds on both inlets and outlets.

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

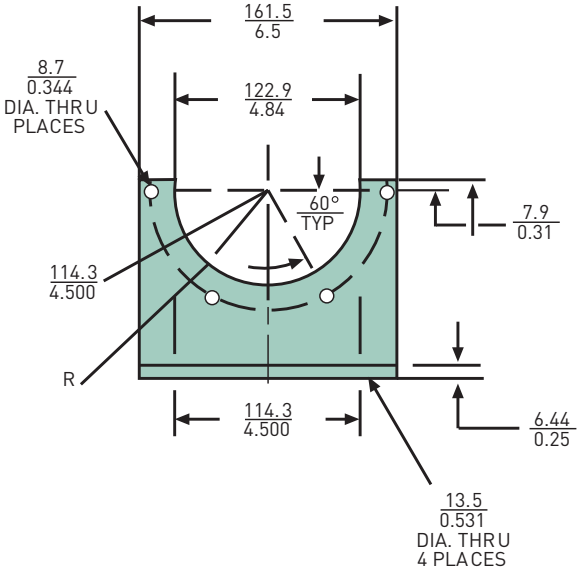


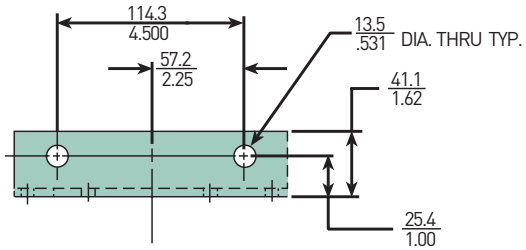
Moduflow™ *Plus* Series

Accessories

Linear Measure: millimeter / inch

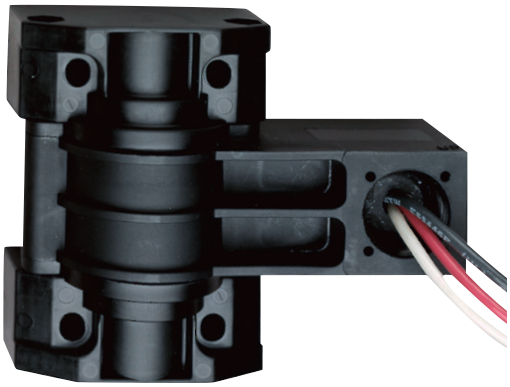
OPTIONAL MOUNTING BRACKET (924904)





"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)

		Part Number	
Size	Code	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.

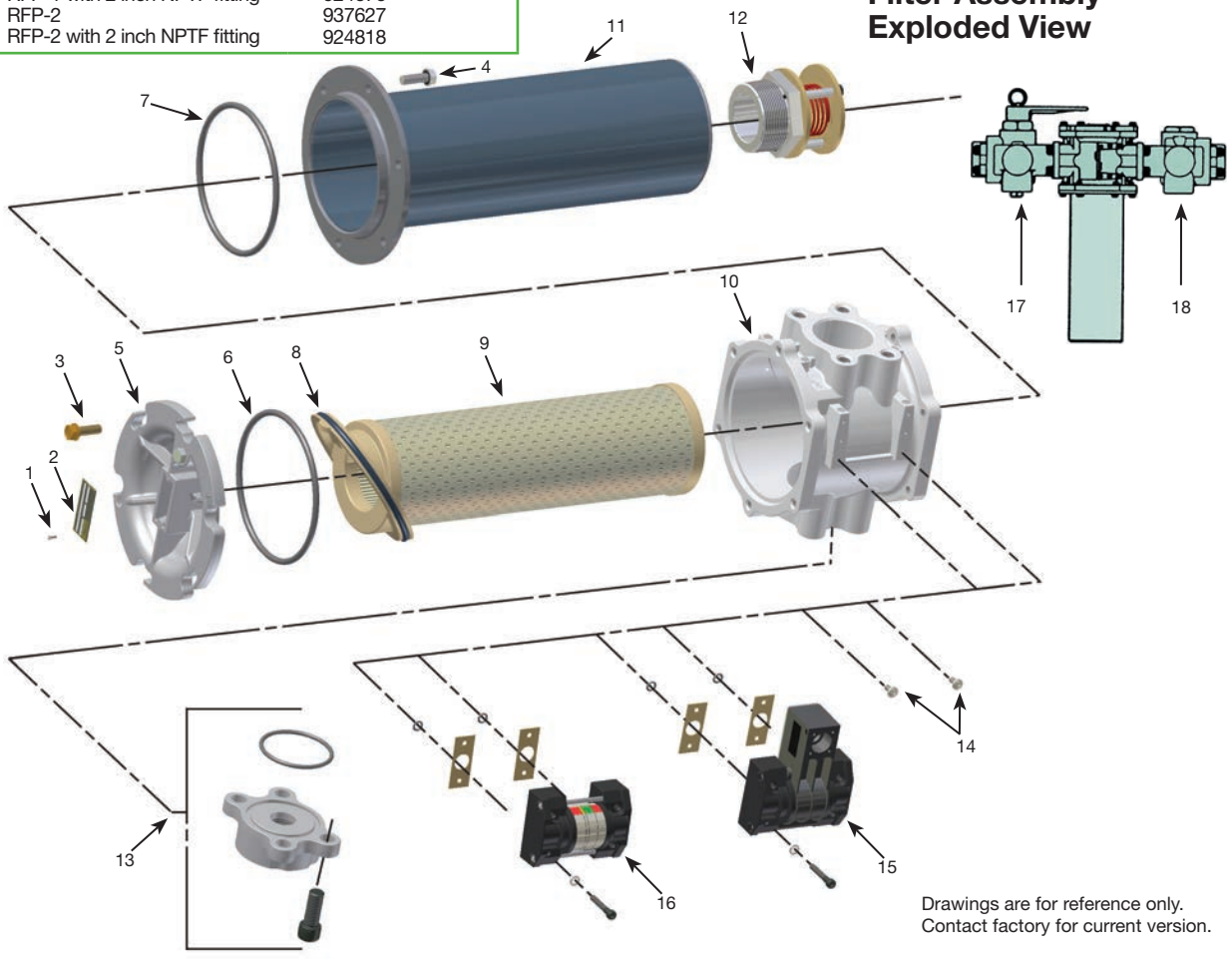
Moduflow™ *Plus* Series

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 1½"SAE Flange 1½" NPTF	 925972 926146 925949	1 1 1
11	Bowl, Select desired model ILP-1 ILP-2 RFP-1 RFP-1 with 2 inch NPTF fitting RFP-2 RFP-2 with 2 inch NPTF fitting	 925916 924816 937626 924676 937627 924818	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	Drain Plug, SAE-24 for RFP model Nitrile Fluorocarbon	 909992 928363	 1 1
Not Shown	Check Valve Assy., Duplex	N72265	1

Filter Assembly Exploded View



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

Moduflow™ *Plus* Series

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
RFP	**Return-lin filter, inlet on side outlet on bottom**
ILP	**In-line filter**
DILP	**In-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**
WR	Water Removal

BOX 4: Seals

Symbol	Description
B	**Nitrile**
E	EPR
V	Fluorocarbon

BOX 5: Indicator

Symbol	Description
P	**Plugged Ports**
M	**Visual indicator w/ "no element" warning**
E	**Electrical indicator w/ 12" leads**
D	Electrical indicator w/ 3-pin male quick dsconnect

Note: First letter of indicator code = left side of filter head when looking into inlet with bowl down; second letter = right side of filter head when looking into inlet with bowl down.

BOX 6: Bypass

Symbol	Description
35	**35 psid (2.4 bar)**

BOX 7: Ports

Filter Model	Inlet Symbol/ Description		Outlet Symbol/ Description	
RFP	Y9	2" flange face	**99**	**No fitting**
	P9	**SAE-24 integral threads**	F9	2" NPTF
			F8	External check valve
ILP	**Y9**	**2" flange face**	**Y9**	**2" flange face**
	P9	SAE-24 integral threads	P9	SAE-24 integral threads
DILP	**Y9**	**2" flange face**	**Y9**	**2" flange face**

BOX 8: Options

Symbol	Description
1	**None**

1. First pair of symbols denotes inlet for all filter styles; second pair of symbols denotes outlet.
2. Four symbols required: two for inlet, two for outlet.
3. Unused ports in filters come plugged with a blank flange.
4. See Flange Kits table for port flange options. Flange Kits are ordered separately.

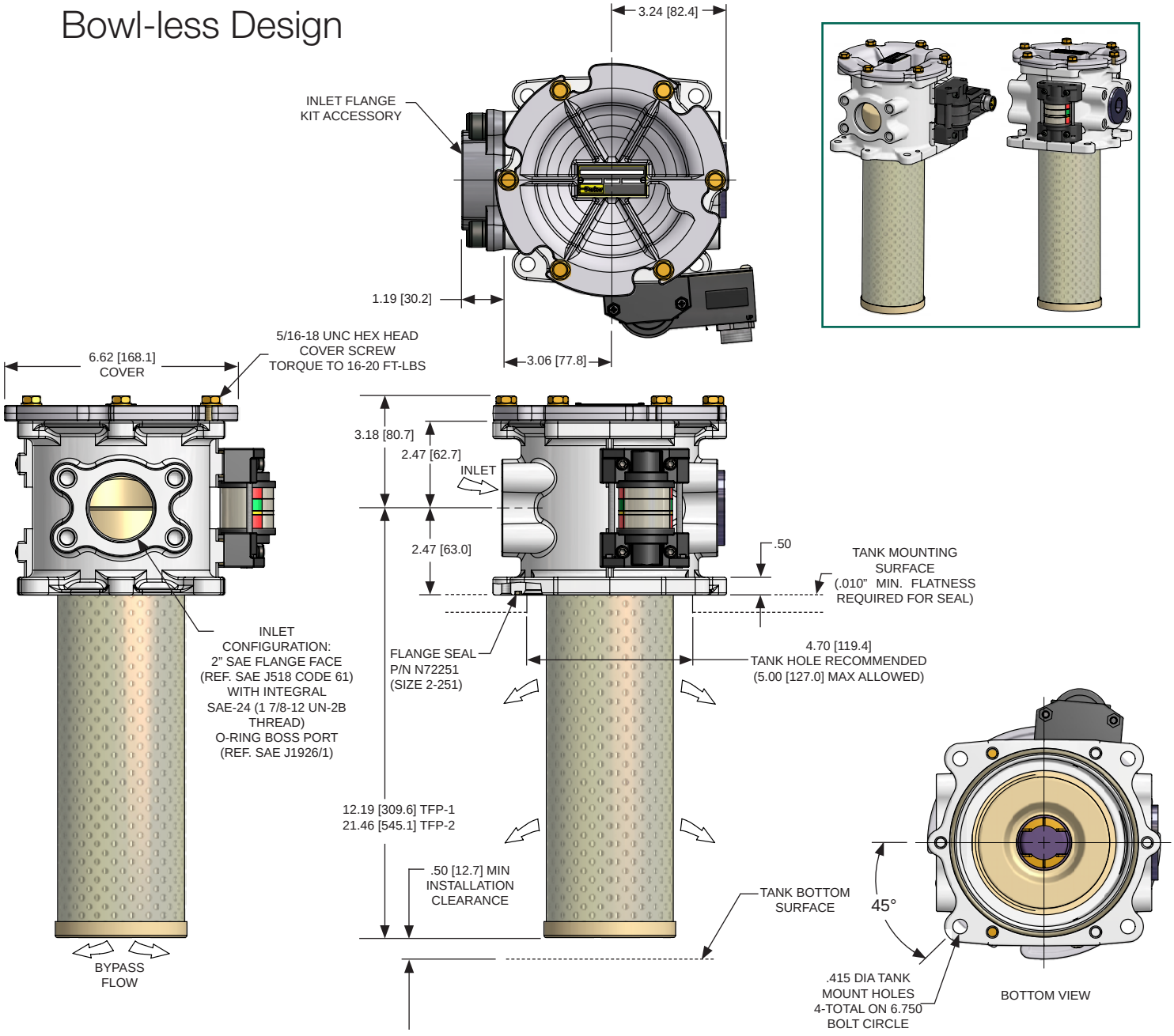
Please note the bolded options reflect standard options with a reduced lead time.

RFP / ILP / DILP Replacement Elements

	Nitrile Seals		Fluorocarbon Seals	
Media	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

Moduflow™ *Plus* TFP Series

Bowl-less Design



Features	Advantages
Shorter port-to-port distance.	Provides a smaller footprint and reduced weight.
Direct tank mount capability eliminates need for adaptor flanges and bowl.	Aluminum die cast head reduces weight and direct tank mount flange reduces installation time and cost.
Standard head incorporates 2" SAE flange face with integral SAE-24 port configuration.	Enables one common head to be used. Simplifies ordering model code.
Filter head and element 2-piece construction requires no filter bowl.	Reduces assembly cost by 25%.
Patented element design with integral bypass valve and inside to out flow path.	Ensures all contaminants remain captured during service. New bypass valve with each element ensures operation reliability.

Moduflow™ *Plus* TFP Series

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
TFP	1	10Q	B	MP	35	C32	1

BOX 1: Filter Series

Symbol	Description
TFP	**Return-line filter**
TFPW	Return-line filter anodized for HWHC 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: Seals

Symbol	Description
B	**Nitrile**
E	EPR
V	Fluorocarbon

BOX 5: Indicator

Symbol	Description
P	**Plugged Ports**
M	**Visual indicator w/ "no element" warning**
E	**Electrical indicator w/ 12" leads**
D	Electrical indicator w/ 3-pin male quick dsconnect

Note: First letter of indicator code = left side of filter head when looking into inlet with bowl down; second letter = right side of filter head when looking into inlet with bowl down.

BOX 6: Bypass

Symbol	Description
35	**35 psid (2.4 bar)**

BOX 7: Ports

Symbol	Description
C32	**2" SAE flange face SAE-24 combination inlet port**

BOX 8: Options

Symbol	Description
1	**None**

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

Media	TFP-1			Media	TFP-2		
	Nitrile	Fluorocarbon	Ethylene Propylene		Nitrile	Fluorocarbon	Ethylene Propylene
02Q	937393Q	937401Q	937671Q	02Q	937397Q	937405Q	937675Q
05Q	937394Q	937402Q	937672Q	05Q	937398Q	937406Q	937676Q
10Q	937395Q	937403Q	937673Q	10Q	937399Q	937407Q	937677Q
20Q	937396Q	937404Q	937674Q	20Q	937400Q	937408Q	937678Q
WR	940733	940735	N/A	WR	940734	940736	N/A

RF7 Series

Low Pressure Filters

ENGINEERING YOUR SUCCESS.

RF7 Series

Applications

- **Mobile equipment**
- **Power unit fabricators**
- **Off-line filter loops**

The Parker RF7 filter is designed for those applications where dependable, yet economical, return line system protection is required. The in-tank mounting design makes the RF7 ideally suited for use by power unit fabricators, mobile equipment manufacturers, or anyone who views equipment space at a premium, but not at the expense of performance.

Element Condition Indicator
- True pressure differential
- Know, at a glance, when to change the filter element
- Gauge also available

Two-Piece Construction (Head/Tube)
- Easy in-tank mounting

Bypass Valves
- Virtually zero leakage
- Multiple valves for high flow

Diffuser Tube
- Disperses return flow below reservoir fluid level
- Prevents fluid aeration
- Closed bottom provides for even fluid dispersal
- Prevents objects from falling into the reservoir during element servicing

Cartridge/Element Handle
- Easy to remove entire assembly for servicing

Bypass Filter Screen
- Prevents gross contamination from passing through the filter — even during bypass

Vent
- For variable displacement pump applications

RF7 Series

Element Features

Inside each Parker Filter is a quality Parker Element

The important item in a filter assembly is the element. It has to capture and hold contaminants that can damage or stop a machine...while at the same time allowing the required flow of clean fluid so the machine can function properly.

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

For instance, consider wire mesh reinforcement. Not all filter elements have it. It's used in Parker elements to keep the pleats from collapsing or bunching.

If pleats bunch, the effective surface area of the element is reduced, excessive pressure drop develops, and the filter assembly may go into the bypass mode. This condition wastes energy and allows unfiltered fluid flow back into the system, effectively shortening filter life.

Gasket Ring Seal
- Positive sealing for optimum element efficiency

Protective Perforated Cylinder
- Necessary for inside-to-outside flow
- Prevents media "blow out"

Wire Reinforced Media (Not Visible)
- Prevents pleat bunching
- Helps prevent media migration
- Maintains media efficiency

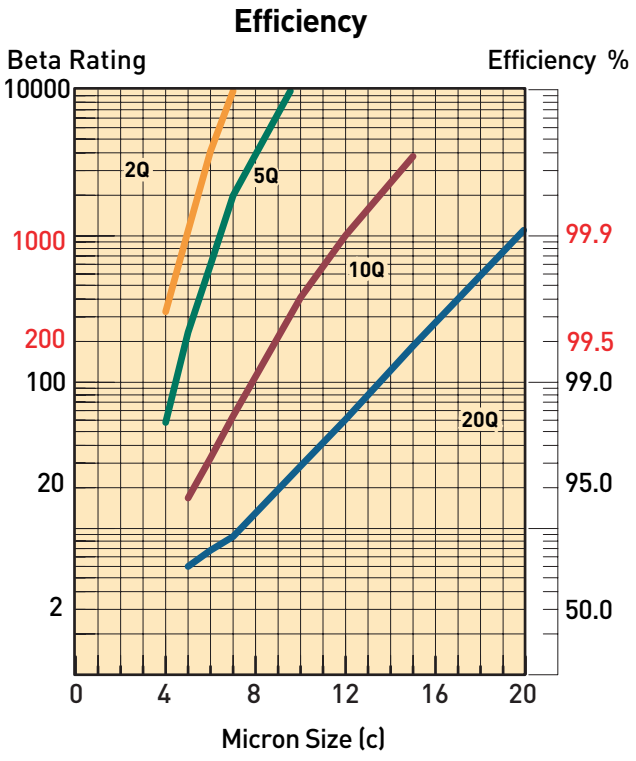
Engineered Element Design
- The right combination of pleat depth and number of pleats means lower pressure losses (longer life)
- Dirt holding capability is maximized for less frequent element change-out

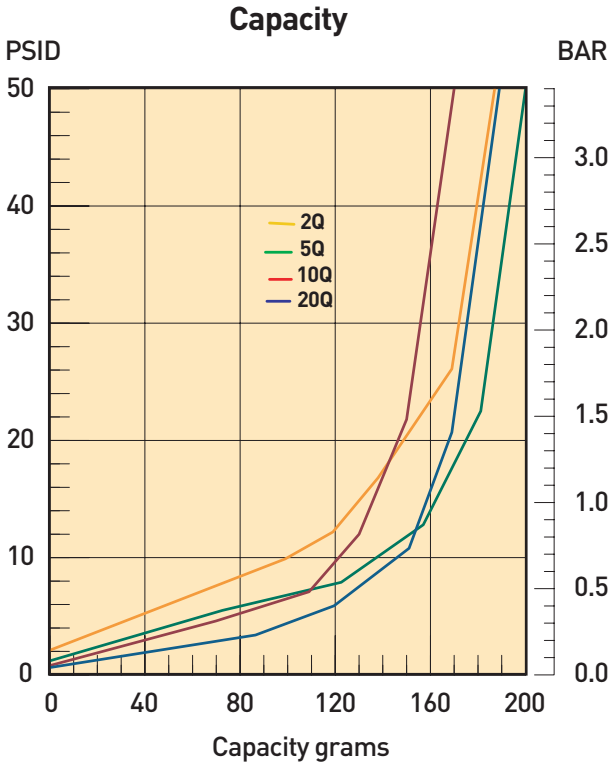
Elements for Every Application
- Microglass media for long life and excellent system protection
- Economical cellulose elements also available

Features	Advantage	Benefits
• Tank mounted design.	• Saves space and reduces hardware requirements.	• Easy to integrate into system design.
• Cover fill port.	• Allows 100% filtration of all new system oil.	• Eliminates contamination before it can cause problems.
• High flow capacity.	• One filter may handle all return line flows.	• Cost savings in filters and hardware.
• Broad range of filter media available, including water removal.	• Choose the proper medium for system parameters.	• Cost savings by avoiding both "over" and "under" filtration.
• Inside-to-outside flow through element with a closed bottom end cap.	• All contamination is trapped inside of element assembly.	• Contamination is not reintroduced into the system during replacement.
• Wire reinforced Microglass elements.	• Rugged construction stands up to abuse of cyclic flows without performance loss. • Wire support reduces pleat bunching, keeps pressure drop 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 modified for fine filtration).	• Filter performance backed by recognized and accepted laboratory test standards.	• Filters you select have consistent 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.

RF7 Series

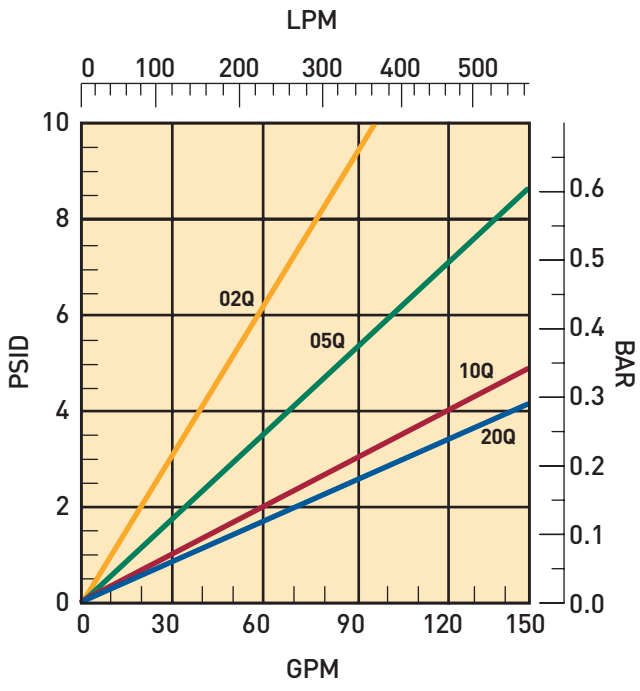
RF7-1 Element Performance

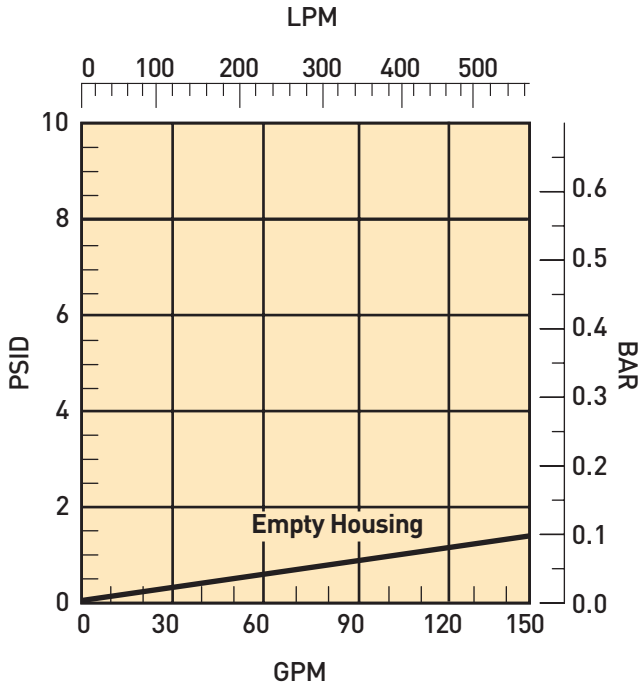




Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 50 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

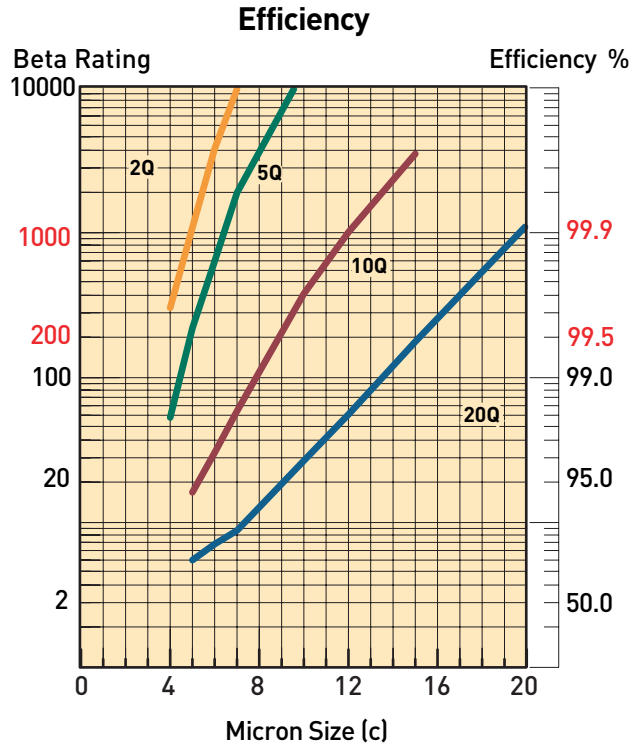
Flow vs. Pressure Loss

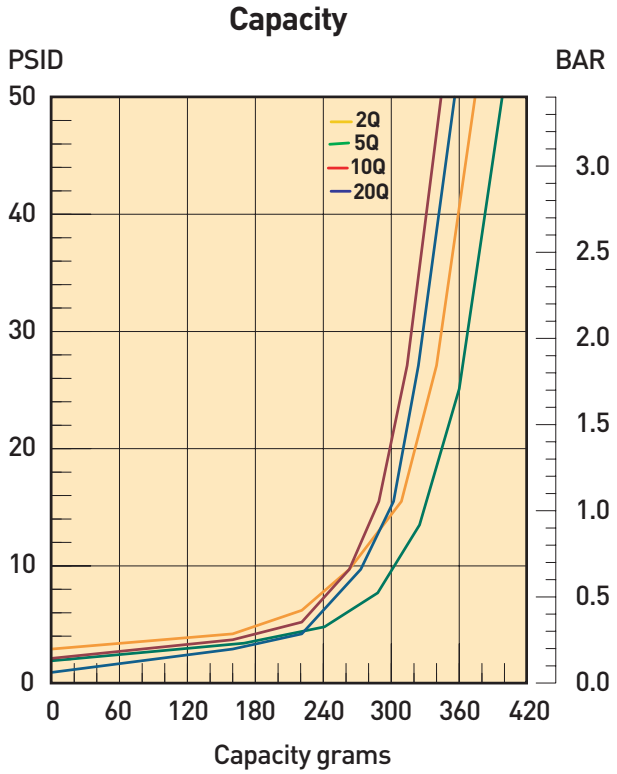




RF7 Series

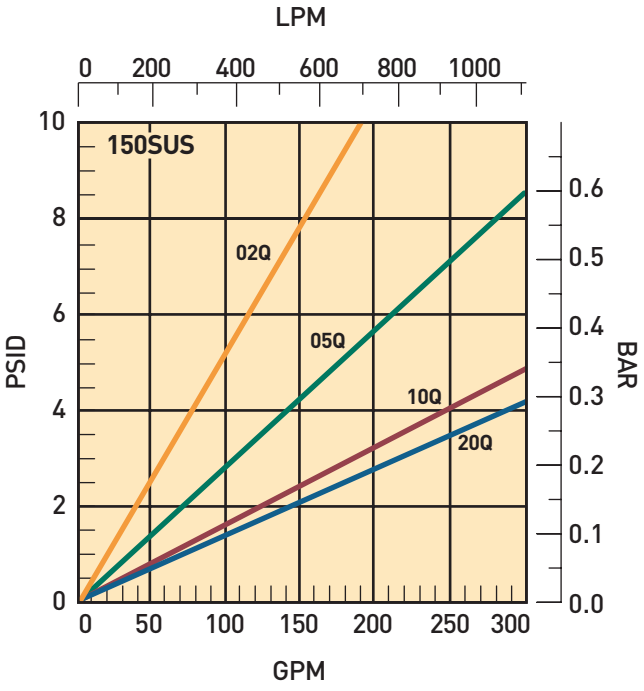
RF7-2 Element Performance

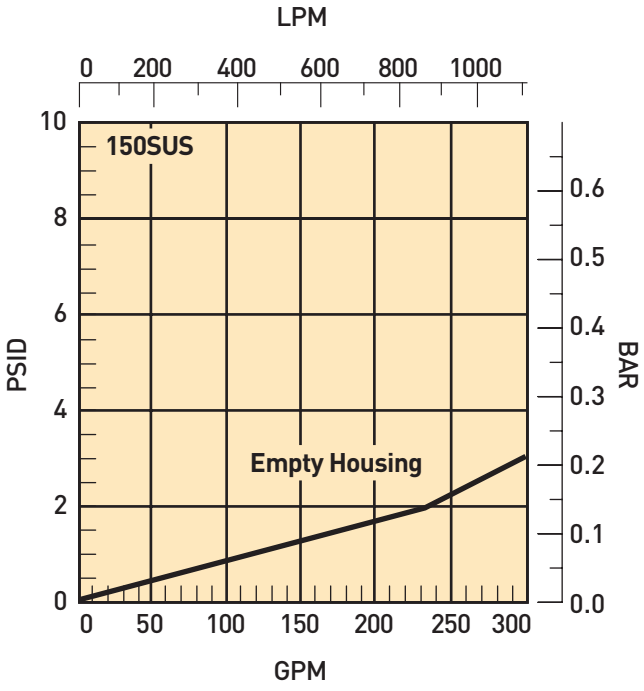




Results typical from Multi-pass tests run per test standard ISO 16889 @ 80 gpm to 50 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

Flow vs. Pressure Loss





RF7 Series

Specifications

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

Design Safety Factor: 3:1

Element Burst Rating:
50 psid (3.4 bar) minimum

Materials:
Cast Aluminum Head & Cover
Steel Diffuser Tube
Steel Clamp

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

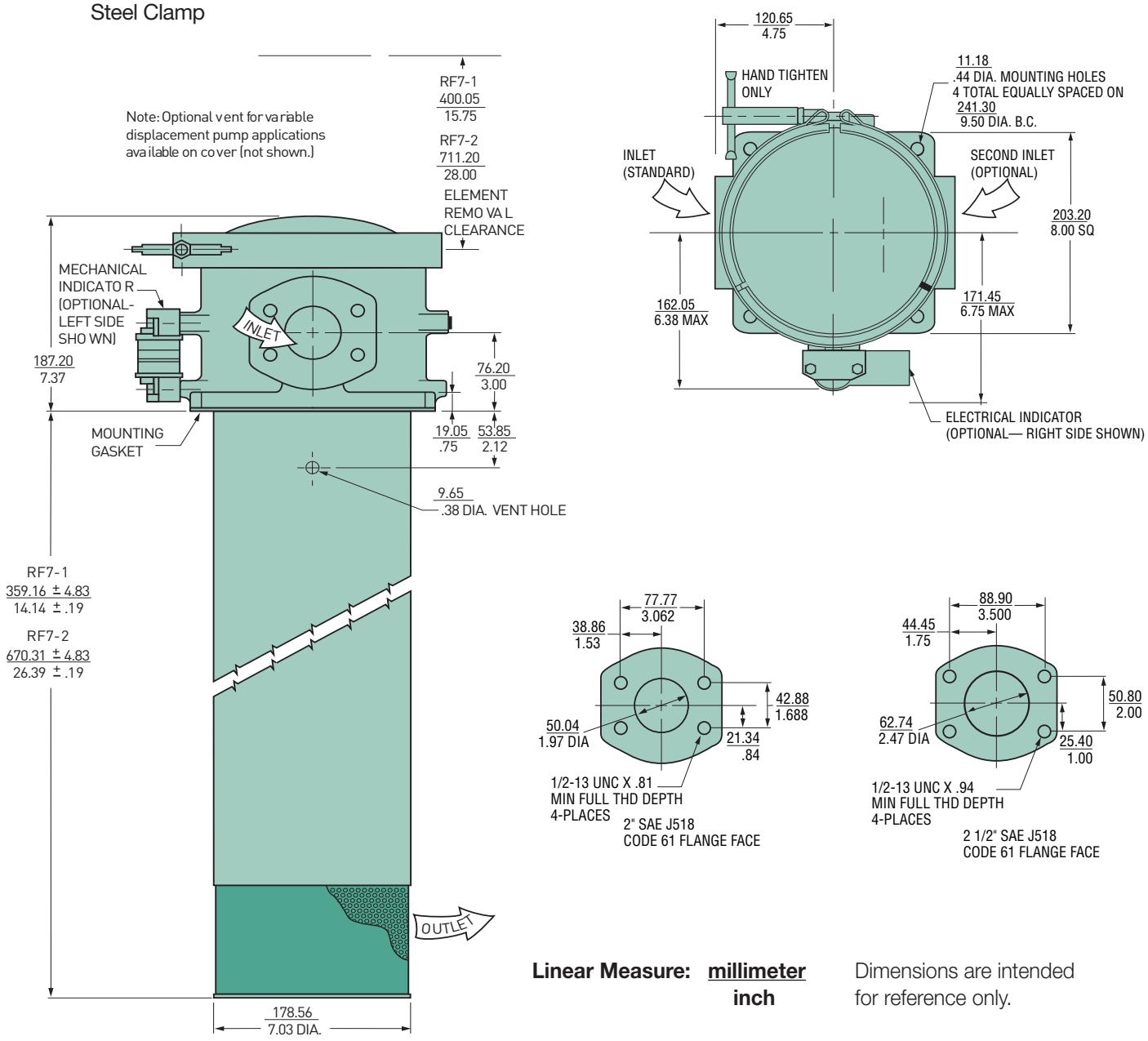
Fluorocarbon 15°F to 275°F
(-26°C to 135°C)

Weight (approximate):
RF7-1 34 lbs. (15.4 kg)
RF7-2 42 lbs. (19 kg)

Indicators:
Visual system pressure
(gauge or pressure switch)

Visual pressure differential

Electrical pressure differential
15A @ 250 VAC
.5A @ 125 VDC



Clearance hole in tank reservoir to be 7 1/8 IN. ± 1/16 IN. DIA.

Linear Measure: **millimeter** / **inch**

Dimensions are intended for reference only.

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

RF7 Series

Specifications

Filter Service

When servicing an RF7 filter, use the following procedure:

A. Stop all flow to the filter.

B. Loosen the clamp handle counterclockwise and remove the clamp assembly.

C. Remove the filter cover by lifting upward.

D. Pull the entire cartridge assembly out by grabbing onto the “T” handle.

E. Unscrew the “T” handle from the bypass assembly (with mesh screen) and remove the bypass assembly.

F. Lift the element over the exposed rod assembly and discard.

G. Place a new element over the rod and seat on the bottom.

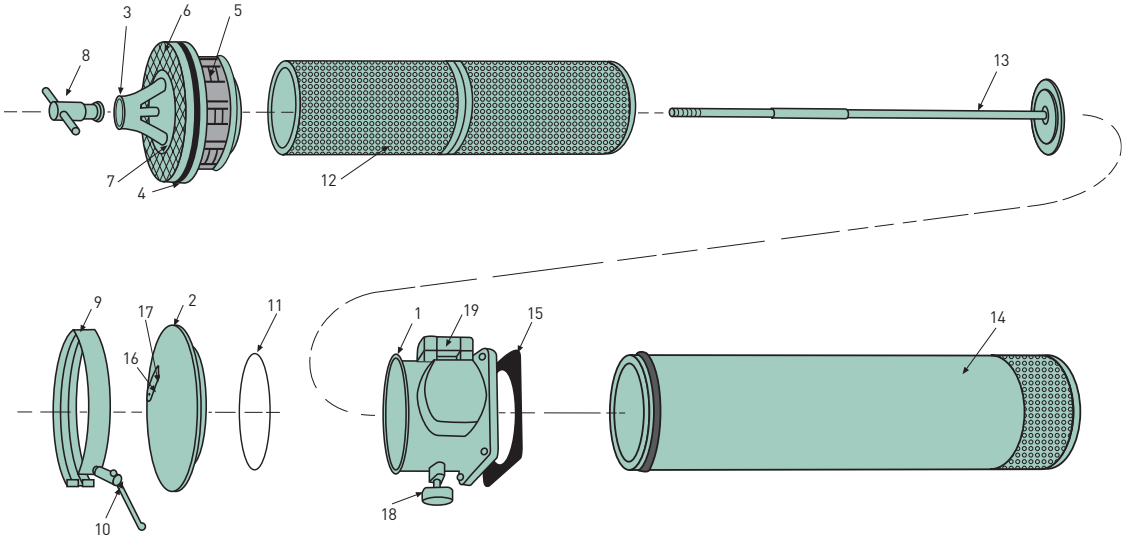
H. Re-attach the bypass assembly to the top of the element.

I. Replace the “T” handle and hand-tighten.

J. Firmly place the entire cartridge assembly back into the filter housing.

K. Set the cover back on the housing, reattach the clamp assembly and hand tighten the handle.

Parts List			
Index	Description	Part Number	
		RF7-1	RF7-2
1	**Head - Single Inlet**		
	2” SAE Flange Face w/gage ports	940709	940709
	2 1/2” SAE Flange Face w/gage ports	932483	932483
	2” SAE Flange Face w/indicator	932484	932484
	2 1/2” SAE Flange Face w/indicator	932485	932485
	Head - Double Inlets		
	2” SAE Flange Face w/gage ports	932550	932550
	2 1/2” SAE Flange Face w/gage ports	932551	932551
	2” SAE Flange Face w/indicator	932552	932552
	2 1/2” SAE Flange Face w/indicator	932553	932553
2	**Cover**	932288	932288
3	**Bypass Mount**	932521	932521
4	**Lipseal**		
	Nitrile	932415	932415
	Fluorocarbon	932488	932488
5	**Bypass Valve (6)**	930507	930507
6	**Screen**	932416	932416
7	**Screen Retaining Ring**	932417	932417
8	**“T” Handle Assembly**	903889	903889
9	**Clamp**	909876	909876
10	**Clamp Handle**	926768	926768
11	**Cover O-Ring**		
	Nitrile	N72263	N72263
	Flourocarbon	V72263	V72263
12	**Element (See model code page)**		
13	**Cartridge Rod Assembly**	933067	932418
14	**Diffuser Tube Assembly**	933064	932419
15	**Gasket**		
	Nitrile	932420	932420
	Fluorocarbon	932489	932489
16	**Nameplate**	920928	920928
17	**Drivescrew (2)**	900028	900028
18	**Pressure Gauge**	936912	936912
19	**Indicators**		
	Visual	924776	924776
	Electrical	924964	924964



RF7 Series
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
	RF7	2	10Q	MP	25	Y999	1

BOX 1: Seals

Symbol	Description
None	**Nitrile**
F3	Fluorocarbon

BOX 2: Filter Series

Symbol	Description
RF7	In-tank return filter

BOX 3: Length

Symbol	Description
1	**Single**
2	**Double**

BOX 4: Media Code

Symbol	Description
02Q	**Microglass, 2 micron**
05Q	**Microglass, 5 micron**
10Q	**Microglass, 10 micron**
20Q	**Microglass, 20 micron**
10C	Cellulose
WR	Water Removal

BOX 5: Indicator(s)

Symbol	Description
P	**Plugged Ports**
G	Gauge, color coded
S	Pressure Switch
M	Visual Indicator
E	Electrical Indicator

Note: (First letter of indicator code = left side of filter head when looking into inlet with bowl down; second letter = right side of filter head when looking into inlet with bowl down.)

BOX 6: Bypass

Symbol	Description
25	**25 psid (1.7 bar)**

BOX 7: Ports

Symbol	Description
Inlet	
Y9	**2" SAE flange face**
Z9	**2-1/2" SAE flange**
2Y9	Two inlets, 180° apart
2Z9	Two inlets, 180° apart
Outlet	
99	**No fitting**

BOX 8: Options

Symbol	Description
1	**None**

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

Media	Single Length		Double Length	
	Nitrile	Fluorocarbon	Nitrile	Fluorocarbon
02Q	933806Q	933811Q	933818Q	933152Q
05Q	933804Q	933810Q	933816Q	933153Q
10Q	933802Q	933809Q	933814Q	933155Q
20Q	933800Q	933808Q	933812Q	933156Q
10C	908648	923551	932498	932503
WR	928563	933853	932501	932506

BGT Series

Low Pressure Filters

ENGINEERING YOUR SUCCESS.

BGT Series

Applications and Features

- Mobile Equipment
- Construction, Refuse
- Machine Tool
- Oil Field

- **Flows to 640 GPM**
- **3 Micron to 120 Micron Absolute**
- **Disposable or Recleanable Elements**
- **Visual and Electrical Indicators**
- **Microglass elements**
- **Magnetic prefiltration**
- **Full flow bypass valve**
- **No internal leakage paths**
- **Inside-to-out flow thru element**
- **Complete contaminant removal during element service**
- **LEIF® element (600 and 1000 Series only)**

Specifications

Housing Data:

Material:

Head – Aluminum Alloy
Diffusor – Steel
Internals – Carbon Steel and Aluminum
Seals – Nitrile (Standard), Fluorocarbon

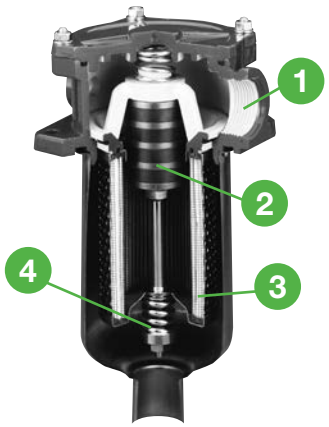
Pressure Rating:

Static – 150 psi (10.3 bar)

Temperature Range:

Operating -40°F to 250°F (-40°C to 120°C)

BGT Tank Mounted Return Flow Filters



BGT Filters feature Parker's exclusive Magnetic Prefiltration core which collects ferromagnetic particles from fluid upstream of the filter element. This feature alone could save hundreds of dollars a year by protecting costly equipment from increased wear and malfunction by assuring that the fluid is as pure as possible when it leaves the filter. Even during bypass due to cold start up, ferris contaminant is collected by the magnetic core, a feature of importance on any fluid power system.

Take a close look and compare Parker features with any other filter.

1. Fluid flows through the inlet port into an enlarged area which reduces fluid velocity. Inlet flow does not impinge on the element.

2. Filtration begins with magnetic prefiltration of ferromagnetic particles in the full fluid flow upstream of the element, not downstream or in the reservoir. Built-in or system generated ferromagnetic wear debris (even particles smaller than the element rating) are collected by the high strength (3.0K Gauss) magnetic column. This results in extended element and oil life and reduced maintenance and downtime, which reduces overall operating cost.

3. Fluid passes through the element in an inside-to-outside direction, collecting particles inside the filter cartridge. This eliminates reinjection of contaminant during element change. Clean fluid then returns to the reservoir through the diffusor which prevents fluid aeration.

Normal return line filters, that flow outside-to-inside, allow contaminated fluid to drain back into the reservoir when the element is serviced.

4. Simplified bypass design and location prevents flushing previously collected contaminant back into the system. Since the element serves as the valve there is no troublesome separate valve to remove when changing elements. Magnetic filtration occurs even during bypass. All potential leakage paths are o-ring sealed to eliminate bypass leakage that occurs in loose fitting valve assemblies.

BGT Filters are available with disposable elements of several contamination class levels for use in all common fluids.

Optional accessories include visual and electric warning indicators that assure proper element service.

BGT Series

How To Size Tank Top Filters

Element Pressure Drop Factor:
Multiply the actual flow rate times the applicable ΔP factor to determine the pressure drop with a fluid viscosity of 140 SSU. Correct for other viscosities by applying the following formula: Flow rate (GPM) x filter factor x (new viscosity in SSU/140 SSU).

Flow/Pressure Drop Data

Fluid Conditions: Viscosity-140 SSU Sp. Gr. - 0.88

Media Code	600	Size Code 1000	2000
02QL	.082	.0493	.0246
05QL	.031	.0187	.0091
10QL	.022	.0129	.0066
20QL	.014	.0088	.0044

Example:
Element Size Code = 600
Element Media Code = 10
Filter Factor = .022 (From chart)
Flow = 160 GPM
Viscosity = 160 SSU

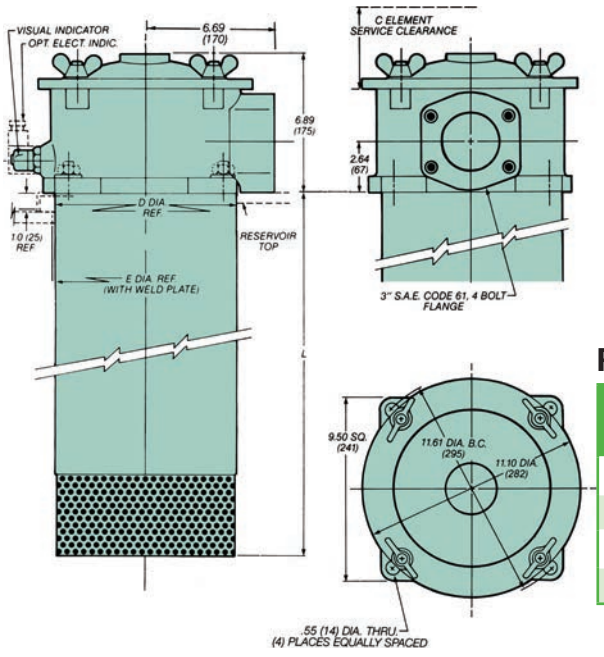
Formula:
160 GPM x .022 x (160 SSU/140 SSU) = 4.0 PSID

Element Data

Media Type	Absolute Rating	Multipass Test Results To ISO 4572 (Time Weighted Averages)						
		B_3	B_6	B_{10}	B_{12}	B_{20}	B_{25}	B_{36}
Microglass	3	≥100	800	2000	>5000	∞	∞	∞
Microglass	6	8	≥100	1000	2000	>5000	∞	∞
Microglass	10	6	22	≥100	≥200	>5000	∞	∞
Microglass	20	–	2	8	20	≥100	≥200	>5000

Dimensions

BGT-13, BGT-15, BGT-17



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

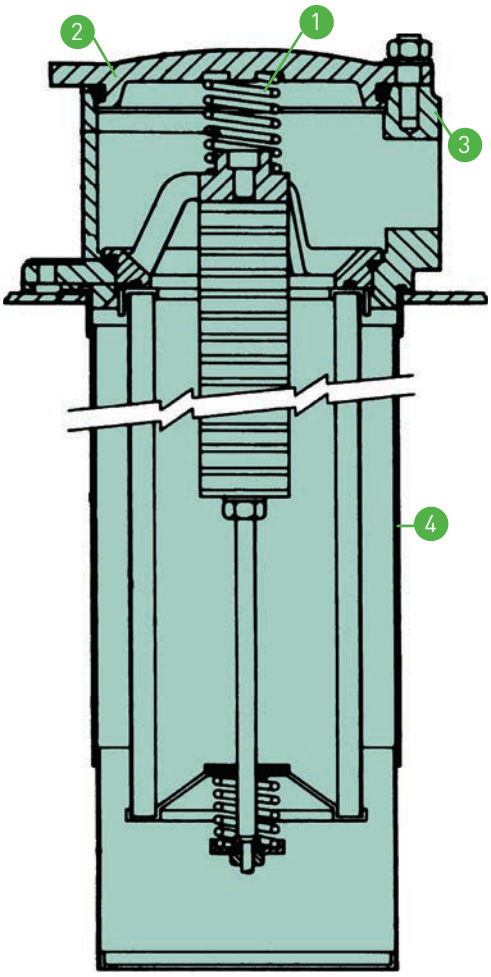
Return Line Filter - Series 4

Dimensions inches (mm)	BGT Filter Model		
	13	15	17
C	18.0 (457)	27.0 (686)	48.0 (1219)
L	16.75 (425)	25.20 (640)	47.25 (1200)
D	9.49/9.47 (241/240.5)		
E	10.25/9.70 (260/246)		

BGT Series

Parts List

Item	Description	Material	BGT-13	BGT-15	BGT-17
1	Top Spring	Steel		48371205	
2	Cover	Die Cast Aluminum		84.22.064.06 (5842206)	
3	Head	Die Cast Aluminum		5841032	
4	Diffusor	Steel	2110084	2110085	21100086



Bypass Assembly	
13, 15 or 17	**Pressure**
6903184	Blocked
4903020	4.5 PSID
4903004	12 PSID
4903008	22 PSID

Seals	
BGT 13, 15 or 17	**Description**
R-8875	Cover O-ring
SOR-90	Insert O-ring
SOR-85	Bypass Seals
R-8975	Tank Gasket
SOR-115	Element O-Ring
Nitrile or Fluorocarbon	Material*

*Please specify seal material suffix when ordering; Fluorocarbon seals: "-V"

Operating And Maintenance Instructions

A. Mounting

1. Standard mounting.
   a. Cut proper size hole in the top of the reservoir.
   b. Drill holes for studs within the proper bolt circle.
   c. Set the filter into the cutout hole and secure with proper size bolts, nuts and lock washers.
4. Utilize proper fittings.

B. Start-Up

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

C. 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.

D. Servicing Dirty Elements

1. Shut system down to assure that there is NO PRESSURE OR FLOW into the filter housing.
2. Remove the filter cover.
3. Remove the filter insert (bridge which holds the element in place).
4. Remove the bypass spring assembly or non-bypass plate from the stud.
5. Remove the contaminated cartridge with a twisting motion.
   a. Discard the disposable element cartridge.
   b. Wash cleanable or mesh elements in a non-caustic solvent. Compressed air can be used to facilitate cleaning. Use care to prevent damage to the element during cleaning. NOTE: Elements finer than 150 microns (100 mesh) may require special ultrasonic cleaning. Consult factory for recommendations.

E. Before Installing A New Element Cartridge

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

F. To Install A New Or Cleaned Element Cartridge

1. Lubricate all seals.
2. Mount new or cleaned Parker filter cartridge. NOTE: For ease of mounting, hold the cartridge away from the magnetic core until the stud is through the hole in the bottom of the element. Then slide it up to securely seat it to the top of the bridge.
3. Install the bypass spring assembly or non-bypass plate, and tighten until snug. NOTE: Older versions may have a cotter pin/castellated nut retained bypass spring. In these cases, the nut should be turned down the shaft until the cross drilled hole is visible in the base of a castellation and the cotter pin inserted and ends flared to lock the bypass assembly in place.
4. Re-install the insert into the filter housing, making sure that the top spring is secure.
5. Re-install the cover. Torque the cover nuts to 22 ft./lbs.

Follow procedures B.1 and B.2.

BGT Series
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
BGT	13	10QL	B	V	E	F48	1

BOX 1: Filter Series	
Symbol	**Description**
BGT	**Return Filter**

BOX 2: Filter Series	
Symbol	**Description**
13	**600 lpm (160 gpm)**
15	**1000 lpm (265 gpm)**
17	**2000 lpm (530 gpm)**

BOX 3: Media Code	
Symbol	**Description**
	BGT13/BGT15
02QL	Leif® Microglass
05QL	Leif® Microglass
10QL	Leif® Microglass
20QL	Leif® Microglass
	BGT17
02QL	Microglass
05QL	Microglass
10QL	Microglass
20QL	Microglass

BOX 4: SEALS	
Symbol	**Description**
B	**Nitrile**

BOX 5: Indicator	
Symbol	**Description**
P	**Plugged Port**
V	Visual Differential Indicator
E	Electrical Differential Indicator

BOX 6: Bypass	
Symbol	**Description**
E	**22 psid (1.5 bar)**

BOX 7: Ports	
Symbol	**Description**
F48	**3" SAE Flange, Code 61**

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

BGT13 (old BGTS600)

Part Number	Description
937834Q	Element Leif® IN-13-02QL
937841Q	Element Leif® IN-13-05QL
937860Q	Element Leif® IN-13-10QL
937867Q	Element Leif® IN-13-20QL

BGT17 (old BGTS2000)

Part Number	Description
937736Q	Element IN-17-02Q-B
937769Q	Element IN-17-05Q-B
937772Q	Element IN-17-10Q-B
937805Q	Element IN-17-20Q-B

BGT15 (old BGTS1000)

Part Number	Description
937836Q	Element Leif® IN-15-02QL
937839Q	Element Leif® IN-15-05QL
937862Q	Element Leif® IN-15-10QL
937865Q	Element Leif® IN-15-20QL

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 Ecoglass filtration, without the environmental impact.

The new environmentally-friendly 12CS and 50CS hydraulic filters feature a reusable bowl and a patented 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.

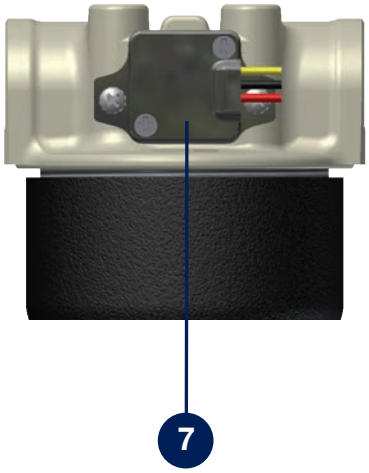
The 500 psi filters are rated up to 50 gpm, with premium Ecoglass elements as standard offerings. The patented element design also prevents filter operation if the proper element is not in place.

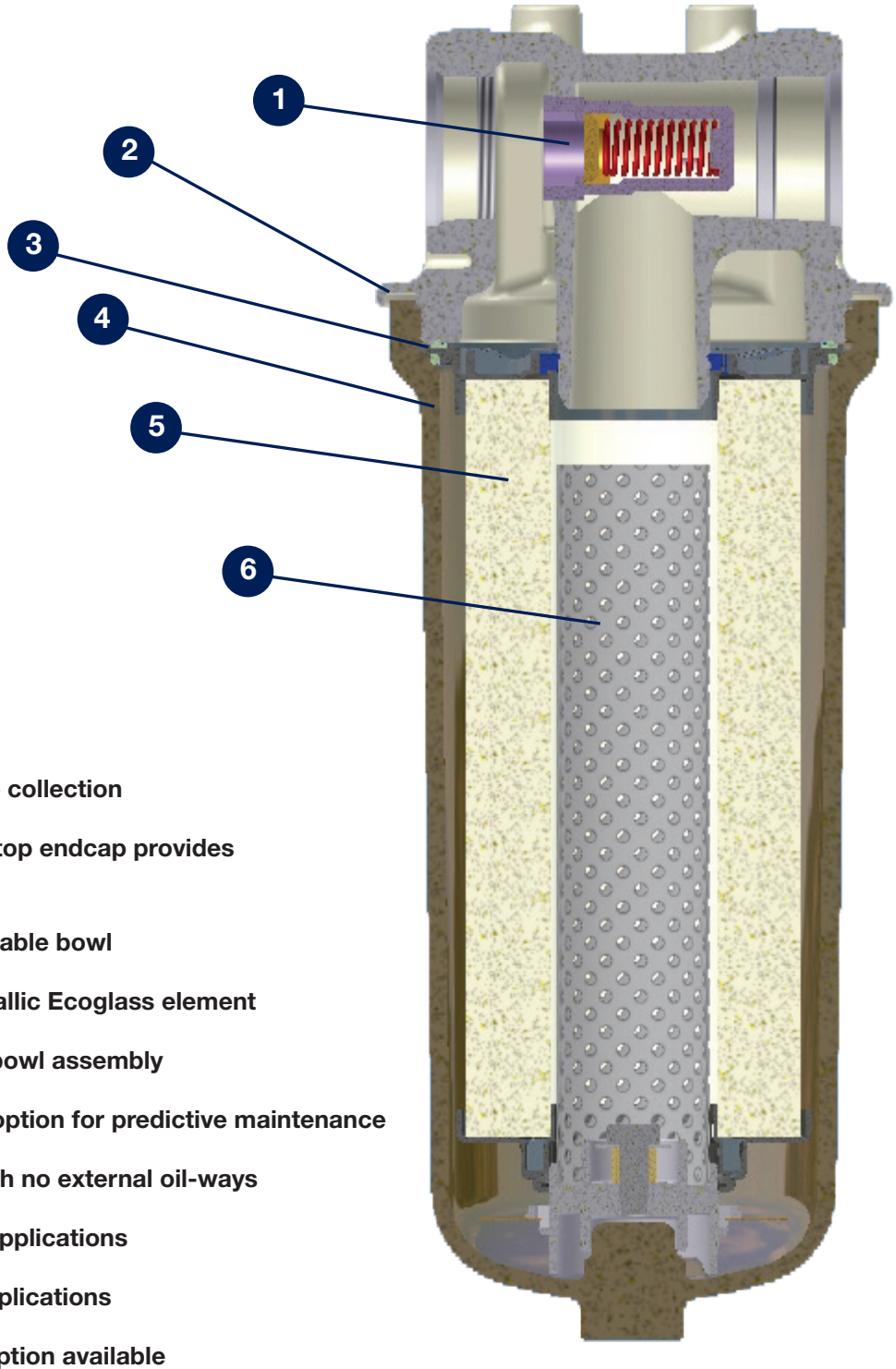
Typical Applications

- **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. Patented coreless non-metallic Ecoglass 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/50CS Series

The Smart Alternative to Spin-on Cans!

Patented Filter Element Provides head-to-bowl seal

Cannot operate without an element installed

Coreless Ecoglass Elements Reduces disposal costs and environmental impact

Ease-of-Service, environmentally friendly

Spin-on Assembly with Reusable Bowl Improved, cost effective design

Easy to maintain

500 PSI Operating Pressure Withstands pressure surges

Application versatility

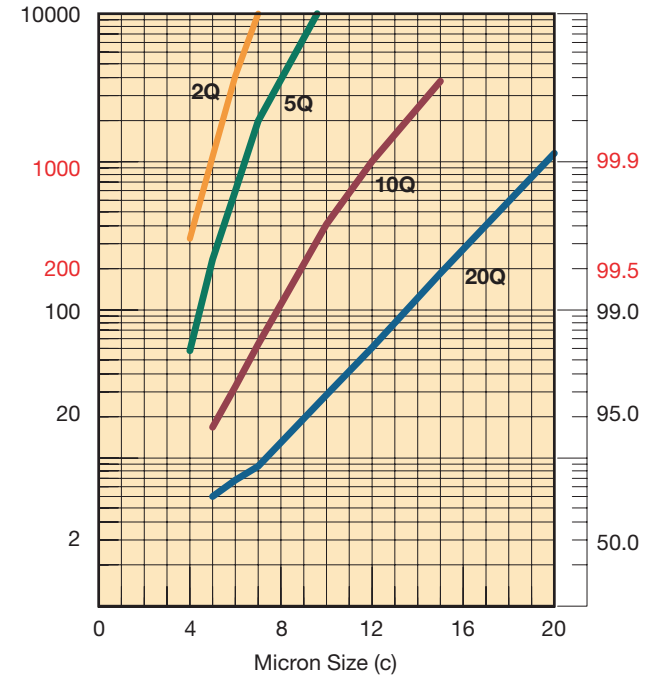
Option for Differential Pressure Sensing including an Analog 0-5V Output For predictive maintenance

No external oil-ways

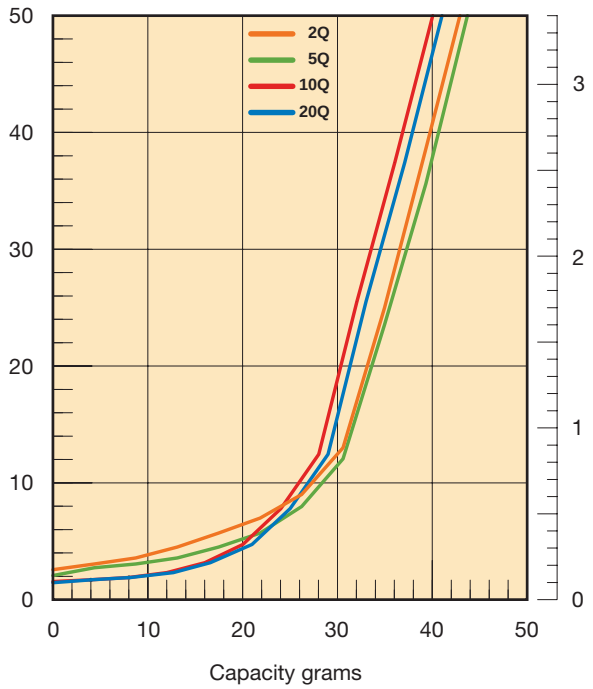
12CS Series

Performance

Efficiency

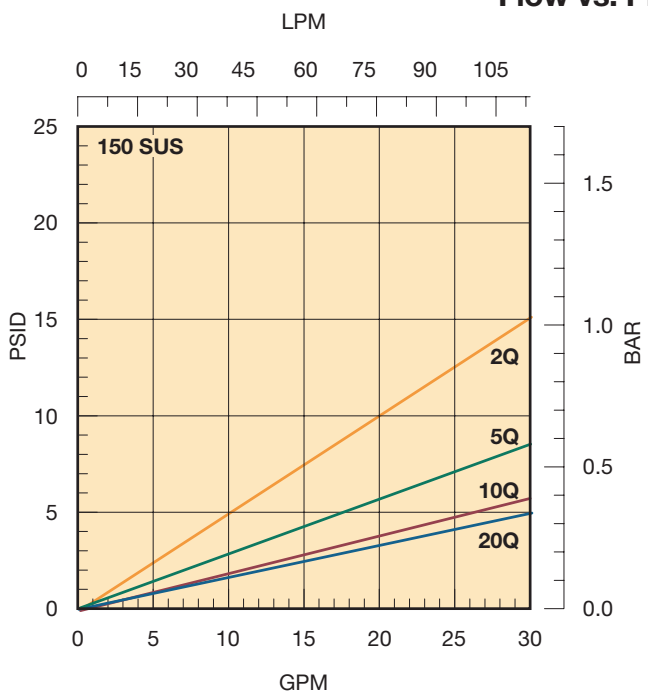


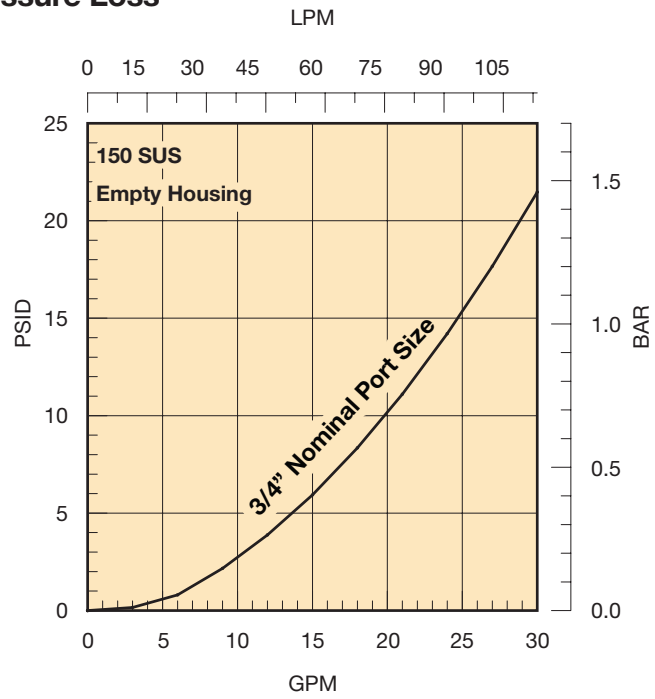
Capacity



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 on pages 264-265 for relationship to test standard ISO 4572.

Flow vs. Pressure Loss

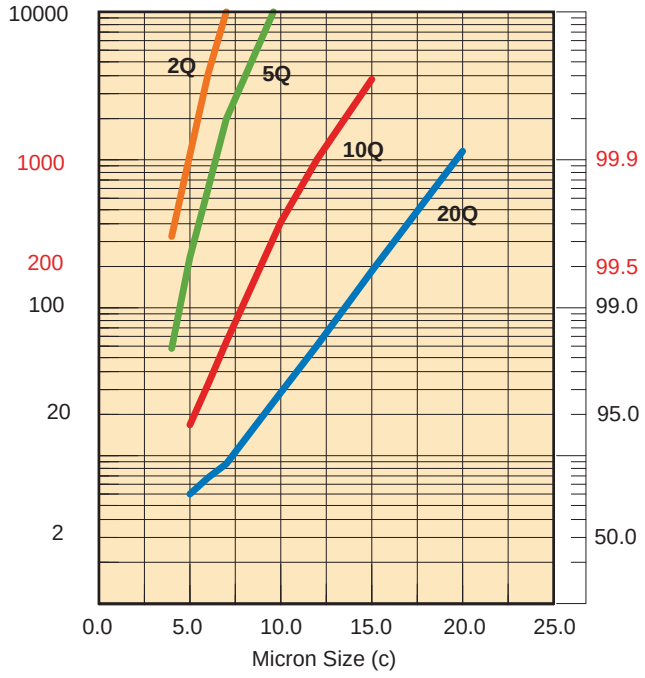




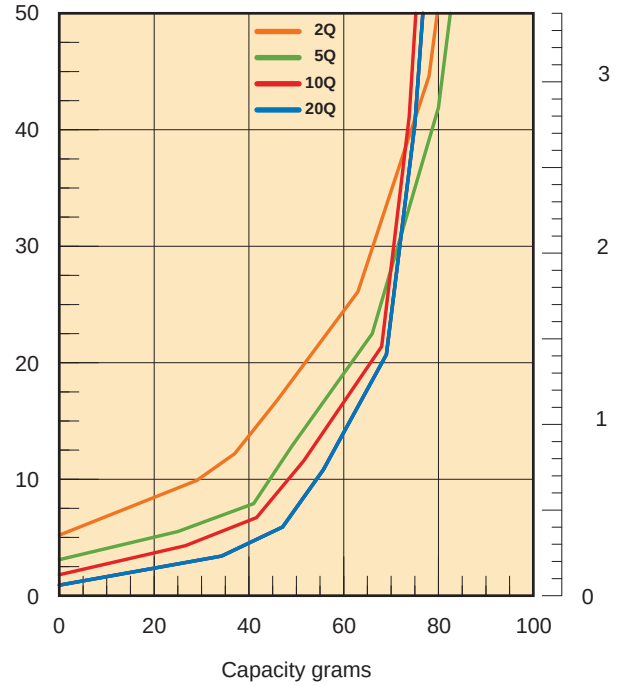
50CS Series

Performance

Efficiency

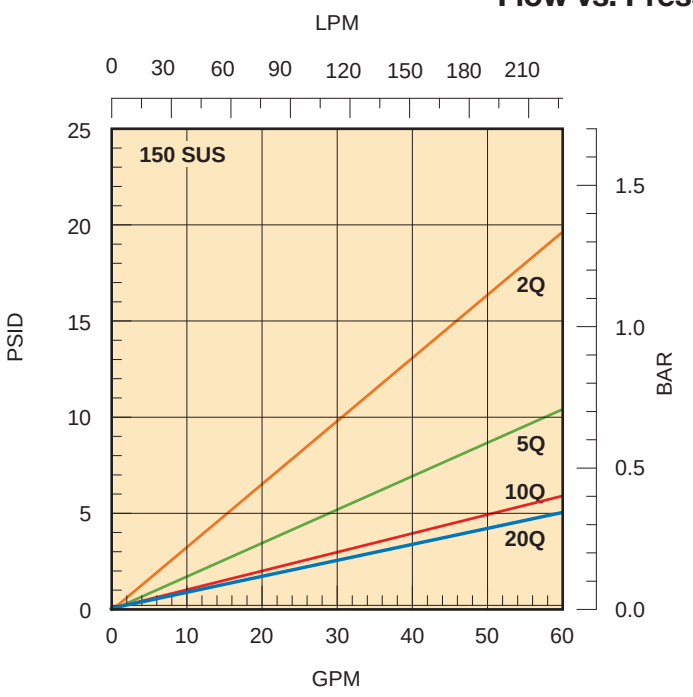


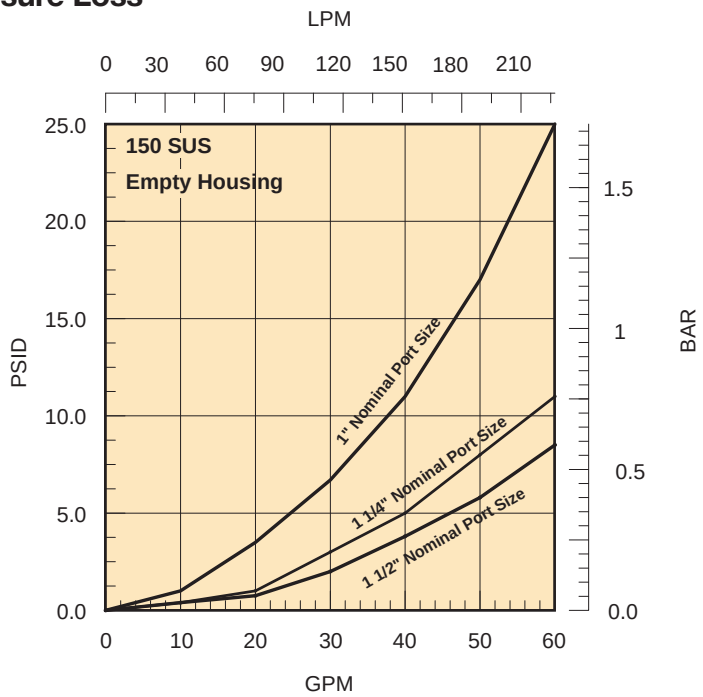
Capacity



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 on pages 264-265 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: -40ºF to 225ºF (-40ºC to 107ºC)

Fluorocarbon: -15ºF to 225ºF (-26ºC to 107ºC)

Element Collapse Rating:

150 psid (10.3 bar)

Weights (approximate):

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

Materials:

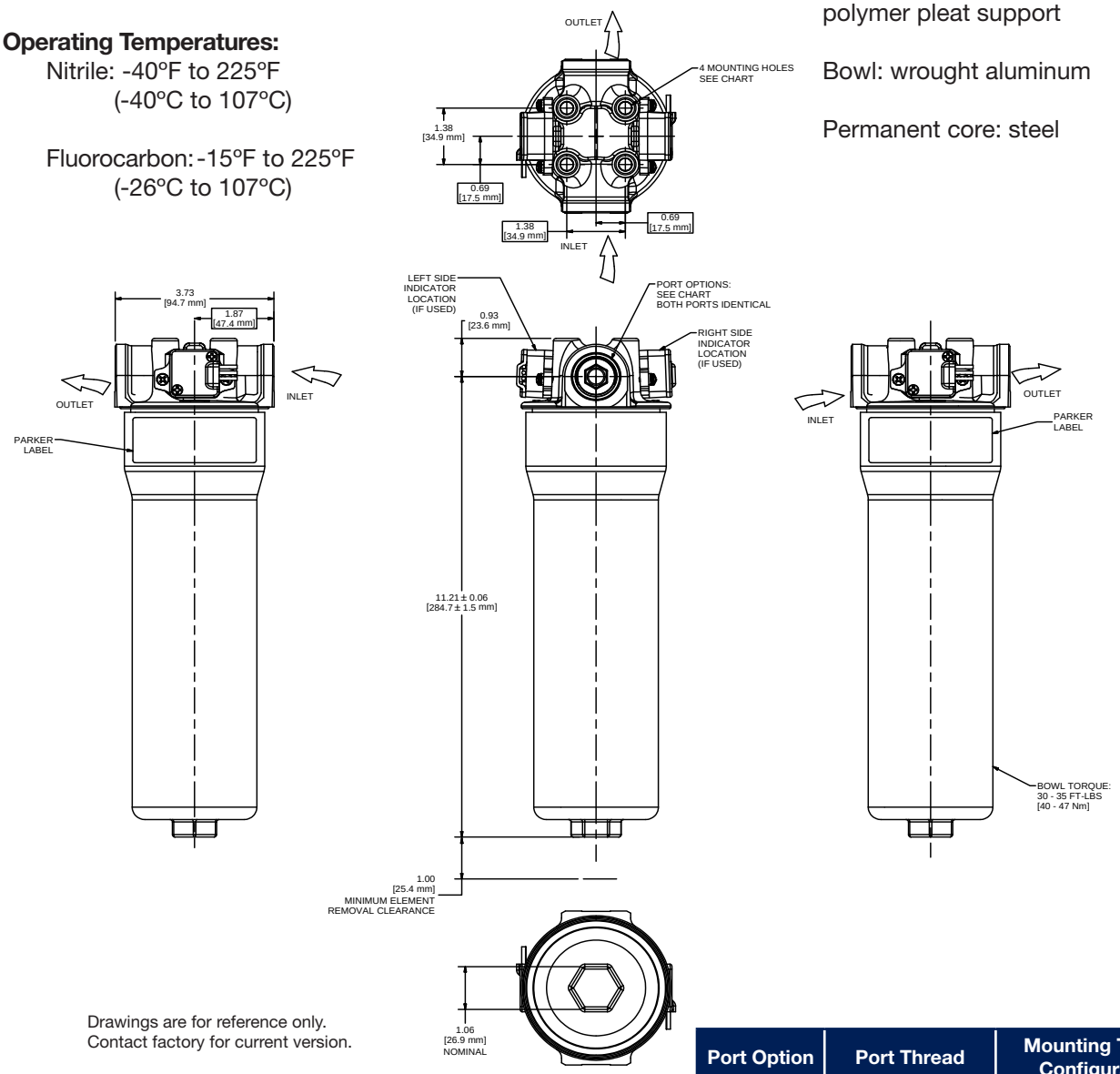
Head: cast aluminum

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: -40ºF to 225ºF (-40ºC to 107ºC)

Fluorocarbon: -15ºF to 225ºF (-26ºC to 107ºC)

Element Collapse Rating:

150 psid (10.3 bar)

Weights (approximate):

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

Materials:

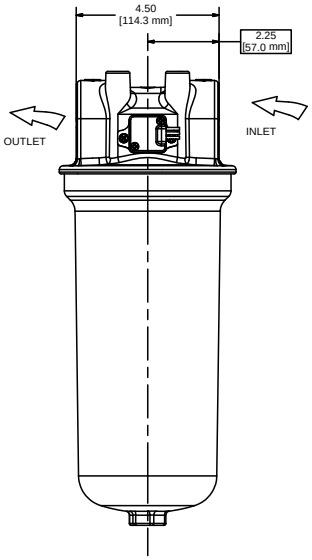
Head: cast aluminum

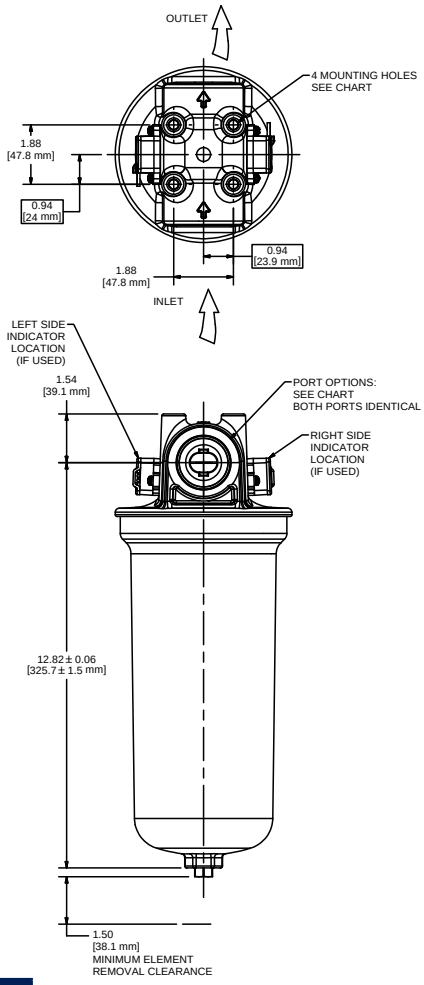
Bypass valve: nylon with steel spring

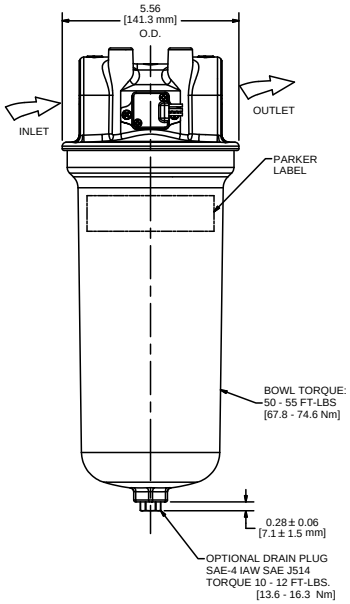
Filter element: reinforced polymer end caps, microglass media, and polymer pleat support

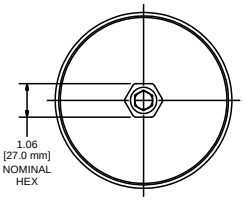
Bowl: cast aluminum

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

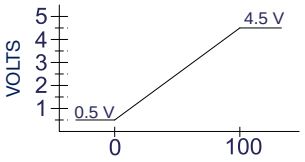
1. **Electrical Switch**
   - Connector: 12” wire leads, 18 Gauge
   - Yellow (NC), black (NO), Red (C)
   - Maximum switching voltage: 30V (DC/AC)
   - Maximum switching current 0.2A
   - Maximum carry current: 0.5A
   - Approvals: CE, IP68

2. **Analog Sensor**
   - Supply voltage: 4.5 to 5.5 VDC
   - Main 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)

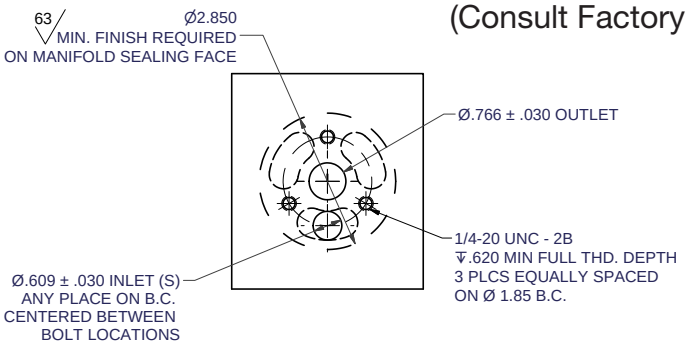
Electrical Switch
or Analog Sensor

Visual Indicator

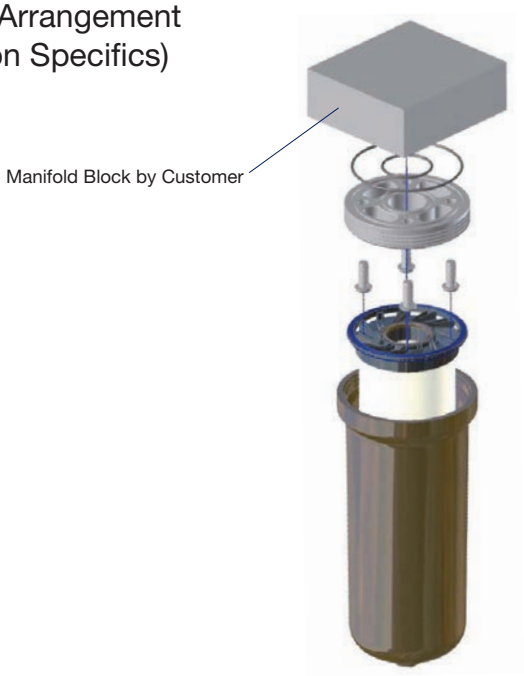


ELEMENT LOAD CONDITION
(% LOADED)

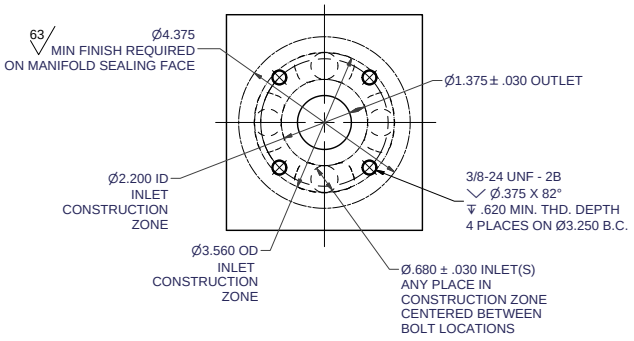
Suggested Manifold Mounting Arrangement
(Consult Factory for Application Specifics)



12CS Adaptor Mounting Arrangement



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



50CS Adaptor Mounting Arrangement

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.

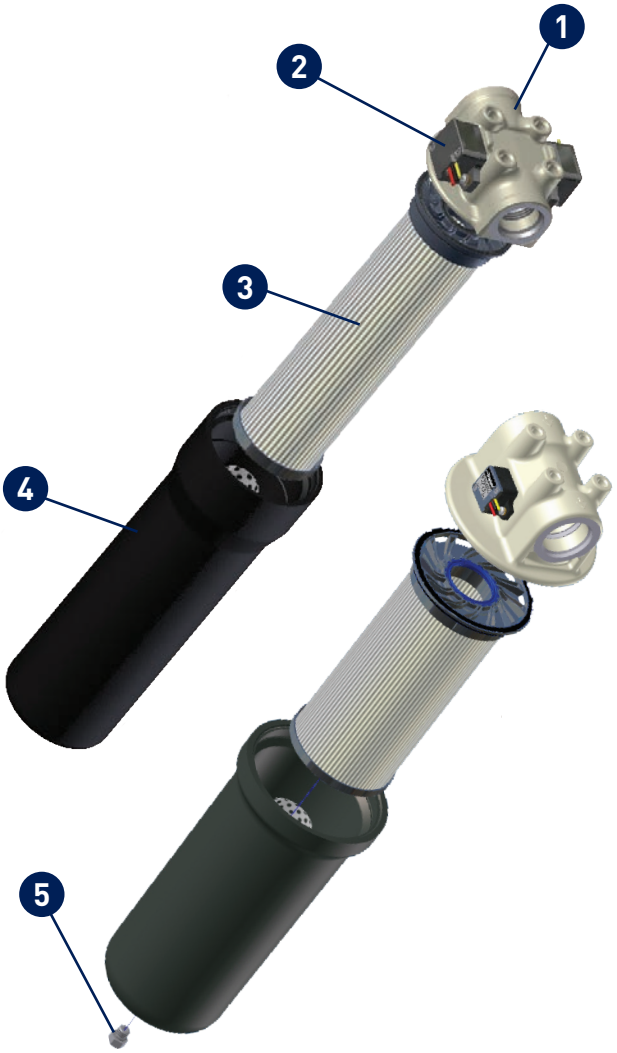
12CS/50CS Series

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 counter clockwise.
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 reuseable bowl onto element and filter head. Tighten to specified torque.



Parts List

Index	Description	12CS	50CS
1	**Head Assembly** (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
2	**Indicator**		
	Electrical	941814	941814
	Analog	941802	941802
	Mounting Screws	941944	941944
3	**Element** (see chart on next page)		
4	**Bowl Assembly**		
	Single - no drain	N/A	942011
	Single - w/ drain	N/A	942012
	Double - no drain	942220	N/A
5	**Drain Plug SAE-4**		
	Nitrile	N/A	921088
	Fluorocarbon	N/A	928882
6	**Bypass (not shown)**		
	50 psid	928981	933424
7	**Manifold Adaptor Kit** (see drawing on previous page)		
	O-Ring (I.D.)	V92020	V72135
	O-Ring (O.D.)	V92038	V72155
	Manifold Adaptor	941811	941986
	Mounting Screws	975689	942174
	Element	see chart on page 85	
	Bowl Assembly	see #4 above	

12CS/50CS Series

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	**20 GPM nominal**
50CS	**40 GPM nominal**

BOX 2: Element Length

Symbol	Description
1	**Single (50CS only)**
2	**Double (12CS only)**

BOX 3: Media Code

Symbol	Description
02QE	Ecoglass, 2 micron
05QE	Ecoglass, 5 micron
10QE	Ecoglass, 10 micron
20QE	Ecoglass, 20 micron

BOX 4: Seals

Symbol	Description
B	**Nitrile**
V	Fluorocarbon

BOX 5: Indicator

Symbol	Description
N	**None**
ML	**Visual w/ push to test, left**
M[1]	Visual w/ push to test, right
EL	**Electrical w/12" flying leads, left**
E[1]	Electrical w/12" flying leads, right
AL	**Analog w/12" flying leads, left**
A[1]	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
	12CS
S12	**SAE-12 integral threads**
N12	3/4" NPT integral threads
G12	G 3/4" BSPP (ISO 228)
	50CS
S16	SAE-16 integral threads
N16	3/4" NPT integral threads
S20	**SAE-20 integral threads**
N20	1-1/4" NPT integral threads
G20	G 1-1/4" BSPP (ISO 228)
S24	SAE-24 integral threads
N24	1-1/2" NPT integral threads

BOX 8: Options

Symbol	Description
1	**None**
4	Drain port on bowl (50CS only)

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements (Ecoglass)

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

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**

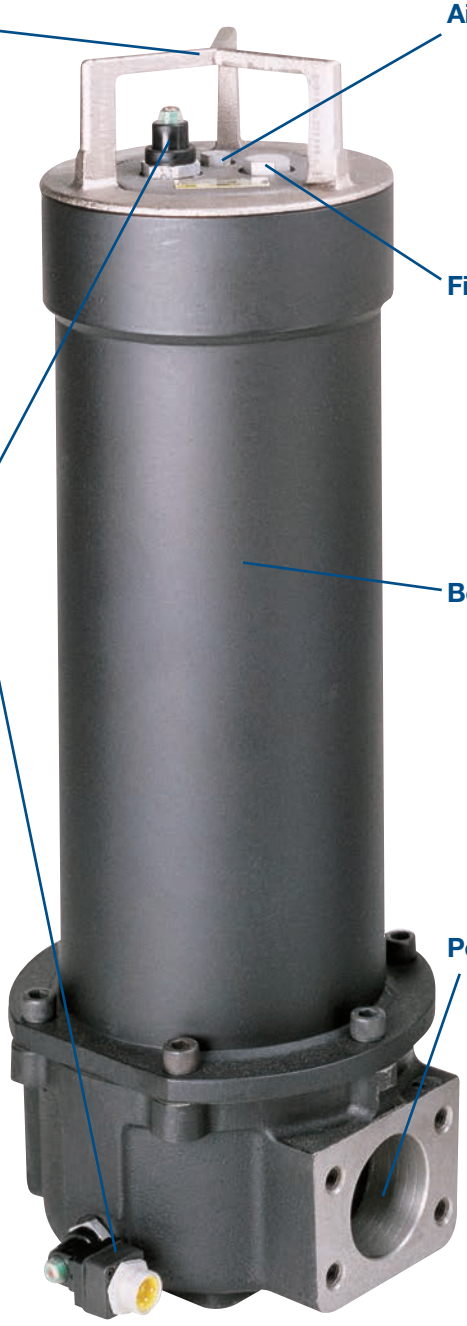
IL8 series filters are excellent choices for your demanding applications whether you require simplex, duplex or quadplex assemblies.

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 annodized 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

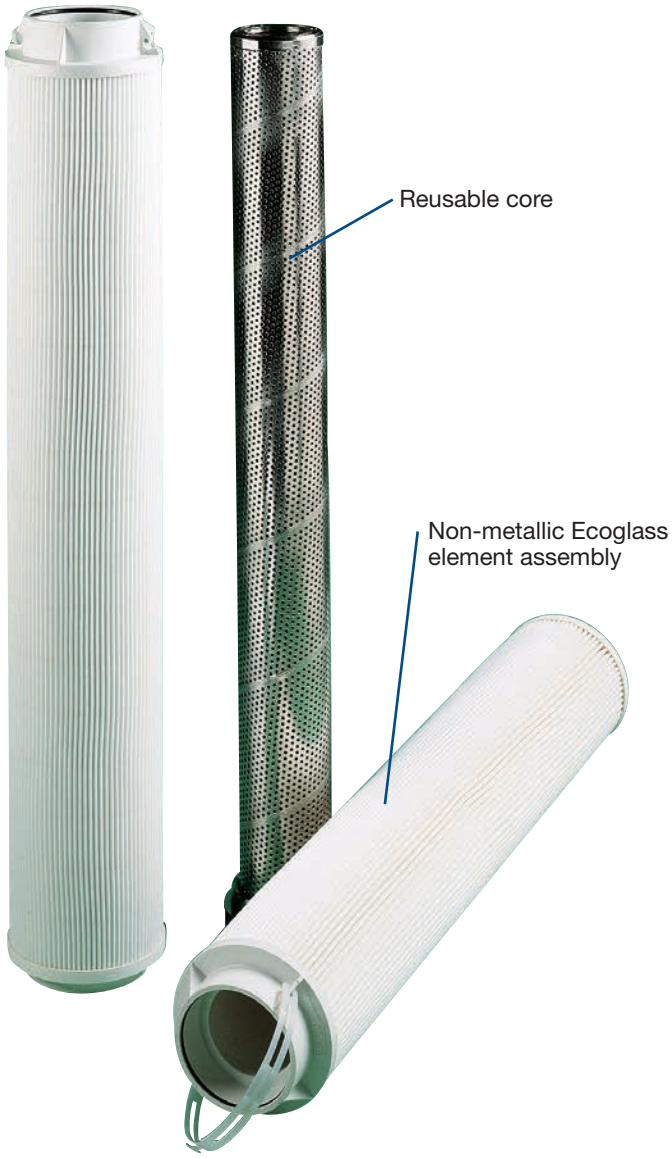
Element Features

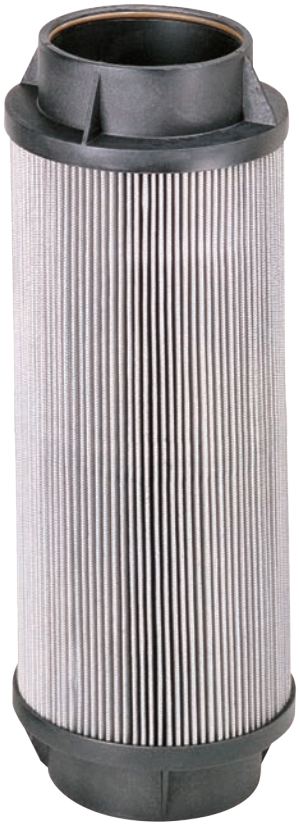
Ecoglass Replacement Elements

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.





Microglass Replacement Elements

Tha latest in Microglass technology represents a leap forward in the performance obtainable in hydraulic and lube filter elements.

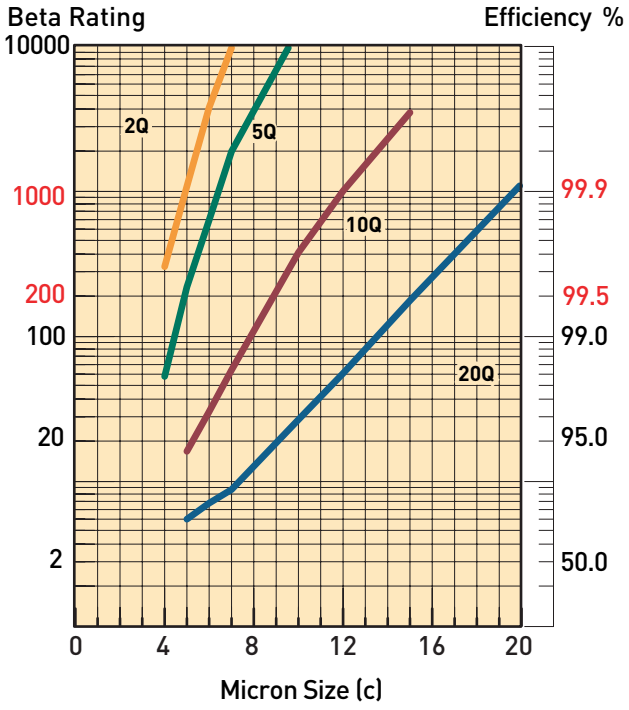
The unique multi-layer design combines high efficiencies with exceptional dirt holding capacities for performance that is unequalled in the industry today. This performance is further enhanced in the IL8 series with the introduction of the deep pleat design. The deep pleat element design increases the amount of media in the element and therefore capacity.

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

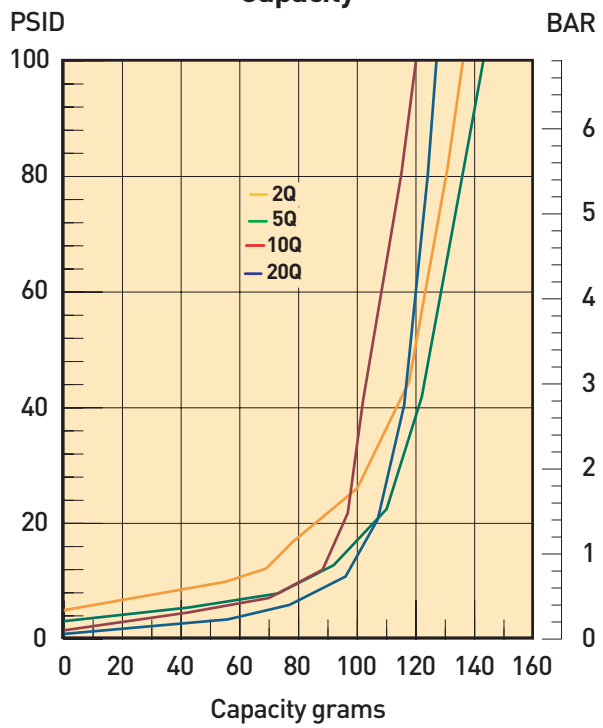
IL8 Series

IL8-1 Element Performance

Efficiency

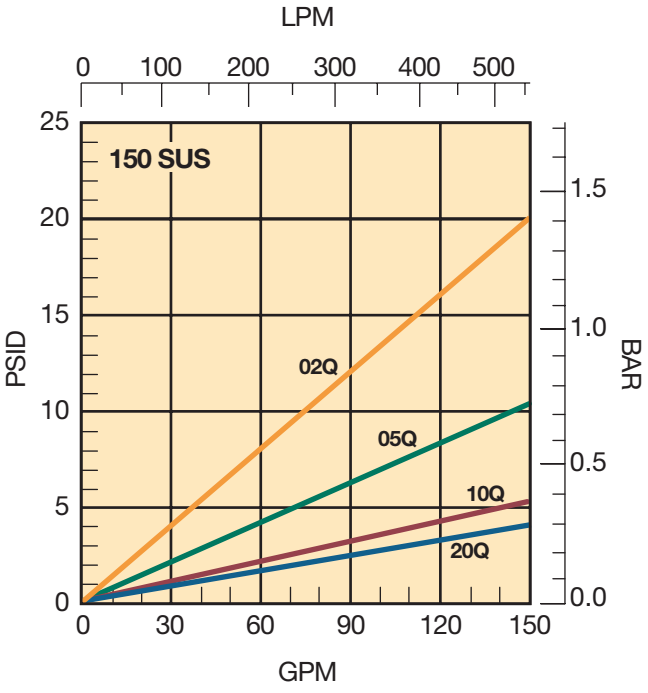


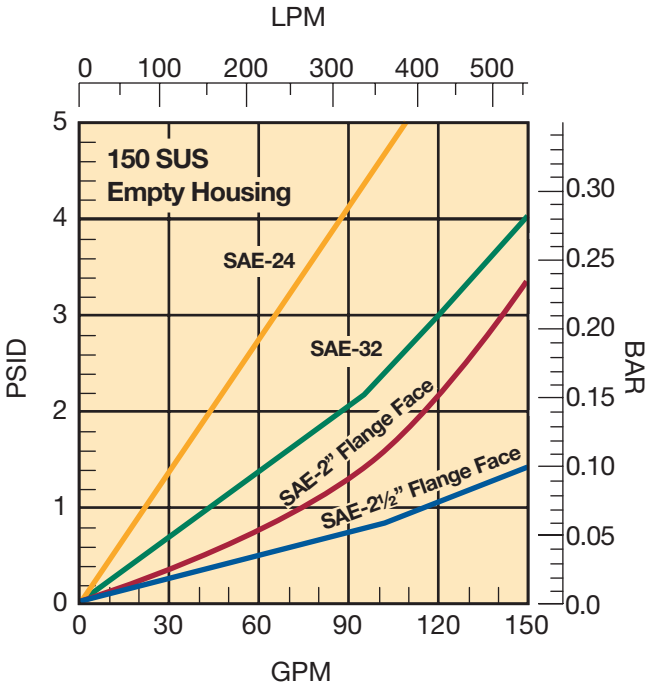
Capacity



Results typical from Multi-pass tests run per test standard ISO 16889 @ 40 gpm to 60 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

Flow vs. Pressure Loss

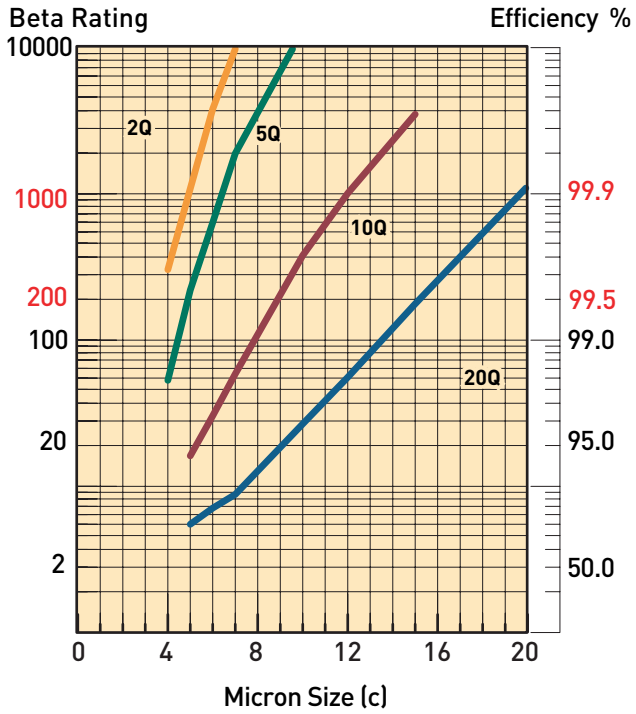




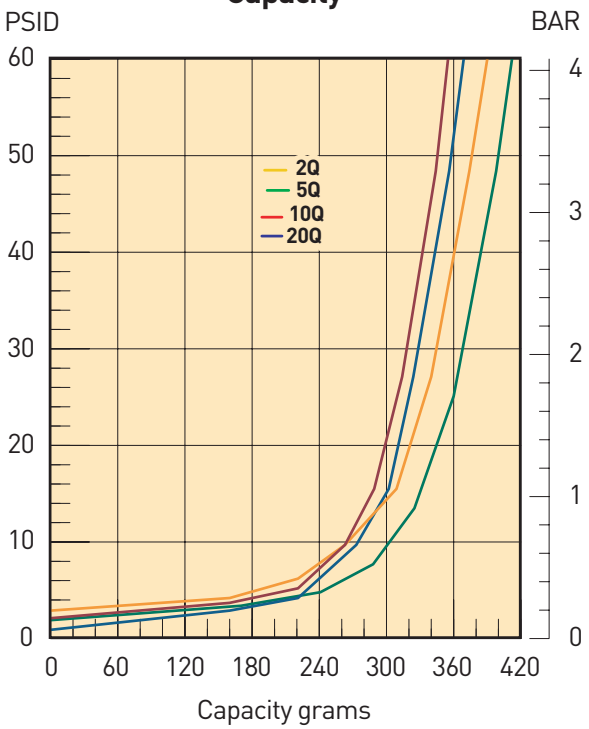
IL8 Series

IL8-2 Element Performance

Efficiency

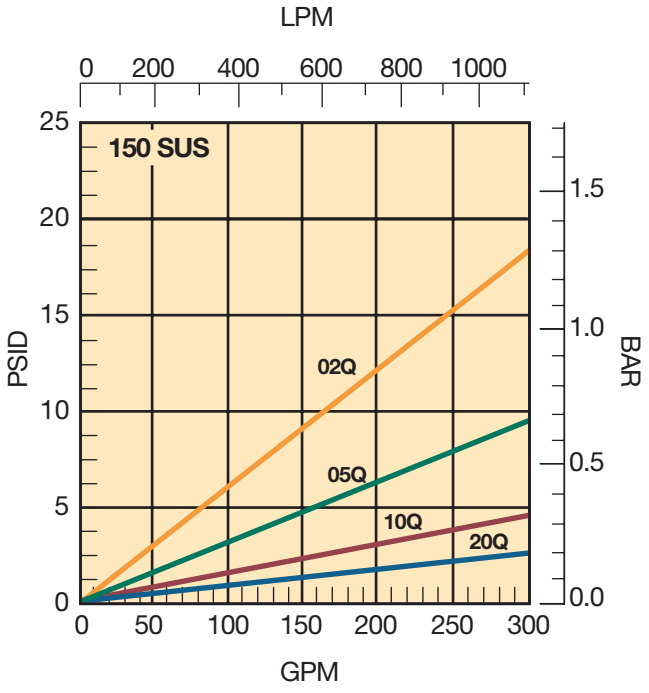


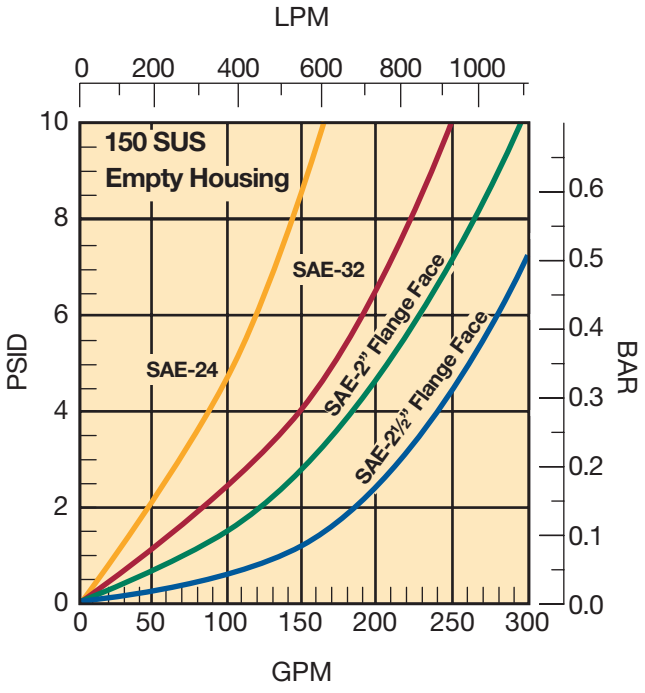
Capacity



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 on pages 264-265 for relationship to test standard ISO 4572.

Flow vs. Pressure Loss

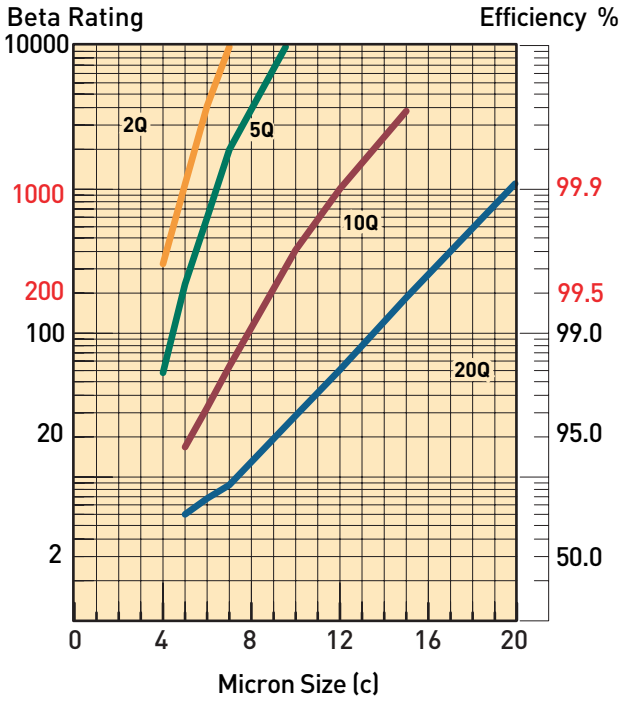




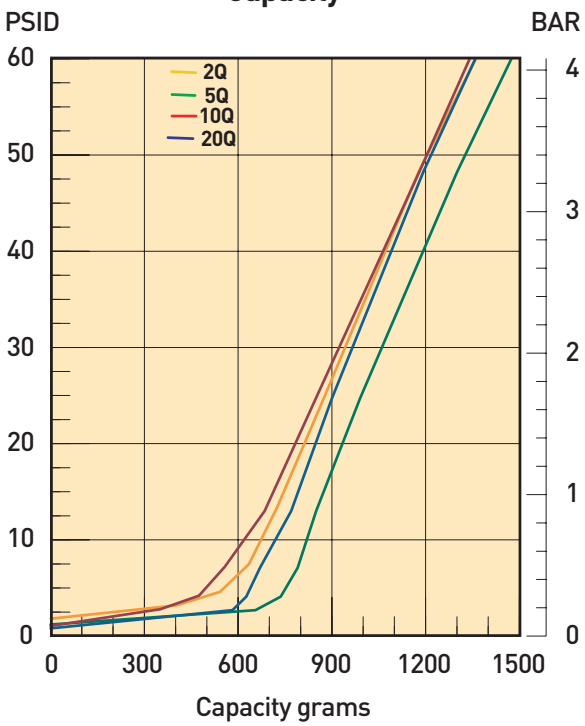
IL8 Series

IL8-3 Element Performance

Efficiency

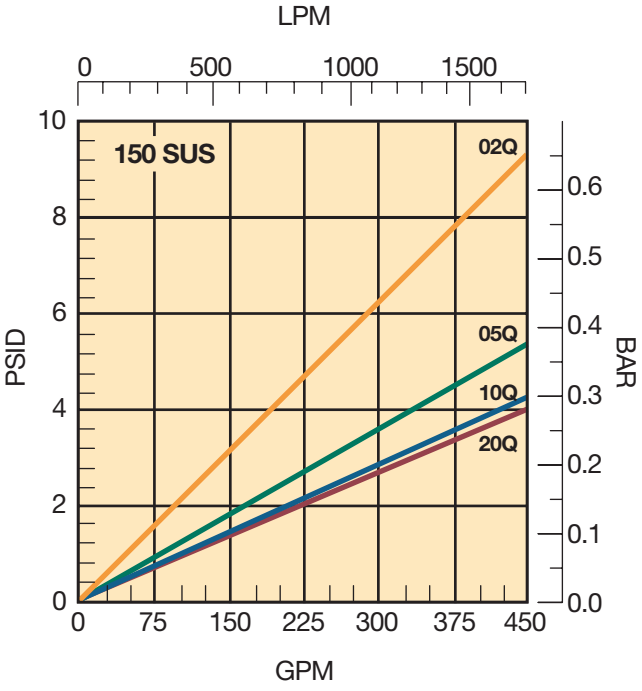


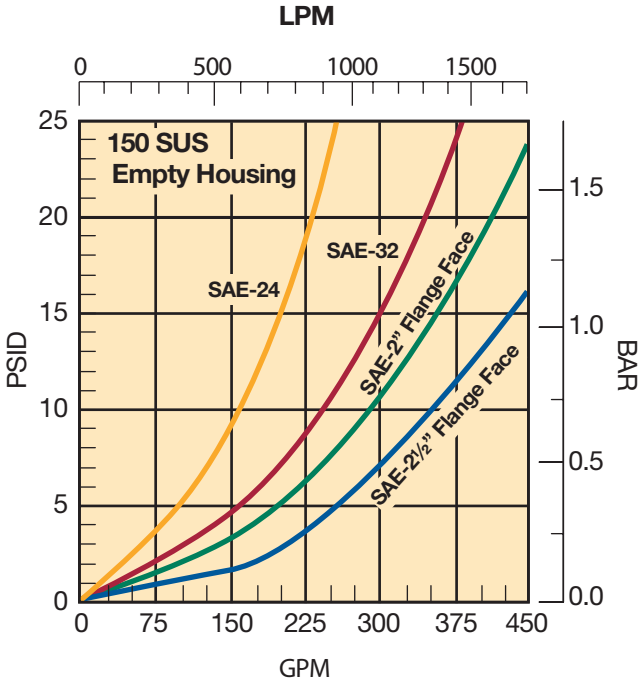
Capacity



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 on pages 264-265 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)

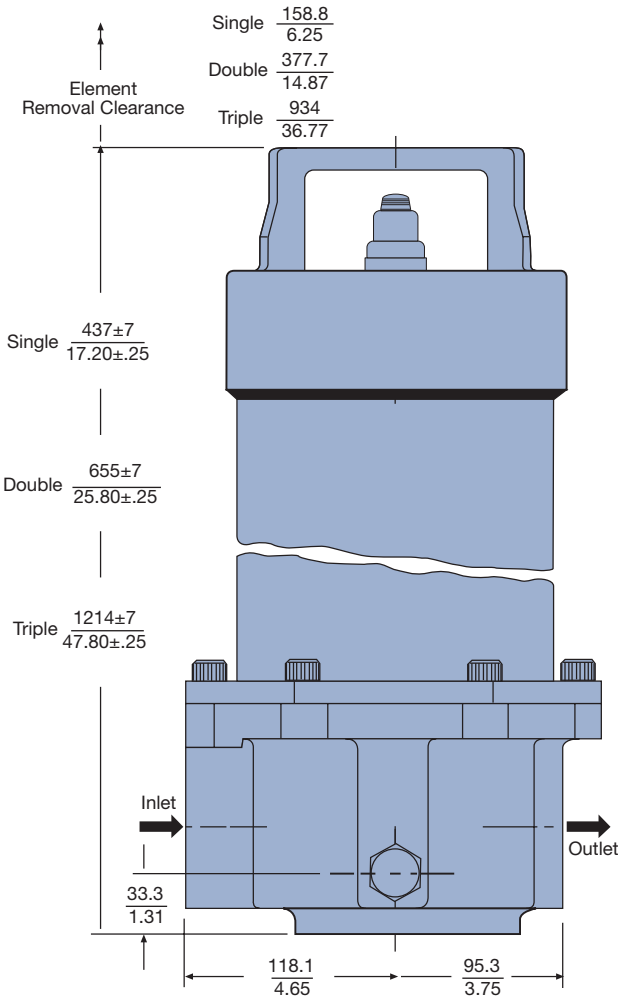
Element Collapse Rating:
150 psid (10.3 bar)

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)

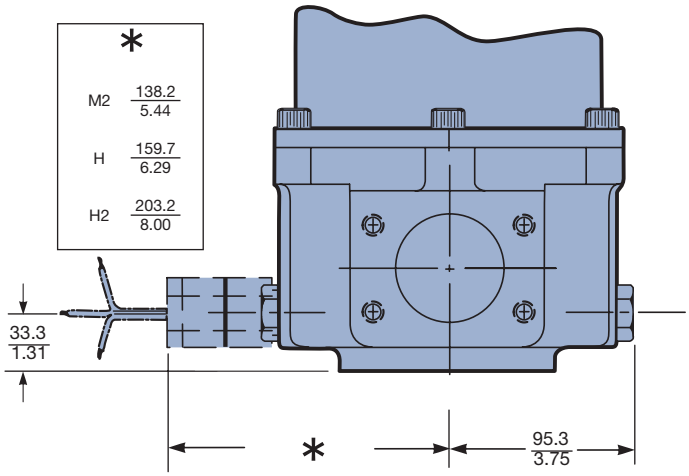
Materials:
Bowl: low carbon steel
Cover: anodized aluminum
Handle: nickel plated ductile iron
Base: anodized aluminum

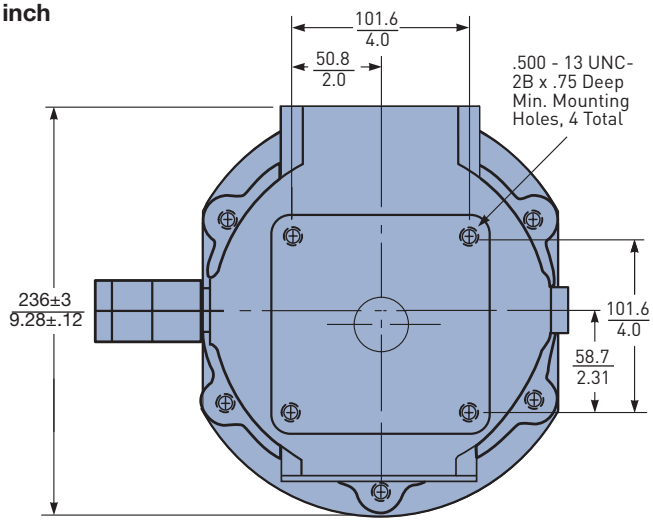
Shipping Weights (approximate):
Single: 40 lbs. (18.1 kg)
Double: 50 lbs. (22.7 kg)
Triple: 75 lbs. (34 kg)



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

Linear Measure: millimeter / inch





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

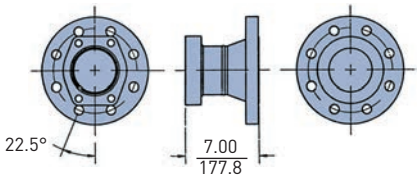
Element Condition Indicators:
Visual (optional)
Electrical-heavy duty (optional)
SPDT .25 amps (resistive) MAX 5 watts
12 to 28 VDC & 110 to 175 VAC
Note: Product of switching voltage and current must not exceed wattage rating

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)

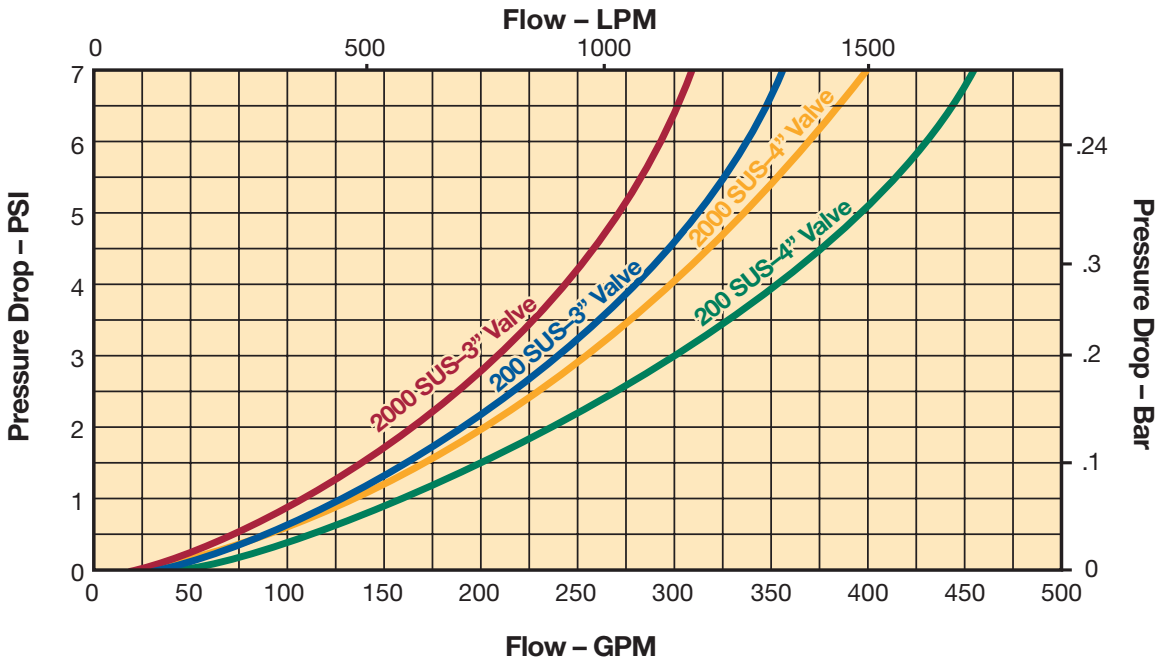
ANSI Flange Adapter

End, Side View



Linear Measure: millimeter / inch

Changeover Valve Flow vs. Pressure Loss

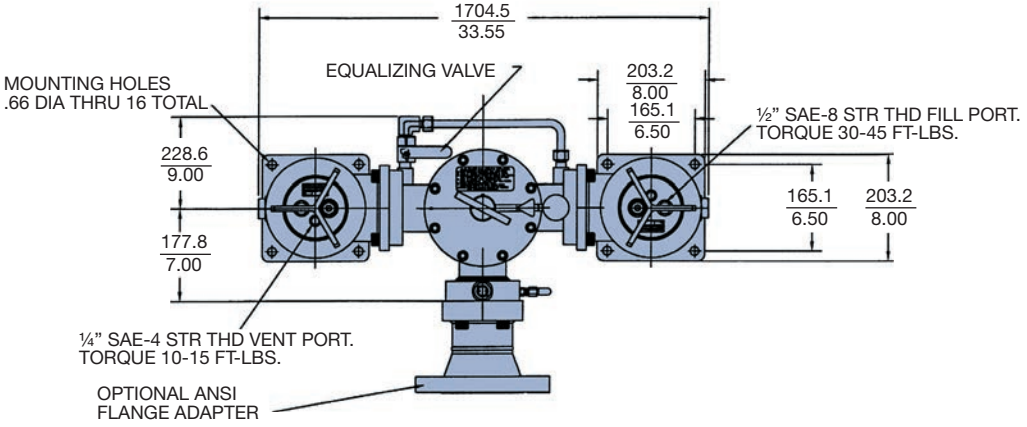


IL8 Series

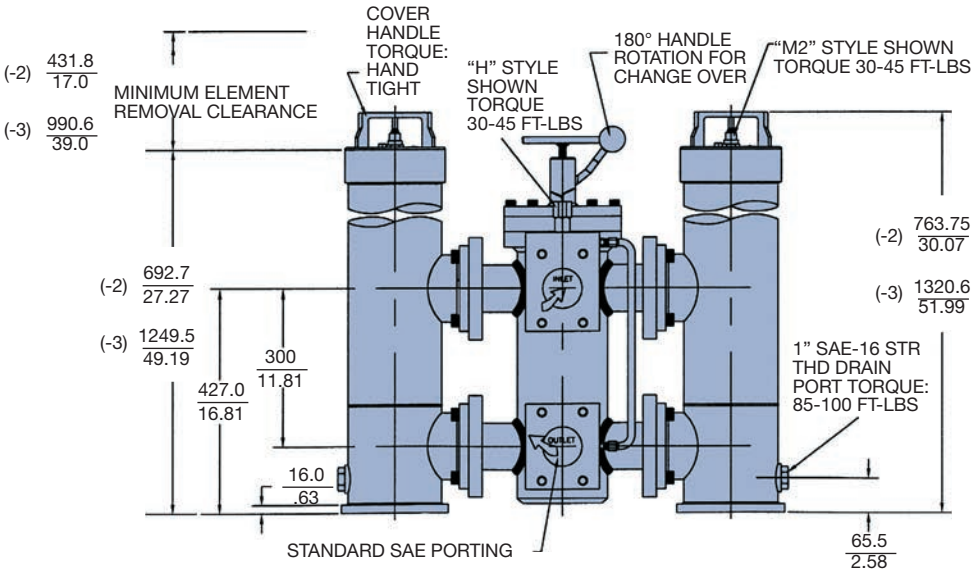
Specifications: HDIL8/HQIL8

Linear Measure: millimeter / inch

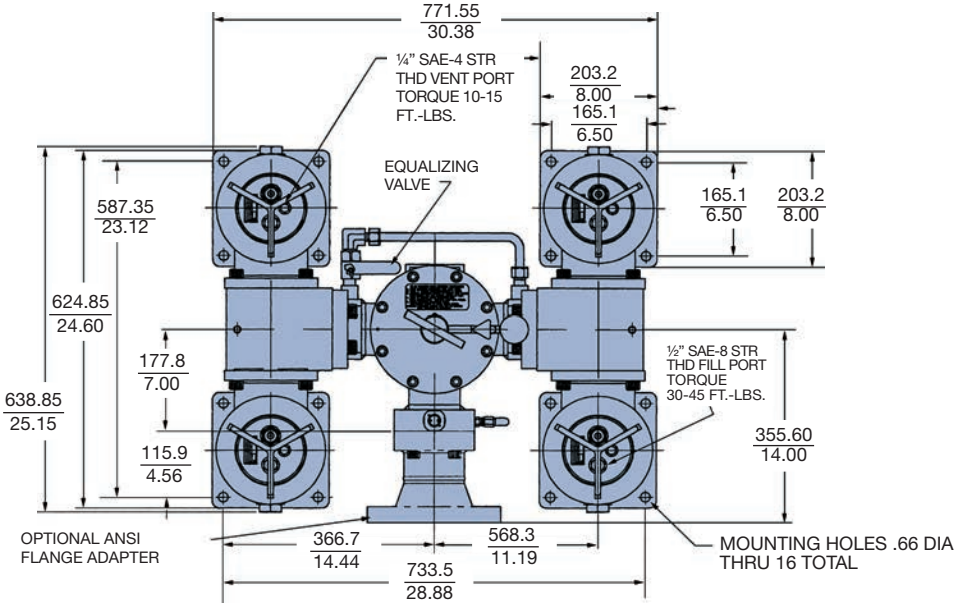
HDIL8
Top View



HDIL8/HQIL8
Side View



HQIL8
Top View



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

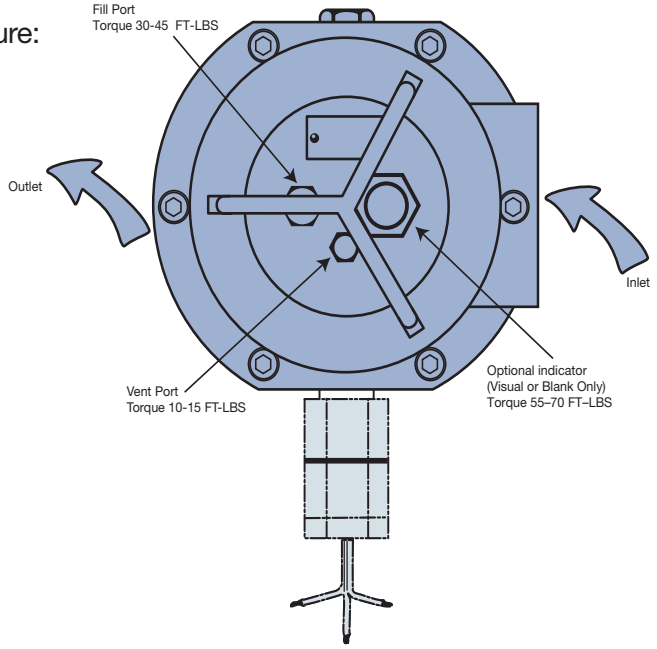
IL8 Series

Element Servicing Instructions: IL8

When servicing the IL8 filter, use the following procedure:

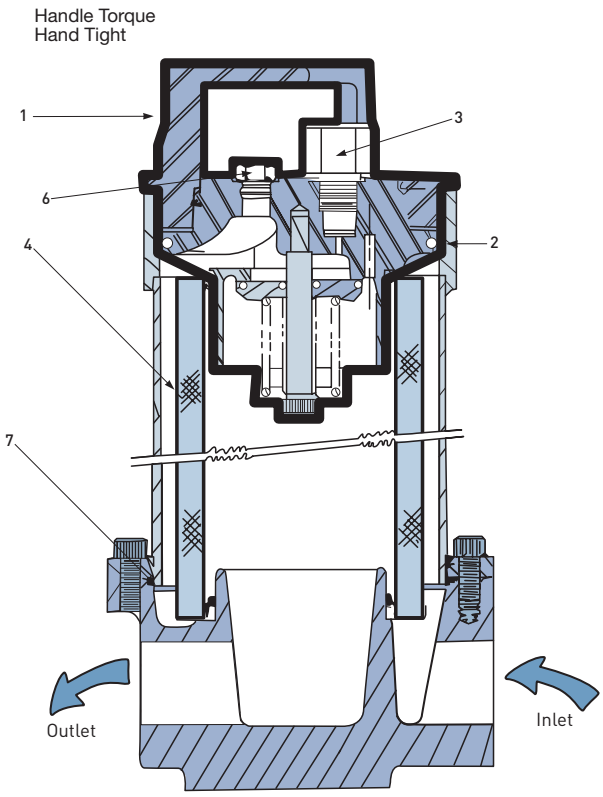
1. Stop the system's power unit.
2. Relieve pressure in the filter line. Drain fluid from housing if desired.
3. Rotate cover handle counter-clock wise. Carefully lift and remove the cover.
4. Remove element from the housing. Discard all disposable elements as they are not cleanable. With Ecoglass elements 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.

Top View



Parts List

Index	Description	Nitrile P/N	Fluorocarbon P/N
1	**Cover Assembly**		
	25 psi bypass w/indicator port	928887	928888
	50 psi bypass w/indicator port	928889	928890
	No bypass w/indicator port	928891	928892
2	**Cover o-ring**	N72257	V72257
3	**Indicators**		
	P option-indicator port plug	N/A	925515
	M 225 PSI	N/A	932026
	M 250 PSI	N/A	932027
	H25 PSI	N/A	933053
	H50 PSI	N/A	932905
	H 225 PSI	N/A	933141
	H 250 PSI	N/A	933142
	H 325 PSI	N/A	934164
	H 350 PSI	N/A	934165
4	**Elements** (See chart on model code page)		
not shown	**Bleed (vent) Plug,** SAE 4	931357	931358
6	**Fill Plug**, SAE 8	908822	928628
not shown	**Drain Port Plug**, SAE 10	925513	928883
7	**Base O-ring**	N72262	V72262
	Flange Kits (optional)		
	1 ½" 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
	2½" socket weld (w/2½" flange face only)	929313	929346
	SAE-32 (w/2½" flange face only)	929314	929347
	2½ NPTF (w/2½" flange face only)	929315	929348
NOTE:	The 2½" Flange Face Kits include the minimum width SAE J518 Code 61 Flanges.		



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

IL8 Series

Element Servicing Instructions: HDIL8/HQIL8

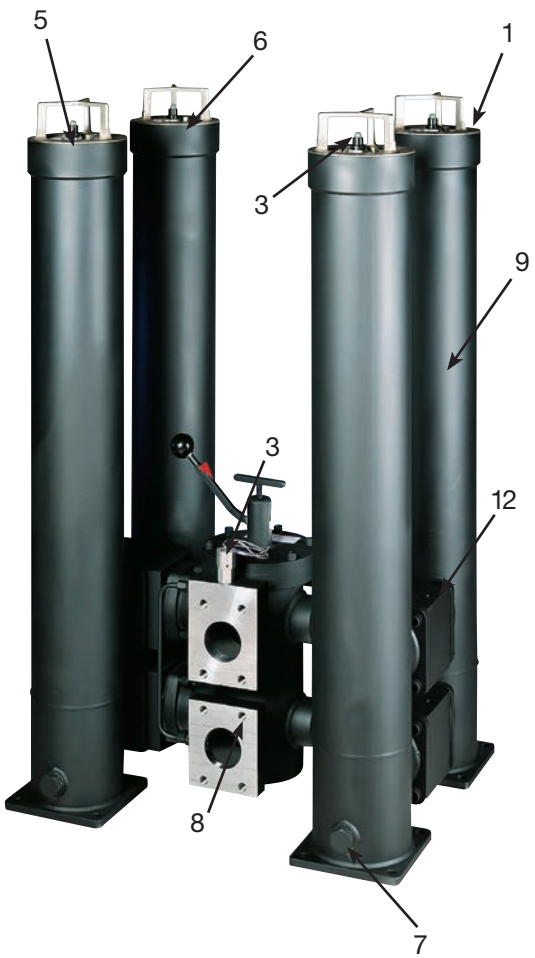
The system does not need to be shut down to service the elements.

1. Red arrow on operating handle points to on-duty chamber(s).
2. Open off-duty vent plug(s). Do not thread out completely.
3. Open the pressure equalizing (fill line) valve slowly to admit fluid to the off-duty chamber(s).
4. When fluid is discharged from the off-duty vent plug(s), close and tighten.
5. Turn the “T” handle, on the center valve section, counter-clockwise 5 turns.
6. Depress the operating handle to unseat the seal shoes, then rotate 180° and return handle upward into the opposite slot.
7. Turn the “T” handle fully clockwise and hand tighten only. This will seat the shoes.
8. Close the pressure equalizing valve.
9. Red arrow now points to the new on-duty chamber(s).
10. Open the new off-duty vent plug(s).
11. Remove the new off-duty chamber cover(s) by rotating counter-clockwise.
12. Remove the new off-duty drain plugs and drain chambers to desired level.
13. Follow steps 3 - 7 on opposite page.
14. 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	**Cover Assembly** 25psi bypass w/indicator port 50psi bypass w/indicator port No bypass w/indicator port	 928887 928889 928891	 928888 928890 928892	 928887 928889 928891	 928888 928890 928892
2	**Cover O-ring**	N72257	V72257	N72257	V72257
3	**Indicators** P option-indicator port plug M2 25psi M2 50psi H 25psi H 50psi H2 25psi H2 50psi H3 25psi H3 50psi	 N/A N/A N/A N/A N/A N/A N/A N/A N/A	 925515 932026 932027 933053 932905 933141 933142 934164 934165	 N/A N/A N/A N/A N/A N/A N/A N/A N/A	 925515 932026 932027 933053 932905 933141 933142 934164 934165
4	**Elements** (see chart on model code page)				
5	**Bleed (vent) Plug**, SAE-4	931357	931358	931357	931358
6	**Fill Plug**, SAE-8	908822	928628	908822	928628
7	Drain Plug SAE-16	925353	928364	925353	928364
8	**Transfer Valve** SAE 4” SAE 3”	 933824 933825	 936123 936122	 933824 933825	 936123 936122
9	**Housing Assembly** 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	**Adapter Block Kit** (block, 3 o-rings, 12 bolts)	N/A	N/A	N/A	933833
13	**Flange Adapter Kit** (flange, o-ring, 4 bolts) 3” SAE 300 lb. flange 4” SAE 300 lb. flange	Consult factory		Consult factory	
14	**Seal Kit Transfer Valve**	Consult factory		Consult factory	
15	**Seal Kit Housing Assembly**	Consult factory		Consult factory	
16	**Equalizing Valve**	Consult factory		Consult factory	



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
	HDIL8	2	R	20QE	HM2	25	QQ	1

BOX 1: Seals	
Symbols	**Description**
None	**Nitrile**
F3	Fluorocarbon

BOX 2: Filter Series	
Symbols	**Description**
IL8	**In-Line**
HDIL8	Duplex
HQIL8	Quadplex

BOX 3: 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**
P	**Port Plugged**
M2	**Visual auto reset**
H	Electrical w/ conduit connection
H2	Electrical w/ DIN 43650 connection

Note: Two symbols required, first is for housing, the second is for the cover(s). Electrical indicators only available on the housing.

BOX 7: Bypass	
Symbols	**Description**
25	**25psid**
50	50 psid
XX	No indicator and blocked bypass

BOX 8: Ports	
Symbols	**Description**
	IL8
PP	SAE-24 straight thread
RR	SAE-32 straight thread
YY	SAE 2” flange face
ZZ*	SAE 2-1/2” flange face
	HDIL8/HQIL8
WW	3” SAE flange face (code 61)
QQ	4” SAE flange face (code 61)

Note: IL8 outlet port requires minimum width SAE J518 code 61 flange.

BOX 8: Options	
Symbols	**Description**
1	**None**
11	Blocked bypass

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

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

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.

Ecoglass Replacement Elements

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.

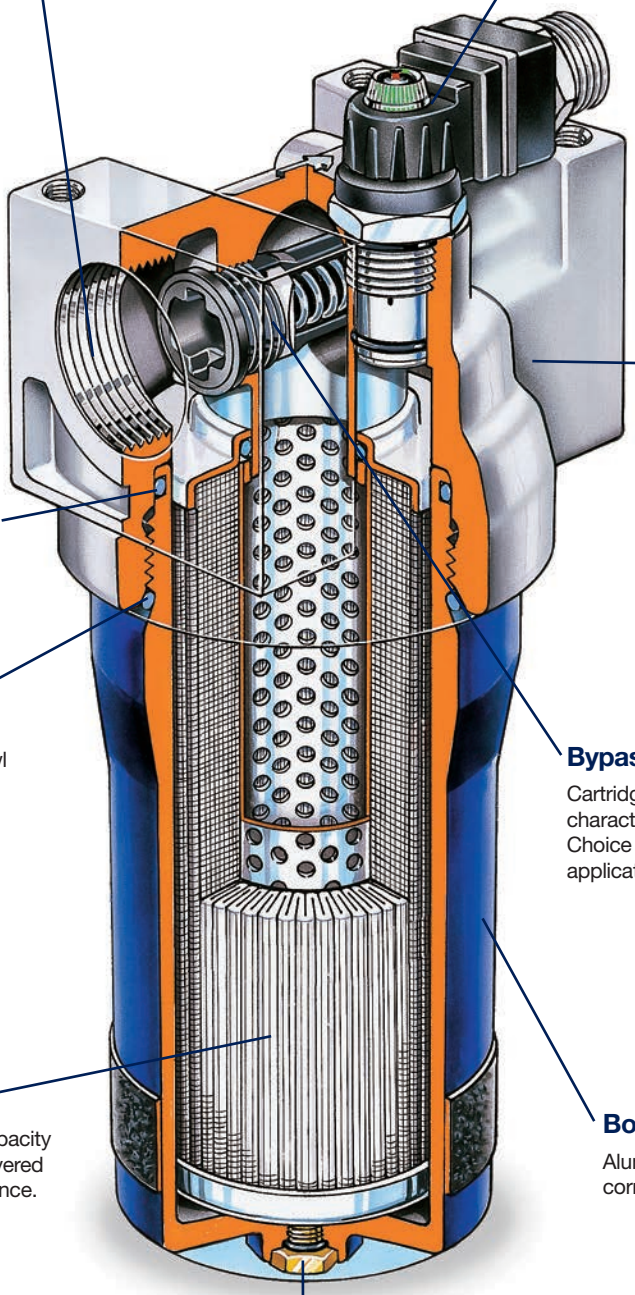
Ecoglass elements utilize the same proprietary media design as our Microglass line of replacement elements.

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

Feature	Advantage	Benefit
800 psi fatigue rating (eight times that of a spin-on)	• Ability to provide reliable service under tough cyclic operating conditions • Can be utilized in applications where high pressure filters may may been the only option	• Reduced downtime due to premature filter failures • Reduce costs, better “fit” for the application
Diametral (side) seal between head and bowl	• Proven reliability in cyclic applications • Reduced importance of bowl torque	• No downtime, no leaks • Performs with “real world” service
Dust seal	• Prevents contamication from building up on bowl / head threads	• Easier service, no galling
Cast aluminum head	• Low profile, lightweight and durable	• Less weight, smaller envelope and cleaner appearance
Standard Ecoglass elements	• Multi-layered design produced high capacity and efficiency • Reduces pleat bunching, keeps performance consistent	• Great performance value • Reliable performance throughout element life • Reduces downtime, maximizes element life
Complete performance data disclosure	• All pertinent information is provided in an easy-to-compare format	• No hidden deficiencies • Easy selection of proper filtration
Visual, electrical or electrical/visual indicators available	• Check element condition at a glance • Right style for the application	• Optimize element life, prevent bypassing • Matches your system electrical connections

15/40/80CN Series

Features



Element Condition Indicators

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

Ports

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

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.

Element Assembly

High efficiency (B_x>200), high capacity Ecoglass media with it's multi-layered design is unequalled in performance.

Bowl

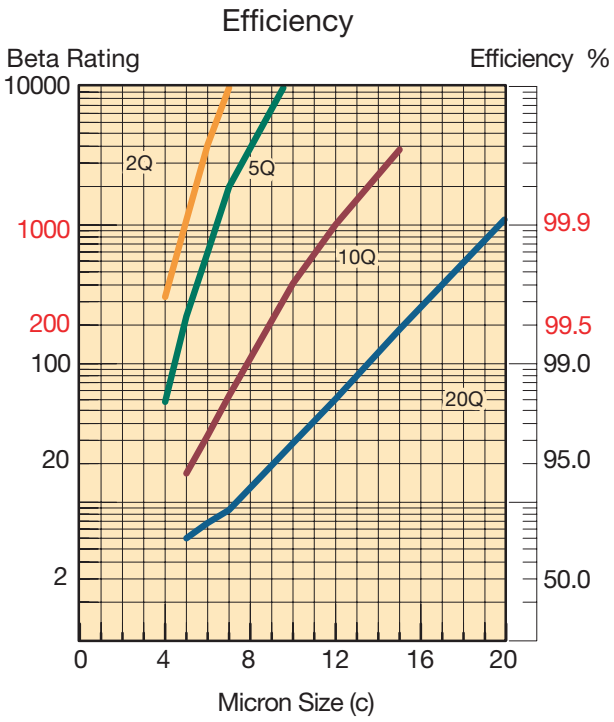
Aluminum is lightweight and corrosion resistant.

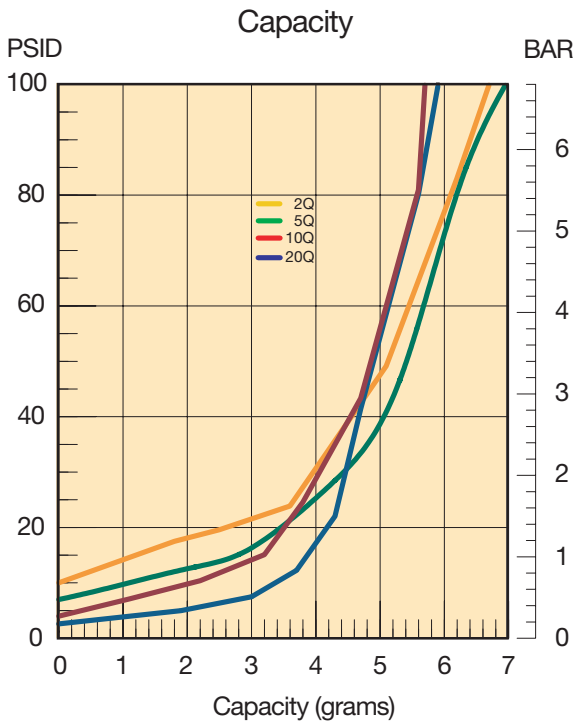
Drain Port (optional)

Optional drain port allows for easy element servicing.

15CN Series

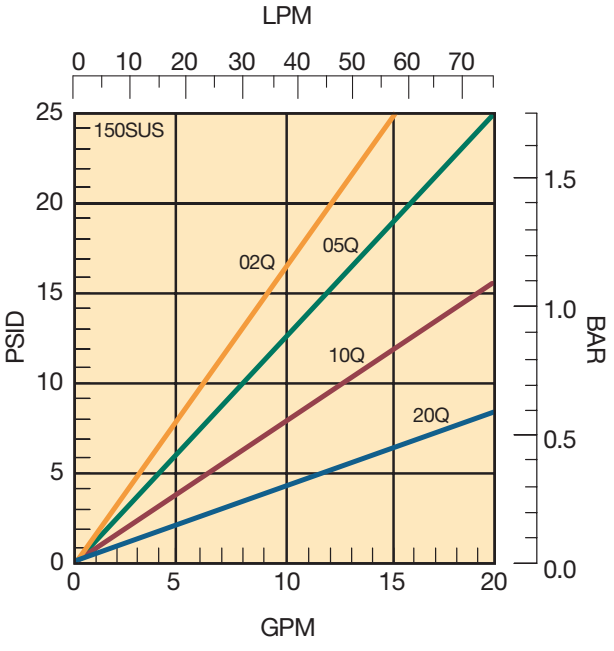
15CN-1 Element Performance

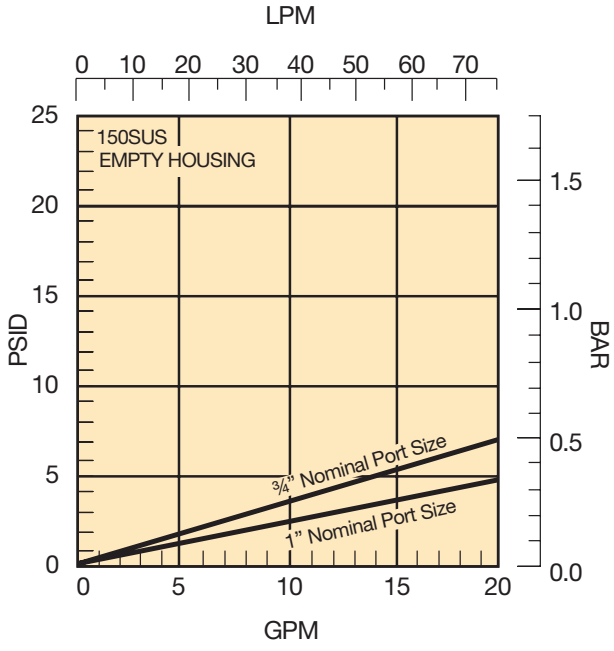




Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

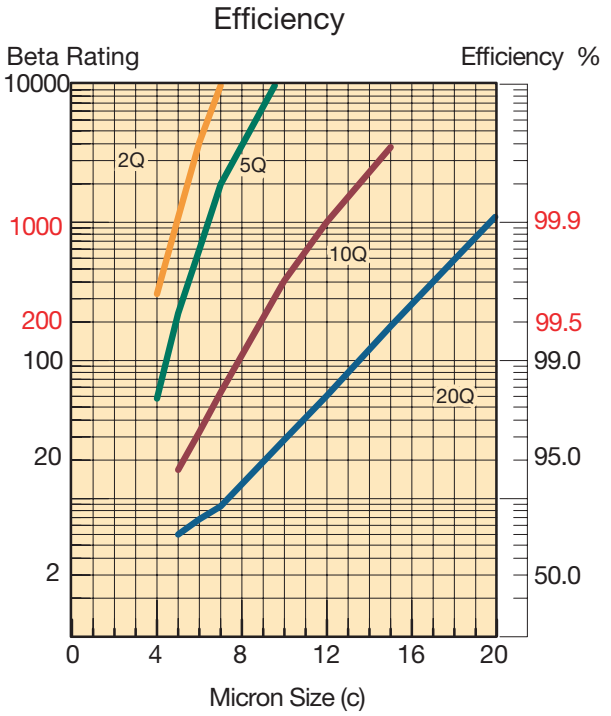
Flow vs. Pressure Loss

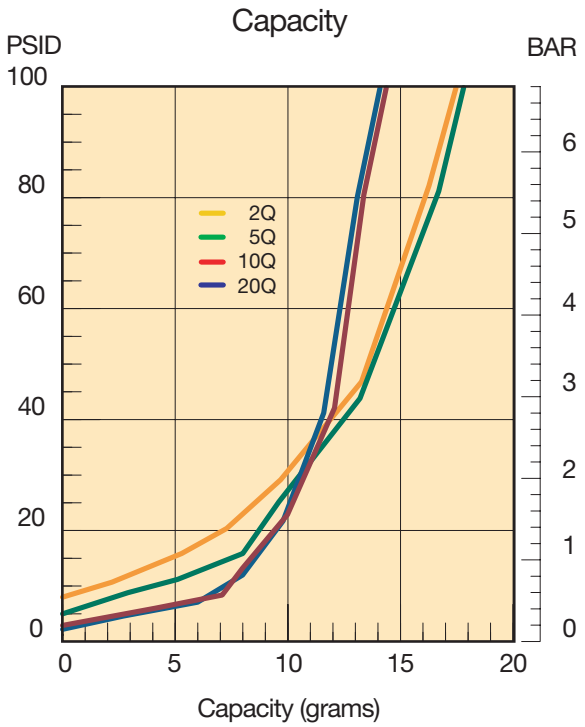




15CN Series

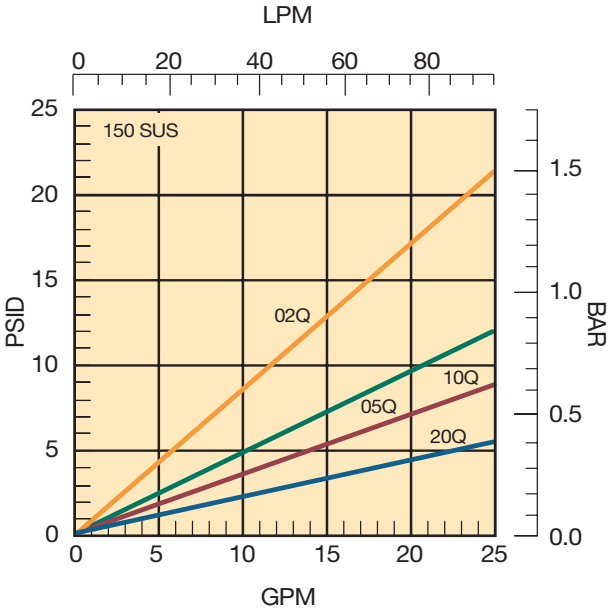
15CN-2 Element Performance

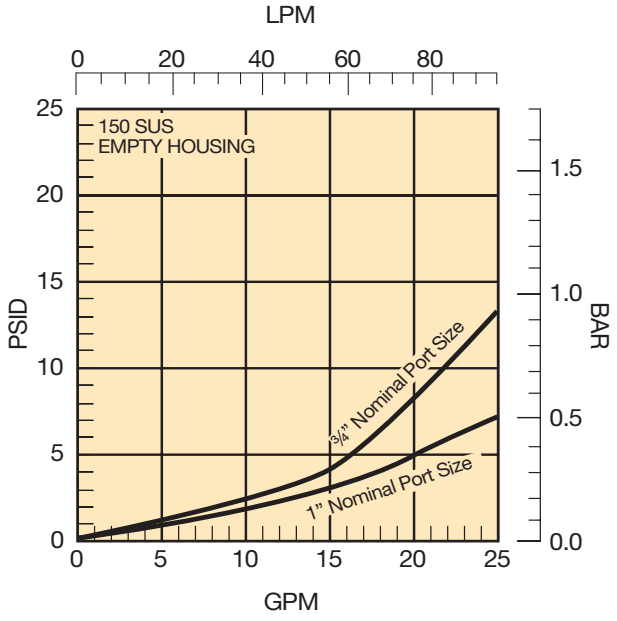




Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

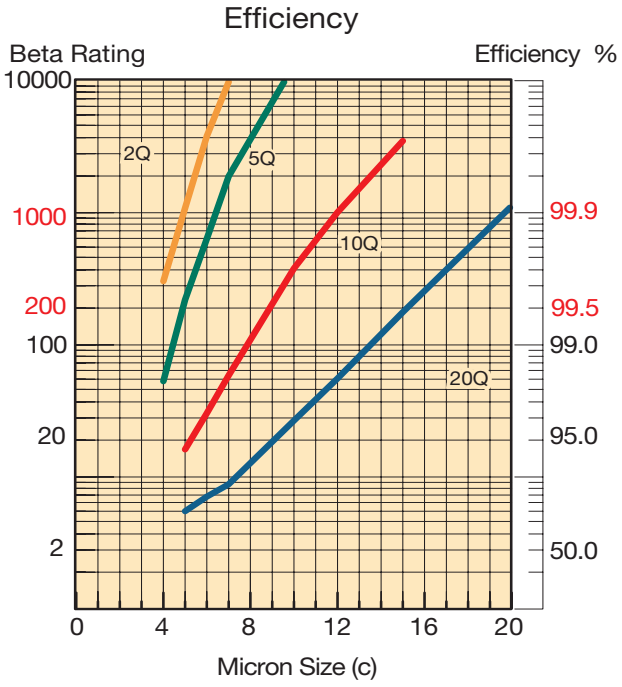
Flow vs. Pressure Loss

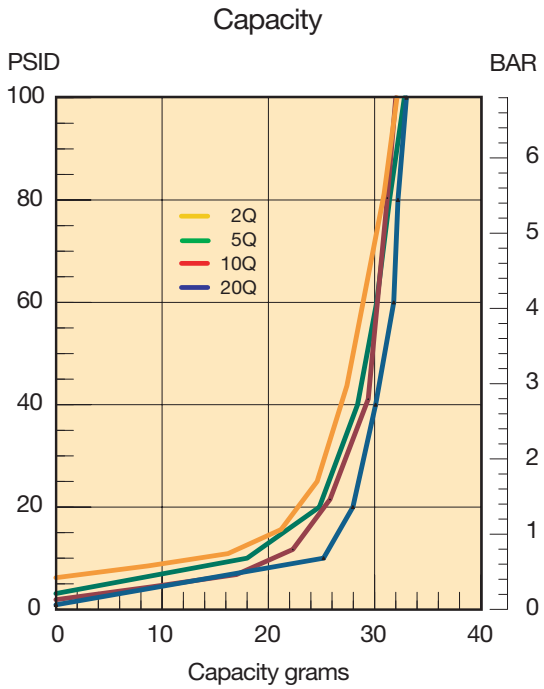




40CN Series

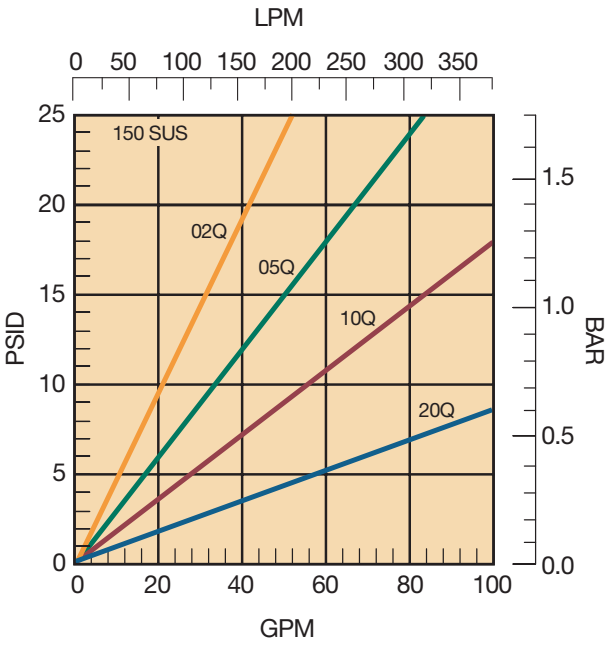
40CN-1 Element Performance

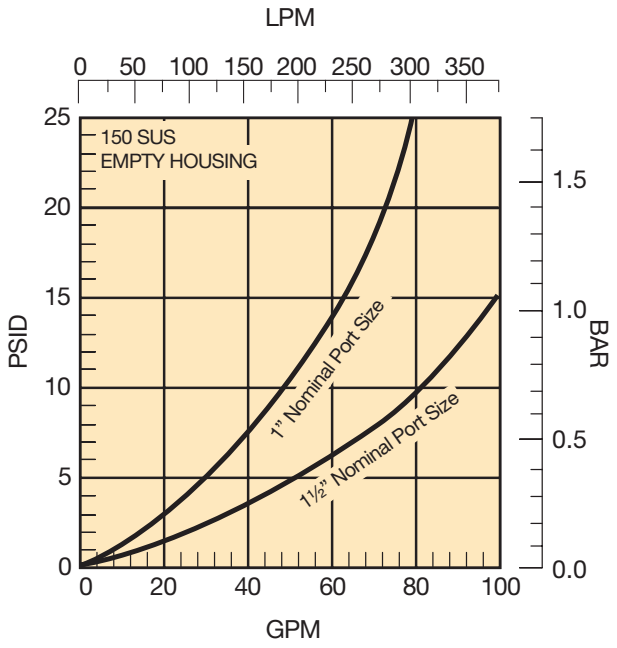




Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

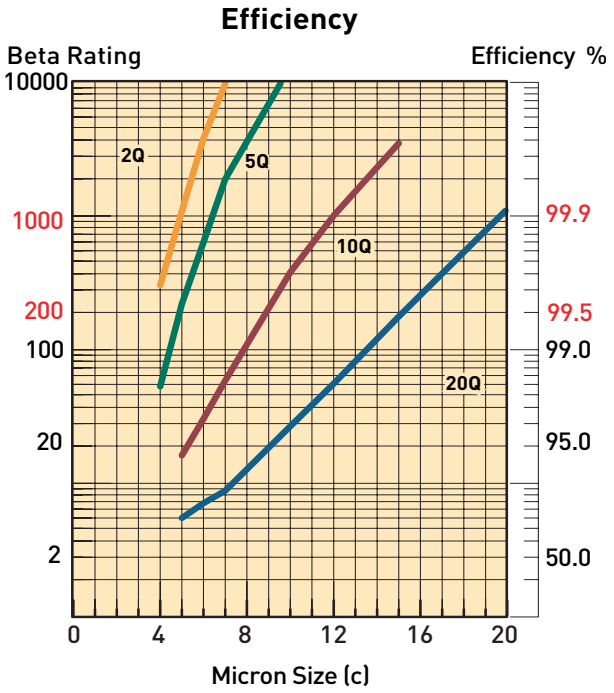
Flow vs. Pressure Loss

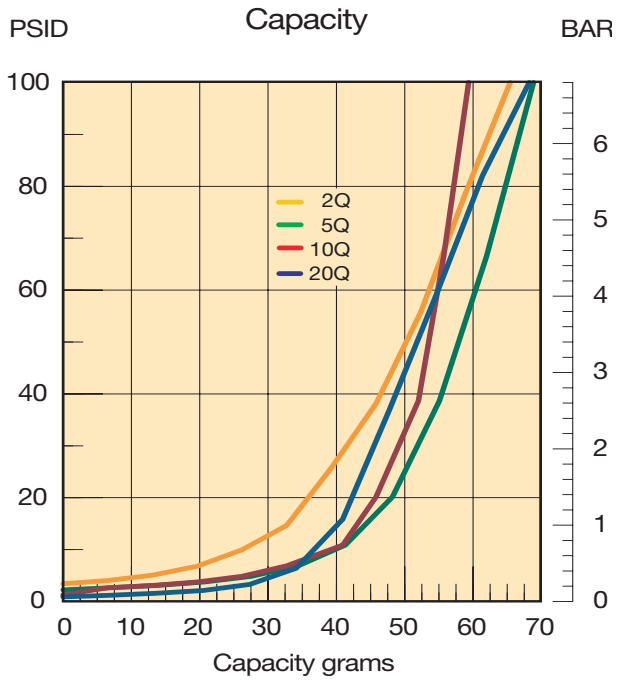




40CN Series

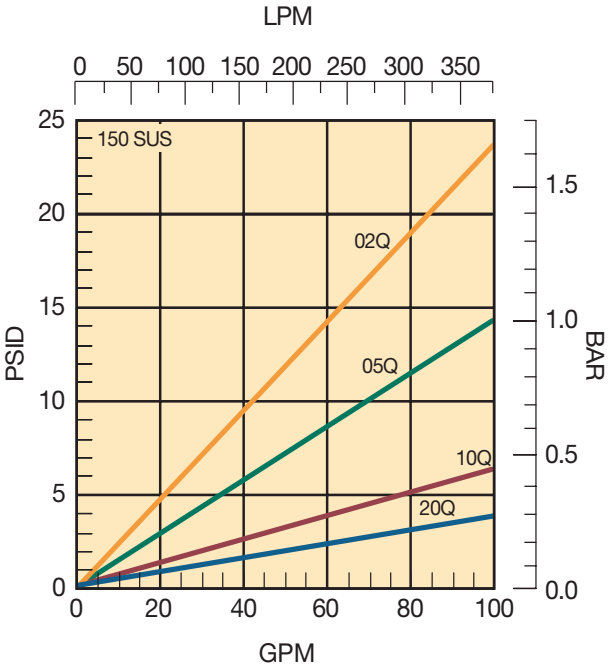
40CN-2 Element Performance

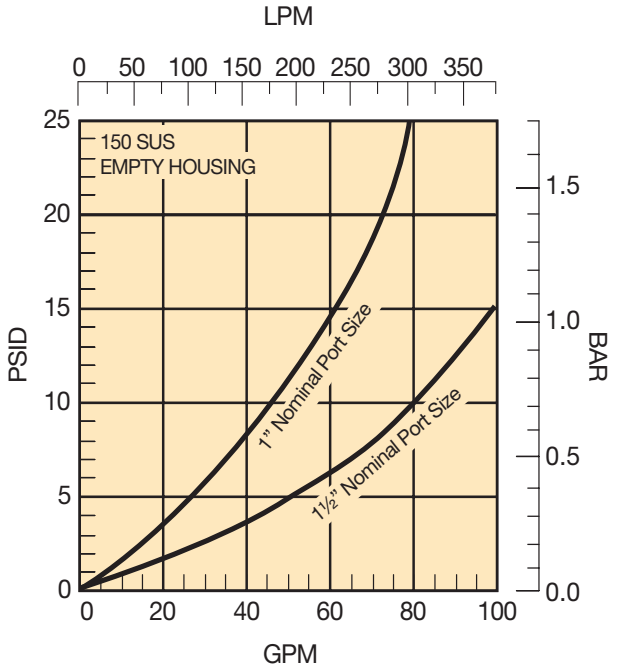




Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

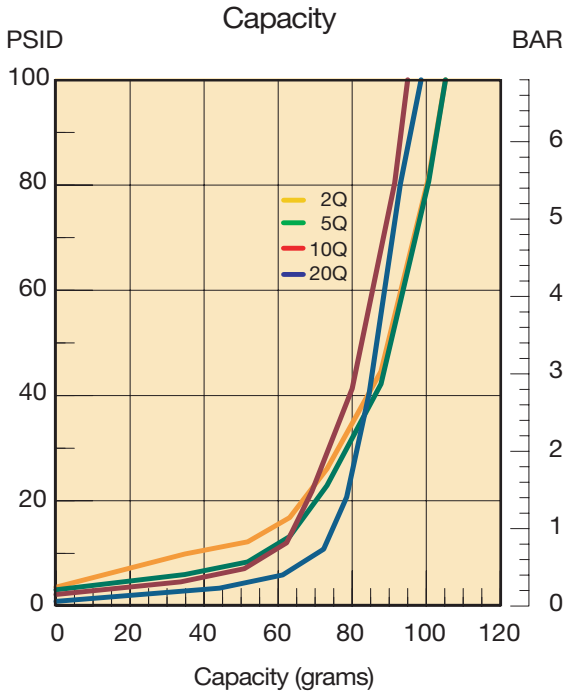
Flow vs. Pressure Loss





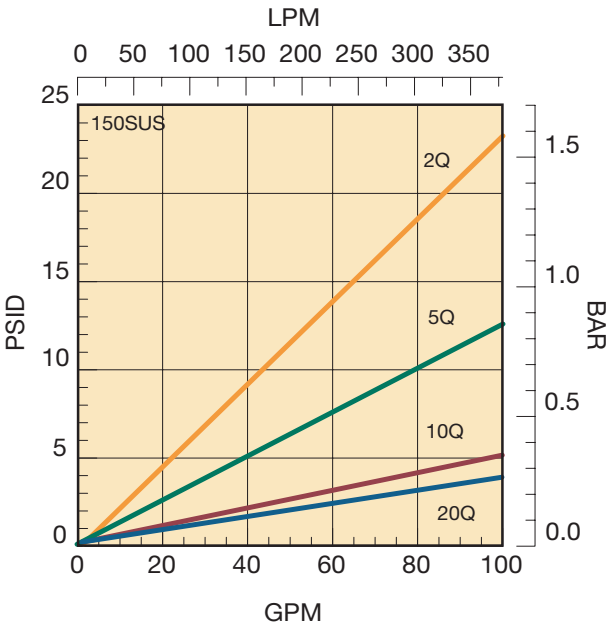
40CN Series

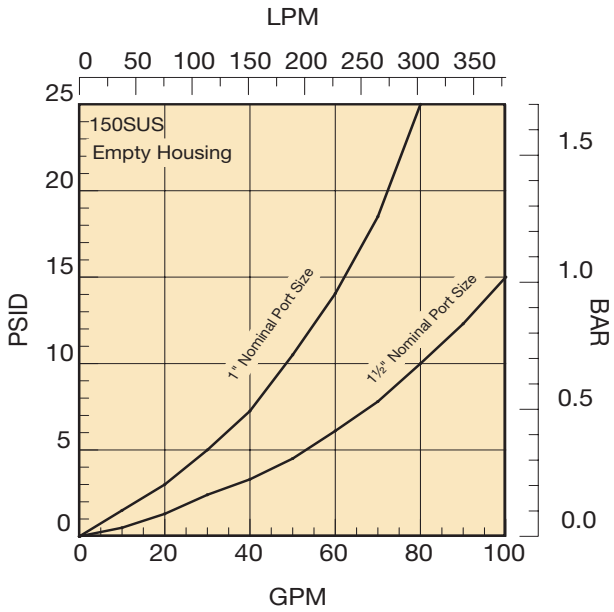
40CN-3 Element Performance



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 on pages 264-265 for relationship to test standard ISO 4572.

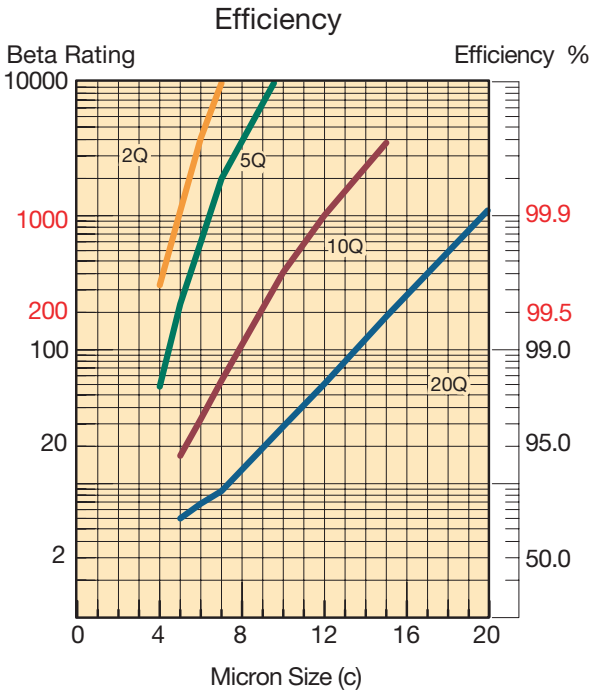
Flow vs. Pressure Loss

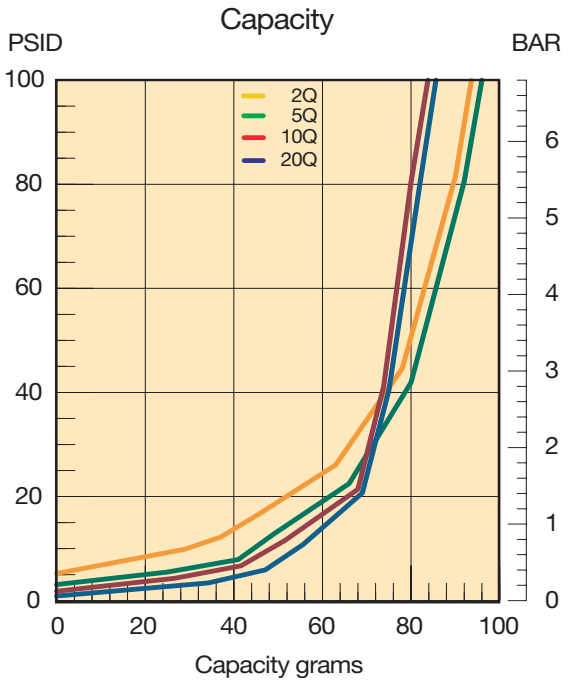




80CN Series

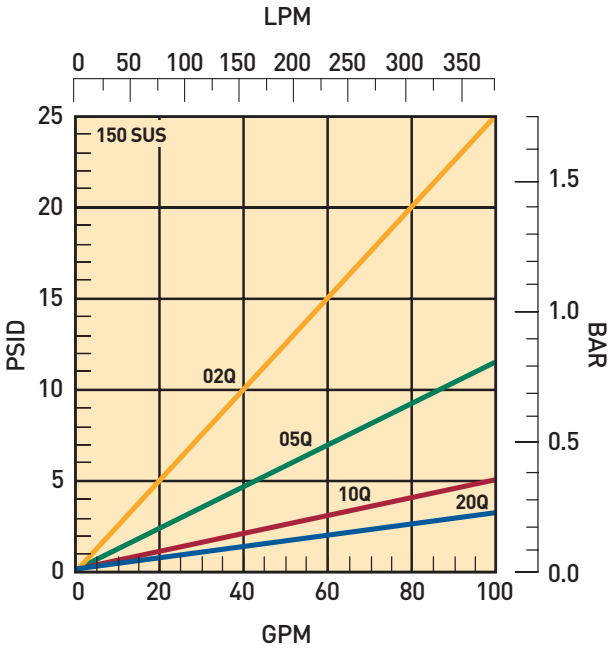
80CN-1 Element Performance

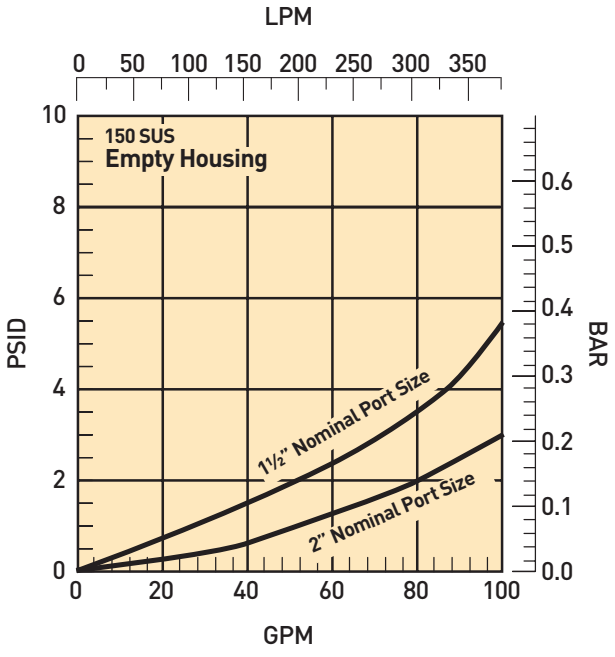




Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

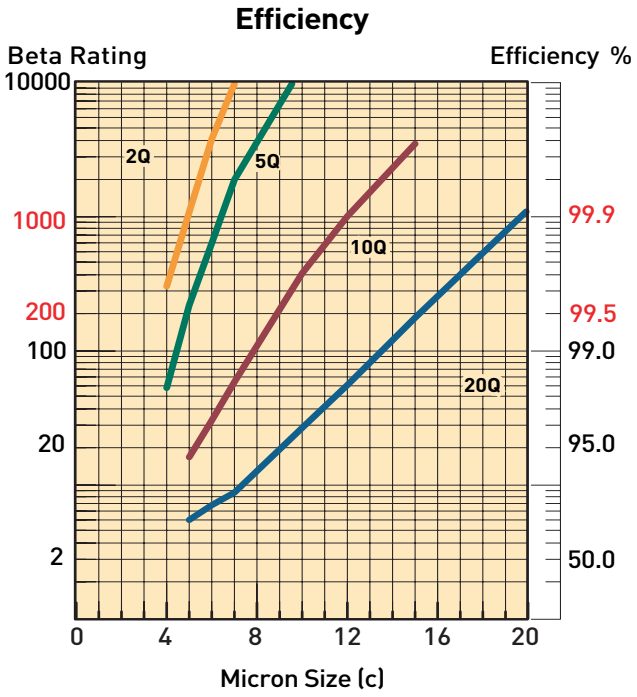
Flow vs. Pressure Loss

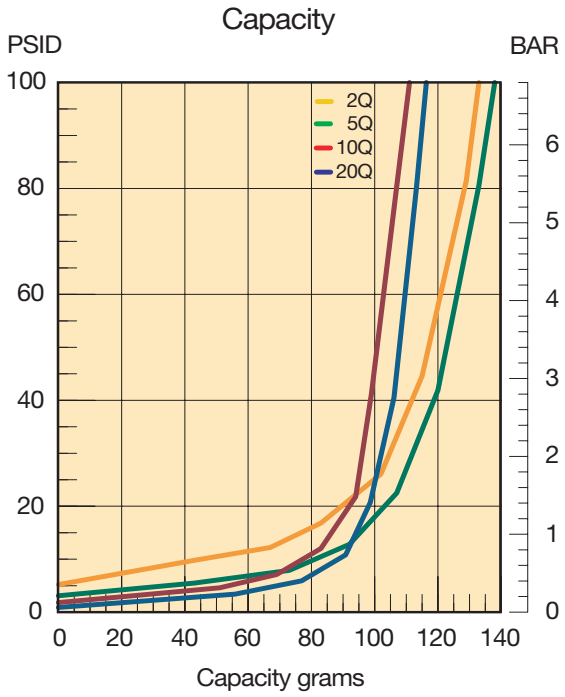




80CN Series

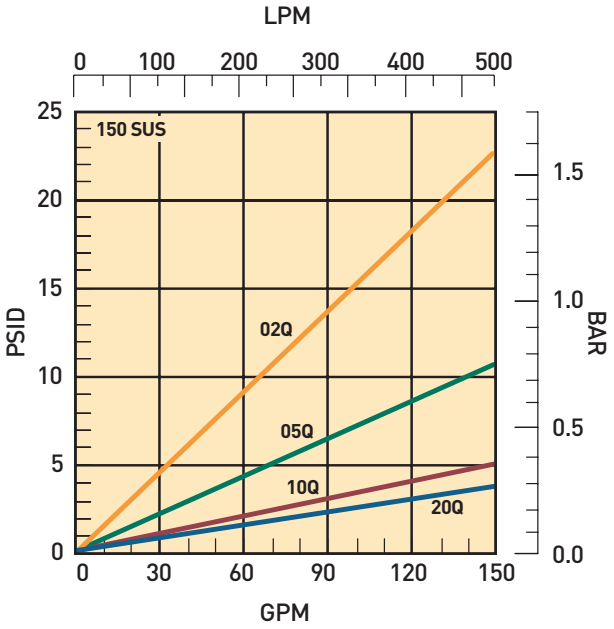
80CN-2 Element Performance

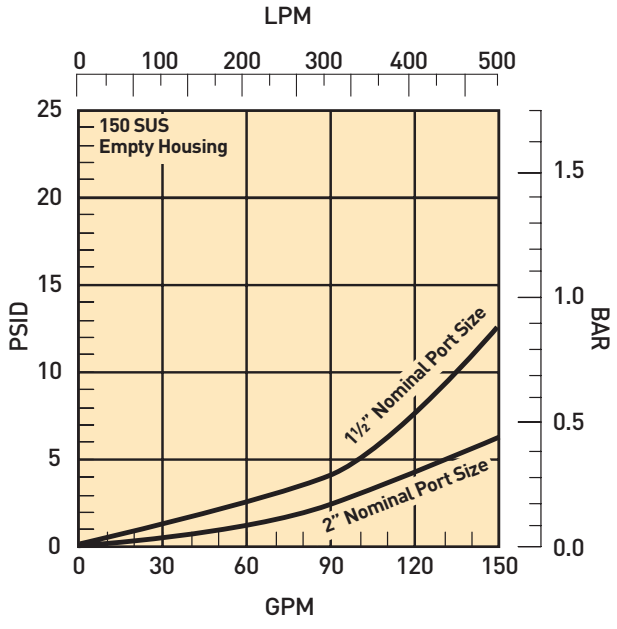




Results typical from Multi-pass tests run per test standard ISO 16889 @ 70 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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)

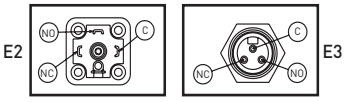
Drawings are for reference only.
Contact factory for current version.

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)

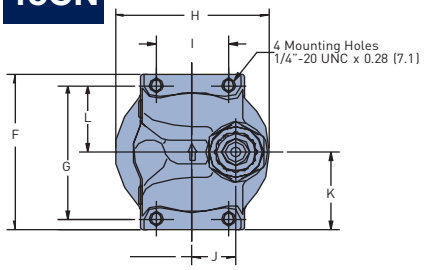
Element Condition Indicators:
Visual 360° green/red auto reset
Electrical/Visual (E)
5A @ 240VAC, 3A @ 28VDC
Black (common)
Red (normally open)
White (normally closed)

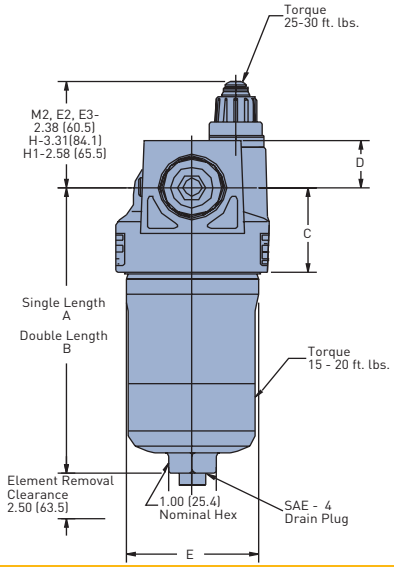


Electrical-Heavy Duty (H)
.25A (resistive) MAX 5 watts
12 to 28 VDC & 110 to 175 VAC
White (common)
Black (normally open)
Blue (normally closed)

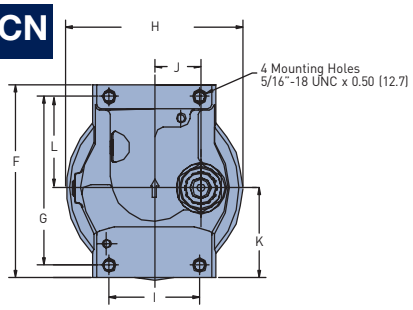
Dimensions are in (mm)	A	B	C	D	E	F	G	H	I	J	K	L	M
15CN	6.17 (156.6)	9.87 (250.7)	1.85 (47.0)	1.00 (25.4)	2.80 (71.1)	3.38 (85.9)	2.88 (73.2)	3.25 (82.6)	1.50 (88.1)	.90 (22.9)	1.69 (42.9)	1.44 (36.6)	NA
40CN	6.73 (170.8)	10.33 (262.4)	2.44 (62.0)	1.28 (32.6)	4.22 (107.2)	5.00 (127.0)	4.37 (111.0)	4.80 (121.9)	2.44 (62.0)	1.25 (31.8)	2.32 (58.8)	2.37 (60.2)	15.07 (382.8)
80CN	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

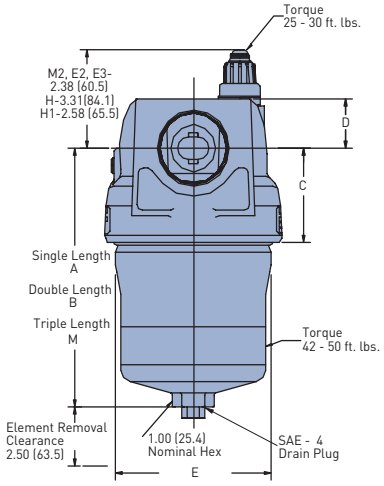
15CN



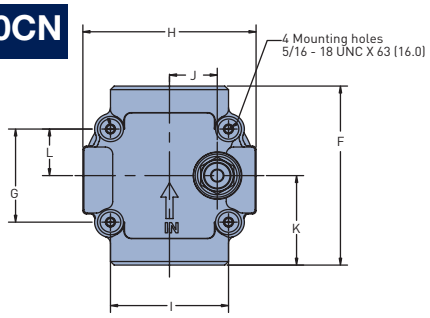


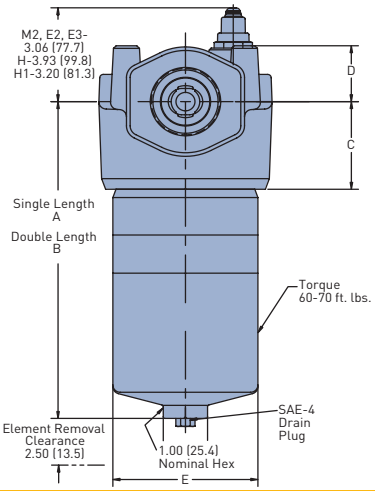
40CN





80CN





15/40/80CN Series

Element Service Instructions

A. Stop the system's power unit.

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.

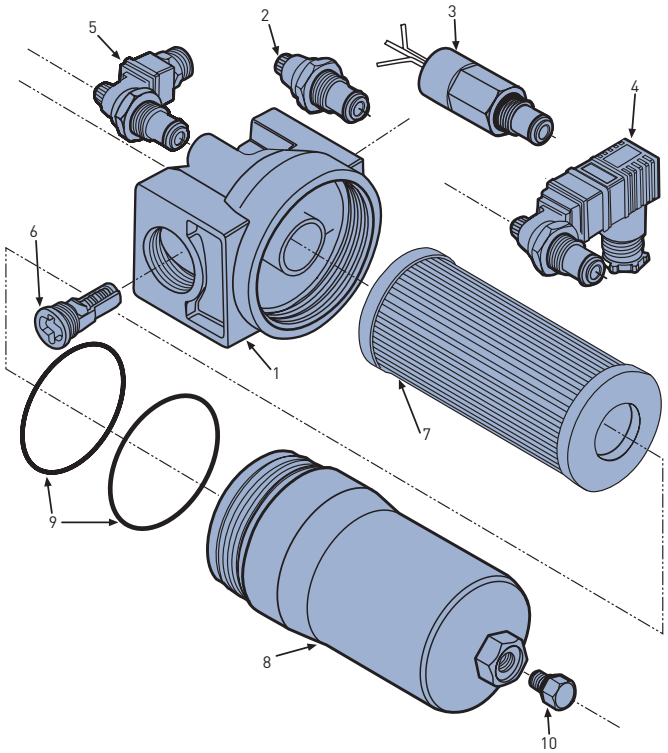
H. Install bowl and tighten to specified torque.

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

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

BOX 3: Media	
Symbol	**Description**
02QE	Ecoglass, 2 micron
05QE	Ecoglass, 5 micron
10QE	Ecoglass, 10 micron
20QE	Ecoglass, 20 micron

BOX 4: Seals	
Symbol	**Description**
B	**Nitrile**
E	Ethylene Propylene
V	Fluorocarbon

BOX 5: Indicator	
Symbol	**Description**
P	**Port plugged**
M2	**Visual Automatic Reset**
E	Electrical/Visual with 1/2" NPT conduit connection and wire leads
E2	**Electrical/Visual (DIN43650 Hirschman style connection)**
E3	Electrical/Visual (ANSI B.9355M 3-pin Brad Harrison style connection)
H	Elctrical indicator with 1/2"-14 NPT connection and 12" leads

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

BOX 7: Ports	
Symbol	**Description**
	15CN
N12	3/4" NPT
N16	1" NPT
S12	**SAE-12 straight threads**
S16	**SAE-16 straight threads**
	40CN
N16	1" NPT
N24	1-1/2" NPT
S16	**SAE-16 straight threads**
S24	**SAE-24 straight threads**
	80CN
N24	1-1/2" NPT
N32	2" NPT
S24	**SAE-24 straight threads**
S32	**SAE-32 straight threads**
Y32	**Flange face, SAE 2", Code 6**

BOX 8: Options	
Symbol	**Description**
4	**Drain port on bowl**
21	No bypass and drain port

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements (Ecoglass)

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

MPD Series

Medium Pressure Duplex Filters

Parker

ENGINEERING YOUR SUCCESS.

MPD Series

Applications

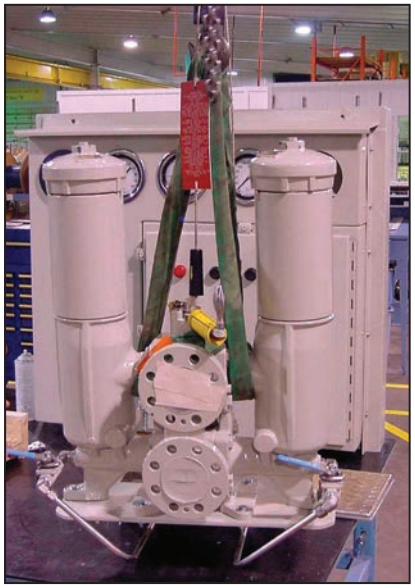
- **Circulating Lube Oil Systems**
- **Power Generation Control Systems**
- **Steel Mill Control Systems**
- **Pulp & Paper Control Systems**
- **Test Stands**
- **Automotive Stamping Presses**
- **Offshore & Land Based Oilfield Applications**

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.

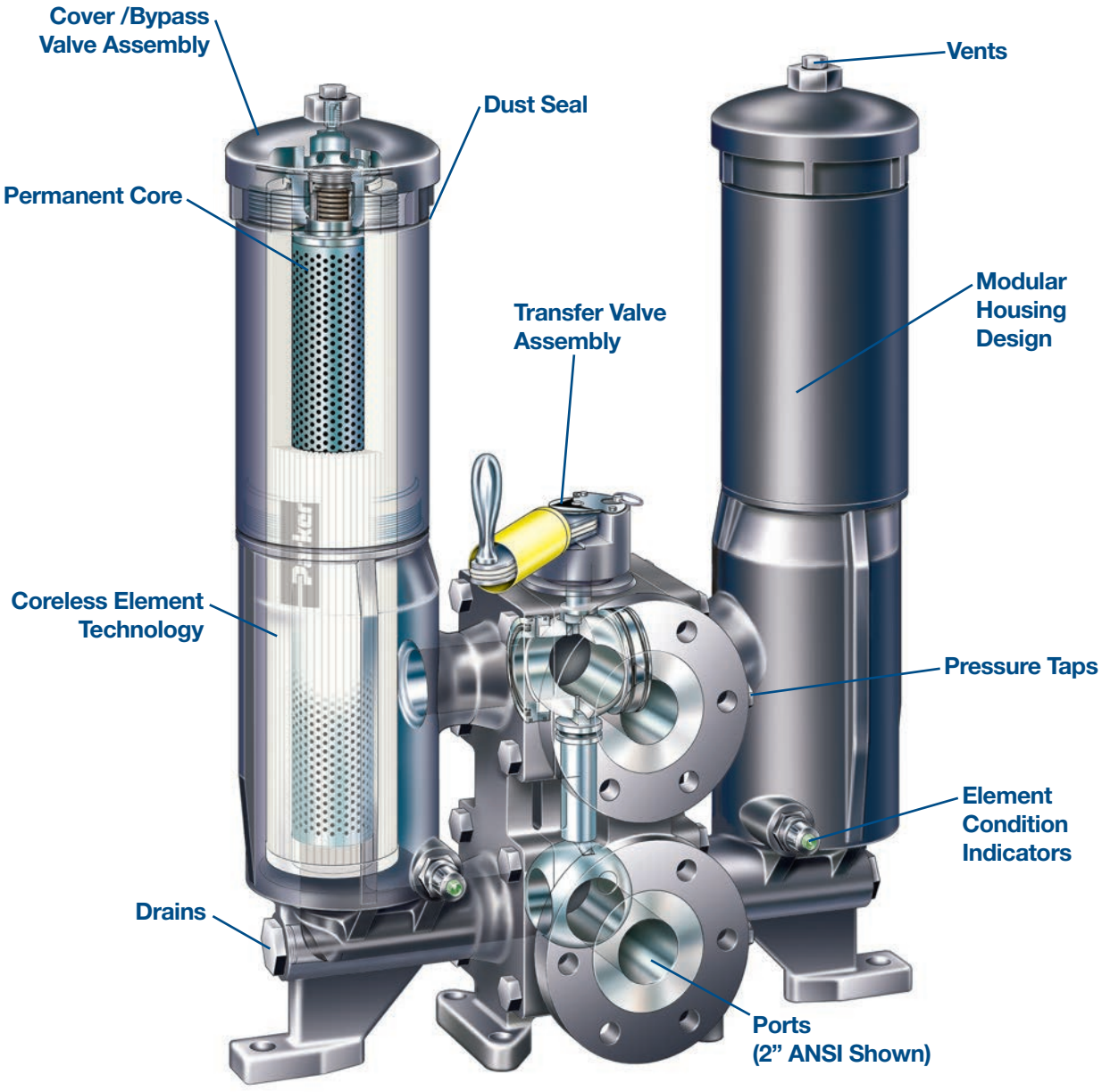
The Modular design provides user flexibility for simplex or duplex applications. Incorporating side chambers as simplex filters along with duplex installations provide common elements across the circuit design.

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

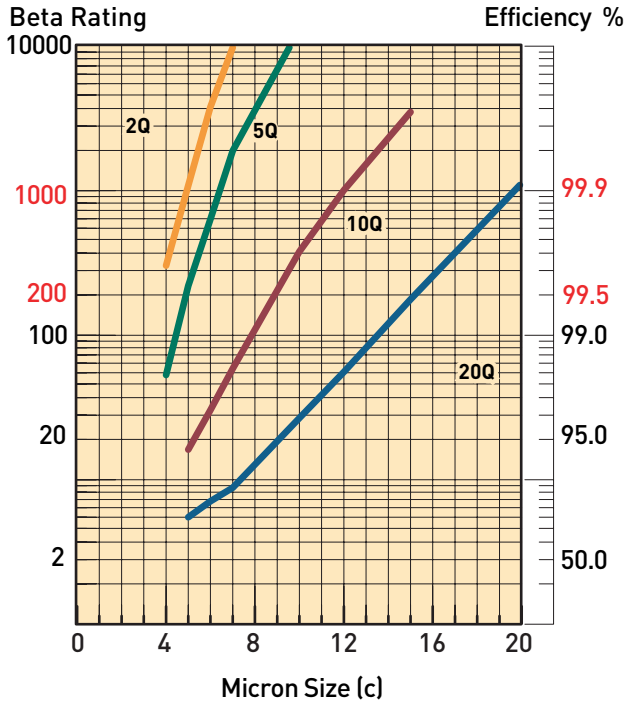
Features



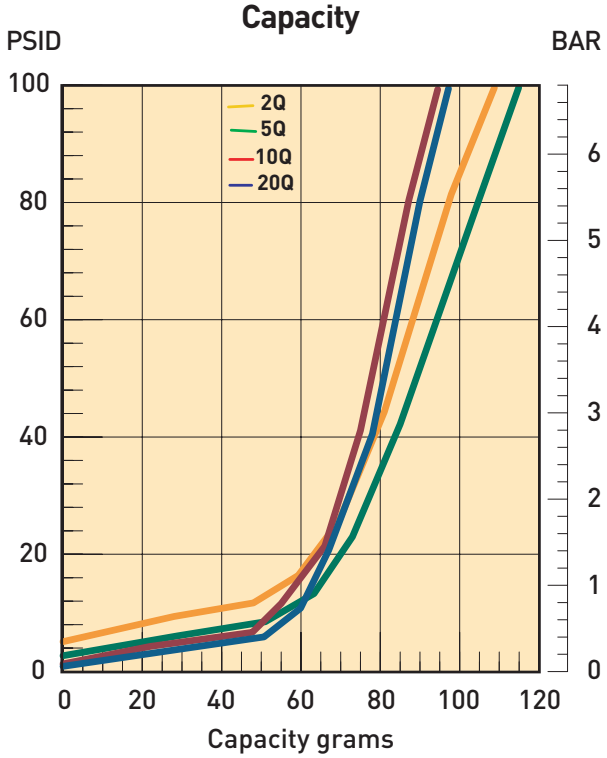
MPD Series

MPD-1 Element Performance

Efficiency

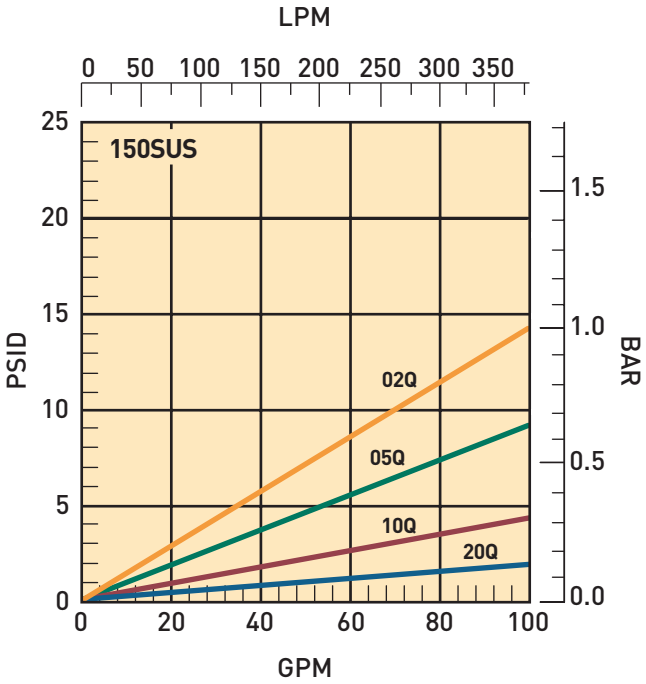


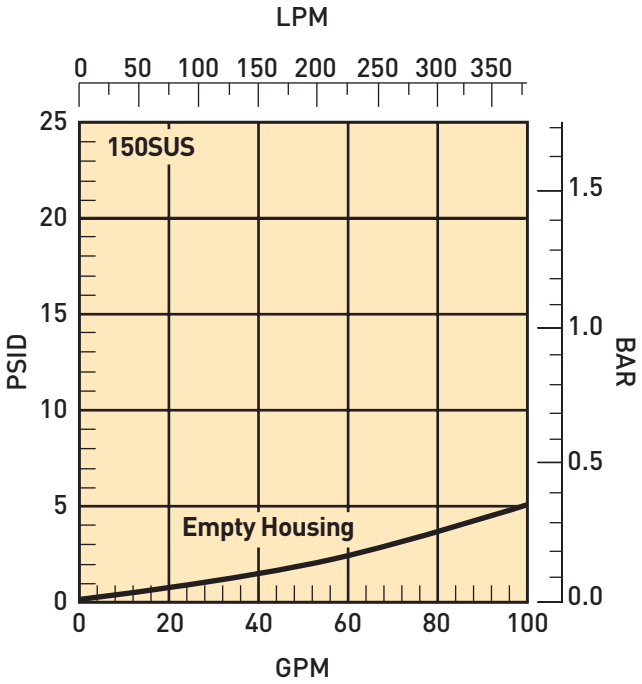
Capacity



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 on pages 264-265 for relationship to test standard ISO 4572.

Flow vs. Pressure Loss

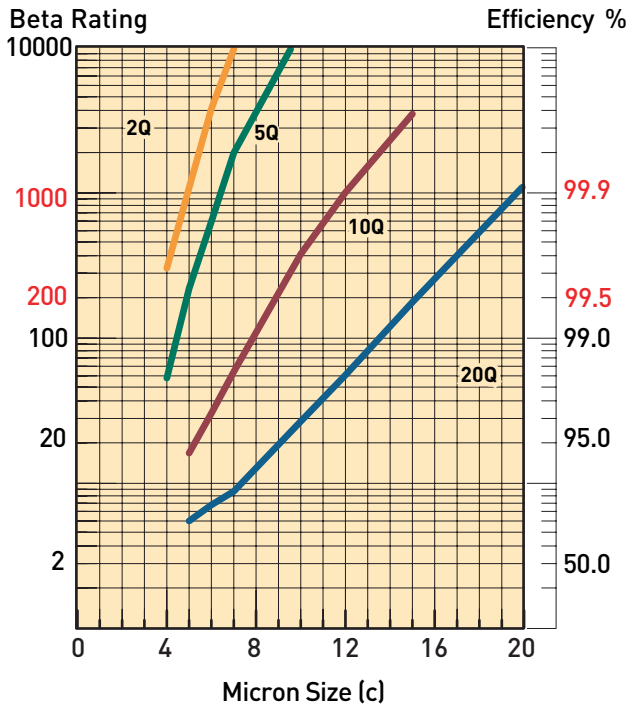




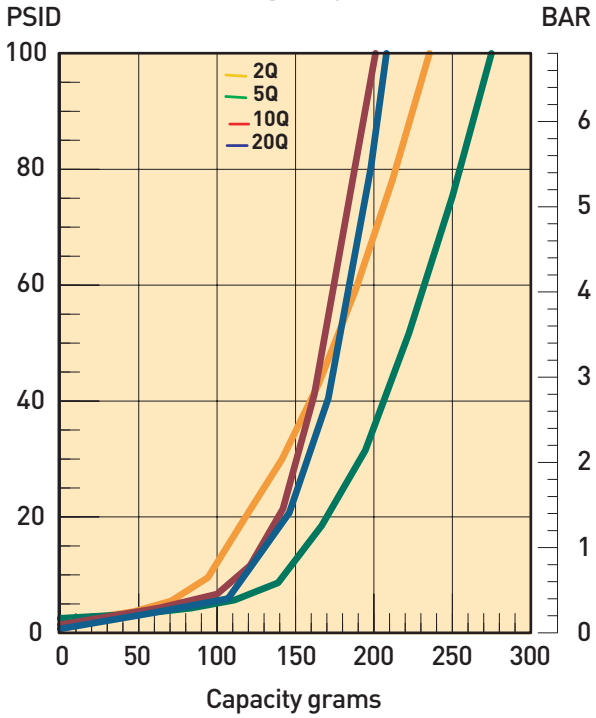
MPD Series

MPD-2 Element Performance

Efficiency

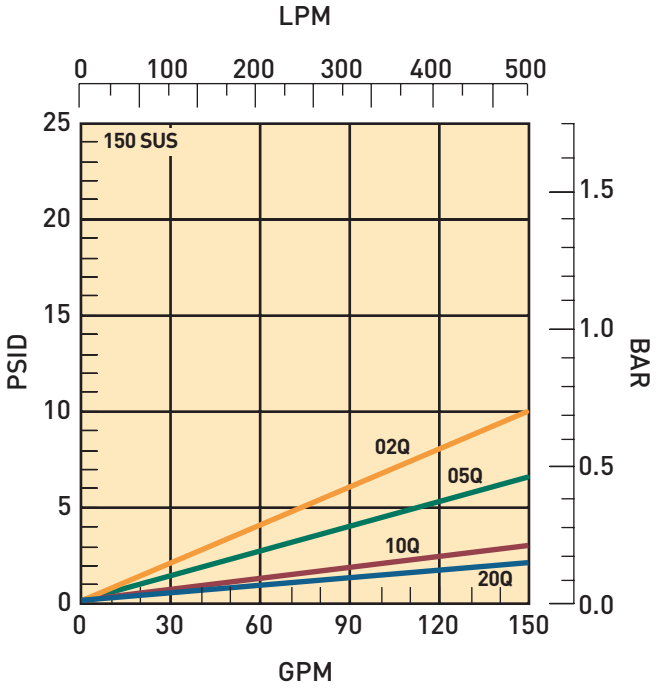


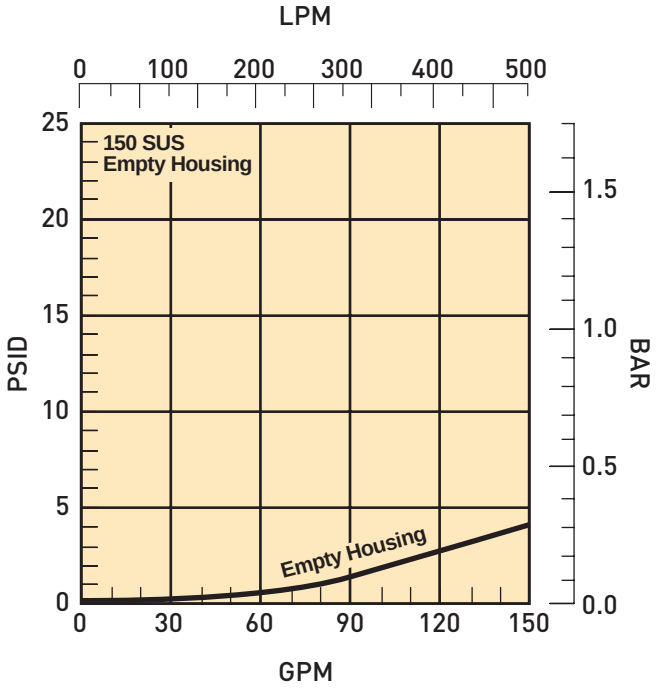
Capacity



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





MPD Series

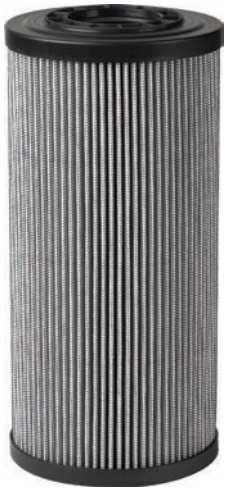
Replacement Elements

Ecoglass represents the merging of high performance filtration technology with environmentally conscious engineering. The Ecoglass line of replacement elements features 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 reuseable core is installed into the filter housing and remains in service throughout the life of the assembly.



Microglass Replacement Elements

Microglass represents a leap forward in the performance obtainable in hydraulic and lube filter 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	• Use a simplex or duplex	• Reduced installation due to common elements • Application flexibility
Top access cover	• Remove element from top • Lighter than removing entire bowl	• No oil mess
Visual and electrical indicators	• Know exactly when to service elements	• Keeps system clean
Drain port	• Drain all oil from assembly prior to servicing	• Eliminates cross contamination
Vent port	• Purges all trapped air in filter	• Get the maximum performance from elements
Multipass tested elements (per ANSI/NFPA T3.10.8.8 R1-1990)	• Element performance backed by recognized test standards	• Elements selected will have consistent performance levels
Option of Ecoglass or	• Multi-layer media • Coreless as standard • HF4 as option	• High capacity with high efficiency • No performance loss from pleat bunching
Equalizing valve & manifold	• No external plumbing	• Safety & reliability
Upstream & downstream sensing ports	• Add additional instrumentation	• Product flexibility

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

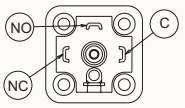
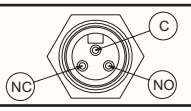
Element Collapse Rating:
Standard: 150 psid (10.3 bar)
High collapse Microglass only:
1200 psid (81.6 bar) (SAE);
500 psid (34 bar) (ANSI)

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.

'E' SERIES ELECTRICAL INDICATOR CONNECTOR CHART		
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.

'H' SERIES ELECTRICAL INDICATOR CONNECTOR CHART		
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.

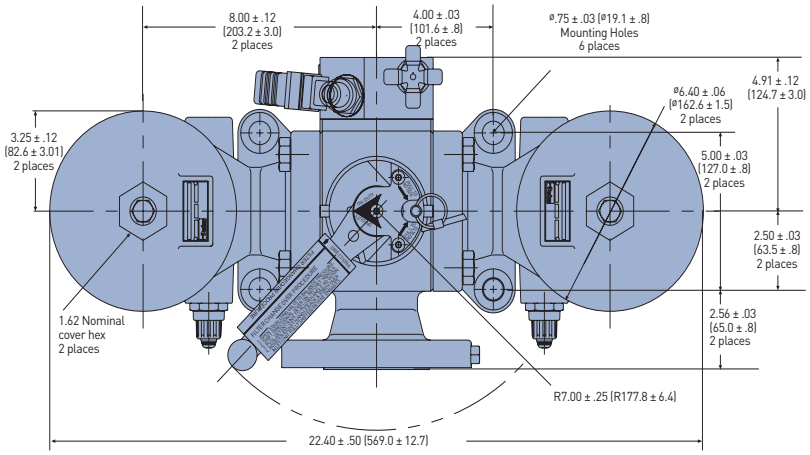
Element Servicing Instructions
The system does not need to be shut down to service elements; however, pressure must be equalized at both side chambers of the duplex filter before performing transfer valve changeover.

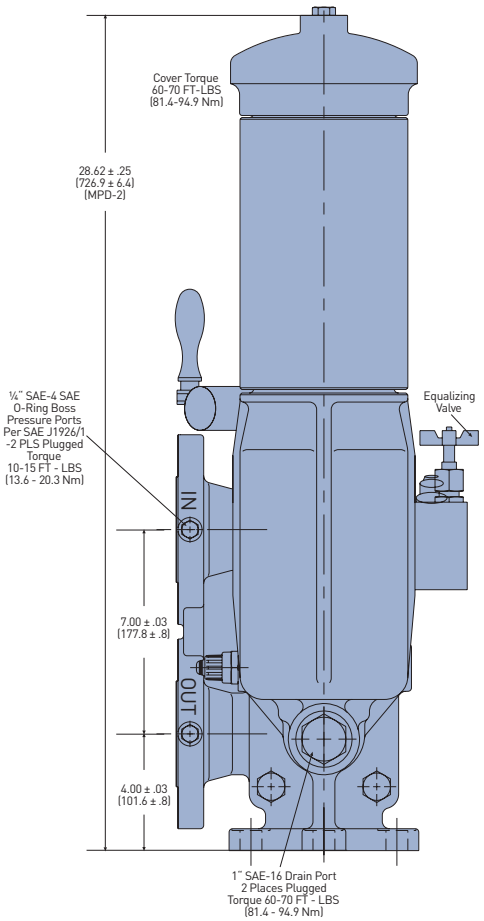
1. Black flow arrow on top of the transfer valve points to the on-duty chamber.
2. Open the equalizing valve (counter-clockwise) to balance pressure at the side chambers.
3. Shift directional lever on the ratchet handle to switch the ratchet direction.
4. Pull detent ring up to disengage the locking 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. Slack 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) tram 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. With Ecoglass elements the permanent core will remain in the chamber.
12. Install new element by centering it on the element locator in the bottom of the chamber and pushing down into place. For Ecoglass elements slide all the way down onto the permanent core.
13. Inspect cover o-rings and replace if necessary.
14. Install cover onto the chamber by rotating clockwise) and tighting 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

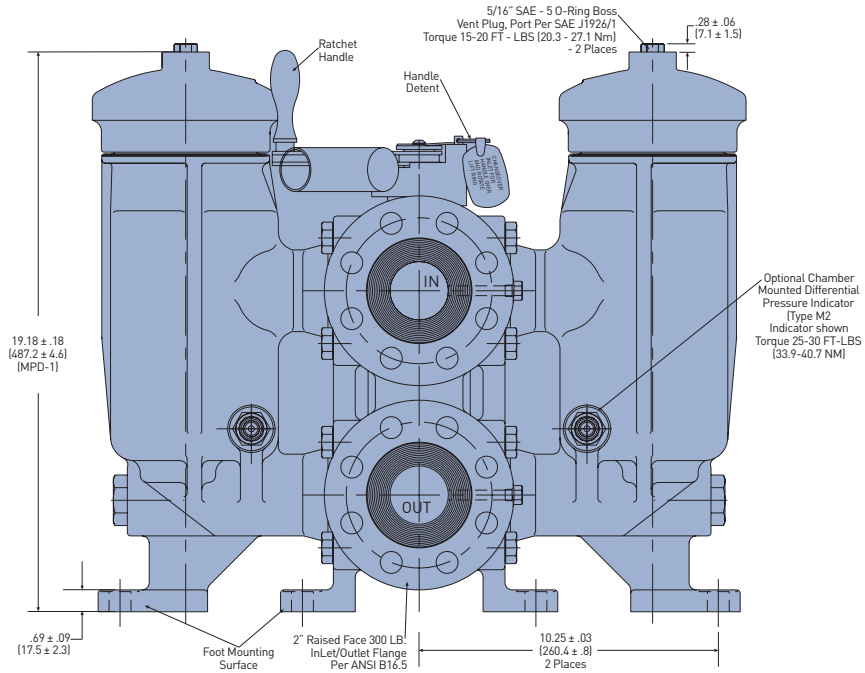
Specifications

ANSI Dimensional Drawing





Linear Measure: inch [millimeter]

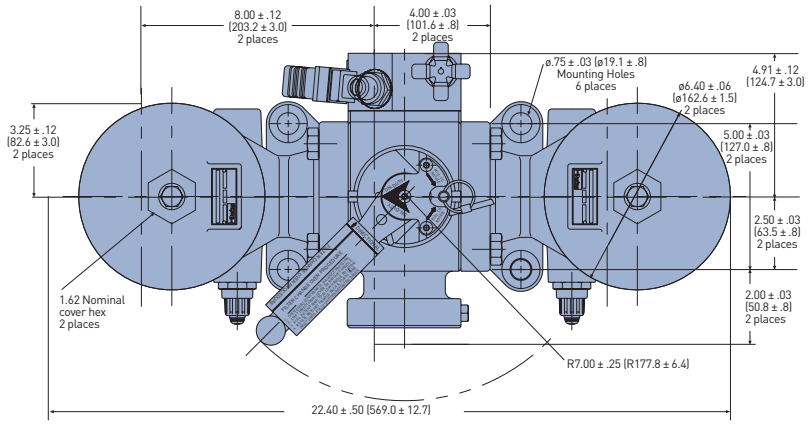


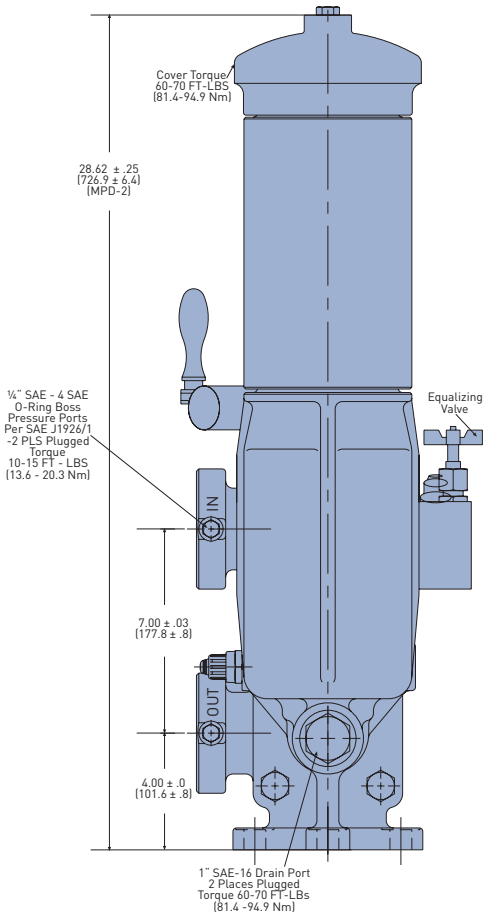
Drawings are for reference only.
Contact factory for current version.

MPD Series

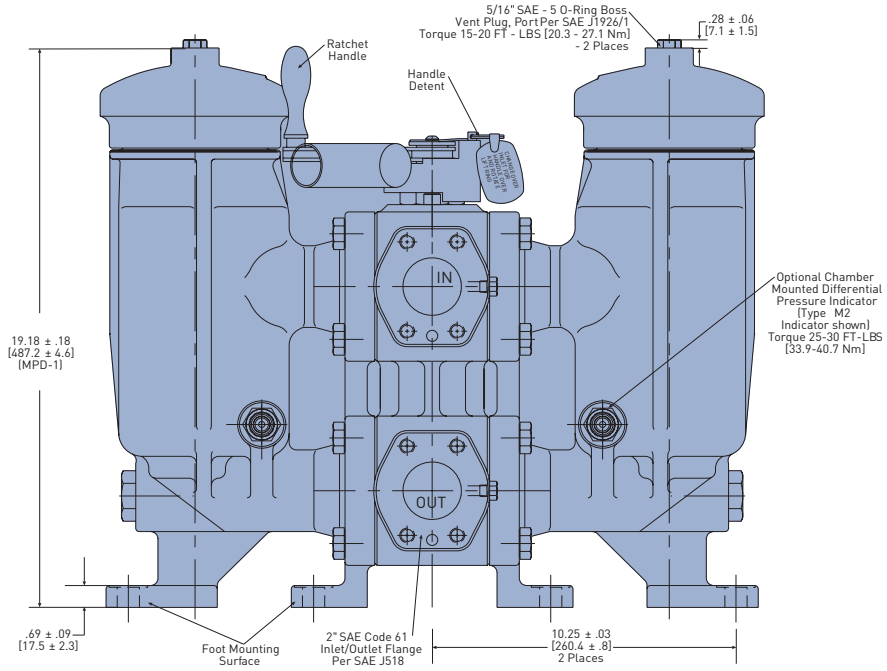
Specifications

SAE Dimensional Drawing





Linear Measure: inch [millimeter]



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

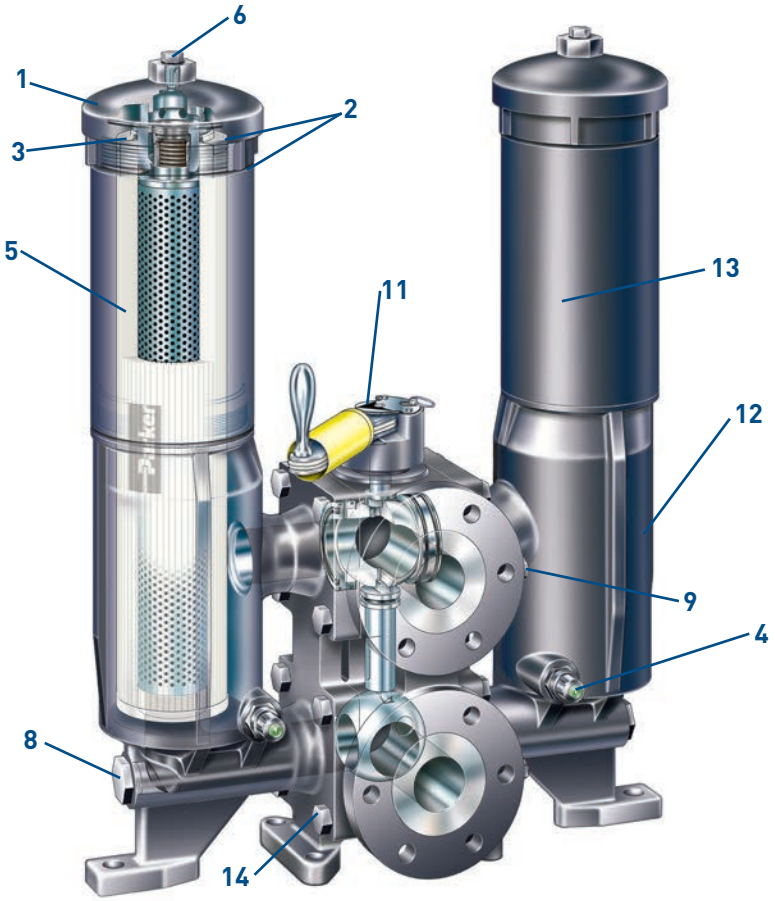
MPD Series

Parts List

Index	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	9299599
	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
	H1 50 psi	932906	932906
5	Element	see chart on model code page	

Index	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

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: Seals

Symbol	Description
None	**Nitrile**
F3	Fluorocarbon

BOX 2: Filter Series

Symbol	Description
MPD	**Duplex Filter**
MPDH	**High pressure, 3000 psi duplex filter**

BOX 3: Element Length

Symbol	Description
1	**Single**
2	**Double**

BOX 4: Media

Symbol	Description
02QE	Ecoglass, 2 micron
05QE	Ecoglass, 5 micron
10QE	Ecoglass, 10 micron
20QE	Ecoglass, 20 micron

BOX 5: Indicators

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

Note: Two (2) symbols required. First symbol denotes side chamber indicator mounted on inlet side. Second symbol denotes indicator on equalizing valve manifold.

BOX 6: Bypass

Symbol	Description
25	25 PSI (1.7 bar) setting
50	50 PSI (3.5 bar) setting

Note: If "no bypass" option (-11) and an indicator is selected, above symbols (25,50) denote the indicator setting

BOX 7: Ports

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

Note: Only available for MPD

BOX 8: Options

Symbol	Description
1	**None**
11	No bypass

Please note the bolded options reflect standard options with a reduced lead time.

EcoglassReplacement Elements (Fluorocarbon)

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

HF4 Replacement Elements (Fluorocarbon)

Media	Element Collapse Rating	Single Length	Double Length
3 micron	150 psi (10.3 bar)	HF41L3VQ	HF42L3VQ
3 micron	2000 psi (138 bar)	HF41H3VQ	HF42H3VQ
5 micron	150 psi (10.3 bar)	HF41L5VQ	HF42L3VQ
5 micron	2000 psi (138 bar)	HF41H5VQ	HF42H3VQ
10 micron	150 psi (10.3 bar)	HF41L10VQ	HF42L3VQ
10 micron	2000 psi (138 bar)	HF41H10VQ	HF42H3VQ
20 micron	150 psi (10.3 bar)	HF41L20VQ	HF42L3VQ
20 micron	2000 psi (138 bar)	HF41H20VQ	HF42H3VQ

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. Patented design resists false signaling due to vibration.

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 it's 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

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

Wire Reinforced Media

Prevents pleat bunching

Helps prevent media migration

Maintains media efficiency

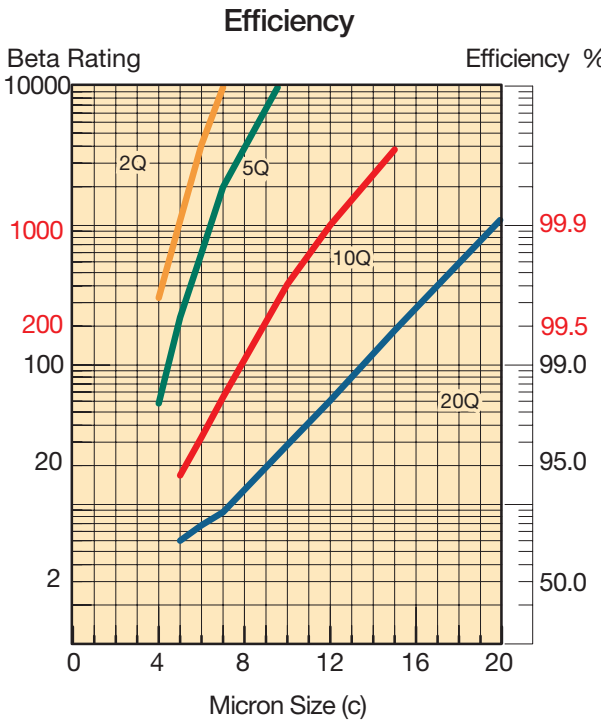
Elements for Every Application

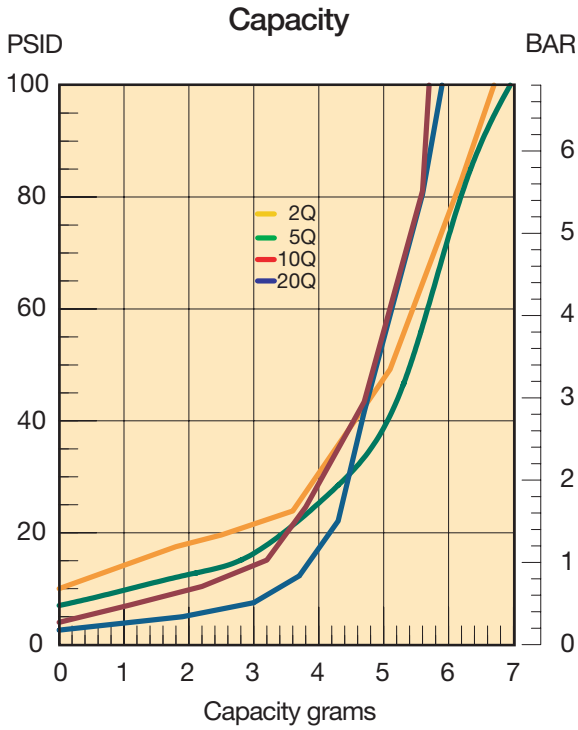
Standard Microglass media for long life and excellent system protection

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

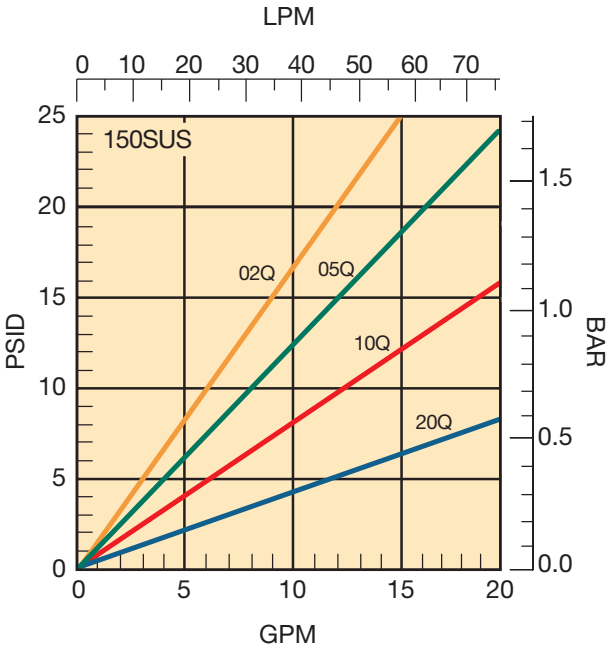


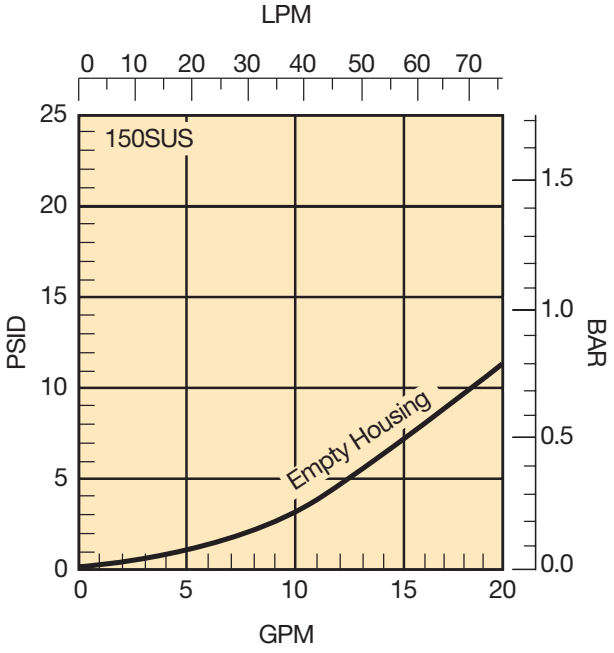


Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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

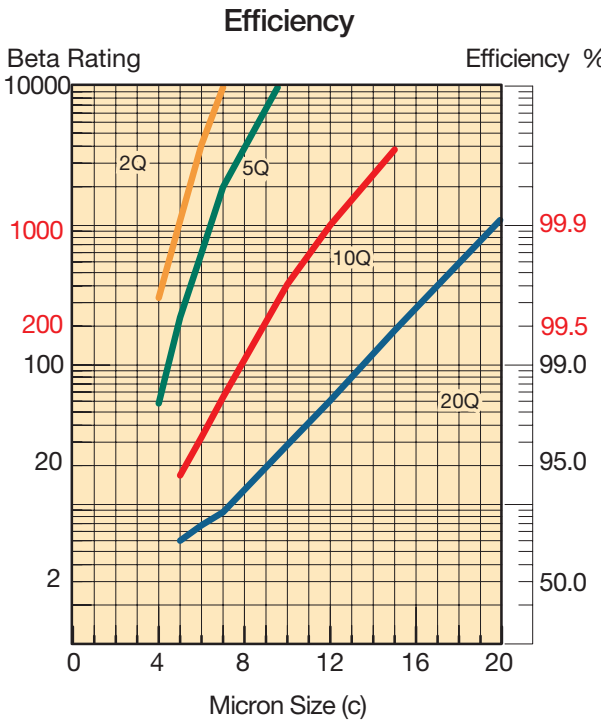
Flow vs. Pressure Loss

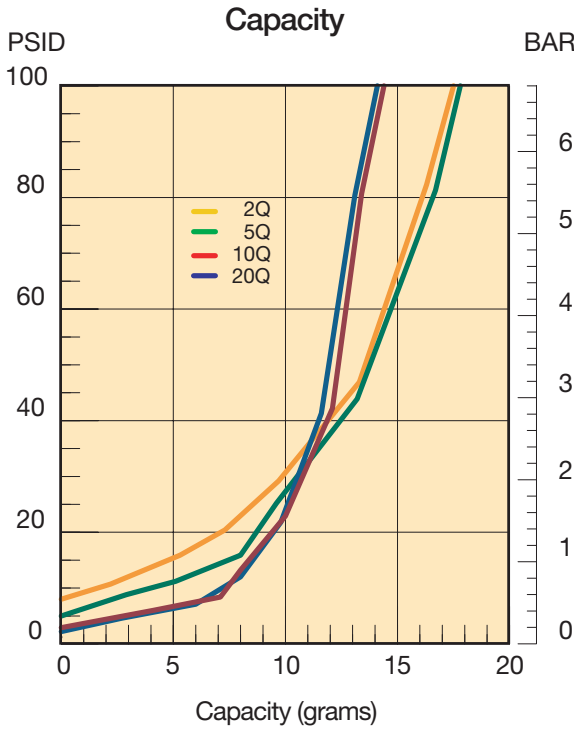




15P Series

15P-2 Element Performance

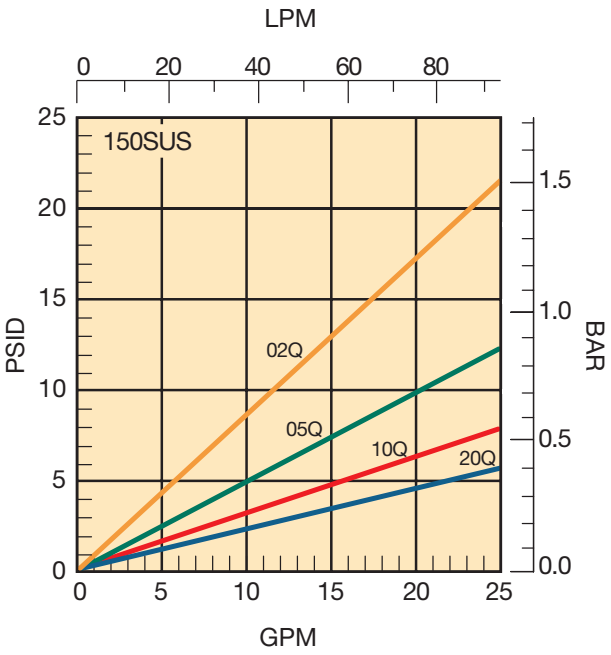


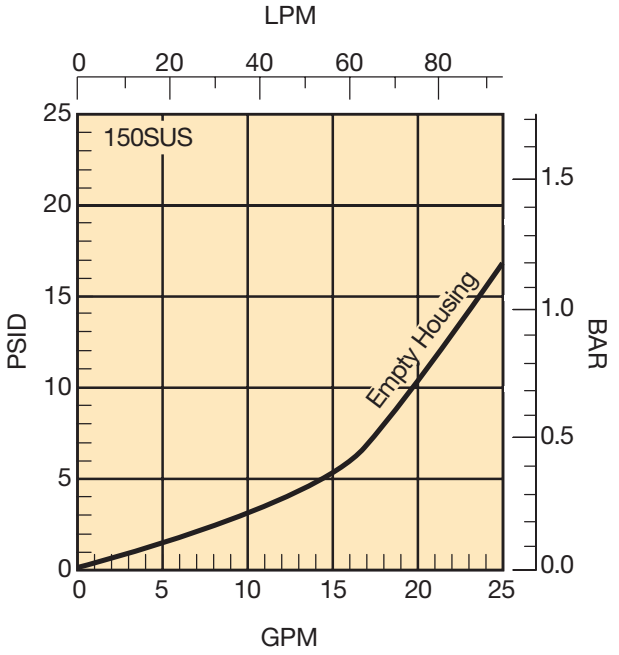


Results typical from Multi-pass tests run per test standard ISO 16889 @ 15 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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

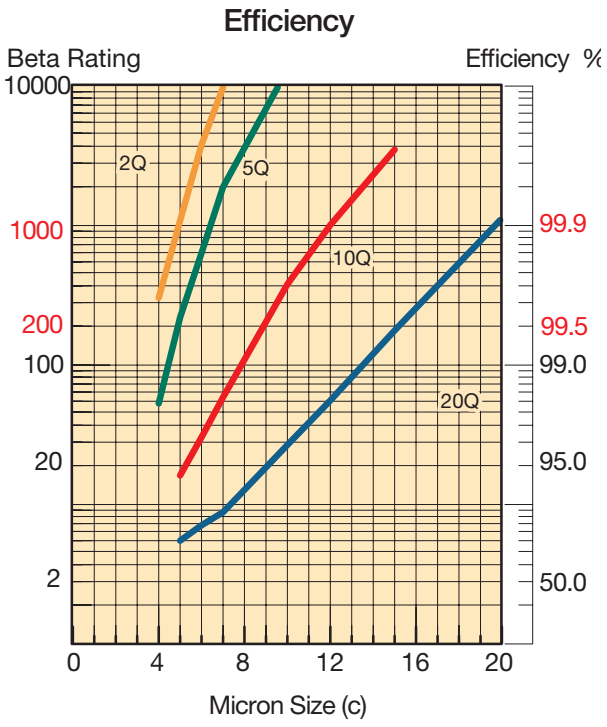
Flow vs. Pressure Loss

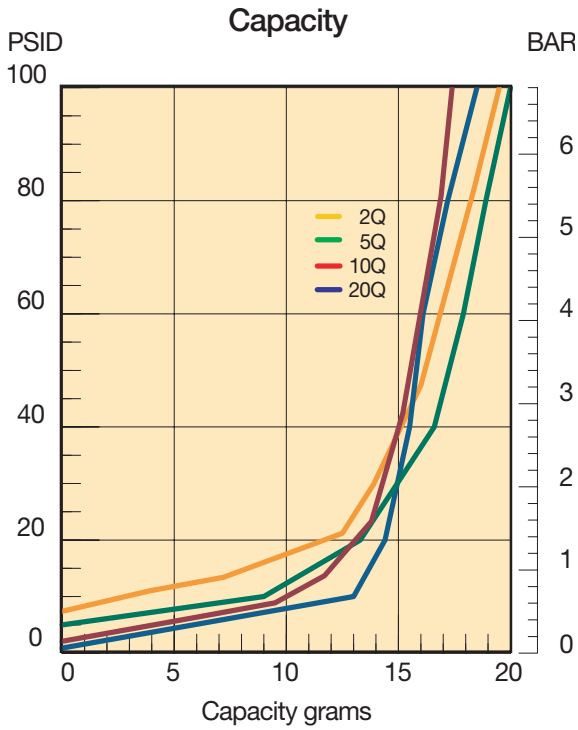




30P Series

30P-1 Element Performance

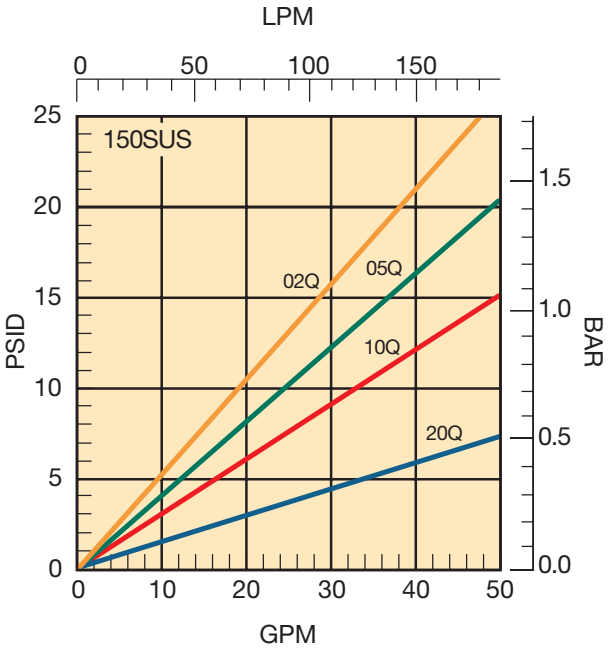


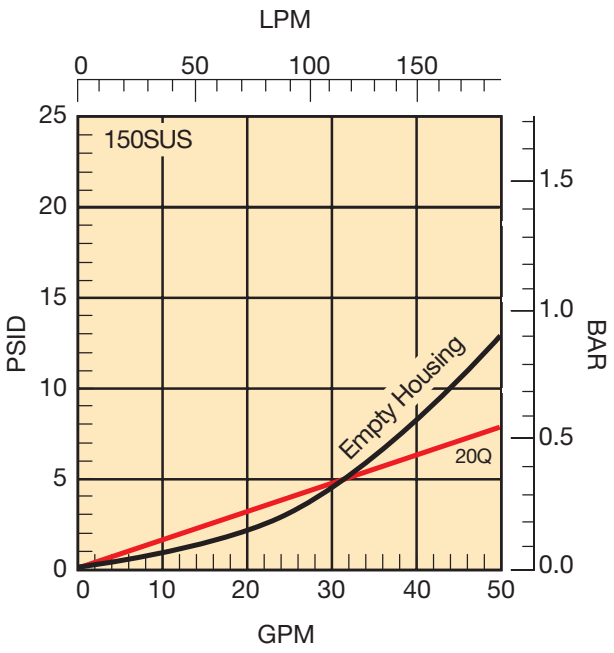


Results typical from Multi-pass tests run per test standard ISO 16889 @ 20 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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

Flow vs. Pressure Loss

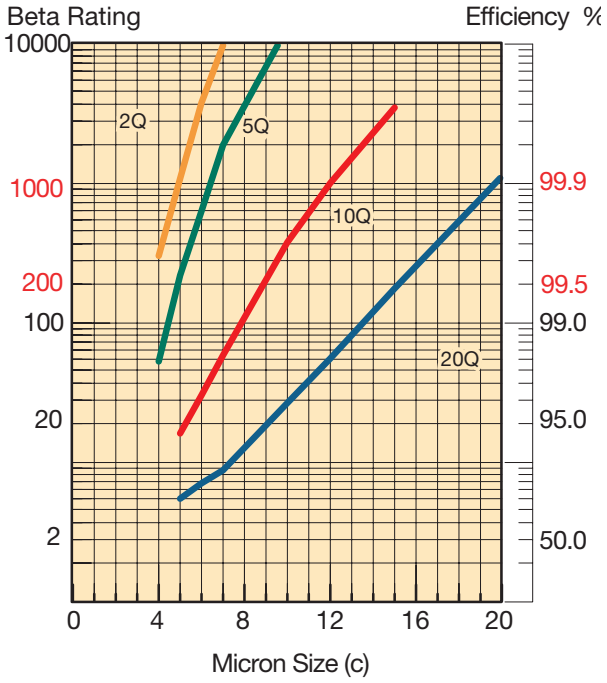




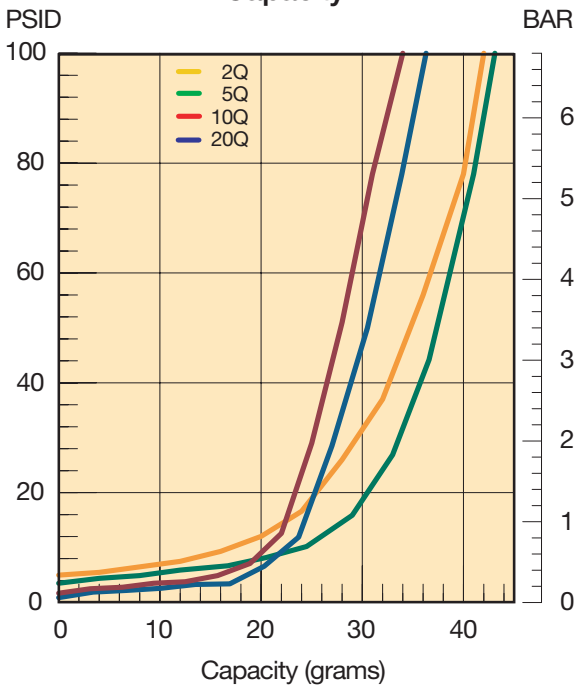
30P Series

30P-2 Element Performance

Efficiency



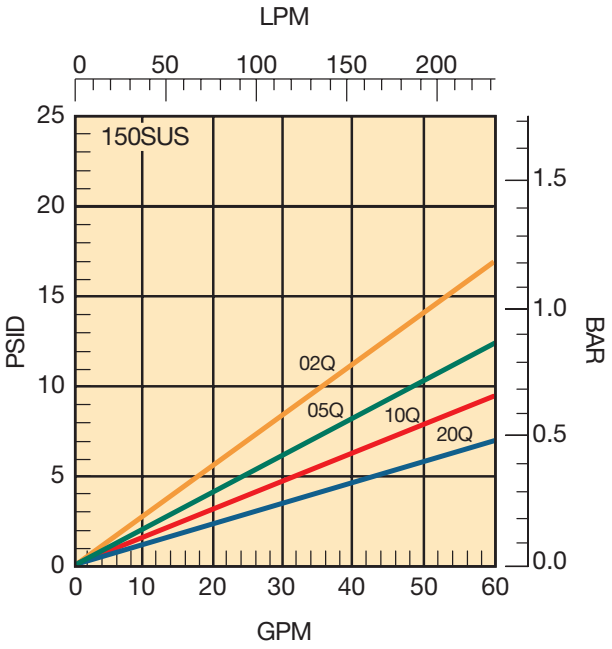
Capacity

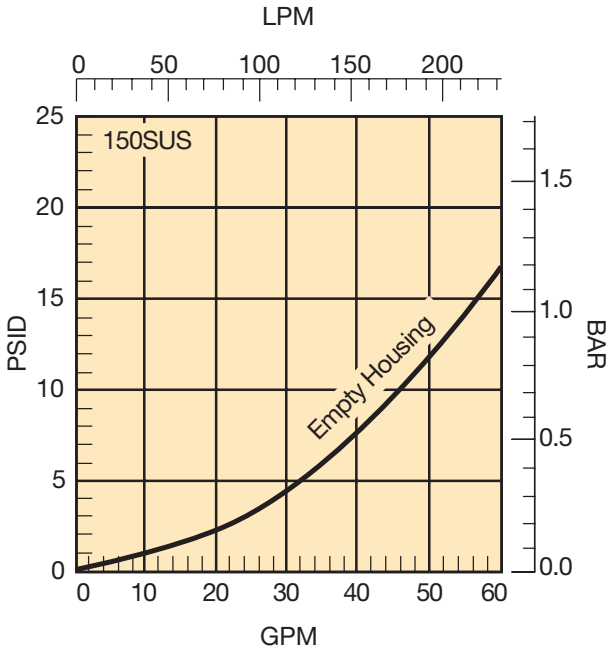


Results typical from Multi-pass tests run per test standard ISO 16889 @ 30 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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

Flow vs. Pressure Loss





15P Series

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

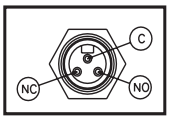
Operating Temperatures:
Buna: -40°F (-40°C) to 225°F (107°C)
Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

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

Weights (approximate):
15P-1 3.5 lb. (1.6 kg.)
15P-2 4.6 lb. (2.1 kg.)

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

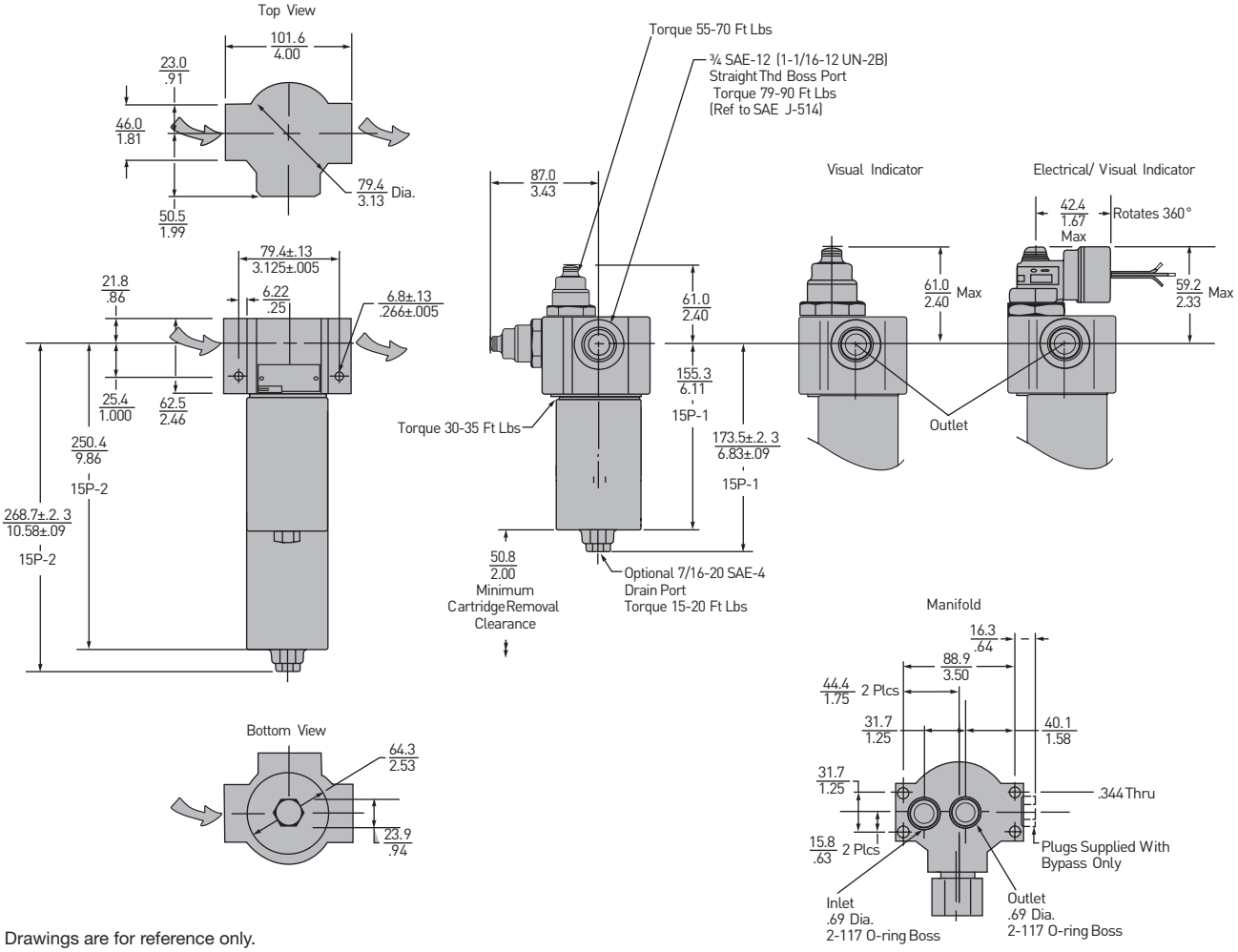
Element Condition Indicators:
Visual (optional) 360° green/ red
Electrical/ Visual (optional)
5A @ 240VAC, 3A @ 28VDC
Electrical-heavy duty (optional)
.25A (resistive) MAX 5 watts
12 to 28 VDC & 110 to 175 VAC



E3

Color Coding:
White (common)
Black (normally open)
Blue (normally closed)

Linear Measure: millimeter / inch



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

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

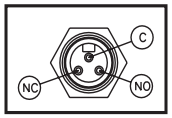
Operating Temperatures:
Buna: -40°F (-40°C) to 225°F (107°C)
Fluorocarbon: -15°F (-26°C) to 275°F (135°C)

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 (6061-T6, black powder painted exterior)
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



E3

Color Coding:
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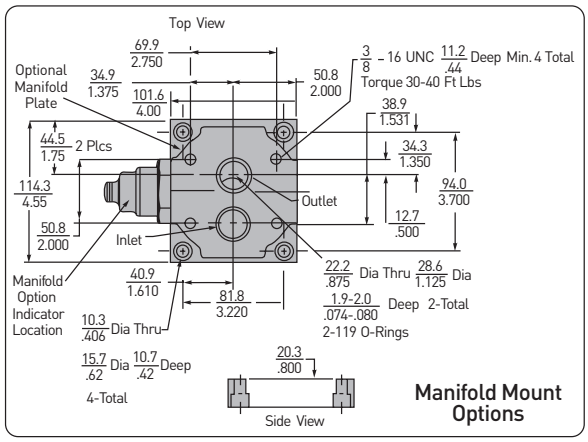
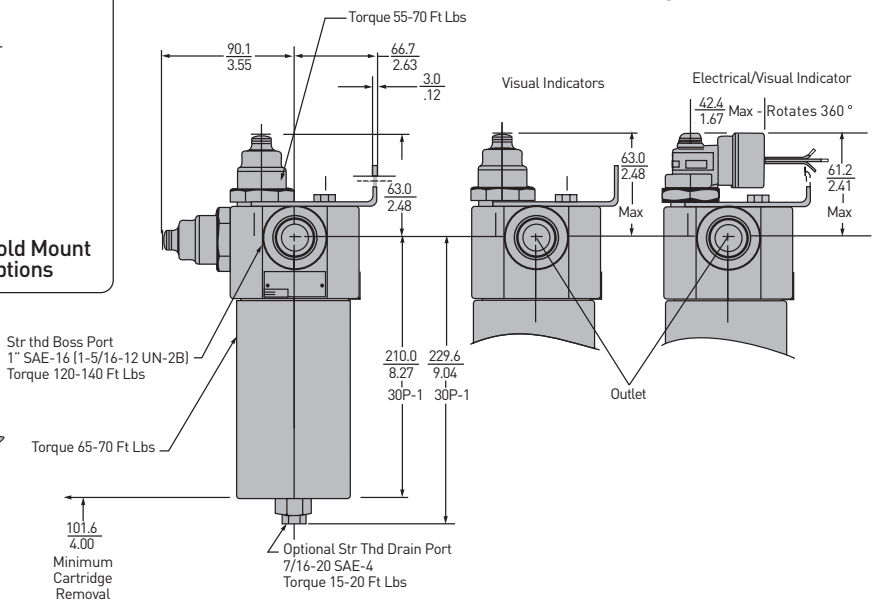
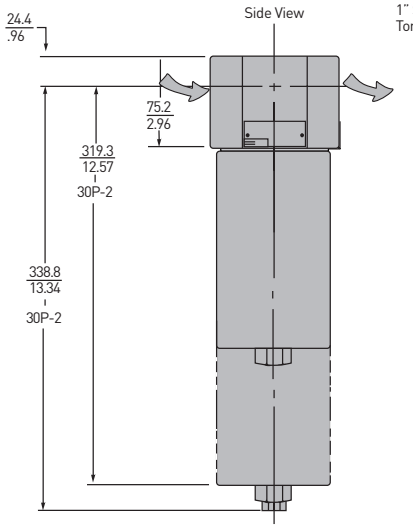
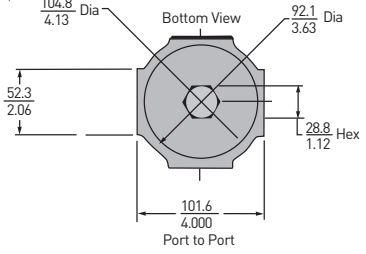
Black (normally open)
Blue (normally closed)

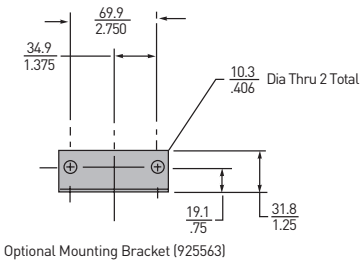


Linear Measure: millimeter / inch









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.

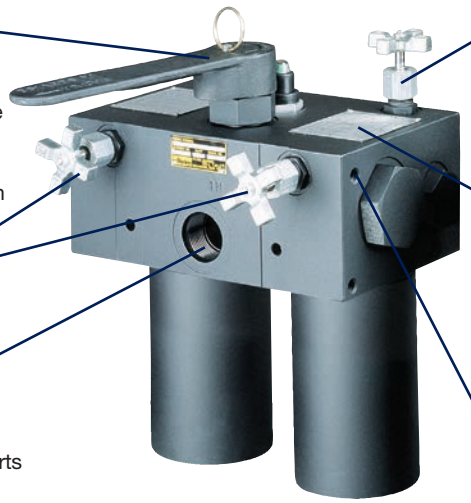
The 30PD allows you to simply switch the diverter valve and service the element while the other side is in service.

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

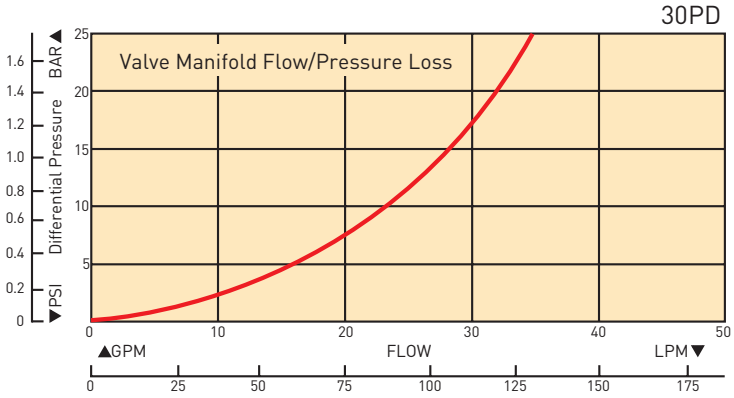
Name tag and operating instructions riveted to manifold

Vent Drains

1/8-27 NPT drain port, both sides

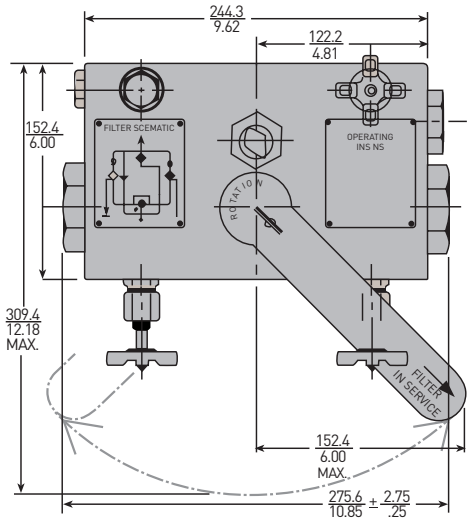
30PD Empty Housing Flow vs Pressure Loss

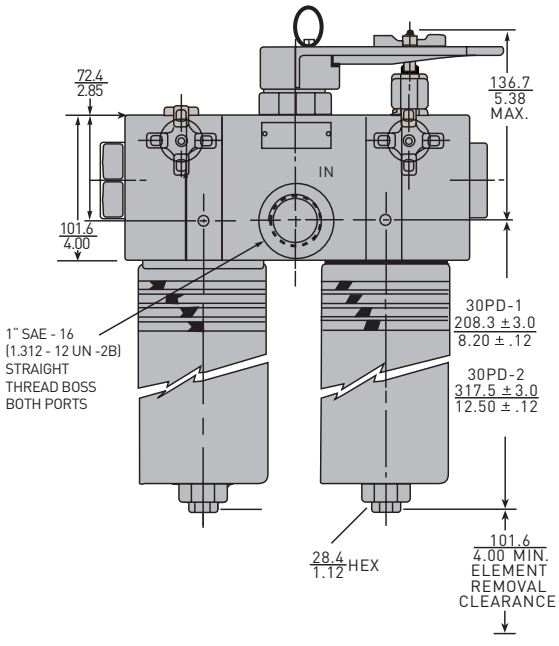
To obtain total filter assembly pressure loss, add empty housing loss to the pressure loss of selected element on 30P element performance pages.



Installation Dimensions

Linear Measure: millimeter / inch



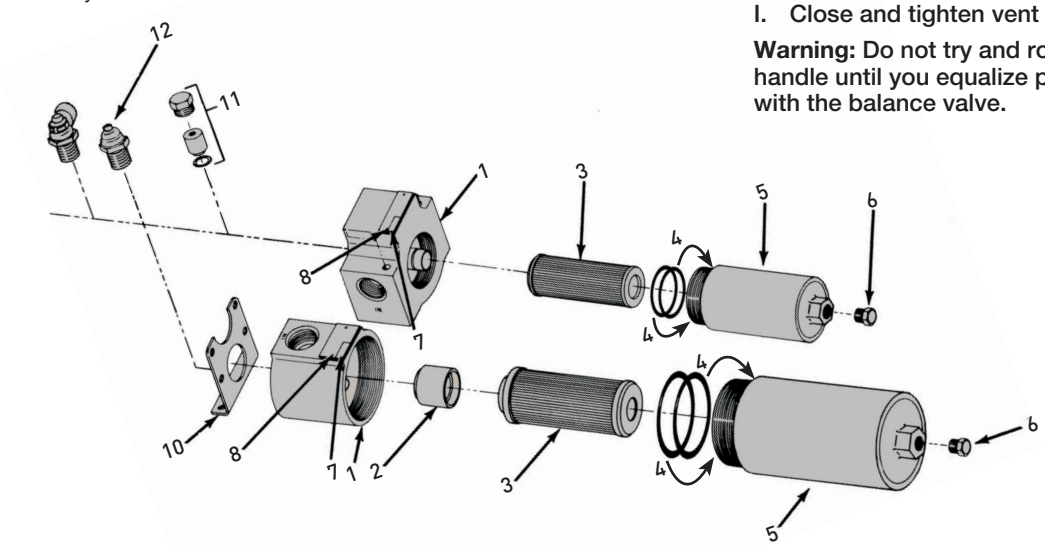


15P/30P Series

Parts List

Index	Description	15P	30P
1	**Head**		
	In-line porting		
	Bypass w/ top indicator port	931520	933956
	No bypass w/ side indicator port	931519	933956
	Bypass w/ side indicator port	931522	933955
	No bypass w/ side indicator port	931521	933955
	Manifold Porting		
	Bypass w/ indicator port	931135	933954
	No bypass w/ indicator port	931523	933954
2	**Bypass valve assembly**		
	50 psid (in-line model only)	928981	925127
	No bypass	935744*	925209
3	**Elements** (see chart on model code page)		
4	**Bowl & back-up O-ring**		
	Nitrile	N92138	N92151
	Fluorocarbon	V92138	V92151
5	**Bowl**		
	Single w/out drain	937547	937551
	Single w/ drain	937549	937553
	Double w/ out drain	937548	937552
	Double w/ drain	937550	937554
6	**Drain plug, SAE-4**		
	w/ nitrile o-ring	921088	921088
	w/ fluorocarbon o-ring	928882	928882
7	**Nameplate (unstamped)**	920928	920928
8	**Drive Screws**	903393	903393
9	**Mounting spacer tube (not shown)**	925650	N/A
10	**Mounting bracket kit**	N/A	925563
11	**Blank indicator kit**	925515	925515
12	**Indicators** (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	**Manifold mounting kit**	N/A	925562
	Manifold o-ring (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 & back-up o-ring 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

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	
Symbol	**Description**
02Q*	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q*	Microglass, 10 micron
20Q	Microglass, 20 micron

BOX 4: Seals	
Symbol	**Description**
B	**Nitrile (NBR)**
E	**Ethylene propylene (EPR)**
N	**Fluorocarbon (FKM)**

BOX 5: Indicators	
Symbol	**Description**
P	**Port Plugged**
M2	**Visual auto reset**
H	Electrical w 1/2" - 14 NPT connection and 12" leads
E	Electrical/visual w/ 1/2" NPT conduit connection and wire leads
E2	**Electrical/visual w/ DIN 43650 Hirschman style connection**
E3	Electrical/visual (ANSI/B.9355M 3-pin Brad Harrison style connection)

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

BOX 6: Bypass	
Symbol	**Description**
K	**50 PSI (3.5 bar)**

BOX 7: Ports	
Symbol	**Description**
	15P
S12	**SAE-12**
X	**3/4" manifold porting**
	30P
S16	**SAE-16**
X	**1" manifold porting**
	30PD
S16	**SAE-16**

Note: Customer supplies subplate for 30P manifold porting or may purchase 925562 30P manifold mounting kit. 15P requires no subplate.

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

Please note the bolded options reflect standard options with a reduced lead time.

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

50P Series

High Pressure Filters

Parker

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. No need to waste money on features you don't need.

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 be removed from filter 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 design that reduces the number of fittings and potential leak points. 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 or double length

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

Bypass (not visible)
Cartridge style
Precision matched assemblies

Indicators
Visual or electrical/visual
Several connector options

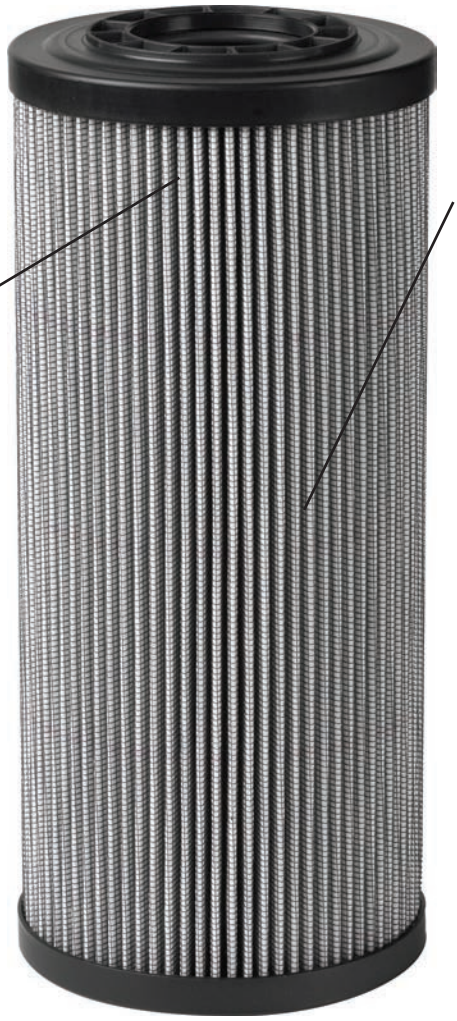
Drain Plug (not visible)
Drain oil for easy service

50P Series

Features

O-Ring Seal
Positive sealing for optimum element efficiency

Plastic End Caps
Excellent corrosion protection
Laser marked for clear long lasting identification



Microglass Media
Multi-layer for high capacity and high efficiency
Four different micron sizes available
Wire reinforced to prevent pleat bunching

Spiral Support Cylinders (Not Visible)
High strength consistent support
Continuous length eliminates leak points and increases surface area

Meets SAE HF4 specificaton for automotive uses

Feature	Advantage	Benefit
Base mounted filter	No brackets required for installation	Reduces installation costs
Top access cover	Remove element from top Lighter then remiving entire bowl	No oil mess
Visual and electrical indicators	Know exactly when to service elements	
Drain port	Drain all oil from assembly prior to servicing	Eliminates cross contamination
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

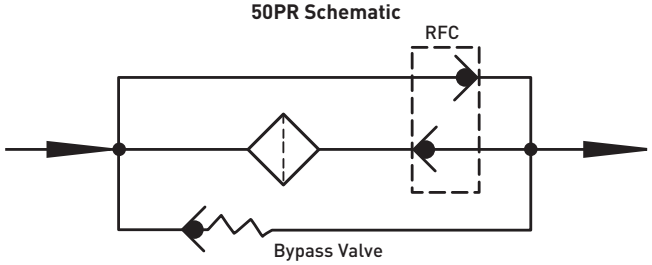
50P Series

50PR Reverse Flow Filter

The 50PR was designed specifically for hydrostatic transmission loops because of it's capability to handle reverse flow.

Closed circuit HSTs frequently reverse direction causing flow to reverse in the fluid lines. Pressure filters installed between pump and motor must be able to handle reverse flow without having contaminant washed off of the elements and back into the system. To prevent such an occurrence, the filters require the use of internal check valves to direct the flow through the element in one direction and around the element in the other. Parker's internal check valve design minimizes additional pressure loss and eliminates the cost associated with external valves and fittings. Also the internal design keeps the envelope dimensions of the filter to a minimum as can be seen on the installation drawing.

50PR Schematic



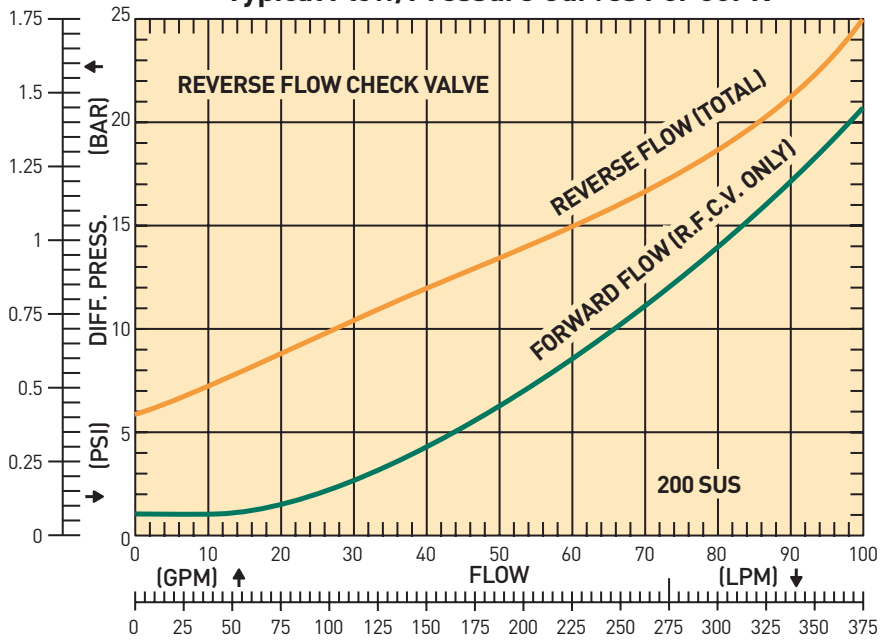
Sizing 50PR Filter Assemblies

To accurately determine the total pressure loss that will be seen when used in your system, the following steps should be taken.

1. Examine the "Flow vs. Pressure" curve below. Find the pressure drop for the maximum system flow on the forward flow curve. Record this value as "housing with check valve pressure loss."
2. Examine the appropriate pressure loss curve for the media and bowl length combination. These curves are found in the Element Performance Data section.
3. Find the pressure drop for the maximum flow rate through the filter and record this value as "element pressure loss."
4. Find the empty housing pressure drop for the maximum flow rate through the filter and record
this value as "empty housing pressure loss."
5. Add the values obtained in steps 1 and 3, then subtract out the value from step 4. The resultant pressure loss should not exceed 1/3 of the bypass valve or indicator you intend to select. If this ratio exceeds 1/3, then a double length housing or other media grade may need to be considered.

Contact the division if there is any doubt as to the total pressure loss you have calculated.

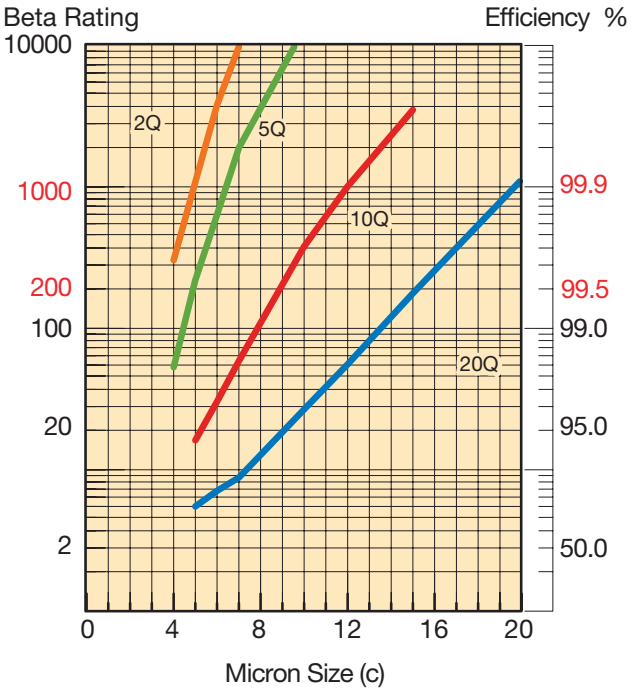
Typical Flow/Pressure Curves For 50PR



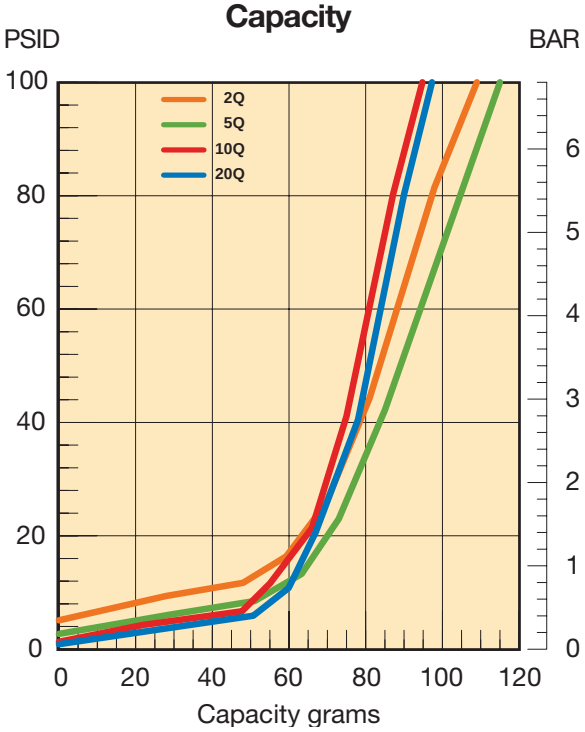
50P Series

50P-1 Element Performance

Efficiency



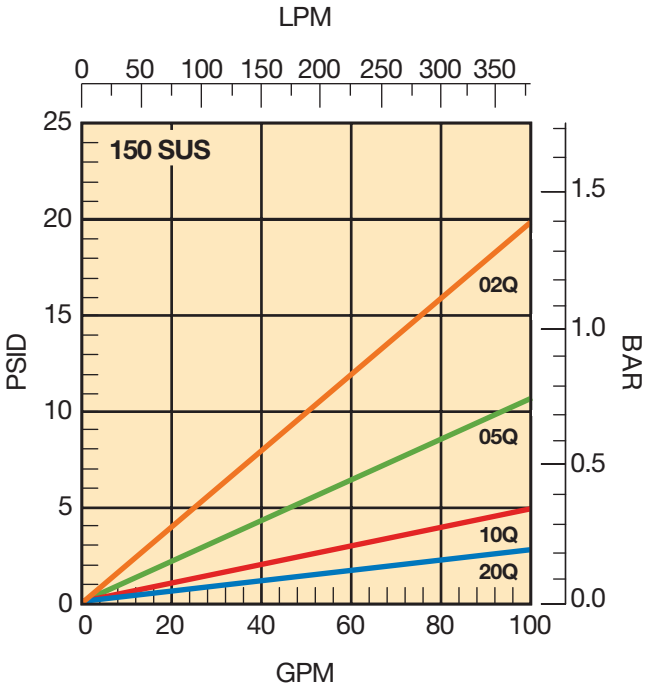
Capacity

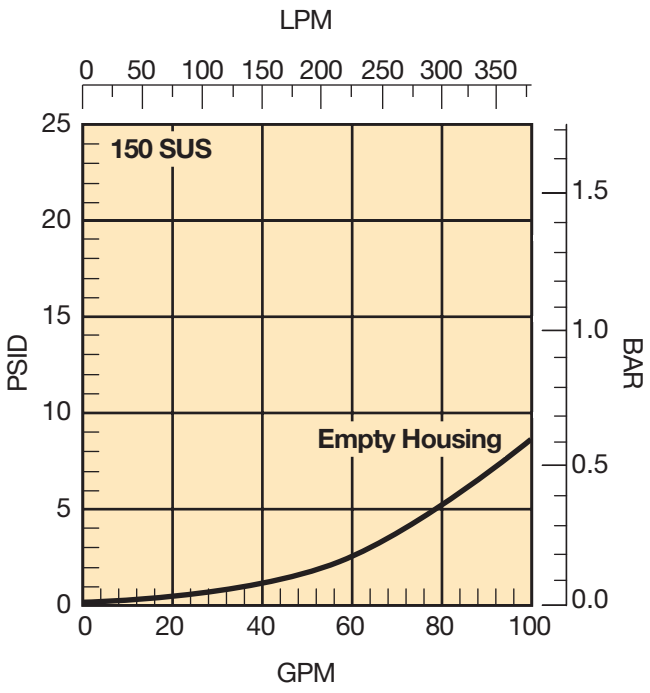


Results typical from Multi-pass tests run per test standard ISO 16889 @ 50 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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

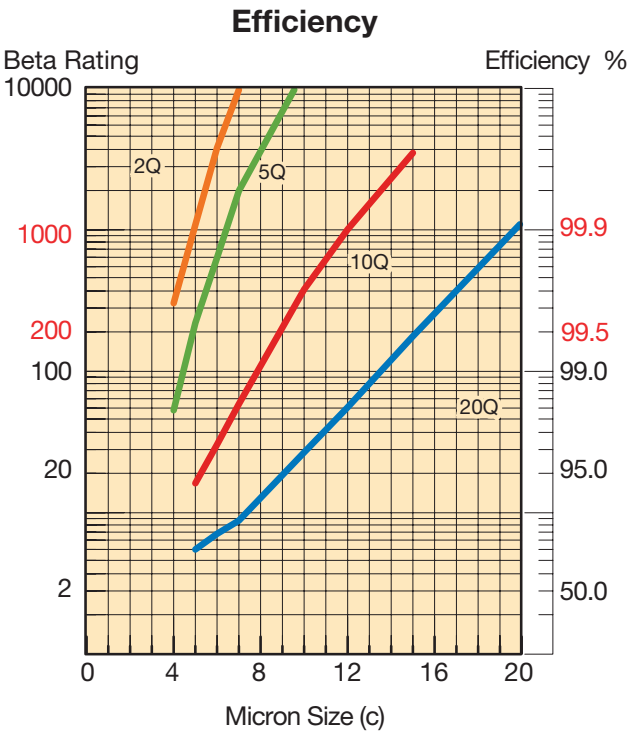
Flow vs. Pressure Loss

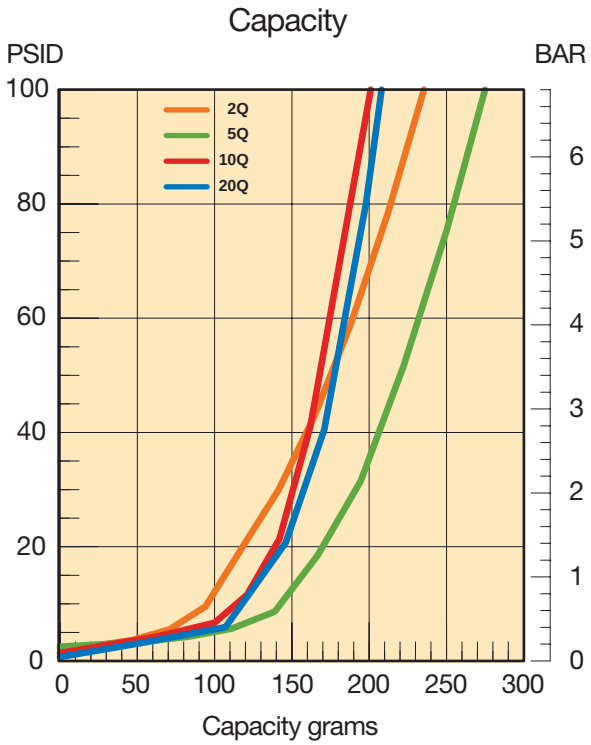




50P Series

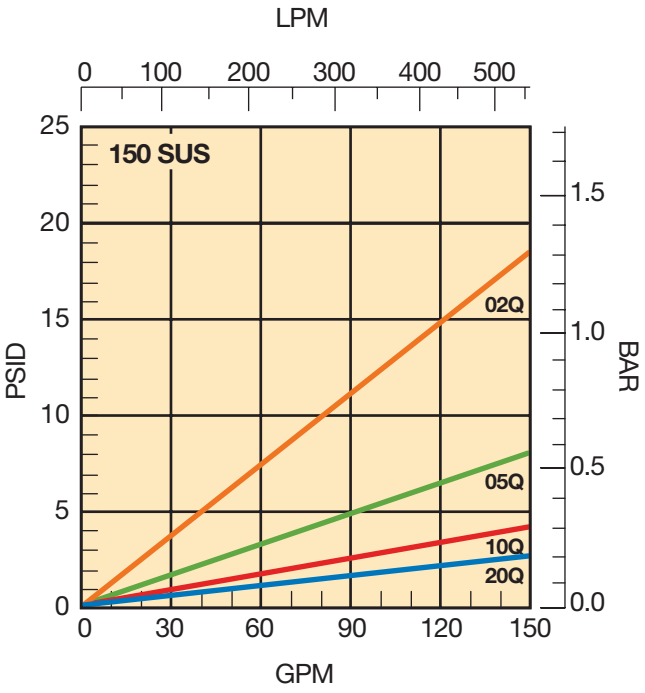
50P-2 Element Performance

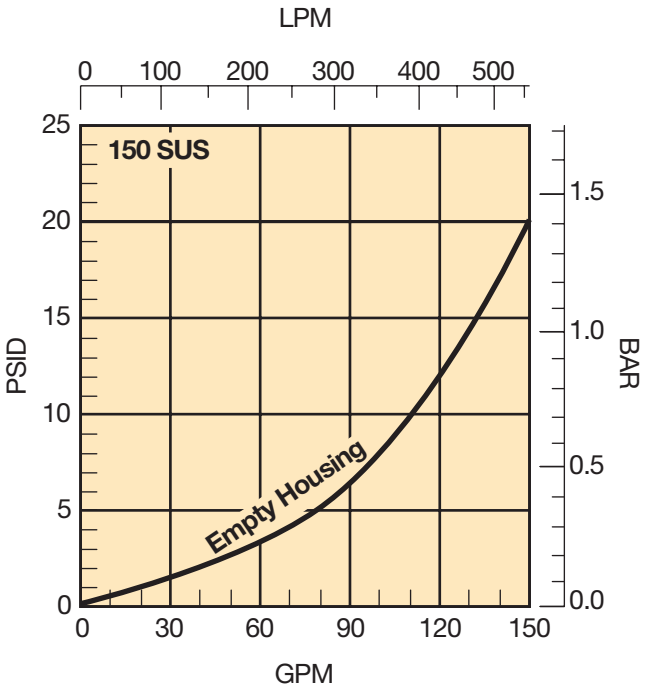




Results typical from Multi-pass tests run per test standard ISO 16889 @ 80 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

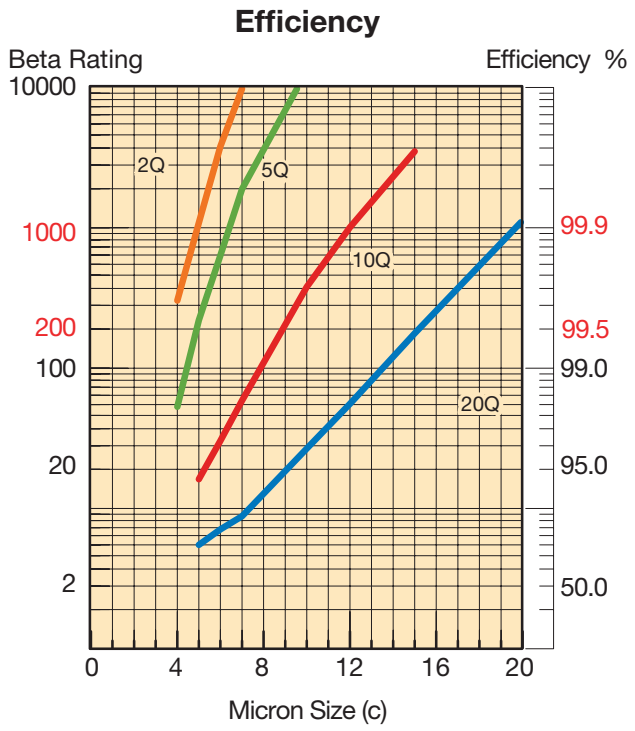
Flow vs. Pressure Loss

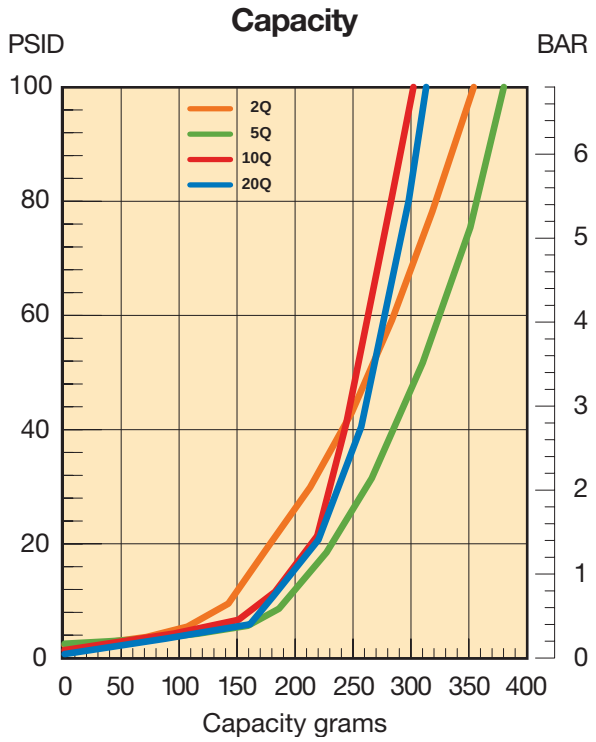




50P Series

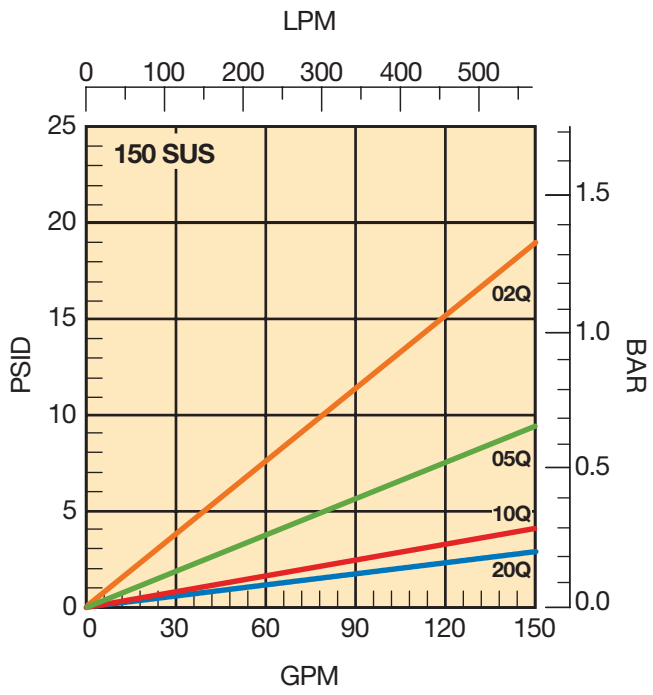
50P-3 Element Performance

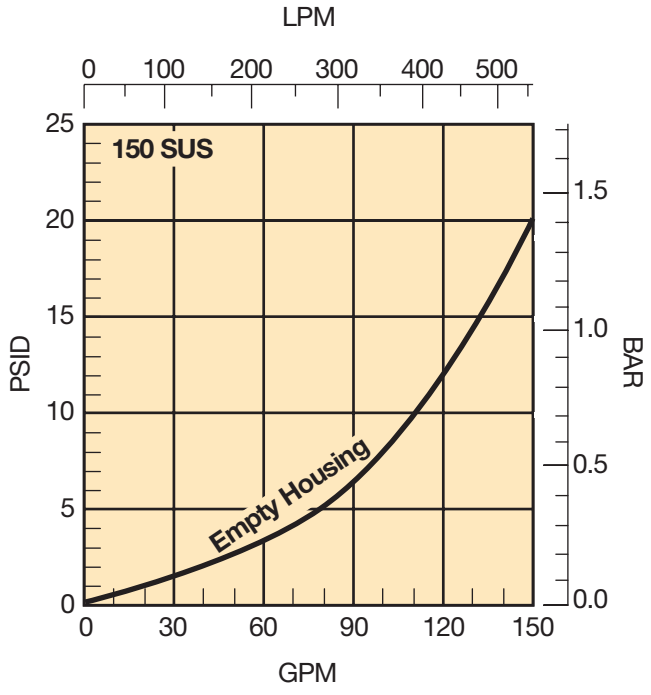




Results typical from Multi-pass tests run per test standard ISO 16889 @ 80 gpm to 100 psid terminal - 10 mg/L BUGL
Refer to Appendix on pages 264-265 for relationship to test standard ISO 4572.

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: 3:1

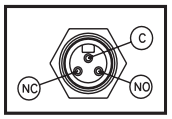
Element Collapse Rating:
150 psid (10.2 bar) standard
2000 psid (138 bar) high collapse "H" option

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

Dimensions: mm/inches	50P-1	50PR-1	50P-2	50PR-2	50P-3
X	387.1 15.24	404.6 15.93	622.8 24.52	640.3 25.21	850.4 33.48
Z	254.0 10.00	254.0 10.00	508.0 20.00	508.0 20.00	760.2 30.00

Indicators:
Visual 3 band (clean, change element, bypass)
Electrical: visual as above plus electrical switch with wire leads or connection as selected.
5A @ 240VAC
3A @ 28VDC
SPDT



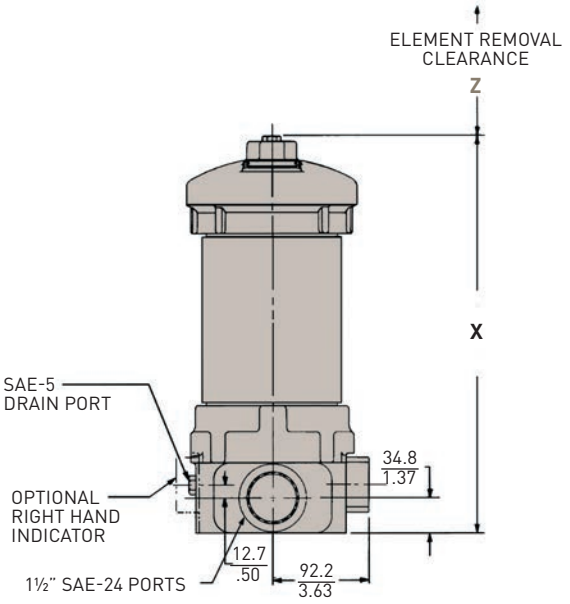
D

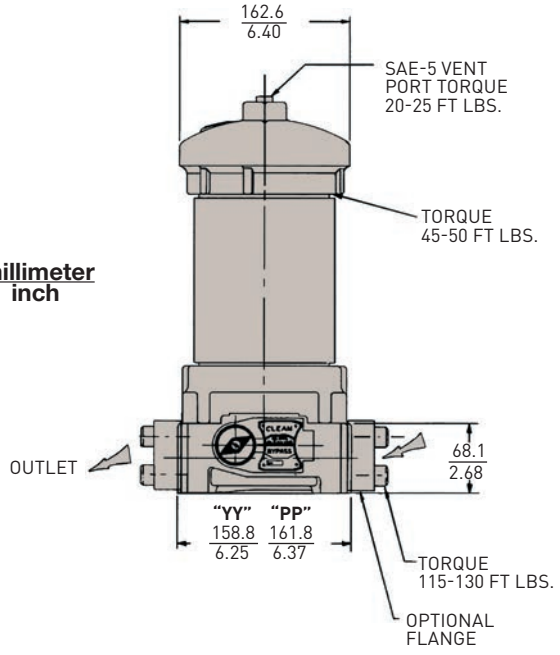
Color Coding:
White (normally closed)
Red (normally open)
Black (common)

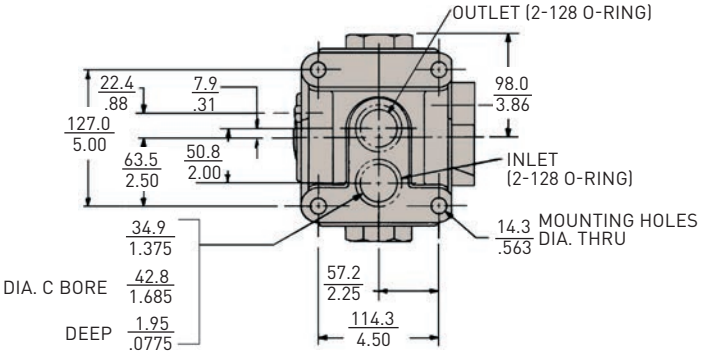
Shipping Weights (approximate):
50P-1: 56 lb. (25.4 kg)
50P-2: 77 lb. (34.9 kg)
50P-3: 95 lbs. (43.0 kg)
50PR-1: 59 lb. (26.8 kg)
50PR-2: 80 lb. (36.3 kg)

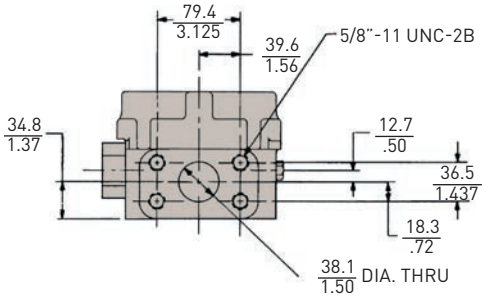
Drawings are for reference only.
Contact factory for current version.

Linear Measure: millimeter / inch









50P Series

Parts List and Service Instructions

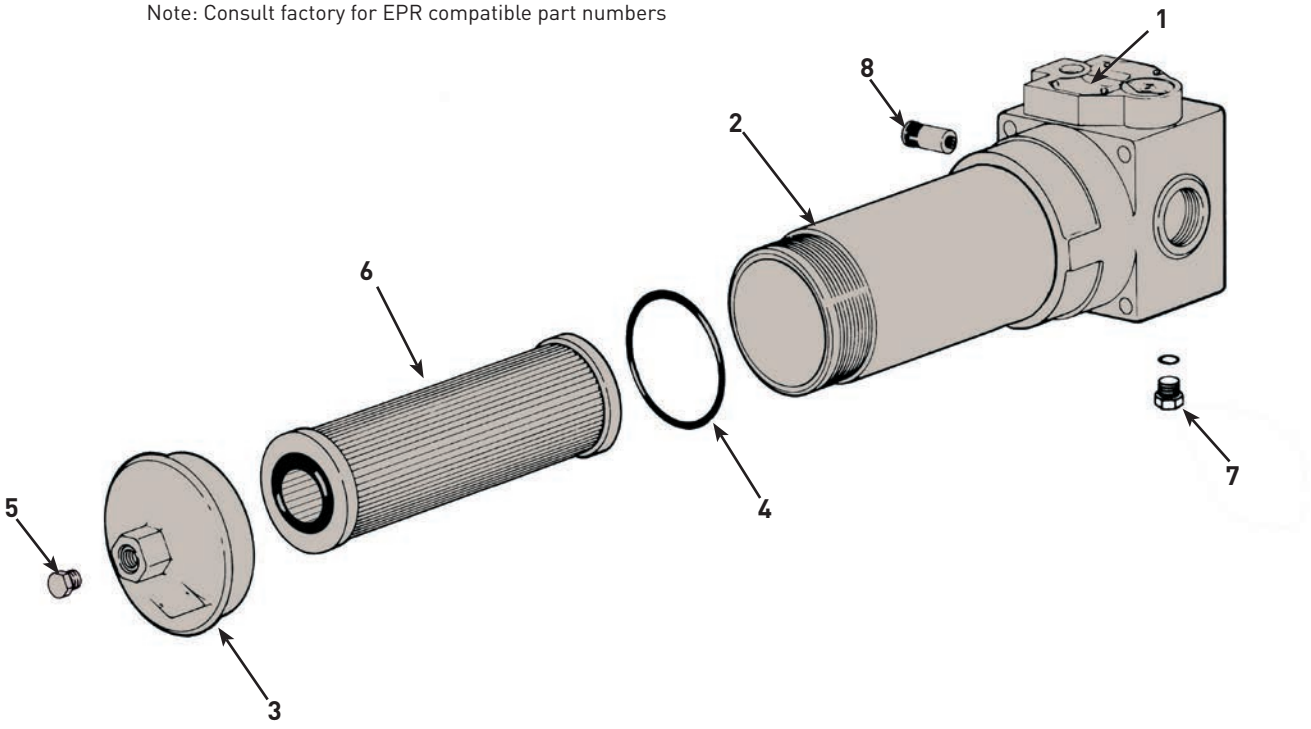
Index	Description	Part Number 50P/50PR
1	**Head Assembly**	C/F
2	**Bowl**	C/F
3	**Cover**	926655
4	**Cover O-ring** Buna Fluorocarbon	 N92246 V92246
5	**Vent Plug** Buna Fluorocarbon	927363 N93905 V93905
6	**Element**	Elements selected will have consistent performance levels
7	**Drain Plug** Buna Fluorocarbon	927363 N93905 V93905
8	**Bypass Valve** (50PR valve is not serviceable) 50psi No bypass, 50 psi indicator 90 psi No bypass, 90 psi indicator **Indicator Kits** Mechanical (left side) Mechanical (right side) Electrical (wire leads) Electrical (3-pin Brad Harrison sytle) Electrical (DIN 43650 connection) **O-ring, Manifold port** Buna Fluorocarbon	 924189 924192 927399 930683 931916 931924 925337 926482 929362 N92128 V92128

Note: Consult factory for EPR compatible part numbers

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 counter-clockwise 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

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
F3	50P	1	10Q	DL	90	PP	1

BOX 1: Seals

Symbol	Description
None	**Buna**
F3	Fluorocarbon
E8	EPR

BOX 2: Basic Assenbly

Symbol	Description
50P	**5000 PSI (MAOP)**
50PR*	Reverse flow hydrostatic version

* Not available on triple length, must choose 1 or 2 in box 3.

BOX 3: Length

Symbol	Description
1	Single
2	Double
3	Triple

BOX 4: Element Media

Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron

BOX 5: Indicators

Symbol	Description
P	**Port plugged**
PL	Port plugged, left side
M	Visual indicator
ML	Visual indicator, left side
E	Electrical indicator w/ wire leads and conduit connection
EL	Electrical indicator w/ wire leads and conduit connection, left side
D	Electrical indicator w/ ANSI, B.93.55M 3-pin Brad Harrison style connection
D	Electrical indicator w/ ANSI/ B.93.55M 3-pin Brad Harrison style connection, left side

Note: Left side is on viewer's left when looking into inlet port.

BOX 6: Bypass & Indicator Setting

Symbol	Description
35	35 psid
50	50 psid
90	**90 psid**

BOX 7: Ports

Symbol	Description
PP	**SAE-24 straight thread**
YY	**SAE 1 1/2" flange face (J518)**
XX	**1 3/8" manifold ports on bottom of head**

BOX 8: Options

Symbol	Description
1	**None**
11	Blocked bypass

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements (Fluorocarbon)

Standard Collapse				High Collapse			
Media	Single	Double	Triple	Media	Single	Double	Triple
02Q	932668Q	932677Q	933486Q	02QH	932674Q	932683Q	936446Q
05Q	932669Q	932678Q	933487Q	05QH	932675Q	932684Q	936447Q
10Q	932670Q	932679Q	933488Q	10QH	932676Q	932685Q	936448Q
20Q	931018Q	931020Q	933489Q	20QH	930438Q	931490Q	936449Q

100P Series

High Pressure Filters

ENGINEERING YOUR SUCCESS.

100P Series

Features

- **Pressures to 6,000 PSI**
- **Flows to 265 GPM**
- **Microglass Elements 3 to 20 Micron**
- **1½" and 2" Ports - SAE O-Ring or Code 62 Flange**
- **Reverse Flow Option**

Specifications:

Flow Rating: 265 GPM

Operating Pressure: 6000 PSI

Proof Pressure: 9000 PSI

Burst Pressure: 12,000 PSI

Fatigue Pressure:
0-4000-0 PSI@3,000,000 cycles

Bypass Setting: 100 PSID

Fluid Temperature: -40°F to +212°F

Constrution:
Head and Cap: Nodular Iron
Bowl: Seamless Steel Tube

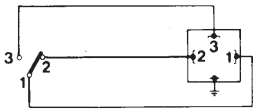
Indicators: Brass

Elements: Consult Factory

Weight: Length 2 -104 Lbs.

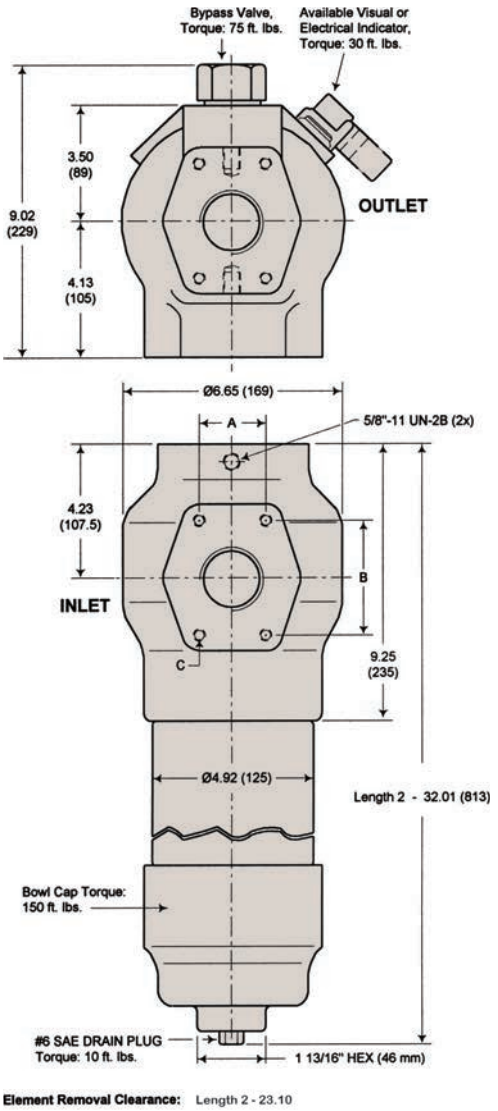
Electrical Ratings:

Hirschman Connector without Lamps:
E2 110 VAC, .5 Amp Ind., 2 Amp Res.
250 VAC, .5 Amp Ind., 2 Amp Res.
28 VDC, 1 Amp Ind., 2 Amp Res.



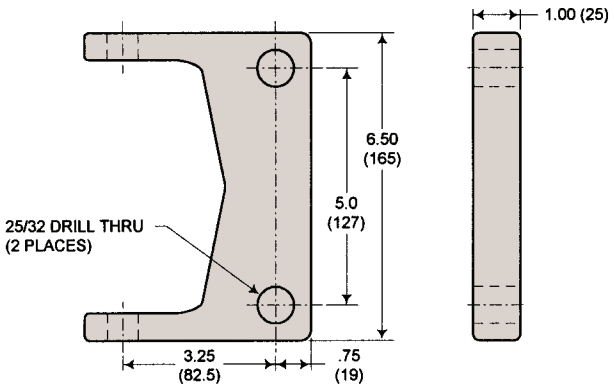
Plug connections	PIN code
Common live in	1
Normally closed live out	2
Normally open live out	3

Dimensions
Inches (mm)



Element Removal Clearance: Length 2 - 23.10

Optional Mounting Bracket



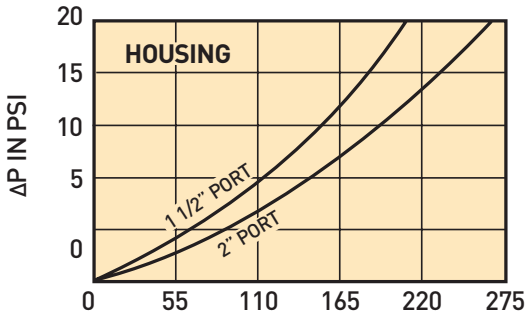
Port	Dimensions in(mm)		
	A	B	C
F	1.437 (36.5)	3.125 (79.4)	5/8"-11 x 1.4"
T	1.750 (44.5)	3.812 (96.8)	3/4" - 10 x 1.4"

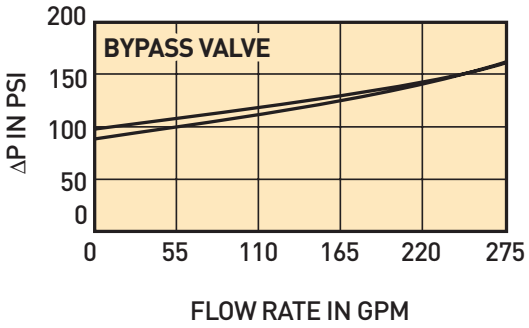
100P Series

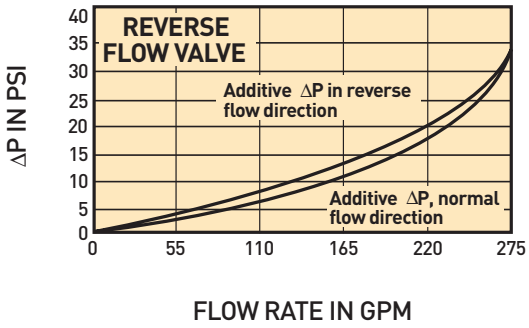
Element Performance

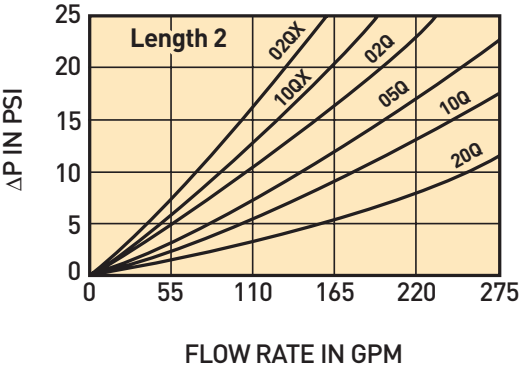
Flow/Pressure Drop Data

Fluid Conditions: Viscosity 140 SSU and Sp. Gr. 0.88









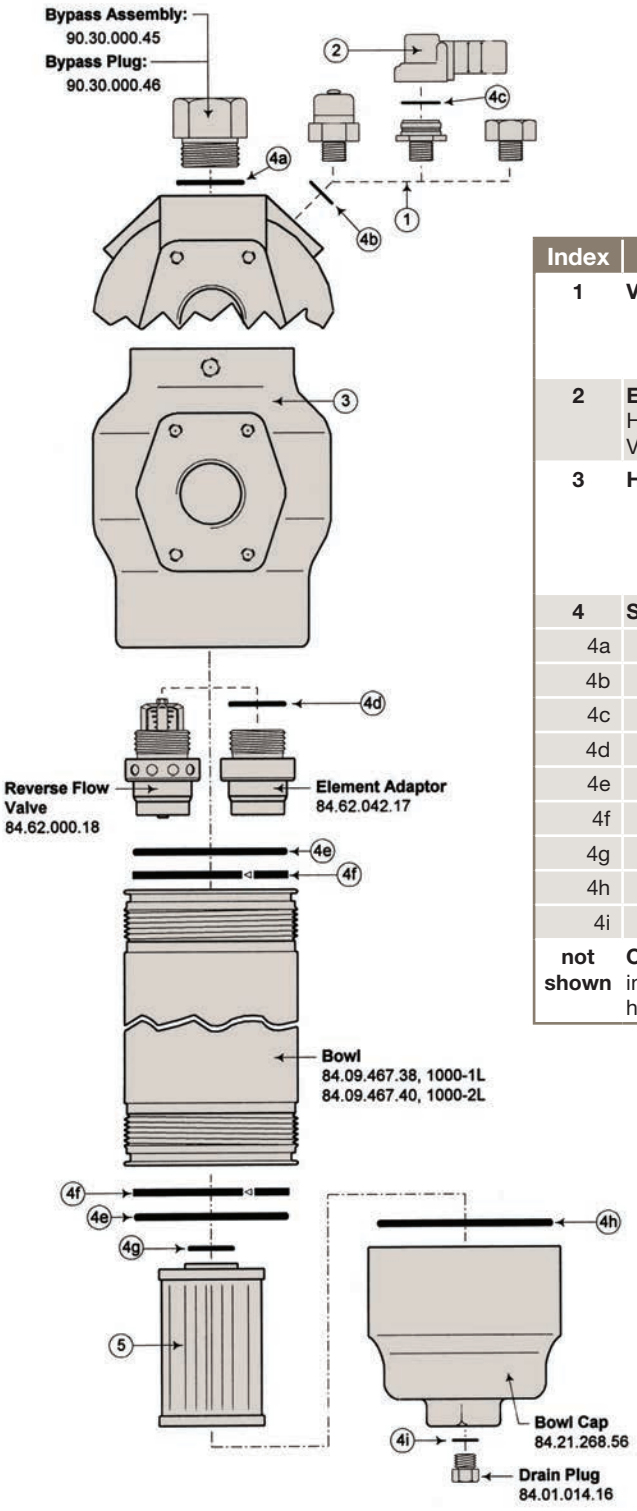
Multipass Test Results to ISO 4572 (Time Weighted Average)

Filtration Rating							
Media Code	$\beta x \geq 100$	β_3	β_6	β_{10}	β_{12}	β_{20}	β_{25}
02Q	3	≥100 99.0	>300 99.67	>1500 99.93	>2000 99.95	>5000 99.98	INF
05Q	6	12 91.7	≥100 99.0	>1000 99.9	>2000 99.95	>5000 99.98	INF
10Q	10	8 87.5	22 95.4	≥100 99.0	≥200 99.5	>5000 99.98	INF
20Q	20	–	2 50.0	8 87.5	20 95.0	≥100 99.0	>200 99.5

Element Beta ratio βx
Element efficiency in percent*

100P Series

Parts List



Index	Description	Part Number	
1	**Visual Indicator**	6N50-2A	
	Electrical Sub-Assy	90.34.000.24	
	Indicator Plug	84.01.066.30	
2	**Electrical Actuator Assembly**, Hirschmann connector, E2, 28 VDC, 250 VAC max.	FF3468	
3	**Head** 1000-F, 1 1/22 SAE 6000 psi flange Code 62 1000-T, 22 SAE 6000 psi flange, code 62	84.69.268.20 84.69.268.22	
4	**Seals**	**Nitrile**	**Flourocarbon**
4a	Bypass assembly/ Plug seal	N93924	V93924
4b	Indicator to Head seal	N72019	V72019
4c	Actuator dust seal	N72012	
4d	Adapter to head seal	81.10.150.15	81.10.152.15
4e	Head/Bowl/Cap seal	N92346	V92346
4f	Head to bowl back-up ring	FF3142	
4g	Element seal	N72141	V72141
4h	Bowl cap seal	81.10.150.86	81.10.152.86
4i	Drain plug seal	N93906	V93906
not shown	**Optional Mounting bracket**, includes (2) 5/8”-11 x 1 1/4” hex flange bolts	402904	

*Included in Seal Kit: **936063**, Nitrile **8061000013**, Fluorocarbon

†Included in Element Kit

‡To specify seal material, add the following suffix to the part number:
A Nitrile H Fluorocarbon

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

100P Series

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
100P	2	10Q	B	M2	M	F32	1

BOX 1: Filter Series	
Symbol	**Description**
100P	**High Pressure Filter**

BOX 2: Element Length	
Symbol	**Description**
2	**Double**

BOX 3: Media Code	
Symbol	**Description**
	Standard Element
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron
	High Collapse
02QX	**Microglass, 2 micron**
10QX	**Microglass, 10 micron**

BOX 4: Seals	
Symbol	**Description**
B	**Nitrile**
V	**Fluorocarbon**

BOX 5: Indicators	
Symbol	**Description**
M2	**Visual Differential**
E2	**Electrical Differential**

BOX 6: Bypass & Indicator Setting	
Symbol	**Description**
M	**100 psid (7 bar)**
X	**No bypass**

BOX 7: Ports	
Symbol	**Description**
F24	**1 1/2" SAE flange, code 62**
F32	**2" SAE flange, code 62**

BOX 8: Options	
Symbol	**Description**
1	**None**
3	Reverse floe valve (RFV)
TP	Mounting bracket (including bolts)
3TP	RFV & mounting bracket (including bolts)

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements (Nitrile)

Standard Collapse		High Collapse	
Media	**Single**	**Media**	**Single**
02Q	939064Q	02QX	940741Q
05Q	939065Q	10QX	940724Q
10Q	939066Q		
20Q	939067Q		

***Note: Consult factory for fluorocarbon elements.**

Notes:

1. Filters include the element you select already installed.

2. Indicator setting is 73 psid (5,0 bar).

3. When the no bypass option is selected, a high collapse element must also be selected.

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

1. **High strength ductile iron filter head with integral indicator port**
2. **Steel bowl with standard drain port**
3. **Proprietary element endcap assembly includes bypass and reverse flow valves**
4. **Patented deformable tangs secure element in bowl**
5. **Coreless element assembly**
6. **Re-usable element support core**

WPF Series

SurgeGuard Elements

Ecoglass design
Non-metallic construction

Environmentally friendly.
Reduced disposal costs due to minimum mass and oil retention

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 ΔP
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

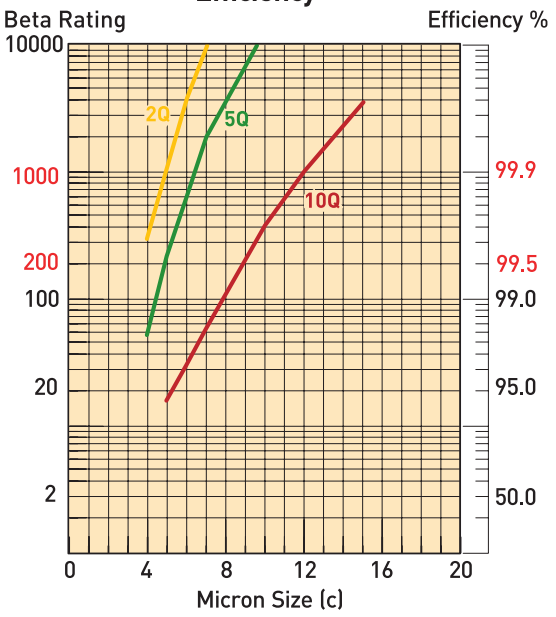
Patented valves with low hysteresis
Zero leakage and low friction

Optimum performance

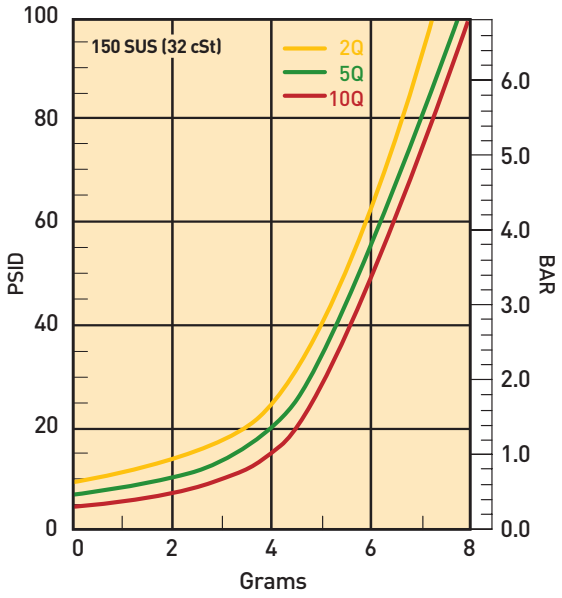
WPF Series

WPF1 Element Performance

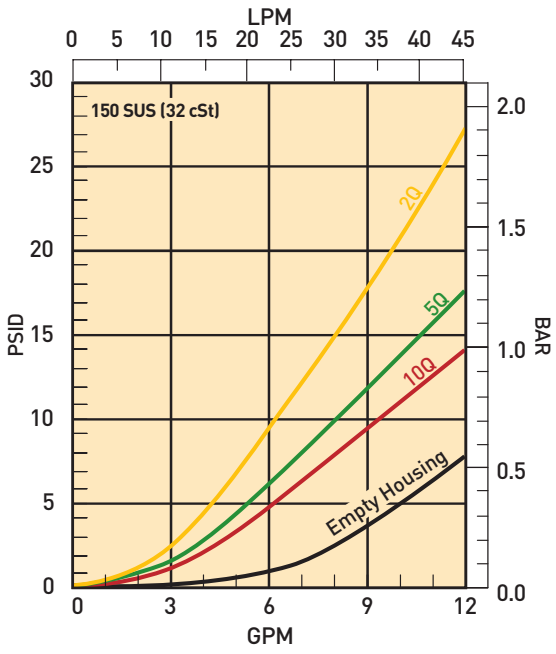
Efficiency



Capacity



Flow vs. Pressure Drop*



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

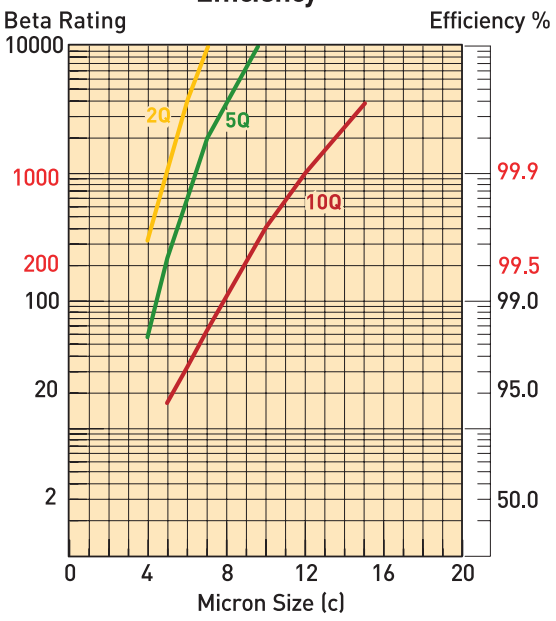
Results typical from Multi-pass tests run per test standard ISO 16889 @ 10 gpm to 50 psid terminal - 10 mg/L BUGL.

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

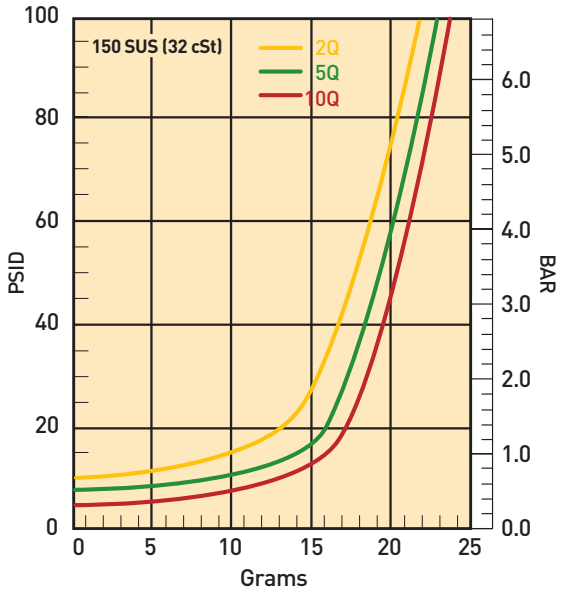
WPF Series

WPF2 Element Performance

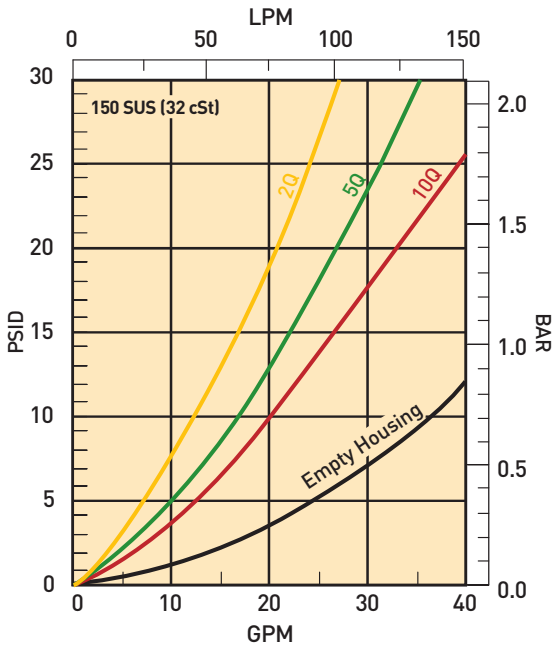
Efficiency



Capacity

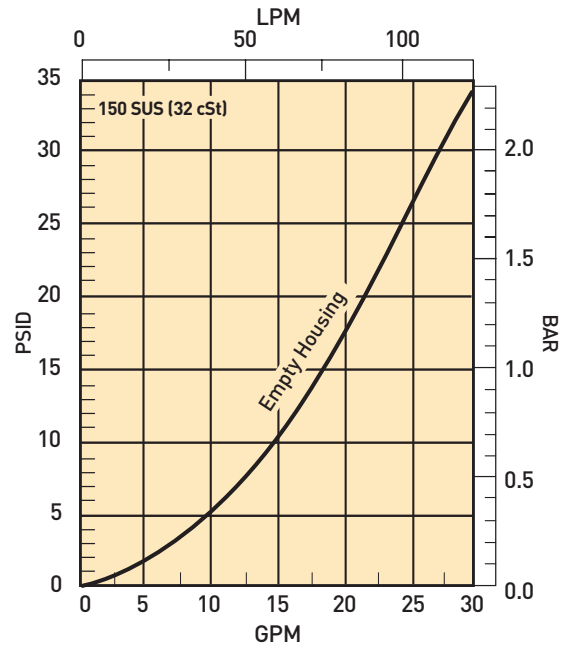


Flow vs. Pressure Drop*



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

Manifold Pressure Drop



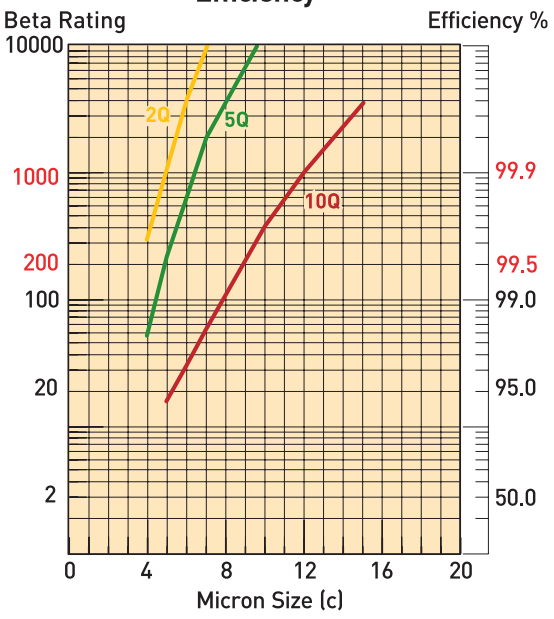
Results typical from Multi-pass tests run per test standard ISO 16889 @ 25 gpm to 50 psid terminal - 10 mg/L BUGL.

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

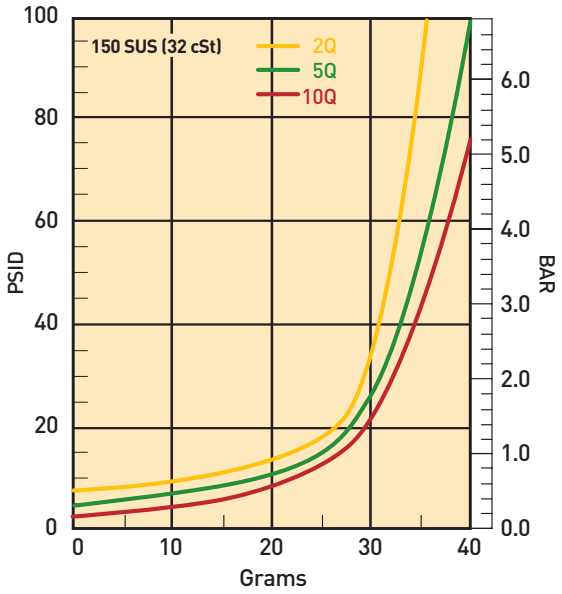
WPF Series

WPF3 Element Performance

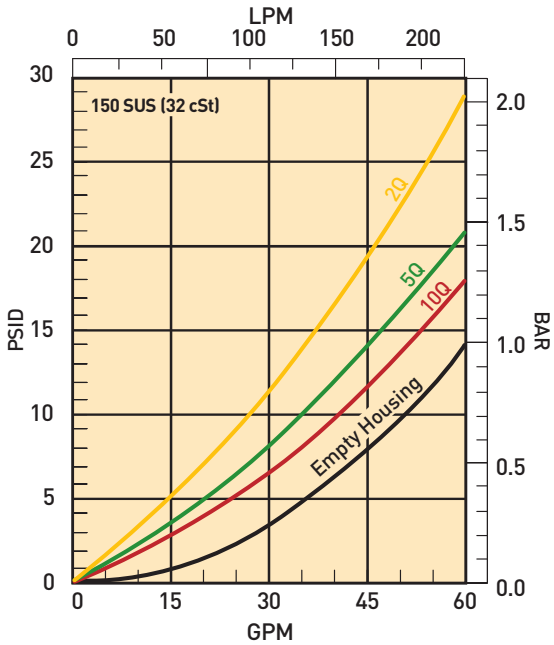
Efficiency



Capacity



Flow vs. Pressure Drop*



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

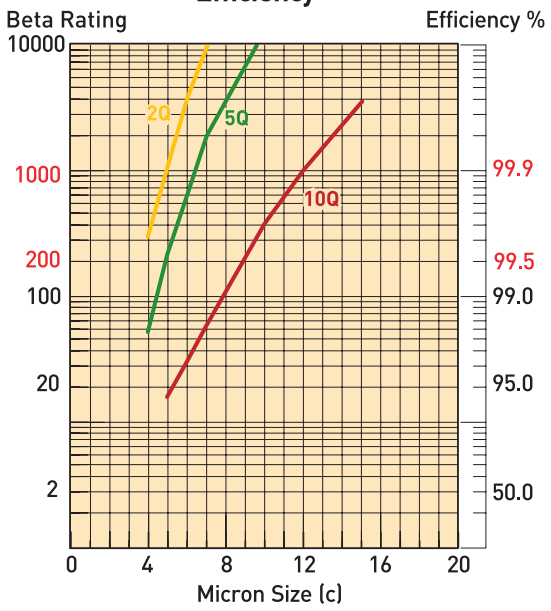
Results typical from Multi-pass tests run per test standard ISO 16889 @ 45 gpm to 50 psid terminal - 10 mg/L BUGL.

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

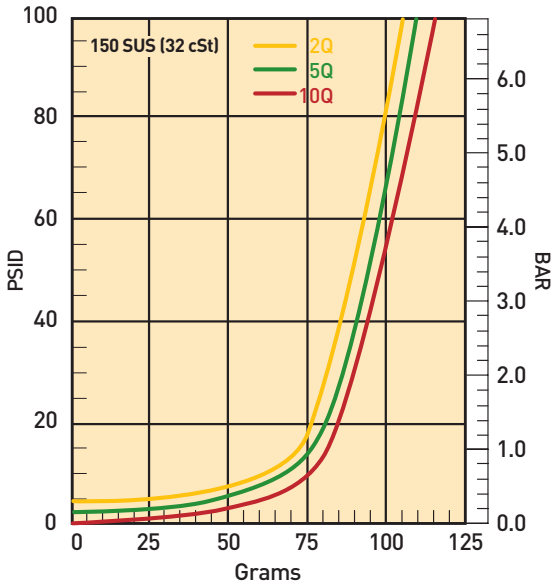
WPF Series

WPF4 Element Performance

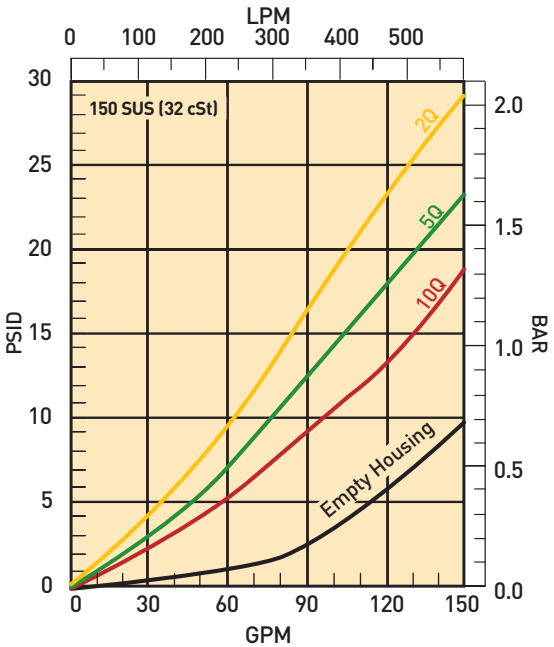
Efficiency



Capacity

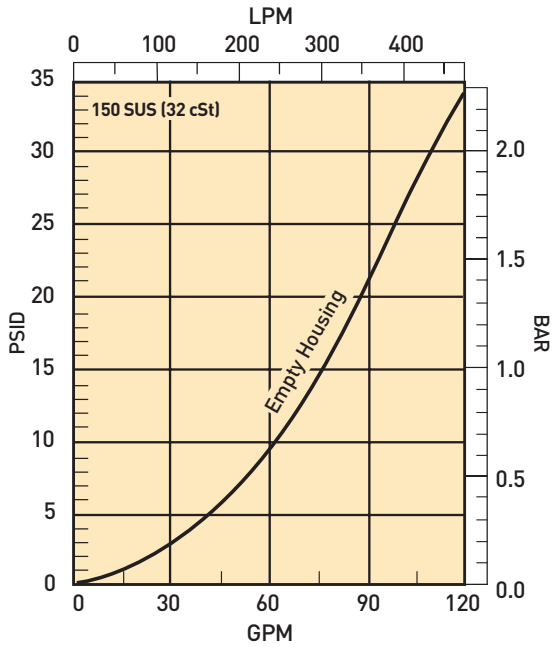


Flow vs. Pressure Drop*



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

Manifold Pressure Drop



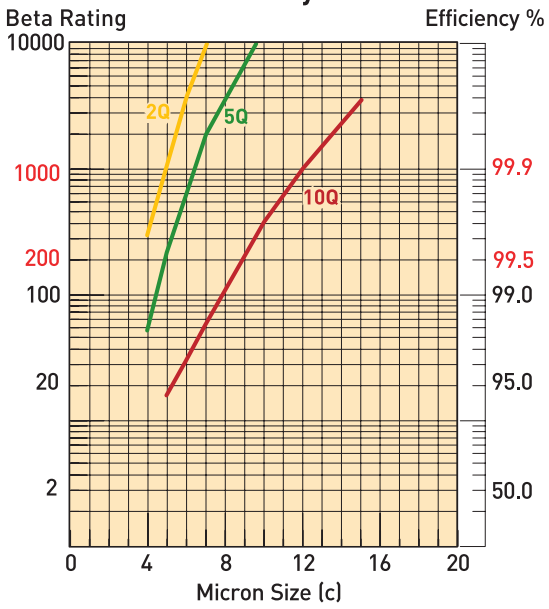
Results typical from Multi-pass tests run per test standard ISO 16889 @ 90 gpm to 50 psid terminal - 10 mg/L BUGL.

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

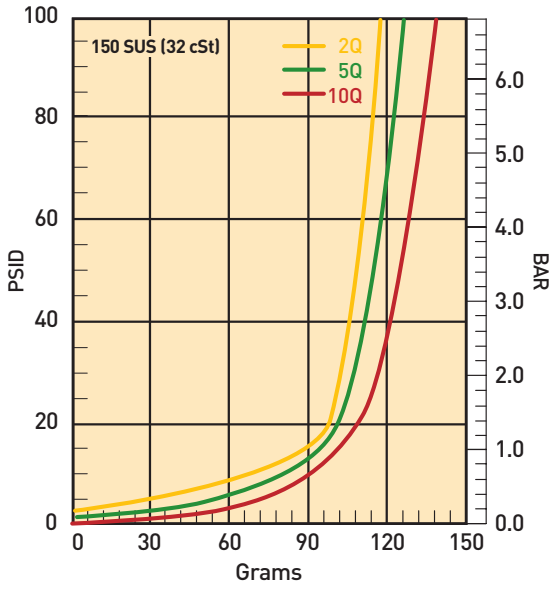
WPF Series

WPF5 Element Performance

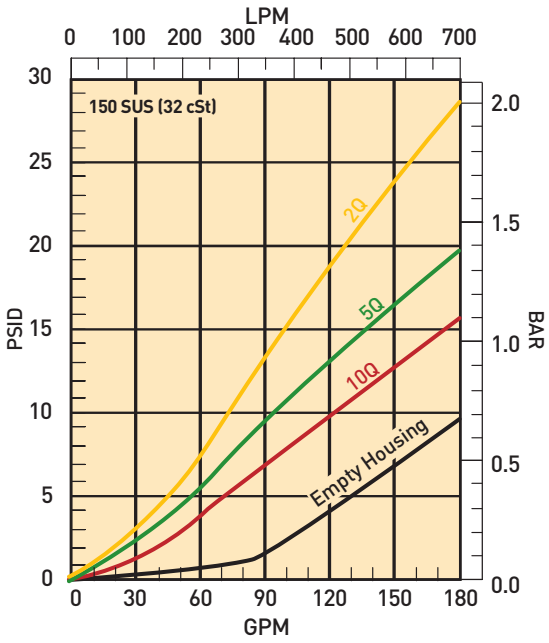
Efficiency



Capacity

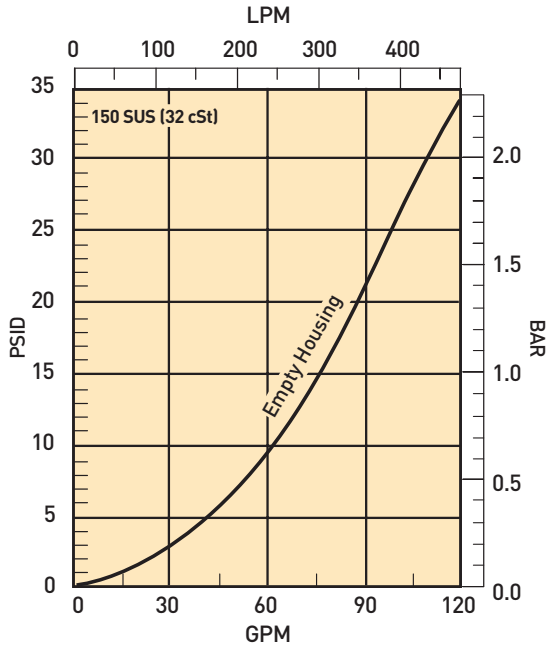


Flow vs. Pressure Drop*



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

Manifold Pressure Drop



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)

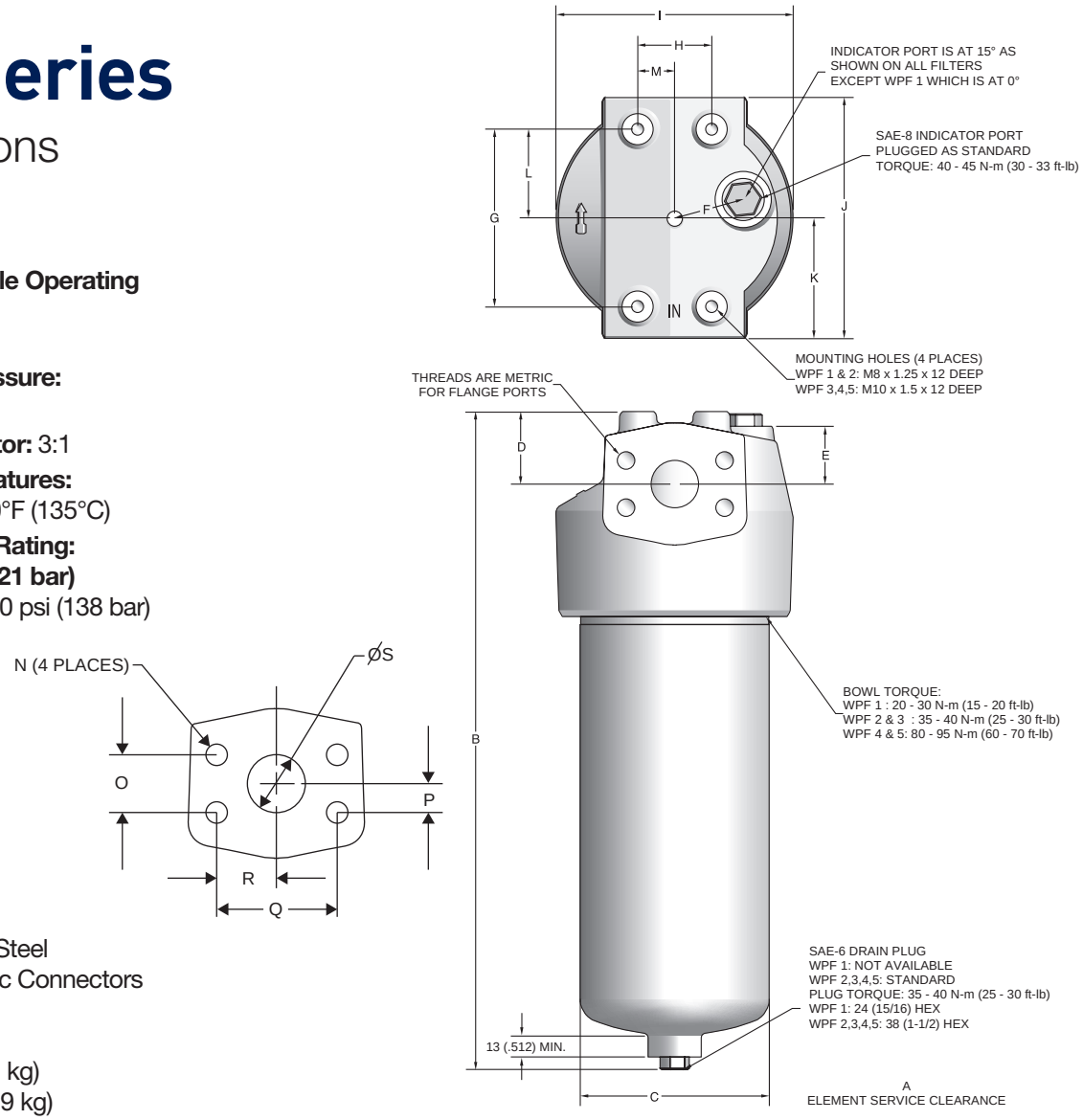
Materials:
Head: SG Iron
Bowl: Steel
Indicator: Stainless Steel
with Plastic Connectors

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



Flange Size	N: Thread & Depth	O	P	Q	R	S
3/4”	.750”	.937”	.469”	2.000”	1.000”	.750”
1”	1.000”	1.093”	.546”	2.250”	1.125”	1.000”
1-1/4”	1.250”	1.250”	.625”	2.625”	1.312”	1.250”
1-1/2”	1.500”	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	70 2.76	180 7.09	69.5 2.74	23 .91	15 .59	27 1.06	60 2.36	30 1.18	90 3.54	92 3.62	46 1.81	30 1.18	15 .59
WPF2	79 3.11	293 11.53	75 2.95	32 1.26	26 1.02	30 1.18	80 3.15	40 1.57	98 3.86	110 4.33	55 2.17	40 1.57	20 .78
WPF3	88 3.47	345 13.58	93 3.66	40 1.57	29 1.14	35 1.38	90 3.54	55 2.17	120 4.72	126 4.96	63 2.48	45 1.77	27.5 1.08
WPF4	100 3.94	445 17.52	128 5.04	49 1.93	39 1.54	48 1.89	120 4.72	50 1.97	160 6.3	163 6.42	81.5 3.21	60 2.36	25 .98
WPF5	100 3.94	561 22.09	128 5.04	61 2.40	51 2.01	48 1.89	140 5.51	80 3.15	160 6.30	183 7.20	91.5 3.60	70 2.76	40 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)

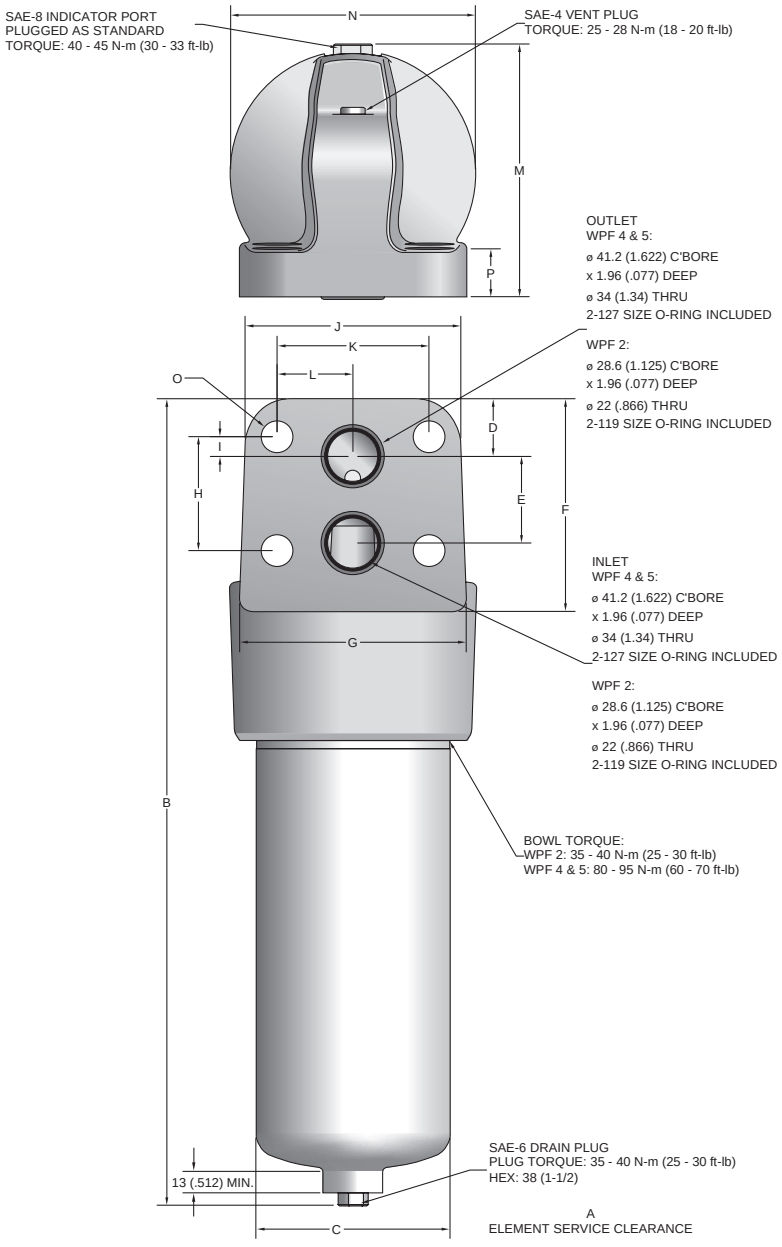
Materials:
Head: SG Iron
Bowl: Steel
Indicator: Stainless Steel
with Plastic Connectors

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

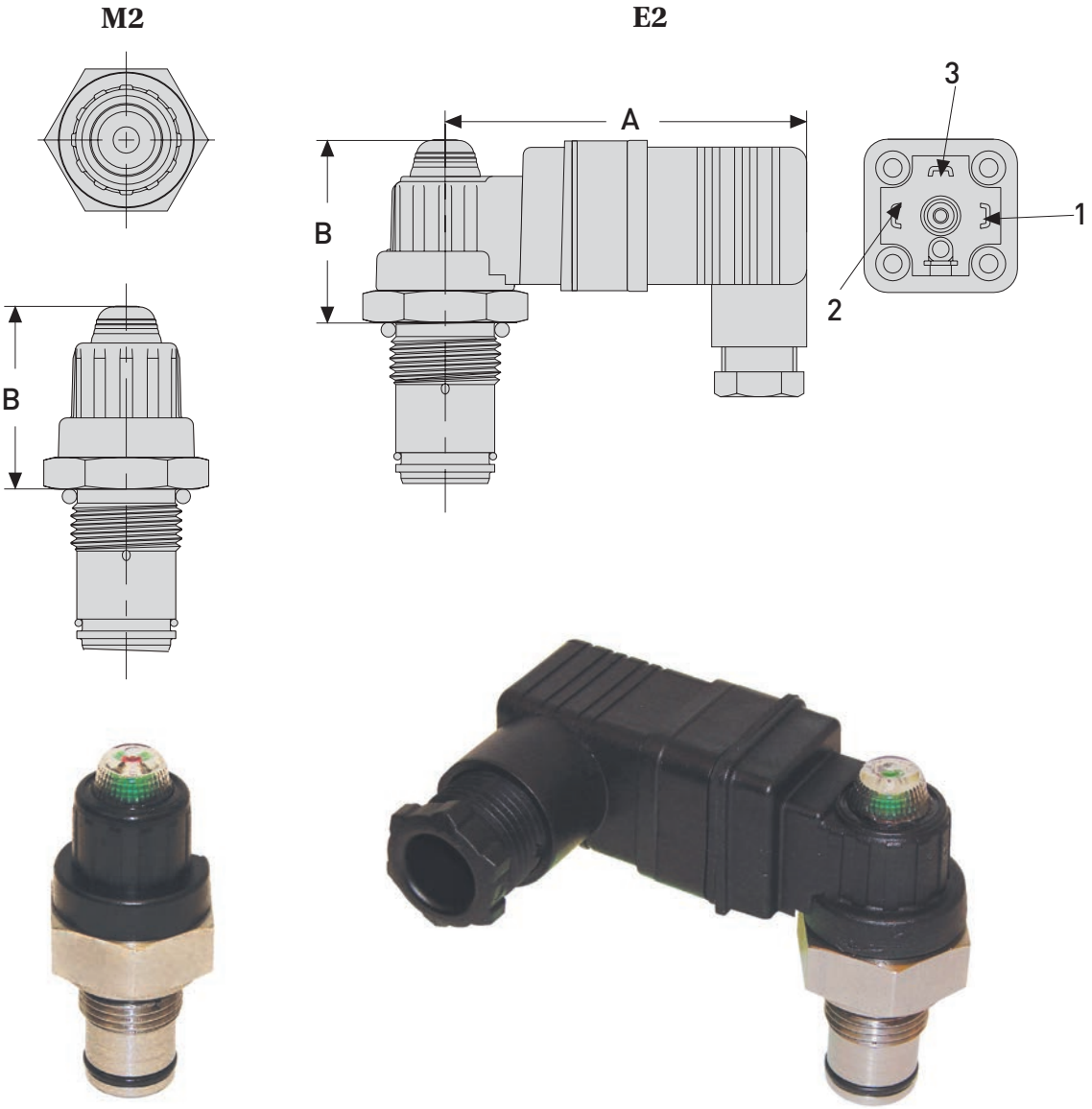


Manifold Dimensions (mm/inch)

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

WPF Series

Indicator Specifications



Torque: 30-33 ft-lb (40-45 N-m)
Indicator setting: 50 psid

Indicator Dimensions (mm/inch)

Option	Description	Connection/Power	Wiring	"A"
M2	Visual auto reset	N/A	N/A	N/A
WPF5	Electrical/visual	DIN 43650 3 pole +Earth 5A@125/250 VAC, 3A@28VDC	Pin 1 - Common Pin 2 - Normally closed Pin 3 - Normally open	73.7 2.90

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.

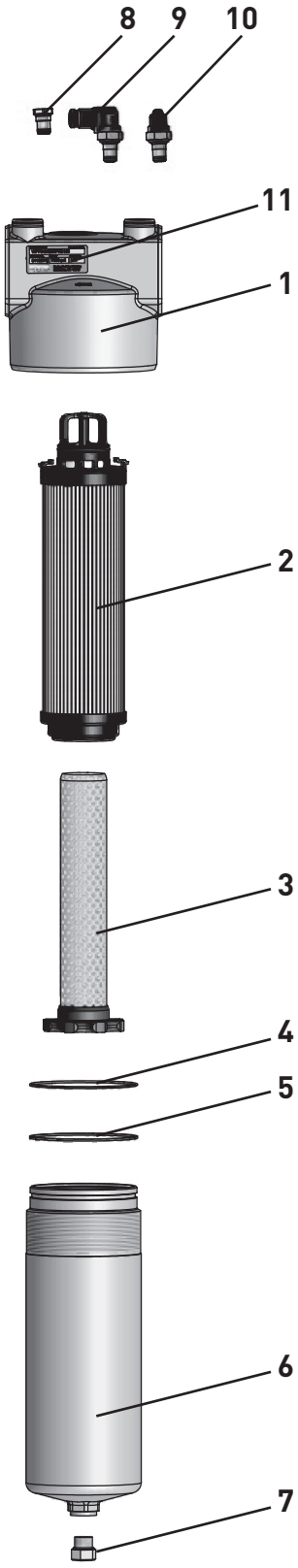
13 Power up and inspect.

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 page 153	
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 Bowl O-ring	V92042
	WPF4 Bowl O-ring	V92157
	WPF5 Bowl O-ring	V92157
5	WPF1 Anti-extrusion Ring	941185
	WPF2 Anti-extrusion Ring	934798
	WPF3 Anti-extrusion Ring	941186
	WPF4 Anti-extrusion Ring	941187
	WPF5 Anti-extrusion Ring	941187
6	WPF1 Bowl	941153
	WPF2 Bowl	941154
	WPF3 Bowl	942300
	WPF4 Bowl	941156
	WPF5 Bowl	941157
7	Drain Plug	934320
8	Indicator Plug	941172
9	Electrical Indicator	941173
11	Name Plate	920928
Not Shown	Drive Screw (2 required)	900028

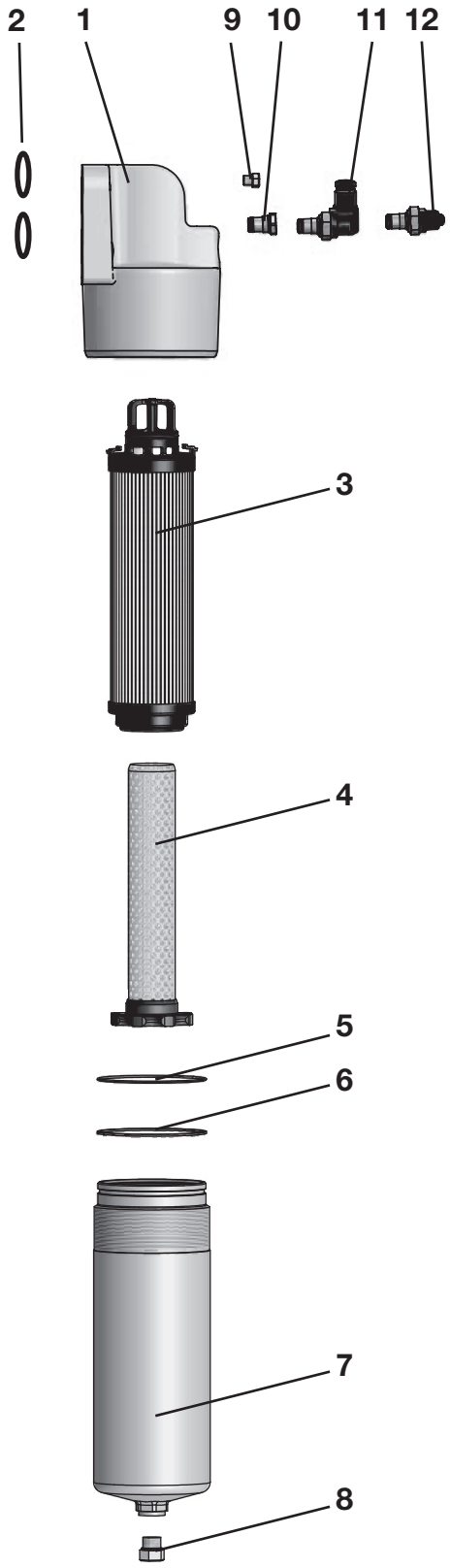


WPF Series

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	941154
	WPF4 Bowl	941156
	WPF5 Bowl	941157
8	Drain Plug	934320
9	Vent Plug	928882
10	WPF Indicator Plug	941172
11	Electrical Indicator	941173
12	Visual Indicator	941174
Not Shown	Name Plate	920928
Not Shown	Drive Screw (2 required)	900028



WPF Series

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
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**
	Standard Element (bypass only)
02E	**Ecoglass, 2 micron**
05E	**Ecoglass, 5 micron**
10E	**Ecoglass, 10 micron**
	High Collapse (no-bypass only)
02QH	Microglass, 2 micron
10QH	Microglass, 10 micron

BOX 4: Seals	
Symbol	**Description**
B	Nitrile
E	Ethylene Propylene
V	**Fluorocarbon**

BOX 5: Indicators	
Symbol	**Description**
P	**Plugged indicator port**
M2	**Visual automatic reset**
E2	**Electrical/Visual (DIN 43650 style connection)**

Note: When the "M2" or "E2" option is selected, the indicator port is plugged and the indicator is shipped as a loose part.

BOX 6: Bypass & Indicator Setting	
Symbol	**Description**
K	**50 psid (3.5 bar)**
X	**No bypass & No indicator (port plugged)**

Note: When an indicator and no bypass ("2" in Box 8) is selected, the indicator setting is 50 psid (3.5 bar).

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

BOX 8: Options	
Symbol	**Description**
1	Bypass (standard element only)
2	No bypass (high collapse element only)

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

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

12S Series

High Pressure Filters

Parker

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**

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
Optional visual and electrical indicators	Know exactly when to service elements	Keeps system clean
Drain port	Drain all oil from assembly prior to servicing	Eliminates cross contamination
Optional upstream & downstream sensing ports	Add additional instrumentation	Product flexibility
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

12SMP (10,000 psi)

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) to 275°F (135°C)
Ethylene Propylene (EPR)	-40°F (-40°C) to 225°F (107°C)
Perfluoroelastomer (FFKM)	5°F (-15°C) to 536°F (280°C)*

* Consult factory when requesting this seal. A special element may be required to withstand operating temperature.

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

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

Weight (approximate):

Model	Single Length	Double Length
12SMP	14 lbs. (6.35 kg.)	17 lbs. (7.71 kg.)

12SHP (20,000 psi)

Pressure Ratings:
Maximum Allowable Operating Pressure
(MAOP): 20,000 psi (1,380 bar)
Proof: 30,000 psi (2,070 bar)

Operating Temperatures:

Fluorocarbon (FKM)	-15°F (-26°C) to 275°F (135°C)
Ethylene Propylene (EPR)	-40°F (-40°C) to 225°F (107°C)
Perfluoroelastomer (FFKM)	5°F (-15°C) to 536°F (280°C)*

* Consult factory when requesting this seal. A special element may be required to withstand operating temperature.

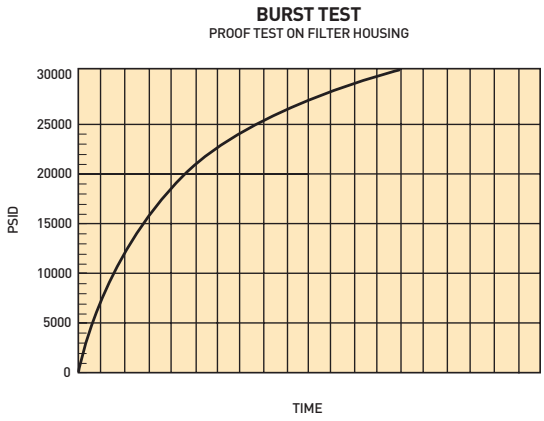
Element Collapsing Rate:
High Collapse "H" option: 2,000 psi (138 bar)

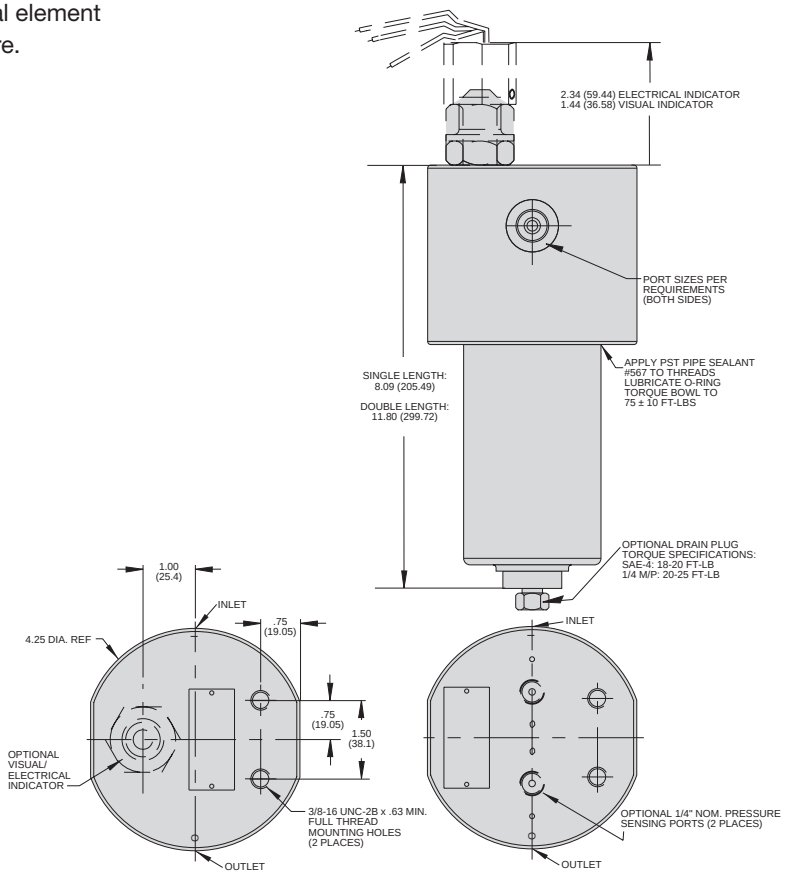
Materials:
Head: Stainless Steel 17-4
Bowl: Stainless Steel 17-4

Weight (approximate):

Model	Single Length	Double Length
12SHP	14 lbs. (6.35 kg.)	17 lbs. (7.71 kg.)

Dimensions



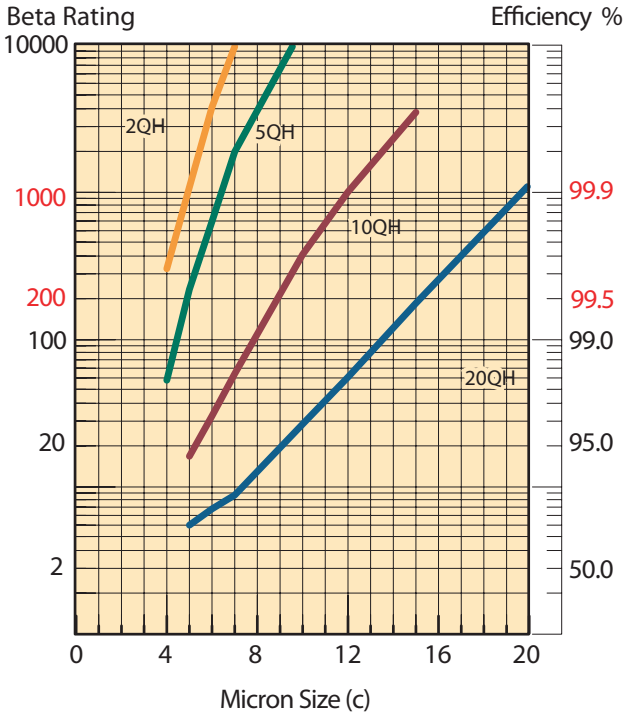


Drawings are for reference only.
Contact factory for current version.

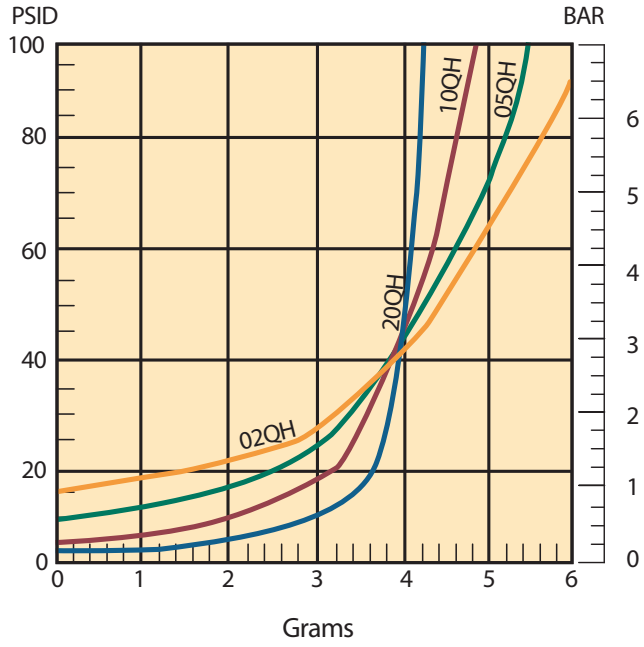
12S Series

12S-1 Element Performance

Efficiency

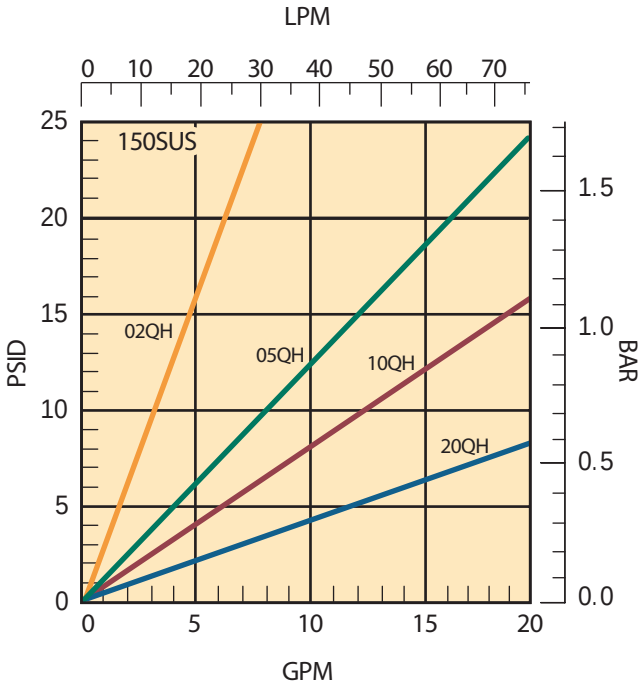


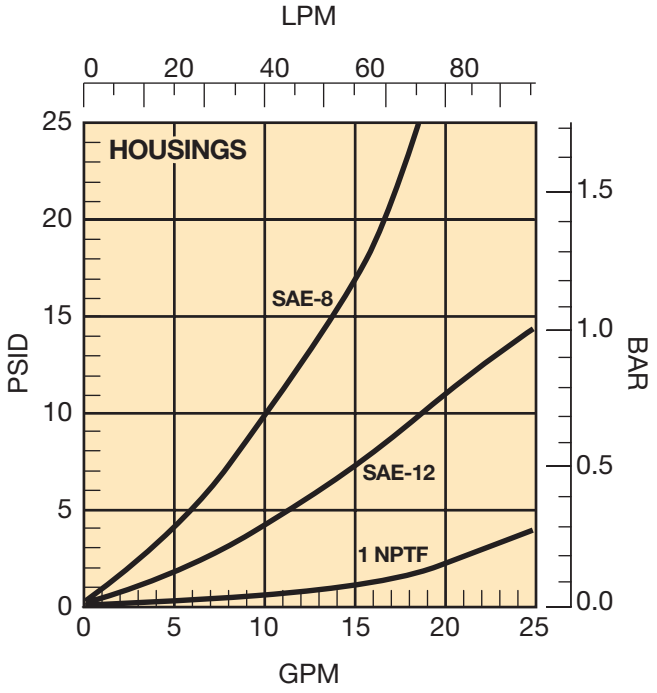
Capacity



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

Flow vs. Pressure Loss

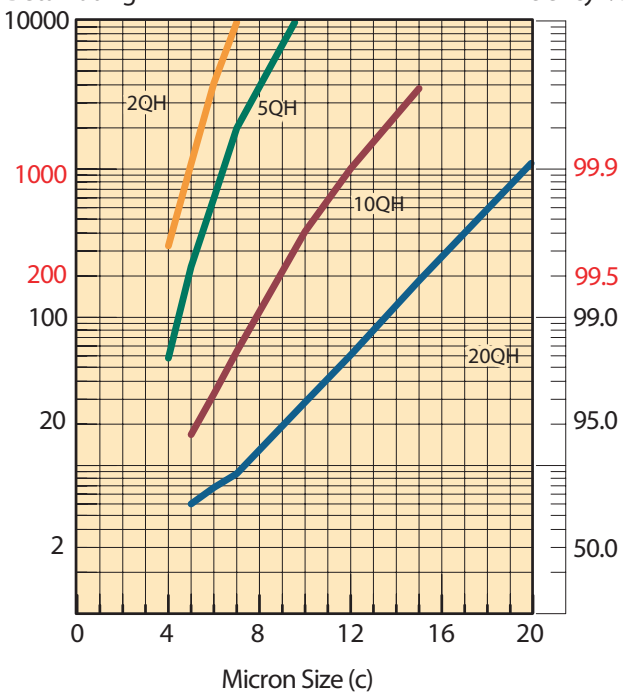




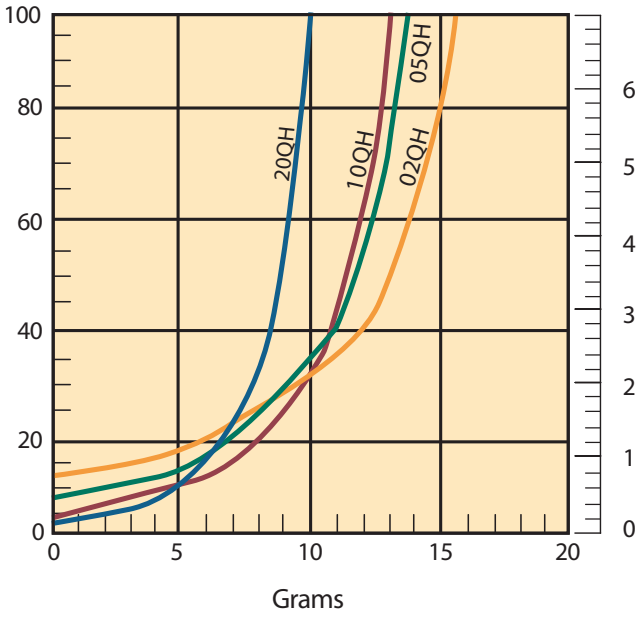
12S Series

12S-2 Element Performance

Efficiency

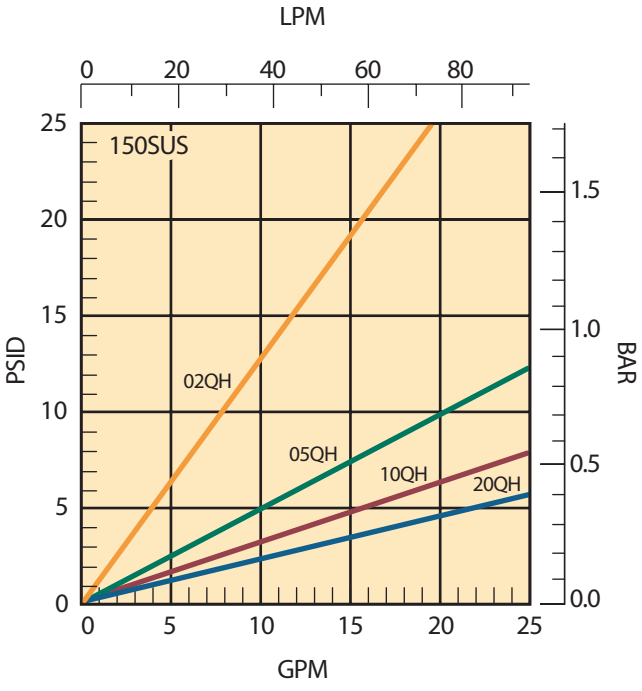


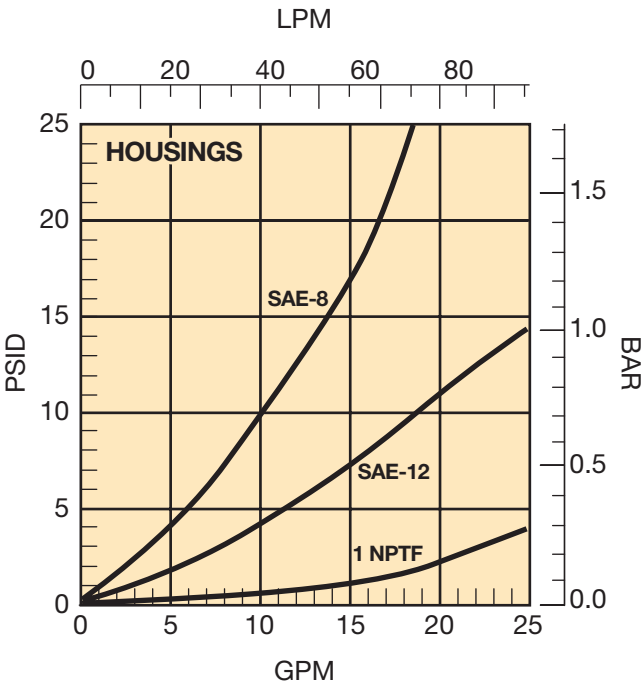
Capacity



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

Flow vs. Pressure Loss





12S Series

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
12SHP	1	10QH	V	SP	HP	10	11

BOX 1: Basic Assembly

Symbol	Description
12SMP	10,000 psi MAOP (316 SS)
12SHP	20,000 psi MAOP (17-4 SS)

BOX 2: Element Length

Symbol	Description
1	Single
2	Double

BOX 3: Media Code

Symbol	Description
02QH	Microglass, 2 micron
05QH	Microglass, 5 micron
10QH	Microglass, 10 micron
20QH	Microglass, 20 micron

BOX 4: Seals

Symbol	Description
V	Fluorocarbon
E[1]	Ethylene Propylene
P	Perfluorocarbon

BOX 5: Indicators

Symbol	Description
N	No indicator, no proessure port
SP[2]	1/4" pressure ports only
4L35[3]	Electrical/Visual (DIN 43650 style connection)
5T35[3]	Electrical DIN 43650-A, ISO 4400, 50 psid setting

BOX 6: Port Type[4]

Symbol	Description
S[5]	SAE O-ring
N[3]	NPTF
MP	Medium pressure autoclave (M/P)
HP	High pressure autoclave (H/P)

BOX 7: Port Size

Symbol	Description
4	1/4" nominal (N, MP)
6	3/8" nominal (N, MP)
8	1/2" nominal (N)
10	9/16" nominal (MP, HP)
12	3/4" nominal (S, N)
16	1" nominal (S, N)

BOX 8: Options

Symbol	Description
1	Bypass (60 psid)
11	No bypass
19[7]	Bypass w/ 1/4" drain port
21[7]	No bypass w/ 1/4" drain port

Notes:
1. Recommended for DI water applications
2. Pressure ports will math port type selected in Box 6
3. Available for operating pressure <10,000 psi only
4. For other options contact the division
5. Available for operating pressure <6,000 psi only

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

	Media	Microglass (Fluorocarbon)		Microglass (Ethylene Propylene)	
		Single	Double	Single	Double
No-bypass	02QH	403397	403401	403482	403417
	05QH	403398	403402	403483	403486
	10QH	403399	403403	403484	403487
	20QH	403400	403404	403485	403488
Bypass	02QH	937439	737443	937471	937478
	05QH	937440	937444	937472	937476
	10QH	937441	937445	937473	937477
	20QH	937442	937446	937474	937478

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 affers 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

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)

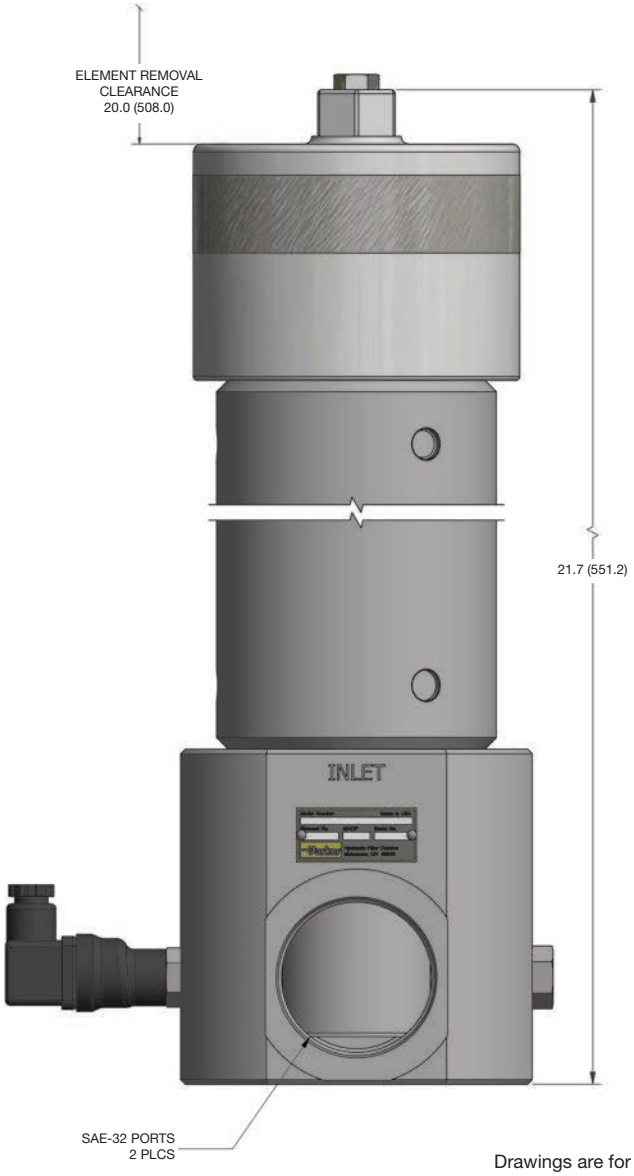
Element Materials:
End Caps: 316 Stainless Steel
Core: 316 Stainless Steel

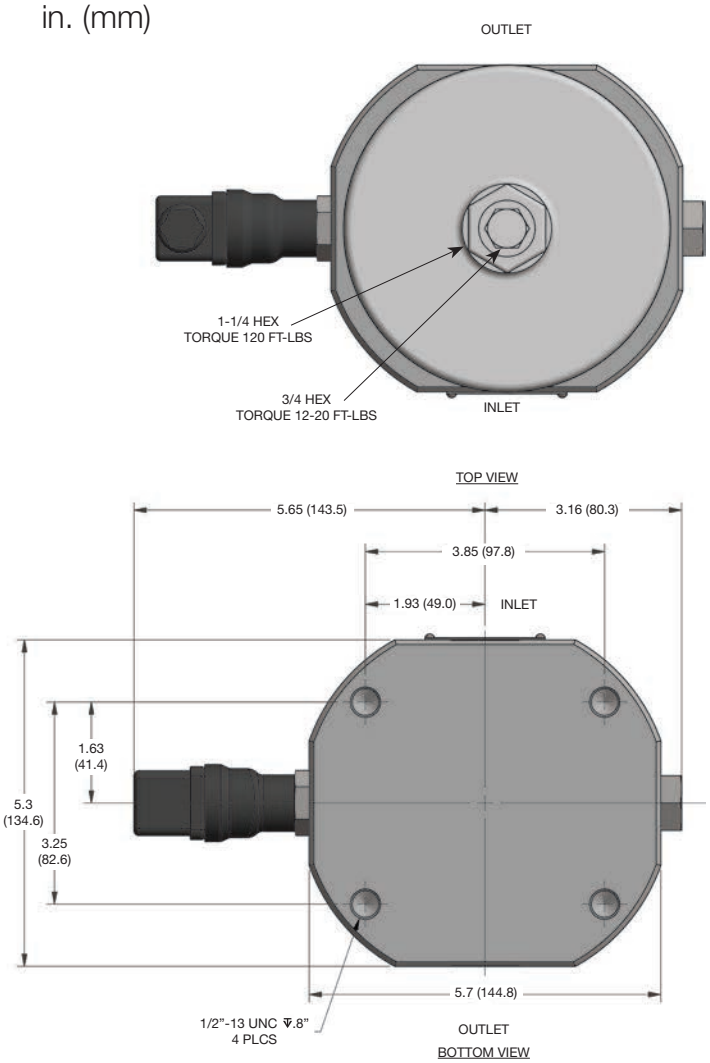
Housing Materials:
Head: 316 Stainless Steel
Bowl: 316 Stainless Steel
Cover: 316 Stainless Steel
Indicator: 300 Series Stainless Steel with Thermoplastic connectors

Weight (approximate): 65 lbs (29.5 kg)

Dimensions

in. (mm)





Drawings are for reference only.

ASSEMBLY NOTE: ANTI-SIEZE COMPOUND REQUIRED ON ALL THREADS

40S Series

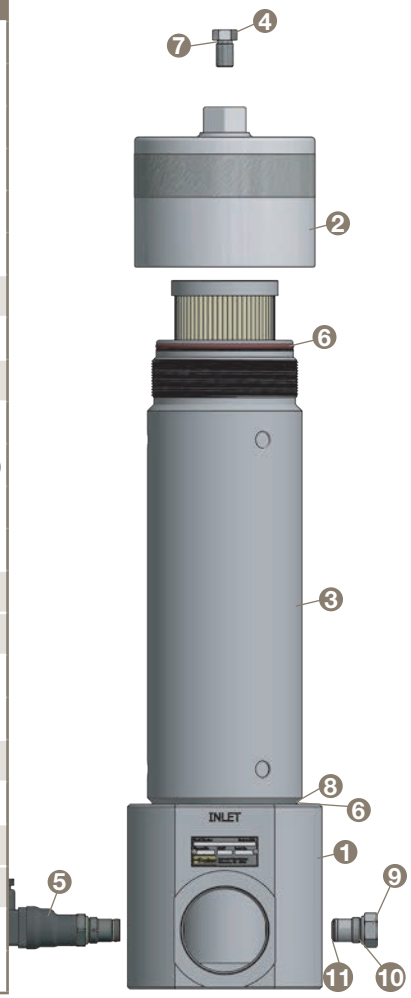
Features

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

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

Parts List

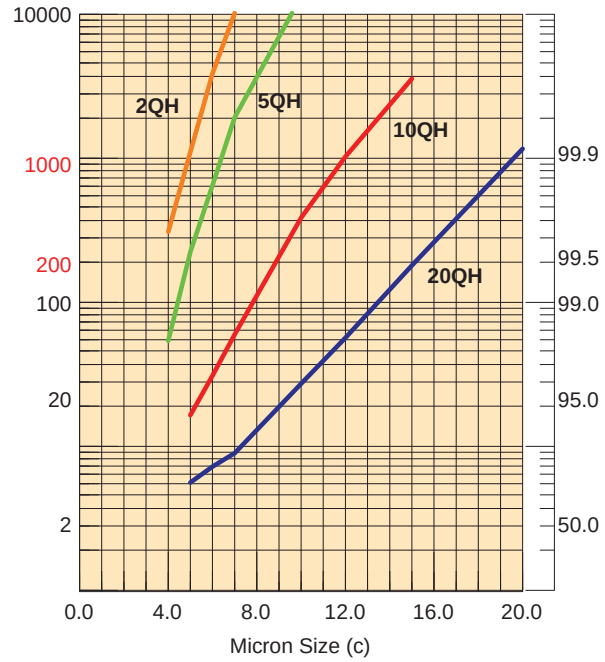
Ref.	Part Number	Description
1	945665	Head, SAE-24, No indicator
	945924	Head, SAE-24
	945926	Head, SAE-32, No indicator
	945925	Head, SAE-32
	946106	Head, 2" NPTF (2" - 11 ½), No indicator
	945684	Head, 2" NPTF (2" - 11 ½)
2	945667	Cover
3	945666	Bowl
4	945704	Fill Port Plug
5	FMUM3LERS08	50PSI (3.5bar) indicator (Ethylene Propylene O-ring)
	FMUT1LERS08	50PSI (3.5bar) SS electrical indicator (Ethylene Propylene O-ring)
	FMUM3LVRS08	50PSI (3.5bar) indicator (Fluorocarbon O-ring)
	FMUT1LVRS08	50PSI (3.5bar) SS electrical indicator (Fluorocarbon O-ring)
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)



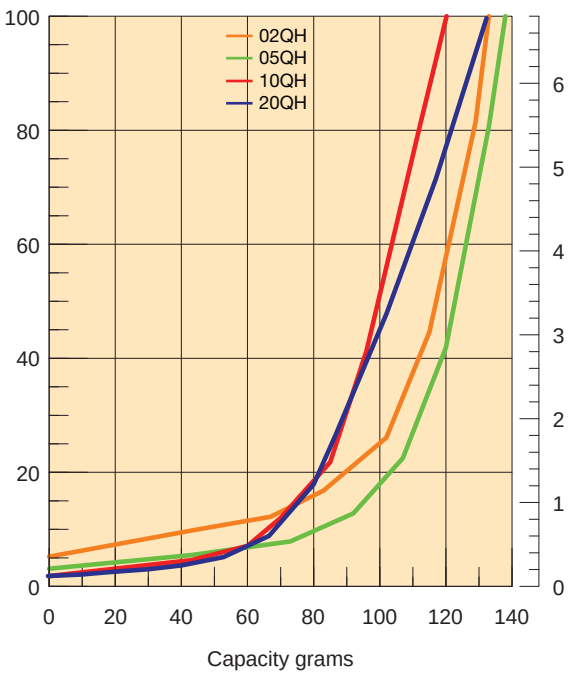
40S Series

Element Performance

Efficiency

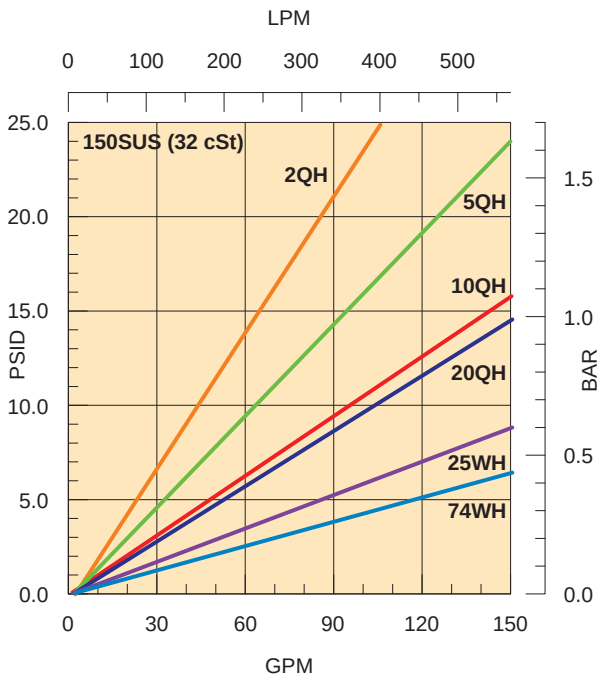


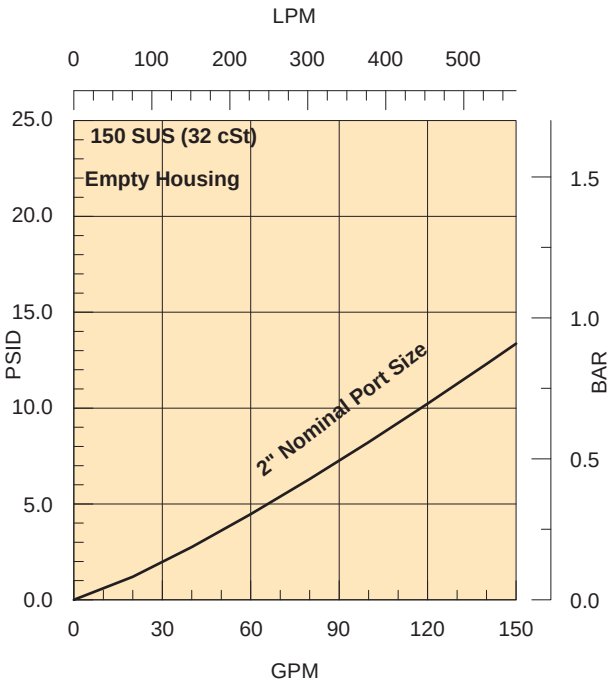
Capacity



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

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	P	K	S32	1

BOX 1: Filter Series[1]

Symbol	Description
40S	High Pressure Filter, 100 gpm

BOX 2: Element Length

Symbol	Description
2	Double Length

BOX 3: Media Code[2]

Symbol	Description
02QH	2 µm Microglass
05QH	5 µm Microglass
10QH	10 µm Microglass
20QH	20 µm Microglass
25WH	25 µm Wire Mesh
74WH	74 µm Wire Mesh

BOX 4: Seals

Symbol	Description
V	Fluorocarbon (FKM)
E[3]	Ethylene Propylene (EPR)

BOX 5: Indicator

Symbol	Description
P	Port Plugged
M3	Visual
T1	Electrical
SP[4]	¼" Sensing Ports

BOX 6: Bypass/Indicator[5]

Symbol	Description
K	50 psid (3.5 bar)
X	No bypass / No Indicator (port plugged)

BOX 7: Ports

Symbol	Description
S24	SAE-24 (1⅞" - 12 UN-2B)
N32	2" NPTF (2" - 11 ½)
S32	SAE-32 (2½" - 12 UN-2B)

BOX 8: Options[5]

Symbol	Description
1[6]	With Bypass (steel spring)
2[3]	No Bypass

Notes:
1. The filter includes the element you select already installed.
2. 2000 psid collapse.
3. Recommended for DI Water applications.
4. Pressure ports will match Box 7 port type (SAE or NPT)
5. When an indicator and no bypass ("2" in Box 8) is selected, the indicator setting in 50 psid (3.5 bar).
6. Bypass valve body: Glass filled nylon
   Bypass Spring: Steel

Replacement Elements

	Media	Fluorocarbon (FKM) Part Number	Ethylene Propylene (EPR) Part Number
No Bypass	02QH	945773Q	945774Q
	05QH	945757Q	945775Q
	10QH	945776Q	945777Q
	20QH	945778Q	945933Q
	25WH	946195	946191
	74WH	946193	946189
Bypass	02QH	945779Q	945780Q
	05QH	945781Q	945782Q
	10QH	945783Q	945784Q
	20QH	945785Q	945786Q
	25WH	946194	946190
	74WH	946192	946188

Portable Filter Carts

Models 5MFP & 10MFP with Moduflow™ *Plus* and Intelli-Cart™

Parker

ENGINEERING YOUR SUCCESS.

Portable Filter Carts

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
Two filters instead of one w/ 2.5 times increased dirt holding capacity	Pump protection and long element life	Element cost savings and trouble-free service
Wide variety of particulate elements available	Capable of getting a fluid to a desired cleanliness level	Extends fluid life and system performance
Par-Gel™ water removal elements available	Removes “free water” from a system	Gets dirt and water out of system with one process
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	Enables use in low or high viscosity applications	Matched to your needs
Eleven-foot hose and wand assemblies included	Additional hardware not necessary	Ready to use as received

Portable Filter Carts

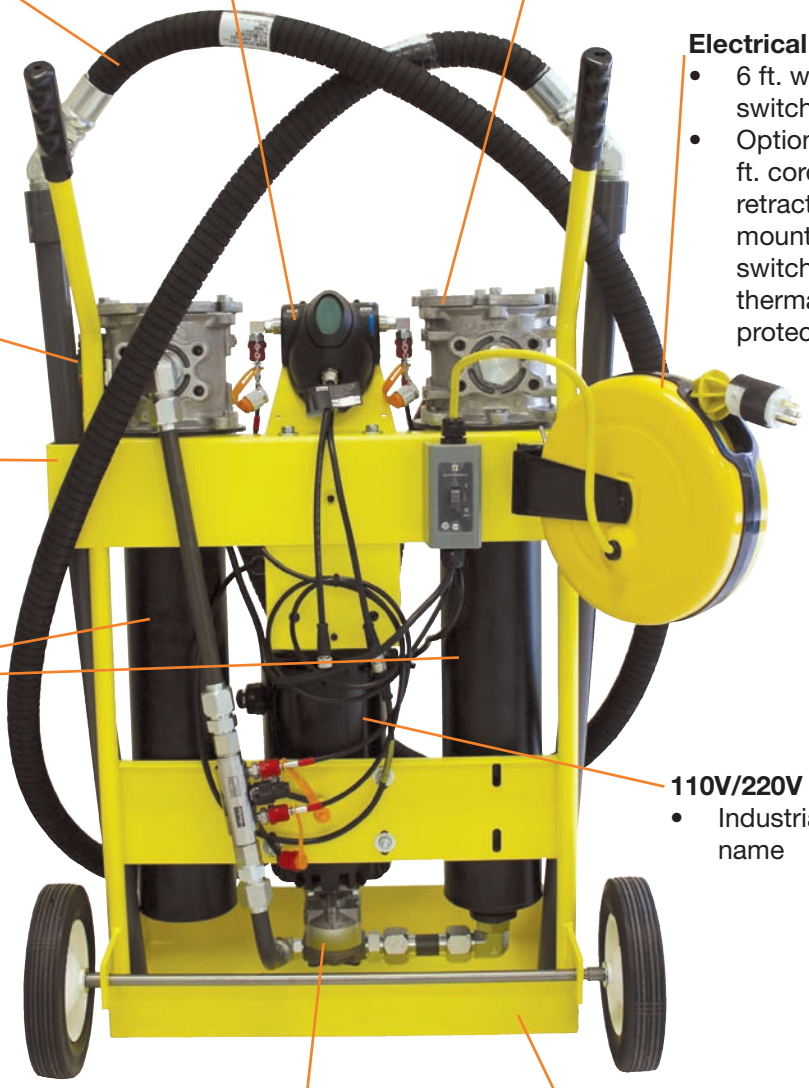
Features

icountPD (Intelli-Cart™ option)
- Early warning LED or digital display indicators for Low,Medium and High contamination levels
- Self diagnostic software

Hose & wand assembly
- Ready to use; no additional hardware needed
- Flexible hoses for tight spots
- Kink-resistant hose prevents pump cavitation

Service cover
- Top-accessible for easy changing of elements

Electrical Cord
- 6 ft. with ON/OFF switch
- Optional 20 ft. cord with retractable reel & mounted power switch with thermal overload protection



Visual indicator
- Tells you when to change element

Heavy Duty frame
- Rugged and built to last

Dual filters
- Two stage, double length filtration for long element life and pump protection

110V/220V AC motor
- Industrial brand name

Elements (not shown)
- Available for both particulate and Water Removal (WR) in double length w/ 2.5 times increased dirt holding capacity

Gear pump
- Industrial quality
- Quiet operation
- Dependable, long life

Drip tray
- Helps keep the work area safe and clean

Portable Filter Carts

Specifications

Maximum Recommended Fluid Viscosity:
5MFP – 3000 SUS (647cSt)
0.85 specific gravity
10MFP – 500 SUS (108 cSt)
0.85 specific gravity

Visual Indicator (outlet filter):
Visual differential type
3-band (clean, change, bypass)

Filter Bypass Valve Settings (Integral to Element):
Inlet – 3 psid (0.2 bar)
Outlet – 35 psid (2.4 bar)

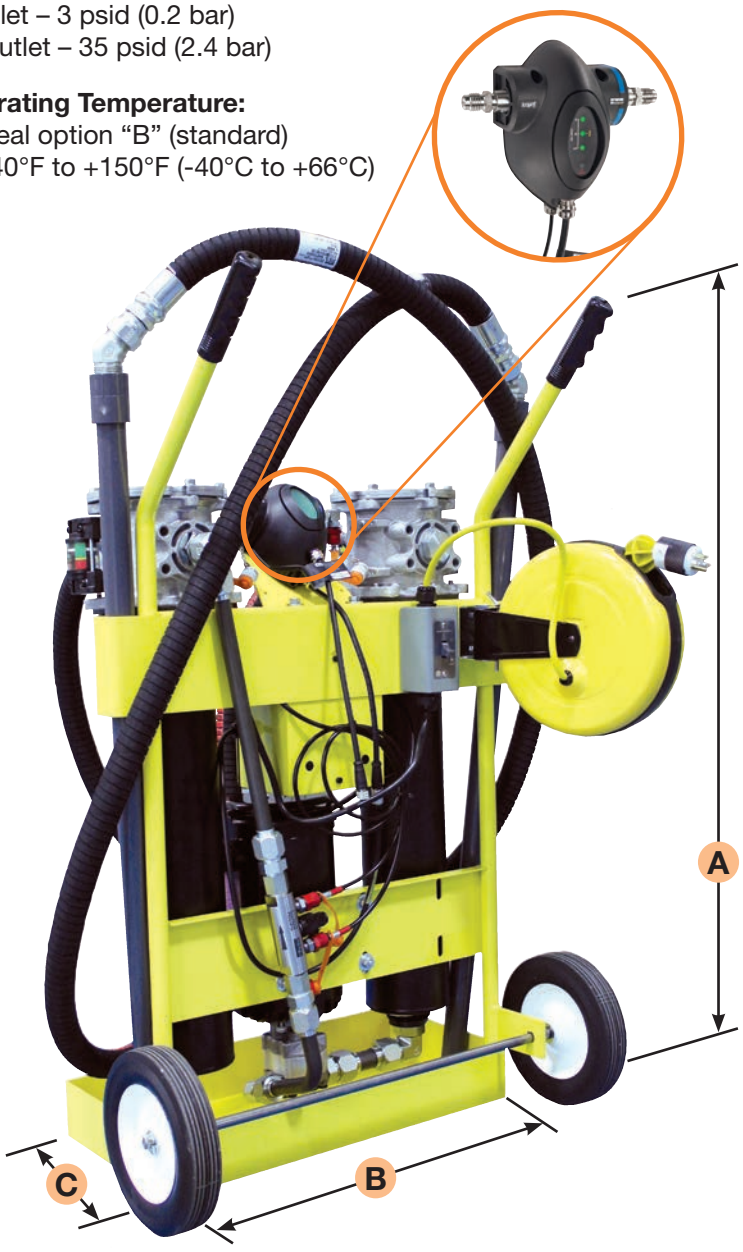
Operating Temperature:
Seal option "B" (standard)
-40°F to +150°F (-40°C to +66°C)

Electrical Service Required:
5MFP – 110/220 volts, 60/50 Hz, single phase, 8/4 amps
10MFP – 110/220 volts, 60/50 Hz, single phase, 10/5 amps

Electrical Motor:
5MFP – ½ hp @ 1725 rpm, Open, Drip Proof
10MFP – ¾ hp @ 3450 rpm, Open, Drip Proof
Thermal overload protection

Construction:
Cart frame – Steel
Filter head – Aluminum
Filter bowl – Steel
Hoses – PVC (Std.)
EPDM (high temp option)
Wands – PVC (Std.)
Steel tube (high temp option)

Weight:
110 lbs. (45.4kg)



Dimensions:

A = Height: 1034mm (40.7 in.)
B = Width: 648mm (25.5 in.)
C = Depth: 503mm (19.8 in.)

New feature!

Intelli-Cart™

Parker is pleased to announce its R&D effort to offer a diagnostic filter cart - the Intelli-Cart. The icountPD particle detector, the most up-to-date technology in solid particle detection, can be mounted to the standard frame of the filter cart for enhanced monitoring of your hydraulic system. The icountPD, coupled with the filter cart is a cost effective solution to fluid management and contamination control. Ask your sales representative today for more information.

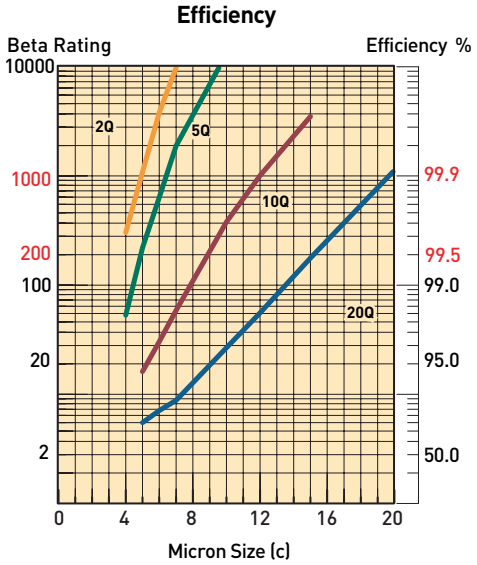
Typical Fluid Cleanliness Level Requirements

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 valvescylinders	20/18/15
New fluid	20/18/15

Filter Cart Element Performance

Media Code	Filter Media	Capacity (grams)
40W	Woven Wire	*
40SA	Synthetic	*
20Q	Microglass	140
10Q	Microglass	135
05Q	Microglass	130
02Q	Microglass	110



Notes: Multipass test run @ 80 gpm to 50 psid terminal - 5 mg/l BUGL.

Filter Cart Performance

Fluid cleanliness levels are a function of initial contamination levels, contamination ingression 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 (10MFP cart).
2. Inlet filter fitted with 40SA element; outlet with 20Q element.
3. System ingression rate equal to 1 X 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
5MFP	75 SUS	600 ml
	200 SUS	420 ml
10MFP	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.

Assembly

1. Install hoses to inlet and outlet filters by threading the hose end with the straight thread o-ring seal fitting into the filter flange.
2. Connect the PVC tube wands to the swivel fitting on the hose end. When servicing the PVC tube wand, do not over-torque the metal fittings going into the PVC coupling. Over-torque will result in cracking the coupling. Generally, 1/4 turn beyond hand-tight is sufficient.
3. The Intelli-Cart™ is shipped with a bag that contains user manuals, iPD programming disk, and 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, the program disk and the iPD owners manual.

Operating Instructions

1. Insert the inlet wand assembly into the supply fluid receptacle (drum/reservoir). The RFP filter is the inlet filter.
2. Insert the outlet wand assembly into the clean fluid receptacle (drum/reservoir). The ILP fIlter is the outlet filter.
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, remove inlet filter access cover and verify the cover sealing o-ring is in place. For very viscous fluids it may be necessary to pour 1 or 2 quarts of fluid into the RFP inlet filter housing to prime pump initially.
5. The condition of the filter element should be monitored by observing the cleanliness indicator on the outlet filter. When the indicator is in the CHANGE position, both inlet and outlet filter elements MUST be replaced to prevent fluid from going through the bypass in the filters.
6. The inlet filter element is provided with a 3PSI bypass spring, and prevents the pump from cavitating if the element is not changed. The outlet filter element is provided with a 35PSI bypass spring to prevent excessive pressure which may be harmful to personnel or to the filter cart.

   Warning: The filter bypass spring acts as a relief valve for the pump. Do not restrict the outlet hose with a shut-off valve 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, CHANGE, or BYPASS).

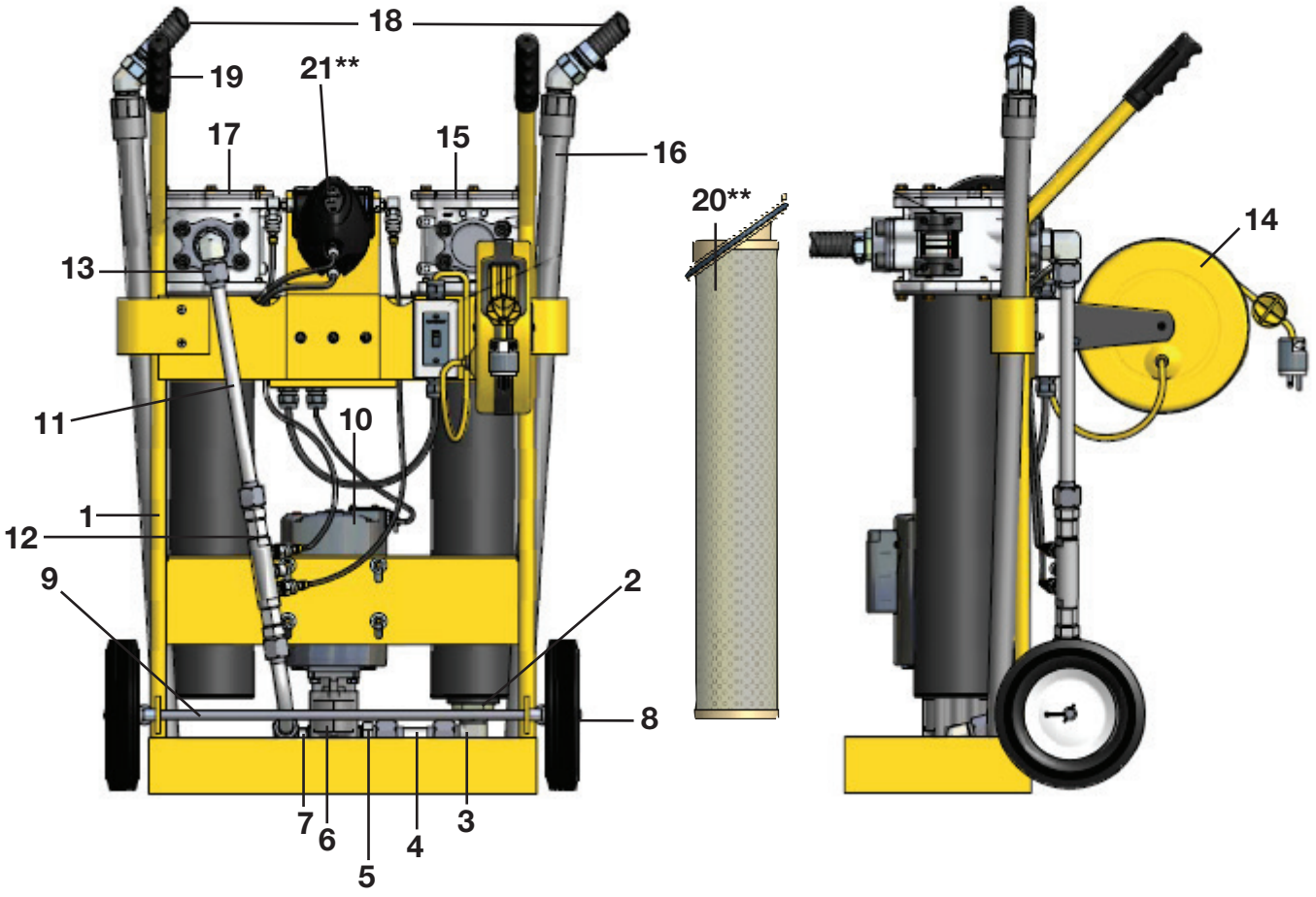
NOTE: The filter cart must be in operation for the indicator to read properly.

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.
   a) Replace the synthetic or Microglass elements. Verify correct element replacement.
   b) Wire mesh elements can be cleaned. Ultrasonic cleaners provide best results.
5. Install element in filter housing. 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. Do not interchange the inlet filter cover with the outlet filter cover. (The inlet filter has a “RFP” prefix, the outlet filter has a “ILP” prefix).
8. Contact the HFD service department at 419-644-0259 regarding iPD calibration.
9. iPD removal: remove oil lines from the iPD at the two fittings closest to the iPD. Disconnect the two cables from the iPD. Remove iPD from cart via two screws. The cart can be used without the iPD as long as the sample hoses are removed from the System 20. Protect sampling connectors from contamination.

Problem	Cause	Solution
Does not start	• ON/OFF Switch • No electrical power • Defective motor	• Turn switch ON, replace switch if defective • Plug in cart • Replace
No oil flow or erratic pump noise	• Filter housing not filled with oil	• Allow pump to run 30 to 60 seconds
	• Suction leak	• Check tightness of inlet fittings • Check o-ring in inlet filter cover for nicks • Kink or restriction in inlet hose • Add 1 or 2 quarts of oil to inlet filter
	• Defective pump	• Replace pump
Indicator reads CHANGE or BYPASS	• Element dirty • Oil extremely cold or viscous	• Replace or clean elements (both filters) • Change element to coarser micron rating
Indicator does not seem to move	• No outlet element • 40 micron element installed in outlet filter	• Install element • Check cart model number to verify correct element. The inlet filter has a rating RFP prefix; the outlet filter has an ILP prefix

Filter Cart Replacement Parts



Item No.	Part No.	Description	Qty
1	928690	Frame	1
1	941468	Frame (Intelli-Cart™)	1
2	940980	Pipe Reducer Fitting	1
3	940979	Tube Fitting	1
4	937526	Suction Tube Assy.	1
5	928652	Adapter Fitting	1
6	928731	Pump	1
7	940977	Adapter Fitting	1
8	928650	Wheel	2
9	928653	Axle	1
10	928678	Motor 10MFP	1
10	929692	Motor 5MFP	1
11	937527	Discharge Tube Assy.	1
12	941467	Discharge Tube Top (Intelli-Cart™)	1
	941466	Discharge Tube Bottom (Intelli-Cart™)	1
	STI.0144.100	System 20 (Intelli-Cart™)	1
	3/8-8F40HG5S	System 20 Fitting 1 (Intelli-Cart™)	2
	12/8 F50X-S	System 20 Fitting 2 (Intelli-Cart™)	2

Item No.	Part No.	Description	Qty
13	940978	Tube Fitting	1
14	928623	Cord Reel	1
15	941665	Inlet Filter – Nitrile	1
15	941666	Inlet Filter – Fluorocarbon	1
16	928784	Tube Wand Assy. – Seal Option B	2
17	941908	Outlet Filter – Nitrile	1
17	941909	Outlet Filter – Fluorocarbon	1
18	928663	Hose Assy. – Seal Option B	2
19	928651	Handle Grip	2
20	See Chart**	Element, (1) Inlet & (1) Outlet	2
21	See Chart**	icountPD (Intelli-Cart™)	1
	B84654	icount Cable (Intelli-Cart™)	1
	B84224	icount Hoses (Intelli-Cart™)	2
	2/2A40EG4M-S	icount Fitting 1(Intelli-Cart™)	2
	EMA3/1/8ED	icount Fitting 2 (Intelli-Cart™)	2

**Refer to chart on How to Order page.

5MFP, 10MFP and Intelli-Cart

Portable Filter Carts

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
10MFP	2	40SA	10Q	B	VP	I	1

BOX 1: Filter Series

Symbol	Description
5MFP	**5 GPM (3000 SUS max)**
10MFP	**10 GPM (500 SUS max)**

BOX 2: Element Length

Symbol	Description
2	**Double**

BOX 3: Inlet Filter Element

Symbol	Description
40SA	**Synthetic, 40 micron**
40W	Stainless steel mesh, 40 micron nominal
20Q	Microglass, 20 micron

BOX 4: Outlet Filter Element

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: Seals

Symbol	Description
B	**Nitrile**

BOX 6: Indicator

Symbol	Description
VP	**Visual indicator, 3-band** (mounted on outlet filter only)

BOX 7: Bypass

Symbol	Description
I	**35 PSID (2.4 bar)** (outlet filter element)

BOX 8: Options

Symbol	Description
1	**None**
6[1]	20' electrical cord (retractable reel)
9	Visual indicator on inlet filter
PD[2]	iPD w/ standard LED display
PDL[2]	iPD w/ LCD display and integrated Moisture Sensor

Notes:
1. standard woth option PD or PDL
2. only available in 10MFP configuration

Please note the bolded options reflect standard options with a reduced lead time.

Replacement Elements

Media	Nitrile Seals		Fluorocarbon Seals	
	Inlet Filter (3 psid integral bypass)	Outlet Filter (35 psid integral bypass)	Inlet Filter (3 psid integral bypass)	Outlet Filter (35 psid integral bypass)
02Q	N/A	937397Q	N/A	937405Q
05Q	N/A	937398Q	N/A	937406Q
10Q	N/A	937399Q	N/A	937407Q
20Q	940971Q	937400Q	940974Q	937408Q
40SA	940802	N/A	940972	N/A
40W	940803	N/A	940973	N/A
WR	N/A	940734	N/A	940736

Guardian®

Portable Filtration System

Parker

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 (11,000 SUS -24 VDC).	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, 24 VDC- 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.

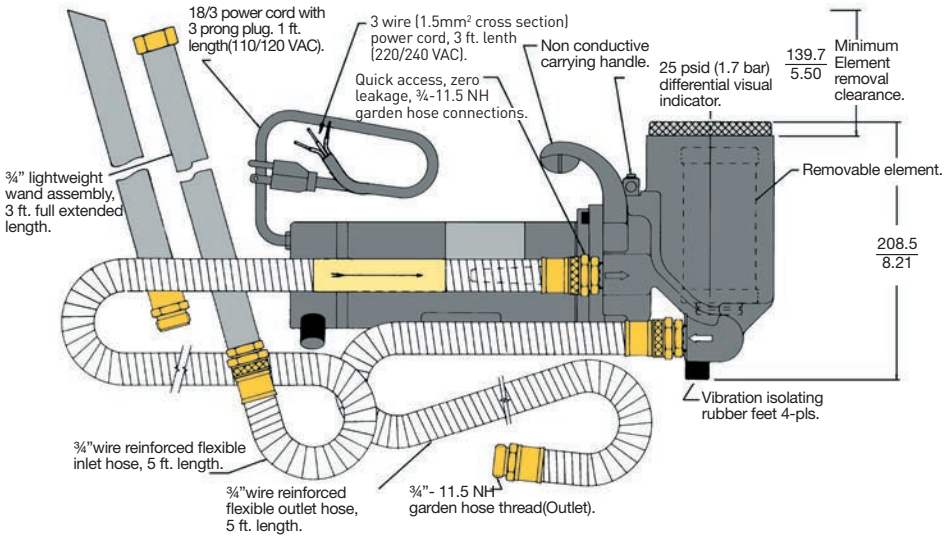
Guardian®

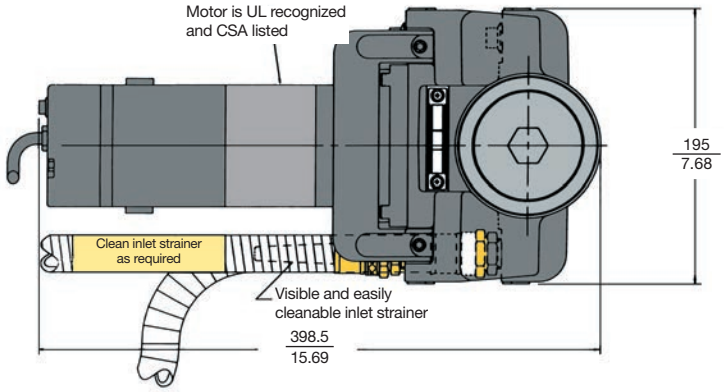
Specifications and Installation

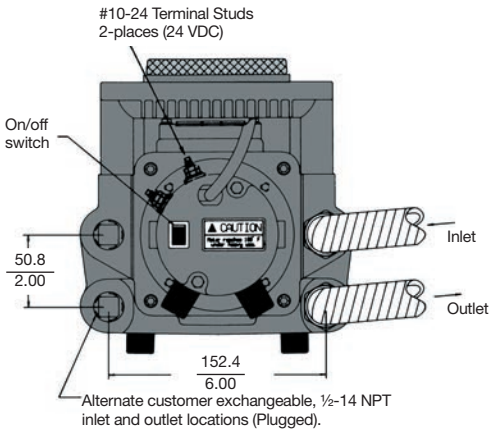
Maximum Allowable Operating Pressure (MAOP)
50 psi (3.4 bar)
Flow Capacity
Up to 4 gpm (15 lpm)
Maximum Recommended Fluid Viscosity
(.85 specific gravity) 110-120 VAC and 220-240 VAC - 16,000 SUS 24 VDC - 11,000 SUS
Warning
Explosion hazard. Do not pump flammable liquids such as gasoline, alcohol, solvents, 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. 24 VDC; 10A max. 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

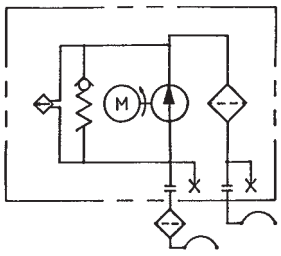
mm
in







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[1]	*
40W	Woven Wire	40 micron[1]	*
25W	Woven Wire	25 micron[1]	*
20C	Cellulose	20 micron[1]	*
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
$B_x = 2$	50.0%
$B_x = 20$	95.0%
$B_x = 75$	98.7%
$B_x = 200$	99.5%
$B_x = 1000$	99.9%

Multipass test run at 4 gpm (15 lpm) to 35 psid (2.4 bar)
[1]Reference ratings only. Not multipass tested due to coarseness.
* Not applicable

Estimated Guardian Element Life and Cleanliness Levels

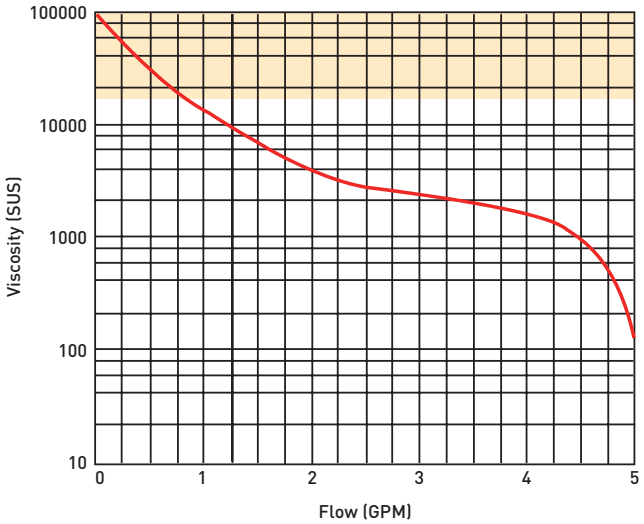
The following chart shows typical element life (in gallons of oil passed) and cleanliness levels achieved by standard Parker elements available with the Guardian. Some assumptions have been made.*

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 ingression.
3. Single pass oil transfer.

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

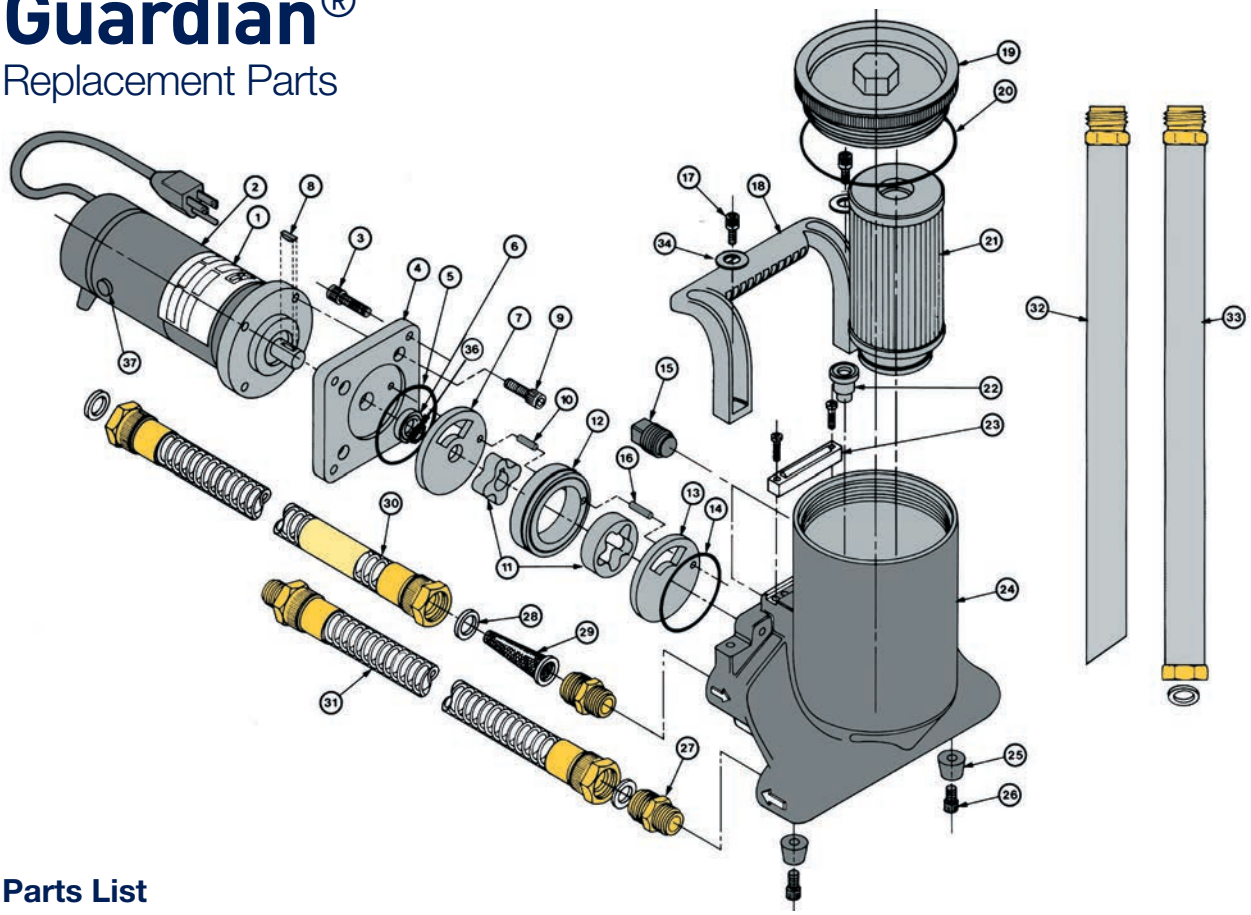
Guardian Flow vs. Viscosity Performance



Note 1: Guardian not recommended for fluid viscosities greater than 16,000 SUS (11,000 SUS;24VDC)

Note 2: Flows based on Guardian with no element installed

Guardian®
Replacement Parts



Parts List

#	Part Number	Description
1	CF	LABEL
2	931913 932381 932759	MOTOR (110-120 VAC) MOTOR (220-440 VAC) MOTOR (24 VDC)
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 932761	BRUSH KIT (110/120 VAC) BRUSH KIT (220/240 VAC) BRUSH KIT (24 VDC)
	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

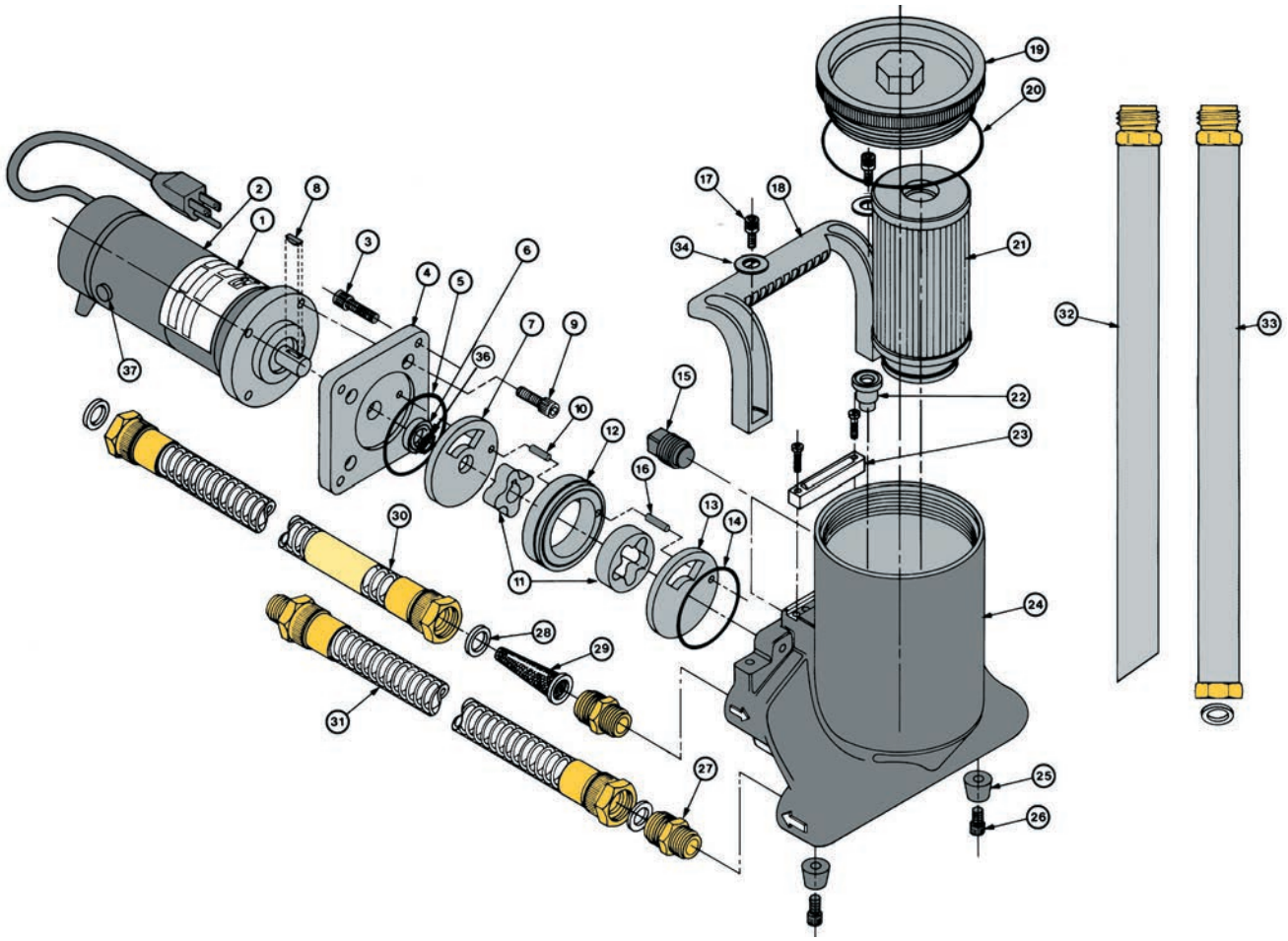
A. Flip the switch on the end of the unit to the “off” position and disconnect the electrical plug.
B. Rotate the cover counter-clockwise and remove.
C. Remove the element from the housing. Discard all disposable elements. These elements are not cleanable,
D. Place the new element In the housing, fitting 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 Guradian, check for tripped circuit breakers, check for blown fuses. Replace if defective. Allow motor to cool, thernal overload will automatically reset. Replace motor.
Does not start or errattic 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 grushes. 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 tghtness 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 throroughly 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 releif 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. Obstruced outlet. Defective indicator.	Replace or clean element. Change element to coarser micron rating. Clear outlet obstruction. Replace indicator.
Indicator dows not seem to move.	No element. Defective indicator.	Install element. Replace indicator.
Joses 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 Replacement Parts



Item No.	Description	PN
1	Label	Consult Factory
2	Motor, 110-120 VAC	931913
	220-440 VAC	932381
	24 VDC	932759
3	SHCS(4),¼-20x1	902734
4	Adapter Plate	931890
5	Housing O-Ring	V72041
6	Polypak Seal	931921
7	Shadow Plate	931899
8	Woodruff Key 1/8 x 3/8	931877
9	SHCS(4), ¼-20 x ¾	902679
10	Roll Pin 1/8 x ¾	903630
11	Geroter Set	931873
12	Geroter Ring	931903
13	Outlet Plate	931900
14	Geroter O-ring	V72135
15	Brass Pipe Plug (2) ½-14	931920
16	Roll Pin 1/8 x 5/8	903426
17	SHCS (2), ¼-20 x 5/8	931889
18	Handle	931897
19	Cover	931892
20	Cover O-Ring	V72237

Item No.	Description	PN
21	Element (see next page)	
22	Relief Valve	928981
23	Indicator Kit	927422
24	Housing	931838
25	Rubber Bumpers (2)	931888
26	SHCS(2), ¼-20 x ½	902907
27	Brass Fitting (2)	931928
28	Gasket (4)	931956
29	Inlet Screen	931927
30	Inlet Hose Assembly	931936
31	Outlet Hose Assembly	931937
32	Wand Crevice Assembly	931965
33	Wand Adapter Assembly	931966
34	Washer (2)	926106
35	Quick Disconnect Kit	932097
	(Not Shown)	
36	Washer	932085
37	Brush Kit (110/120)	934329
	(220/240 VAC)	934327
	(24 VDC)	932761
	Seal Kit	932263
	Bowl Extension Kit	932081

NOTE: SHCS denotes “socket head cap screw”

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: Seals

Symbol	Description
None	**Carboxylated Nitrile**

BOX 2: Model

Symbol	Description
GT4	**Guardian® 110/120 VAC**
GT4D	24 VDC
GT4E	220/240 VAC

BOX 3: Media

Symbol	Description
25W	Wire Mesh
40W	Wire Mesh
74W	Wire Mesh
10C	**Cellulose**
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
20Q	Microglass, 20 micron
WR	Water Removal

BOX 4: Options

Symbol	Description
1	**None**
6	Quick disconnect hose connections

Please note the bolded options reflect standard options with a reduced lead time.

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

Global products as identified are offered worldwide through all Parker locations and utilize a common ordering code.

Sentinel™

Portable Purification System

Parker

ENGINEERING YOUR SUCCESS.

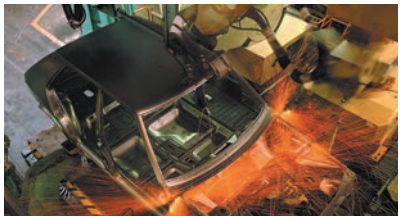
Sentinel™

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 effiicient operation

316 Stainless Steel
- Used for primary wetted surfaces
- No corrosion
- Product reliability

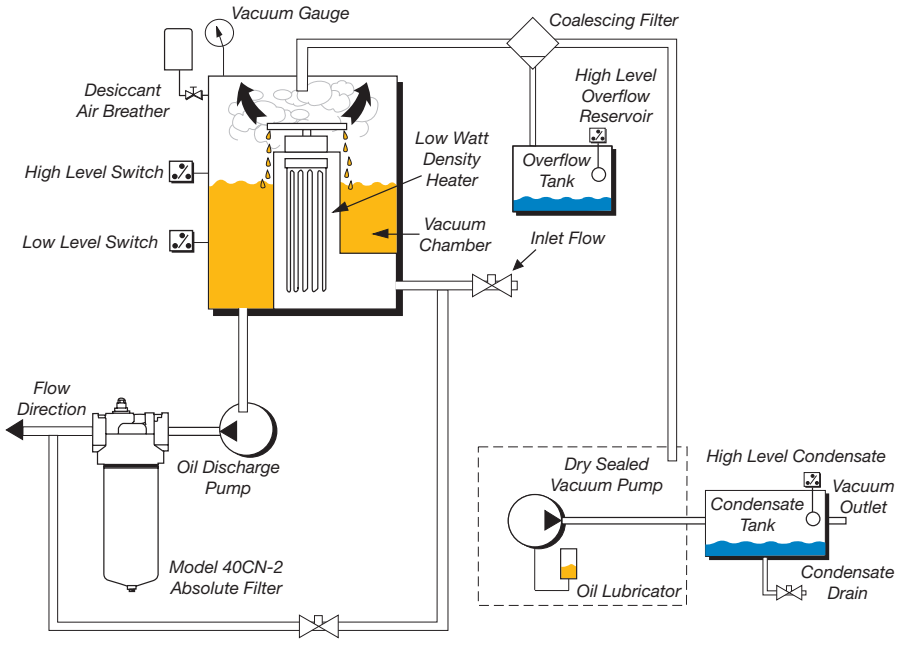
Reverse Phase Switch
- Enable easy change of motor rotation if out of phase
- Ease of maintenance
- Prevents incorrect rotation

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

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

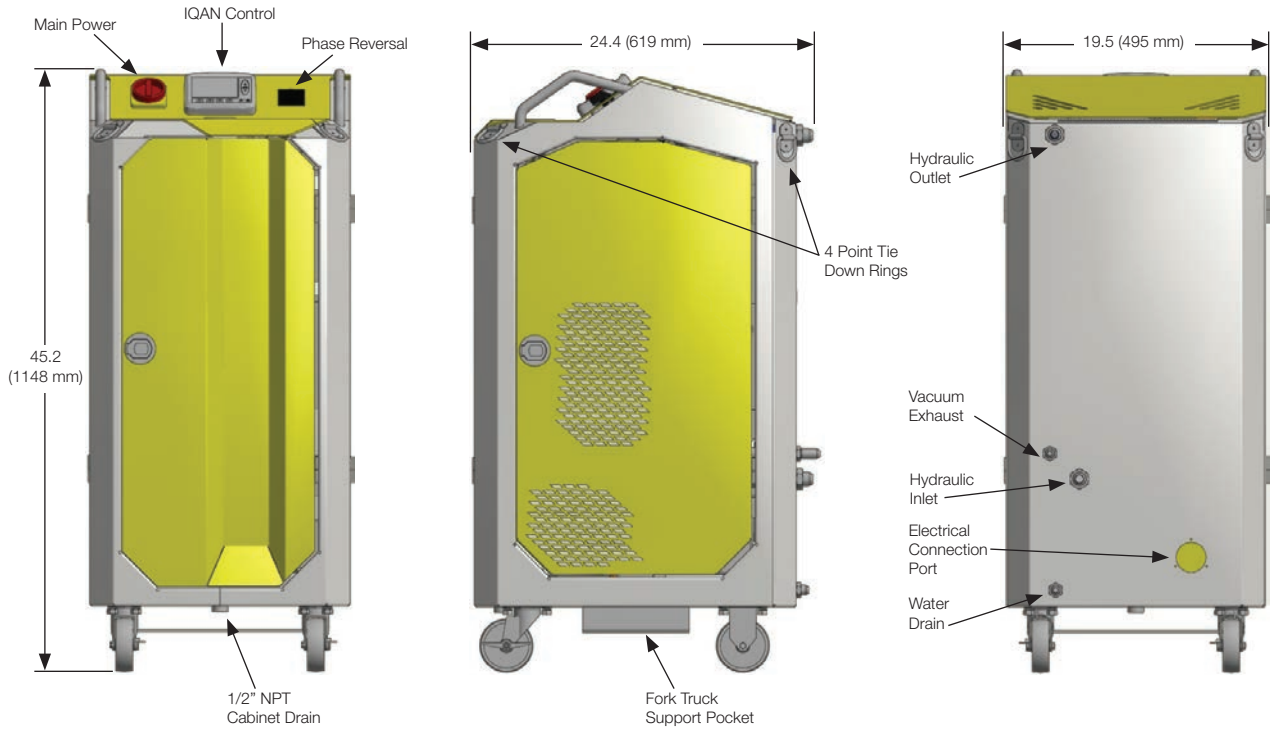
Hydraulic Connections:
Inlet: JIC 12
Outlet: JIC 12
Max Flow: 5 GPM
Water Drain: JIC 8

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



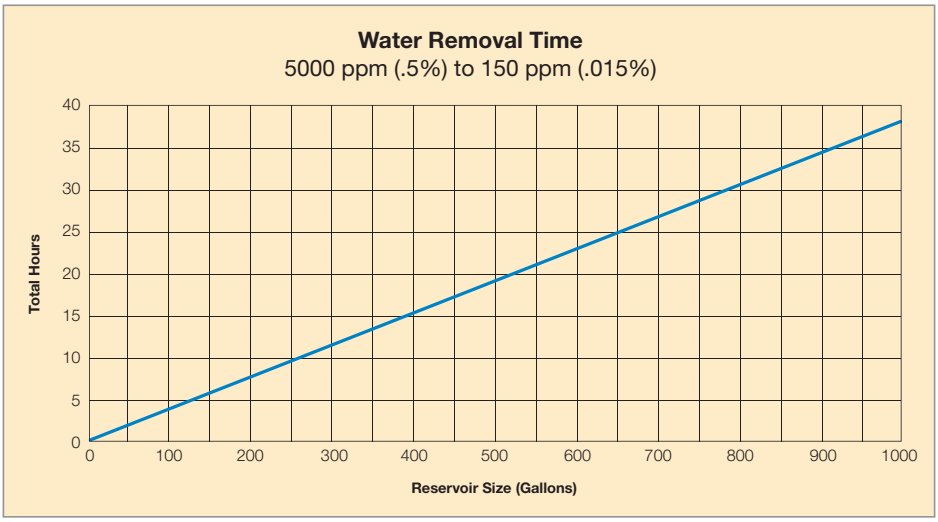
Note: Dimensions and weights are approximate and are for reference only.

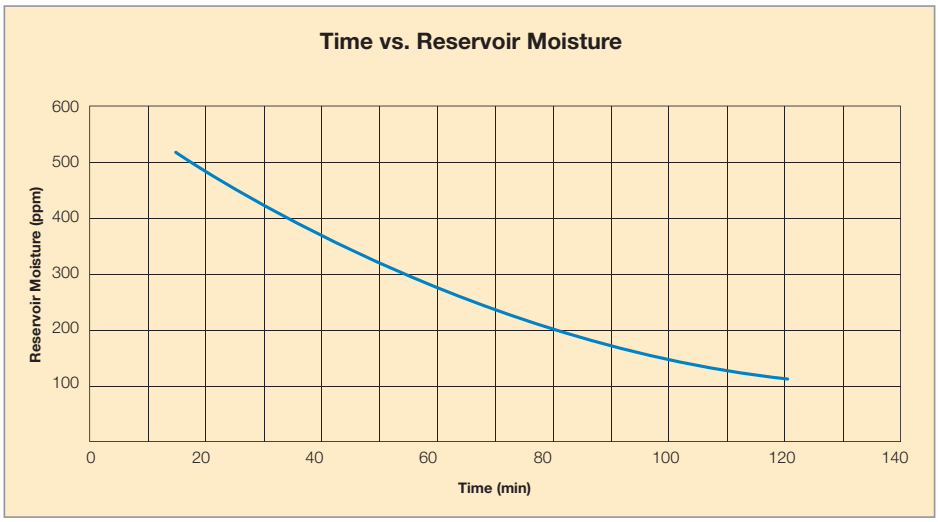
Sentinel™

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
Standard Unit	
943118*	230VAC, 3P, 60Hz
943116*	380VAC, 3P, 50Hz
943494*	415VAC, 3P, 50Hz
943213*	460VAC, 3P, 60Hz
945341*	575VAC, 3P, 60Hz
Optional Accessories	
943236	Mounting Bracket Kit
943238	Cordset (pigtail end)
Service Parts	
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)

☐ Servo Valves ☐ Proportional Valves

☐ Vane and piston pumps/motors ☐ Gear pumps/motors

☐ Directional & pressure control valves ☐ 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: _____

Parker Hannifin Corporation
Hydraulic & Hydraulic Filter Division
16810 Fulton County Road #2
Metamora, OH 43540
phone 419 644 4311
hydraulicfilter@parker.com
www.parker.com/hydraulicfilter

Portable Purification Systems

Models PVS 185, 600, 1200, 1800, 2700

ENGINEERING YOUR SUCCESS.

PVS Series

Principles of Operation

Contaminated oil is drawn into the Parker Portable Purification System by a vacuum of 25 In/Hg. The oil passes through the in-line low watt density heater where the oil is heated to an optimum temperature of 150° F (66°C).

The oil then enters the distillation column where it is exposed to the vacuum through the use of special dispersal elements. This increases the exposed surface area of the oil and converts the water to vapor form, which is then drawn through the condenser by the vacuum pump.

The water-free oil falls to the bottom of the column and is removed by a heavy duty lube oil pump. This pump forces the dry oil through a final particulate removal filter. Clean oil passes out of the unit, back to the reservoir — and into the system.

Typical Saturation Points

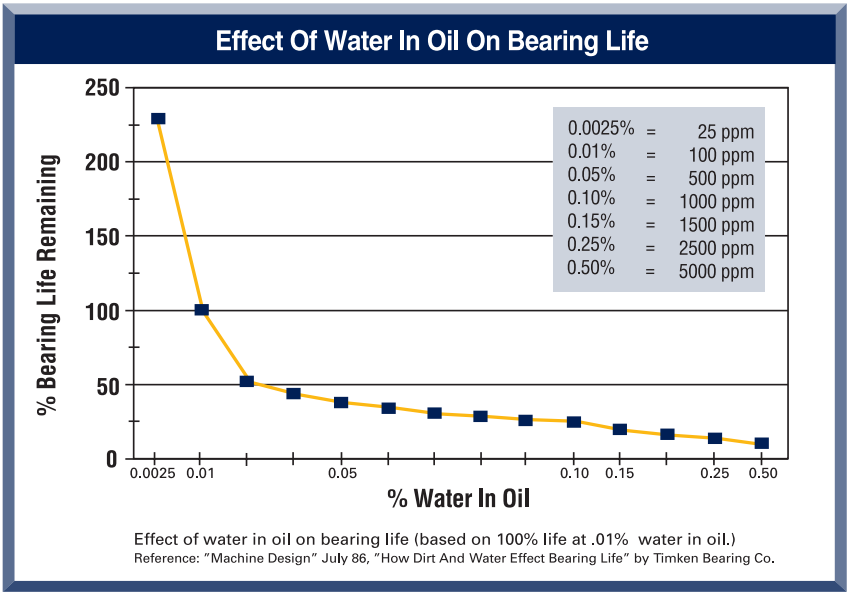
Fluid Type	PPM	%
Hydraulic Fluid	300	.03%
Lubrication Fluid	400	.04%
Transformer Fluid	50	.005%

Effects of Water Contamination

Water is one of the most common contaminants in a fluid system and one of the most damaging. When water contaminates a system, it can cause serious problems such as:

- Corrosion be etching metal
- Fluid breakdown, reduction of lubricatins properties, additive precipitation and oil oxidation
- Reduced dielectric strength
- Abrasive wear in hydraulic components

Free water occurs when oil becomes saturated and cannot hold any more water. This water is usually seen as cloudy oil or puddles of water at the bottom of an oil reservoir. Water which is absorbed into the oil is called dissolved water. At higher temperatures, oil has the ability to hold more water in the dissolved stage due to the expansion of oil molecules. As the oil cools, this ability reverses and free water will appear where not visible before. In addition to temperature, fluid type also determines the saturation point for your system (see chart above).



Effect of water in oil on bearing life (based on 100% life at .01% water in oil.)
Reference: "Machine Design" July 86, "How Dirt And Water Effect Bearing Life" by Timken Bearing Co.

PVS Series

Applications

- Hydraulic Systems
- Lubrication Systems
- Turbine Oil
- Transformer Oil
- New Oil (oil storage)
- Seal Oil
- Explosion Proof Environments

NEMA 7 Explosion Proof

Markets

- Power Generation
- Pulp and Paper
- Primary Metals
- Mining
- Plastic Injection Molding
- Oil Exploration
- Petrochemical
- Automotive
- Aerospace
- Refineries
- Transportation

Standard Features	Advantages	Benefits
Variable flow circuit	• Allows oil to heat more quickly so water is removed faster	• Time savings
Moisture sensor	• Real-time water content indication in % saturation	• At-a-glance visual confirmation
Automatic operation	• Unattended use • Designed for 24/7 operation	• Reduces labor costs • Increases operation time
316 Stainless steel used for primary wetted surfaces	• No corrosion	• Product reliability
Ecoglass particulate element	• Coreless, non-metallic construction	• Environmentally friendly, easy disposal
Clear plexiglass covers on the condensate tank and vacuum chamber	• See the vacuum dehydration process work	• Visual verification of water removal
Desiccant breather	• Insures dry, clean intake air	• More efficient operation
Reverse phase switch	• Enables easy changing of motor rotation if out-of-phase	• Ease of maintenance • Prevents incorrect rotation
Condensate holding tank with optional auto drain	• Large volume for infrequent servicing intervals	• Reduces maintenance costs
Programmable thermostat	• Maintains oil within 1°F • Prevents overheating the oil	• Unattended operation
Forklift guides and lifting eyes	• Provides safe and secure method of lifting the unit	• Employee safety
Coalescing or packed tower oil dispersal elements	• Flexibility with various fluid viscosities	• Greater efficiency in removing moisture

PVS Series

Vacuum Dehydration Performance

Potential Contaminant	PVS 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

When utilizing 02Q media.

Typical Performance	
Tank Size	60 Gallons (227 liters)
Run Time	62 minutes
Parker Model	PVS 600 (10 GPM)
Water Content (ppm)	Start: 10,000 PPM (1.0%) Stop: 50 PPM (0.005%)
Contamination Level	Start: ISO 21/18/16 Stop: ISO 16/14/11

Start Stop

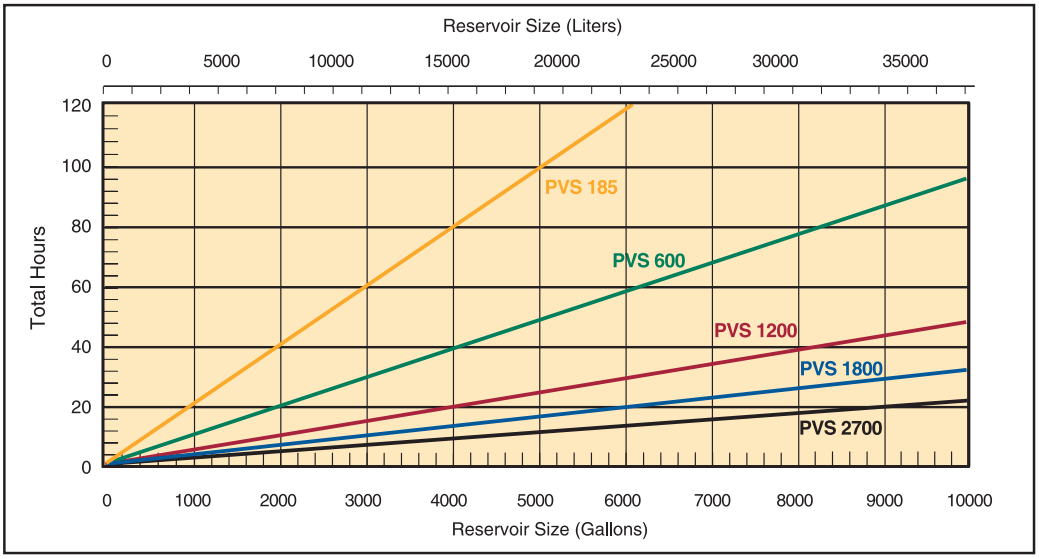
PVS (Vacuum Dehydration) Compared to Other Technologies

Centrifuge units – Removes free water only; has difficulty breaking stable emulsions; larger envelope dimensions but lower flows; higher initial and operating costs.

Desiccant units – Have limited water removal capability due to absorbing material; only removes air ingressed particles; expensive compared to the volume of water removed.

Coalescer units – Removes free water only; has difficulty breaking stable emulsions; does not work well in viscous fluids (>100 sus); much larger in size compared to PVS.

Estimated Water Removal Time
5000 ppm (0.5%) to 150 ppm (0.015%)



PVS 185 Series

Specifications

Flow rate	5 gpm (18.9 lpm)
Dimensions	65" H x 33" W x 48" L
	(1651mm x 838mm x 1219mm)
Weight	650 lbs. (295 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	4.1 gal (15.5 ltrs)
Dispersal elements	1
Minimum operating capacity	5 gal (18.9 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable
	2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	3/4" JIC (male) inlet
	3/4" JIC (male) outlet
FLA (full load amps)	15-41 amps
	(Depending on options & voltages)
Shipping Weight	1400 lbs. (635 kg) maximum
Shipping Dimensions	70" H x 48" W x 60" L
	(1778mm x 1219mm x 1524mm)

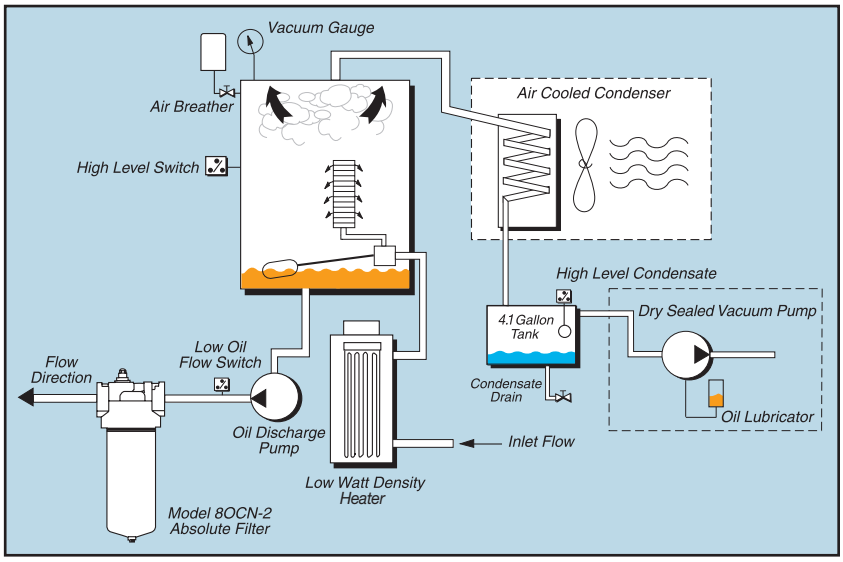
UL and CUL Marked

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

Replacement Elements

Standard Coreless Particulate (80CN-2)	
02QE (2 micron)	936716Q
05QE (5 micron)	936717Q
10QE (10 micron)	936718Q
20QE (20 micron)	936719Q
Optional Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	945801
Packed tower (Cleanable)	933553

PVS 185 Flow Diagram



PVS 600 Series

Specifications

Flow rate	10 gpm (37.9 lpm)
Dimensions	65" H x 33" W x 48" L (1651mm x 838mm x 1219mm)
Weight	900 lbs. (408.2 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	4.1 gal (15.5 ltrs)
Dispersal elements	2
Minimum operating capacity	6 gal (22.7 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable 2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	1" JIC (male) inlet 1" JIC (male) outlet
FLA (full load amps)	24-38 amps (Depending on options & voltages)
Shipping Weight	1500 lbs. (680 kg) maximum
Shipping Dimensions	70" H x 48" W x 60" L (1778mm x 1219mm x 1524mm)

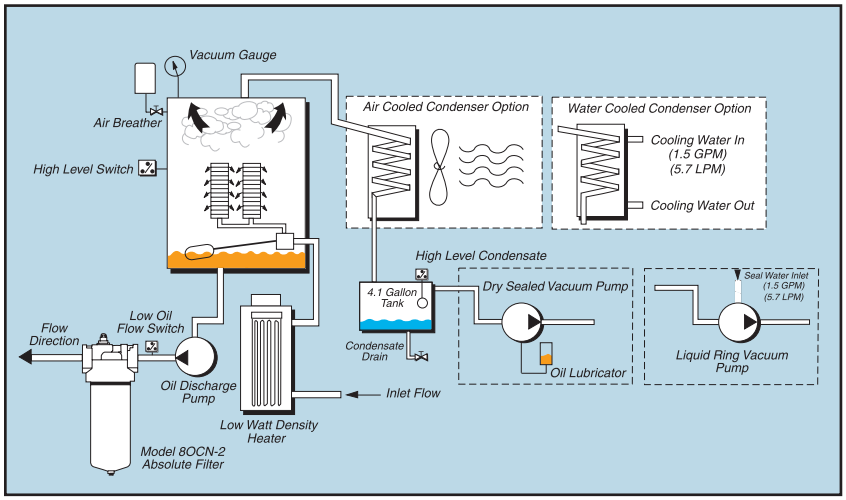
UL and CUL Marked

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

Replacement Elements

Standard Coreless Particulate (80CN-2)	
02QE (2 micron)	936716Q
05QE (5 micron)	936717Q
10QE (10 micron)	936718Q
20QE (20 micron)	936719Q
Optional Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	945801
Packed tower (Cleanable)	933553

PVS 600 Flow Diagram



PVS 1200 Series

Specifications

Flow rate	20 gpm (75.7 lpm)
Dimensions	65" H x 44" W x 61" L
	(1651mm x 1118mm x 1549mm)
Weight	1550 lbs. (703 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	8.3 gal (31.4 ltrs)
Dispersal elements	4
Minimum operating capacity	11 gal (41.6 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable
	2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	1½" JIC (male) inlet
	1" JIC (male) outlet
FLA (full load amps)	30-48 amps
	(Depending on options & voltages)
Shipping Weight	2300 lbs. (1043 kg) maximum
Shipping Dimensions	70" H x 48" W x 65" L
	(1778mm x 1651mm x 1524mm)

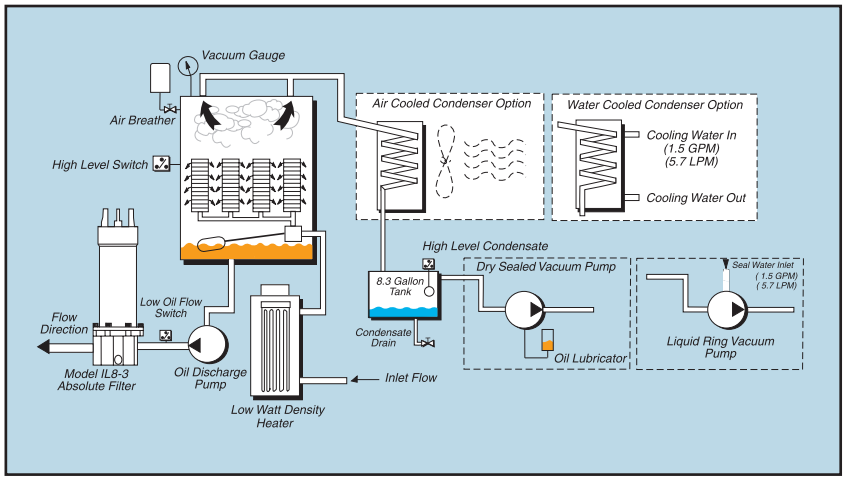
Note: Dimensions and weights are approximate and for reference only.

UL and CUL Marked

Replacement Elements

Standard Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	945801
Packed tower (Cleanable)	933553

PVS 1200 Flow Diagram



PVS 1800 Series

Specifications

Flow rate	30 gpm (113.6 lpm)
Dimensions	68” H x 42” W x 75” L (1727mm x 1067mm x 1905mm)
Weight	2550 lbs. (1157 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	8.3 gal (31.4 ltrs)
Dispersal elements	8
Minimum operating capacity	18 gal (68.1 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable 2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	2" JIC (male) inlet 1.5" JIC (male) outlet
FLA (full load amps)	40-65 amps @ 460 V/60hz
Shipping Weight	3000 lbs. (1361 kg) maximum
Shipping Dimensions	70” H x 48” W x 80” L (1778mm x 1219mm x 2032mm)

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

Replacement Elements

Standard Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	945801
Packed tower (Cleanable)	933553

UL and CUL Marked

PVS 2700 Series

Specifications

Flow rate	45 gpm (170.3 lpm)
Dimensions	65" H x 42" W x 75" L (1727mm x 1067mm x 1905mm)
Weight	2550 lbs. (1157 kg)
Seal material	Fluorocarbon (EPR optional)
Condensate tank	8.3 gal (31.4 ltrs)
Dispersal elements	8
Minimum operating capacity	18 gal (68.1 ltrs)
Vacuum (max)	25 In/Hg
Viscosity (max)	500 sus (108 cSt)-Disposable 2150 sus (460 cSt)-Packed Tower
Outlet pressure (max)	60 psi (4.1 bar)
Ports	3" JIC (male) inlet 2" JIC (male) outlet
FLA (full load amps)	50-70 amps @ 460 V/60hz
Shipping Weight	3000 lbs. (1361 kg) maximum
Shipping Dimensions	70" H x 48" W x 80" L (1778mm x 1219mm x 2032mm)

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

Replacement Elements

Standard Coreless Particulate (IL8-3)	
02QE (2 micron)	933734Q
05QE (5 micron)	933612Q
10QE (10 micron)	933735Q
20QE (20 micron)	933736Q
Dispersal	
Disposable (Coalescing)	945801
Packed tower (Cleanable)	933553

UL and CUL Marked

PVS Series

Specification Worksheet

1. Application: _____

2. Fluid Type: _____ Brand: _____
   Grade: _____ Specific Gravity: _____

3. Viscosity: Min _____ SUS/cSt @ _____ °F/°C
   Max _____ SUS/cSt @ _____ °F/°C
   Normal _____ SUS/cSt @ _____ °F/°C

4. Contamination level: Current ISO level _____/____ /____
   Desired ISO level _____/____ /____

5. Water concentration: Current PPM level _____
   Desired PPM level _____

6. Suction head: Positive/Negative _____ Ft./meters _____

7. Operating distance: _____ Ft./meters _____

8. System fluid operating temperature: _____°F/°C Is there a cooler? _____

9. Operating environment air temperature: (air cooled model)
   Min _____°F/°C
   Max _____°F/°C
   Normal _____°F/°C

10. Water supply temperature: (liquid ring model)
    Min _____°F/°C
    Max _____ °F/°C
    Normal _____°F/°C

11. Operating environment above/below sea level: _____ Ft./meters

12. Voltage options:
    - 230VAC, 3P, 60Hz (185, 600)
    - 380VAC, 3P, 50Hz (185, 600, 1200, 1800, 2700)
    - 460VAC, 3P, 60Hz (185, 600, 1200, 1800, 2700)
    - 575VAC, 3P, 60Hz (185, 600, 1200, 1800, 2700)

13. Available amperage: _____

14. Reservoir volume: _____

15. Special requirements: _____

    _____

    _____

16. Any previous filtration problems with the application: _____

17. PVS model selected: _____

NOTE: Specification sheet must be completed before order can be entered.

PVS Series

Portable Purification Systems

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
	PVS	600	460	DS	D	10QE	AC	ACD, DFL, CR

BOX 1: Filter Series

Symbol	Description
None	Fluorocarbon
E8	10 GPM (500 SUS max)

BOX 2: Base Unit Flow Rate

Symbol	Description
185	5 GPM (18.9 lpm)
600	10 GPM (37.9 lpm)
1200	20 GPM (75.7 lpm)
1800	30 GPM (113.6 lpm)
2700	45 GPM (170.3 lpm)

BOX 3: Power Supply[1]

Model	Symbol	Description
185	230	230 VAC, 3P, 60Hz
	380	380 VAC, 3P, 50Hz
	460	460 VAC, 3P, 60Hz
	575	575 VAC, 3P, 60Hz
600	380	380 VAC, 3P, 50Hz
	460	460 VAC, 3P, 60Hz
	575	575 VAC, 3P, 60Hz
1200	380	380 VAC, 3P, 50Hz
	460	460 VAC, 3P, 60Hz
	575	575 VAC, 3P, 60Hz
1800	380	380 VAC, 3P, 50Hz
	460	460 VAC, 3P, 60Hz
	575	575 VAC, 3P, 60Hz
2700	380	380 VAC, 3P, 50Hz
	460	460 VAC, 3P, 60Hz
	575	575 VAC, 3P, 60Hz

* Consult factory for special voltage

BOX 4: Vacuum Pump

Symbol	Description
DS	Dry sealed
LR[2]	Stationary liquid ring
ALR[2]	Portable liquid ring

BOX 5: Dispersal Element

Symbol	Description
D	Coalescing (disposable)
P	Packed tower (cleanable)

BOX 6: Particulate Element

Symbol	Description
2QE	Ecoglass, 2 micron
5QE	Ecoglass, 5 micron
10QE	Ecoglass, 10 micron
20QE	Ecoglass, 20 micron

Note: Above elements are rated for Beta 200+ (99.5% efficiency)

BOX 7: Heater

Model	Symbol	Description
185	12	12 kW/ 3 phase
600	24	24 kW/ 3 phase
	36	36 kW/ 3 phase
1200	24	24 kW/ 3 phase
	36	36 kW/ 3 phase
	48	48 kW/3 phase
1800	36	36 kW/ 3 phase
	48	48 kW/ 3 phase
2700	48	48 kW/ 3 phase

BOX 8: Condenser

Symbol	Description
AC	Air cooled
LC	Liquid cooled
BC	Air and water cooled

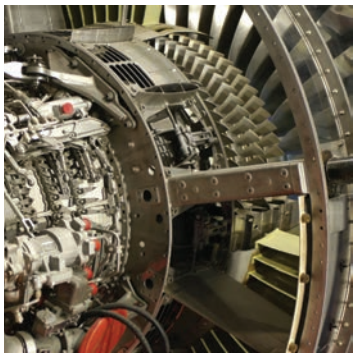
BOX 9: Options[4]

Symbol	Description
3HP	3HP high viscosity circuit
5DW	5” diameter wheels
ACD	Auto condensate drain
AFK	Auto-fill kit
CDC	Condensate drain counter
CE	CE marked
CF	Carbon exhaust filter
CR	Cable reel
CR48	Cable reel 48kW
DFL	Dirty filter light
DPG	Differential pressure gauge
EX2	Explosion proof (Class I, Division II, Zone I and II)
IL8	Upgrade to IL8-3 coreless filter
MBV	Motorized ball valves
PW	Pneumatic wheels
RHM	Resetable hour meter
SFI	Sight flow indicator
PD	LED particle detector
PDL	LCD particle detector

Notes:
1. Consult factory for special voltage
2. External water source
3. Onboard water source
4. Consult factory for other options

SMR Series

Submicronic Removal
Fluid Purification Systems



Parker

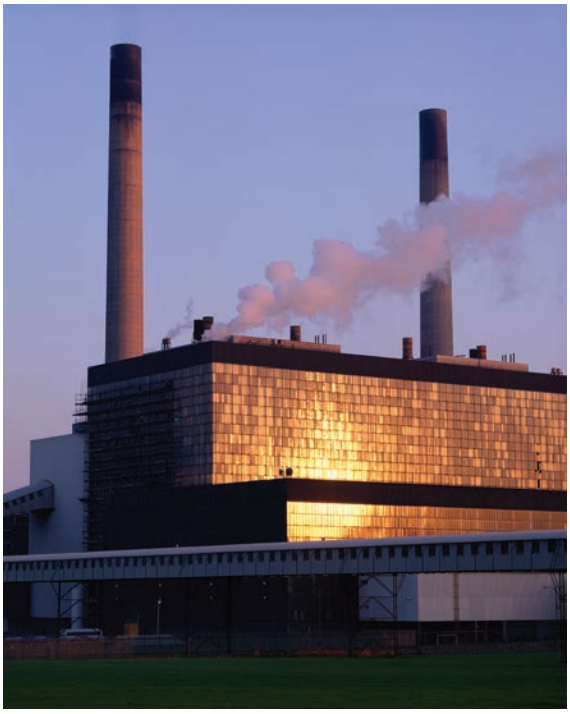
ENGINEERING YOUR SUCCESS.

SMR Series

Applications

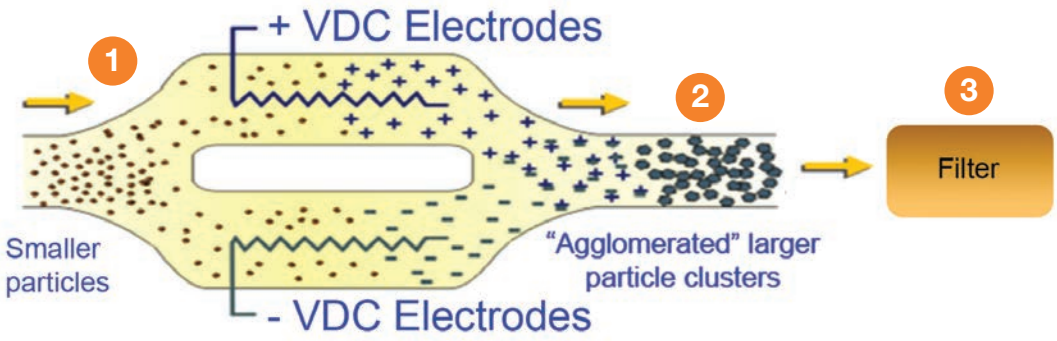
The SMR Series is the smart purification solution for fluid flow in the 10 GPM (38 LPM) range. The SMR contains patented Balanced Charge Agglomeration (BCA™) technology, which maintains hydraulic and lubricating fluids in optimum condition while preventing/removing the build-up of sludge and varnish. The system is available in a PLC or simplified control version. Balanced Charge Agglomeration (BCA™) technology does not remove water, however with the removal of thousands of sub-micron particles, the majority of sites where water can readily attach are mitigated. Water is more easily separated and removed, improving demulsibility.

- **Power Generation**
  - Steam & Gas Turbine
  - hydraulics & lubrication
- **Oil & Gas**
  - Compressor/Turbine hydraulics & lubrication
- **Pulp & Paper**
  - Lube oil
  - Hydraulics
- **Manufacturing**
  - Hydraulics
  - Lubrication
  - EDM
  - Injection molders
- **Others**
  - Cooking oil
  - Gear oil
  - Fuels
  - Bio fuels
  - Steel
  - Military



SMR Series

Balanced Charge Agglomeration (BCA™) - How the Technology Works



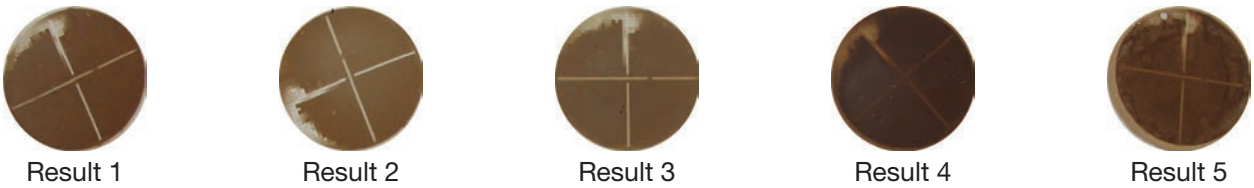
1. Particles are passed across high-voltage electrodes, inducing a charge on the particles (+) and (-) in separate paths.

2. Oppositely charged particles are mixed and are attracted to each other, forming larger particle clusters.

3. Particle clusters are more efficiently filtered.

Evaluation of the SMR Process - Actual Test Results

- Varnish is stripped from the hydraulic or lubrication system as fluid is processed through the SMR.
- The varnish is suspended in the hydraulic fluid as sub-micron particulate.
- BCA™ develops larger particles (see graphic above).
- The particulate is effectively removed from the hydraulic or lubrication fluid by high efficiency filters.



Result 1 | Result 2 | Result 3 | Result 4 | Result 5

Result 6 | Result 7 | Result 8 | Result 9 | Result 10

Results from a 10 month field trial

SMR Series

Features and Benefits

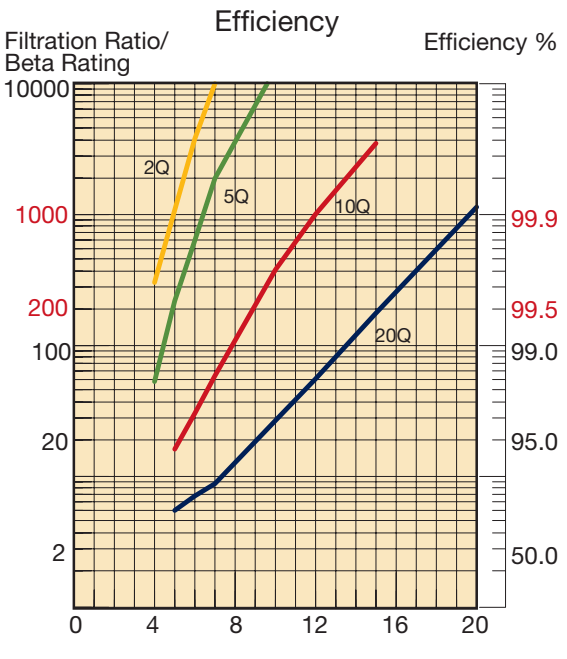
- Contaminant Removal to the Sub-Micron Level
- Prevention and Removal of Sludge and Varnish
- Removal of Oxidation Byproducts and Biological Contamination
- Removal of Ferrous and Non-Ferrous Contaminants

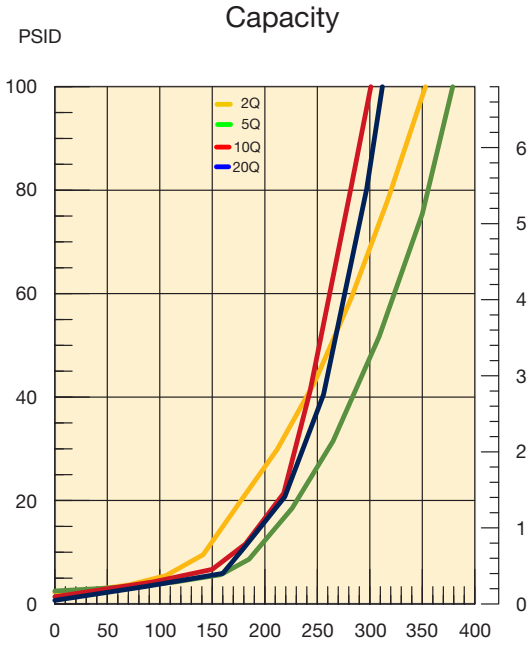
The Parker SMR Benefit

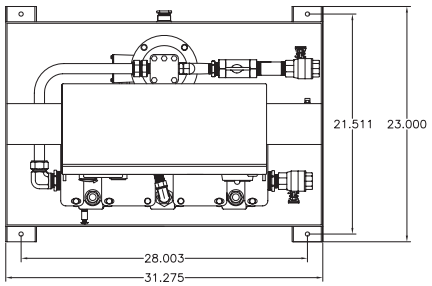
- Unmatched Fluid Purification & System Polishing
- Proven Varnish Removal
- PLC Control & Data Tracking
- OEM Approvals

SMR10

Element Performance

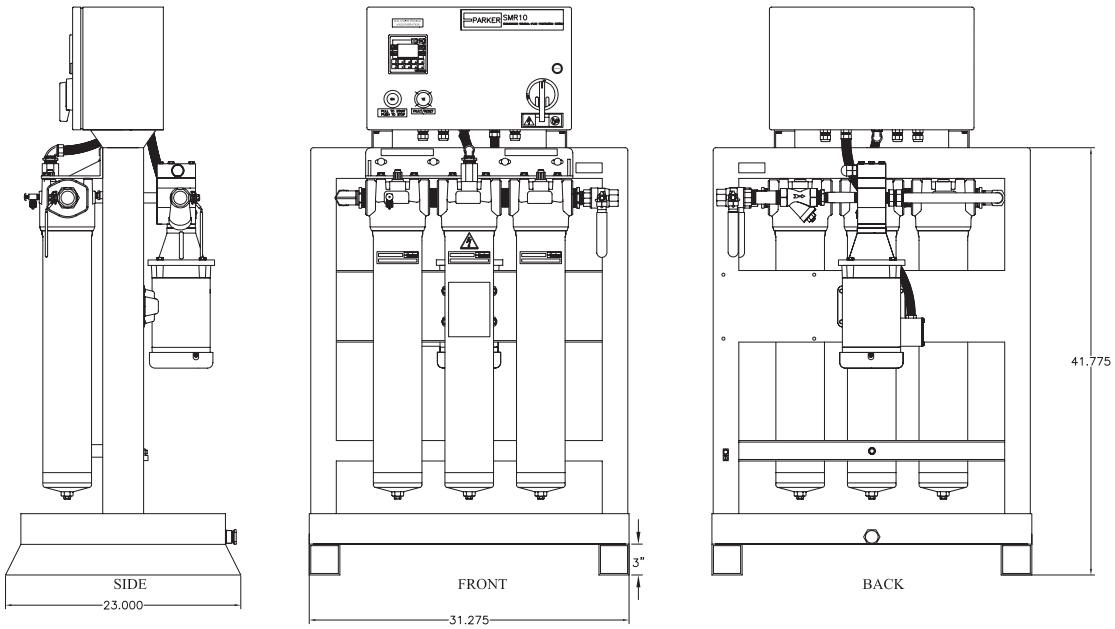






Dimensions are in inches.

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



SMR10

Specifications

Shipping Weight
Approx. 525 lbs (238 kg)

Fluid
Viscosity: 1,020 SUS (220 cSt) maximum
Maximum Pressure: 50/80 PSI (operating/static)
Minimum Fluid Temperature: 65° F (18° C)
Maximum Fluid Temperature: 200° F (93° C)
Minimum Fluid Flash Point: >140° F (60° C)

Power
Customer Provided
Voltage: 110VAC/1Ph/60Hz, 230VAC/3Ph/60Hz, 460VAC/3Ph/60Hz
Phase: 1/3
Frequency 60Hz

Motor
Power: 0.5 HP
Voltage/Ph/Freq: 0-230/460/3/variable
RPM: 0 to 2000

Pump
Positive Displacement - Variable Frequency Drive (VFD)
Design Flow Rate: 2.5 - 10 GPM

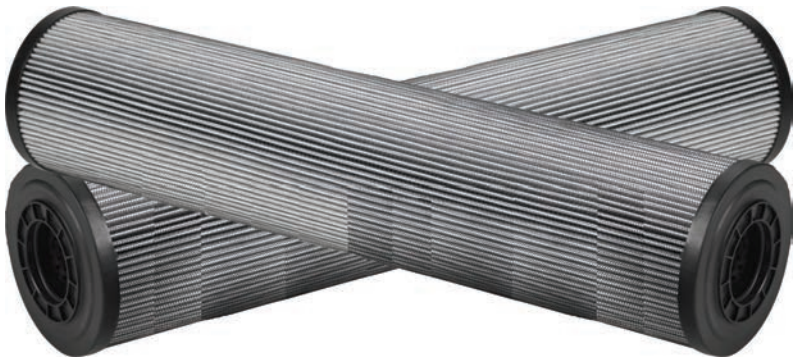
Parameter Settings

Parameter	Default	Minimum	Maximum
Flow	**10 GPM [37.9 LPM]**	2.5 GPM [9.45 LPM]	10 GPM [37.85 LPM]
Shutdown Pressure	**70 psi [4.82 bar]**	0 psi/bar	75 psi [5.17 bar]
Max Operating Pressure	**50 psi [3.4 bar]**	0 psi/bar	60 psi [4.13 bar]
Min Operating Pressure	**0 psi [0.0 bar]**	0 psi/bar	5 psi [0.34 bar]
Maximum Temperature	**200°F [93.3°C]**	35°F [1.6°C]	200°F [93.3°C]
Minimum Temperature	**35°F [1.5°C]**	35°F [1.6°C]	200°F [93.3°C]
Upstream Filter Delta-P	**15 psi [1.0 bar]**	5 psi [0.34 bar]	25 psi [1.7 bar]
Downstream Filter Delta-P	**10 psi [0.67 bar]**	5 psi [0.34 bar]	25 psi [1.7 bar]
Auto-Restart after power loss	**OFF**	n/a	n/a
Auto-Restart after temperature shutdown	**OFF**	n/a	n/a
US or Metric units	**US**		

SMR10

Parts List

Quantity	Parker Part #	Description
1	165-00004	Drive, AC, A/B 1 HP 240V 1 PH
	165-00003	Drive, AC, A/B 1 HP 480V 3 PH
	165-00008	Drive, AC, A/B 1 HP 120V 1 PH
	165-00011	Drive, Line Filter, 120V & 240V 1 PH
	165-00014	Drive, Line Filter, 460V 3 PH
1	270-00006	PLC/HMI
1	275-00007	Power Supply, H.V.
1	275-00002	Power Supply, A/B 24V 110-240V
1	275-00006	Power Supply, C/H 24V 380-480V
1	290-00001	Relay, H.V., A/B
1	245-00006	Light Module, A/B, Green
1	245-00005	Light Module, A/B, Yellow
1	250-00022	Motor, 1 HP, 230-380 STD
1	280-00009	Pump/Bypass, 10 GPM, STD
1	V72244	O-Ring, vessel 1, 2 or 3
1	933219Q	5 Micron Filter, Upstream
1	933218Q	2 Micron Filter, Downstream
1	195-00001	Feedthru, H.V.
4	350-00001	Transducer, pressure



SMR Series

Specification Worksheet

1. Application: _____

2. Fluid Type: _____ Brand: _____
   Grade: _____ Specific Gravity: _____

3. Viscosity: Min _____ SUS/cSt @ _____ °F/°C
   Max _____ SUS/cSt @ _____ °F/°C

4. Contamination level: Current ISO level _____/____ /____
   Desired ISO level _____/____ /____

5. Water concentration: Current PPM level _____
   Desired PPM level _____

6. Current TAN_____ Have there been long term isues with acid? _____

7. Has there been static discharge from system filters? _____

8. Any visible signs of fluid oxidation or varnish? _____

9. Any frequent component failures or repairs? _____

10. Quantitative ANalysis (VPR from Analyst Inc.): _____

11. Suction head: Positive/Negative _____ Feet/meters

12. Suction and Discharge Port Connections (Size & Type): _____

13. Operating distance: _____ Feet/meters

14. System fluid operating temperature F/C

15. Voltage options: Indicate One
    - 115 VAC, 1P, 60Hz ☐
    - 230 VAC, 3P, 60Hz ☐
    - 380 VAC, 3P, 50Hz ☐
    - 460 VAC, 3P, 60Hz ☐
    - 575 VAC, 3P, 60Hz ☐

16. Available amperage: _____

17. System volume: _____

18. Special requirements: _____
    _____

19. Any previous filtration problems with the application: _____
    _____

20. SMR model selected: _____

NOTE: Specification sheet must be completed before order can be entered.
*** Baseline samples required prior to field trial or final equipmnet recommendation.**

SMR Series

Submicronic Removal Fluid Purification Systems

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
SMR	10	460	20QE	V	M2	X	N16	PD

BOX 1: Filter Series

Symbol	Description
SMR	Submicronic filtration system

BOX 2: Flow Rate

Symbol	Description
10	10 gpm (38 lpm)

BOX 3: Power

Model	Symbol	Description
120		120 VAC, 1Ph, 60Hz
230		230 VAC, 3Ph, 60Hz
380		380 VAC, 3Ph, 50Hz
460		460 VAC, 3Ph, 60Hz

BOX 4: Element Media[1]

Symbol	Description
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron

BOX 5: Seals

Symbol	Description
V	Fluorocarbon

BOX 6: Indicator

Symbol	Description
P	No indicator
M2	Analog visual indicator

BOX 7: Bypass

Model	Symbol	Description
X		No bypass

BOX 8: Ports

Symbol	Description
	SMR10
N16	1" NPT threaded ports

BOX 9: Options

Symbol	Description
PD[2]	Particle detector
PDM[2]	Particle detector w/ moisture sensor

Note:

1. Outlet polishing filter is always fitted with 02QE/02Q element.

Replacement Elements

Media	Fluorocarbon	Ethylene Propylene
05Q	933219Q	CF
10Q	933220Q	CF

Note: "CF" = Consult Factory

Stationary Offline System

SOS for Indoor/Outdoor Fluid Filtration Needs

Parker

ENGINEERING YOUR SUCCESS.

Stationary Offline System

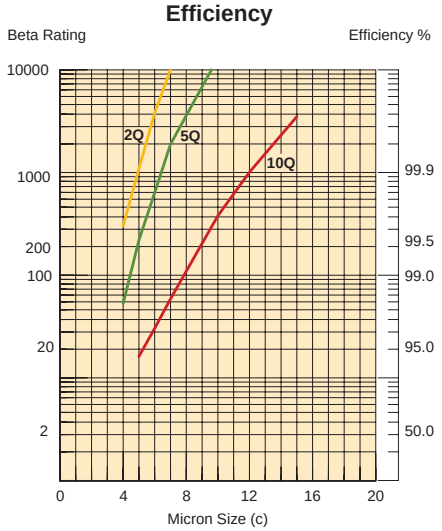
Performance Data

Parker's patented Moduflow™ Plus element was designed with built-in diverter cone and bypass valve, to meet your application needs.

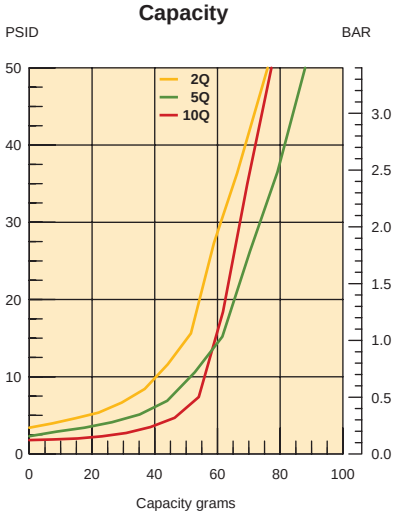
Applications

- Oil & Gas
- Plastic Injection Molding
- Die Casting
- Steel
- General Industrial
- Power Generation
  - Load Tap Changer
  - Wind Turbines
  - Transformer
- Mining
- Off-highway Equipment
- Food Processing
- Refining
- Paper Mills
- Aircraft Ground Support

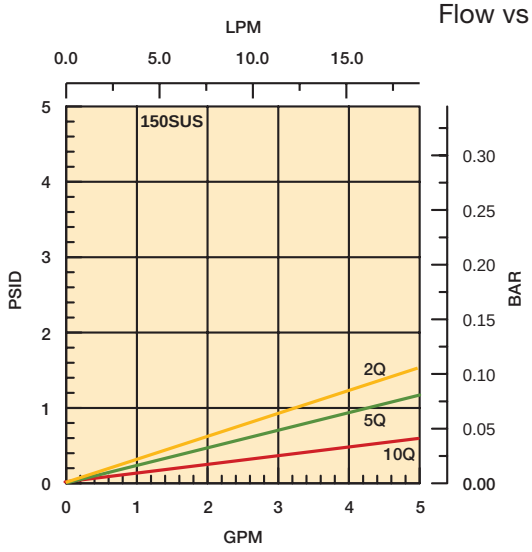
Efficiency

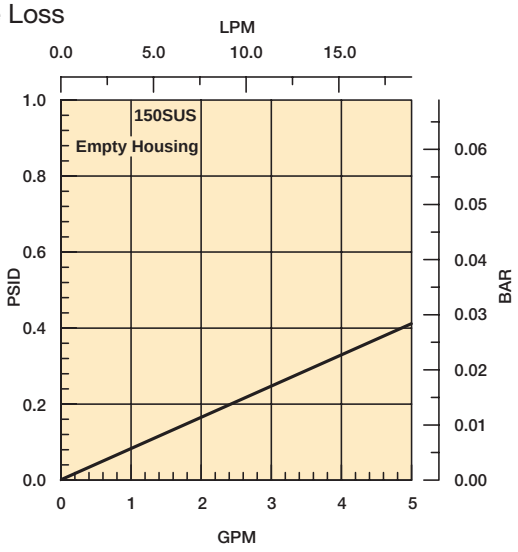


Capacity



Flow vs Pressure Loss



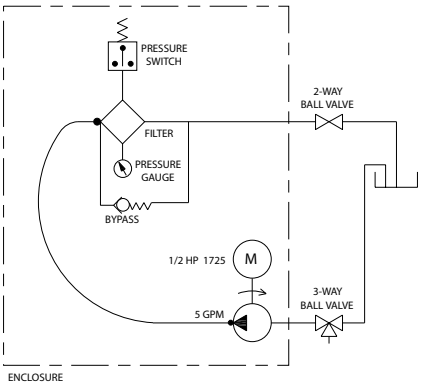


Stationary Offline System

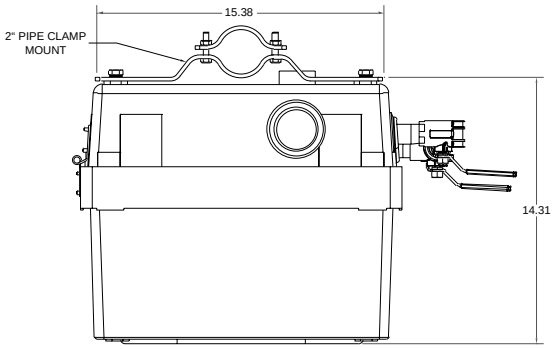
Specifications

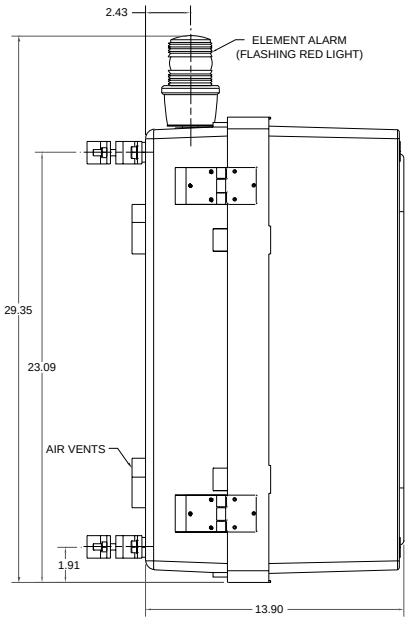
Flow rate: 5 gpm
Filtration: High efficiency Microglass (B_x = 200+).
Enclosure: Weatherproof NEMA 4 IP 65 with sealed safety glass window.
Electrical service required: 115V, 10A, single phase, 60 Hz
Electrical motor: ½ HP @ 1725 rpm w/ thermal overload protection.
Filter bypass alarm: Red strobe light indicates at 20 psid filter element pressure drop. Auto shut-down at 40 psid.
Seals: Nitrile
Weight: Approximately 80 lbs.

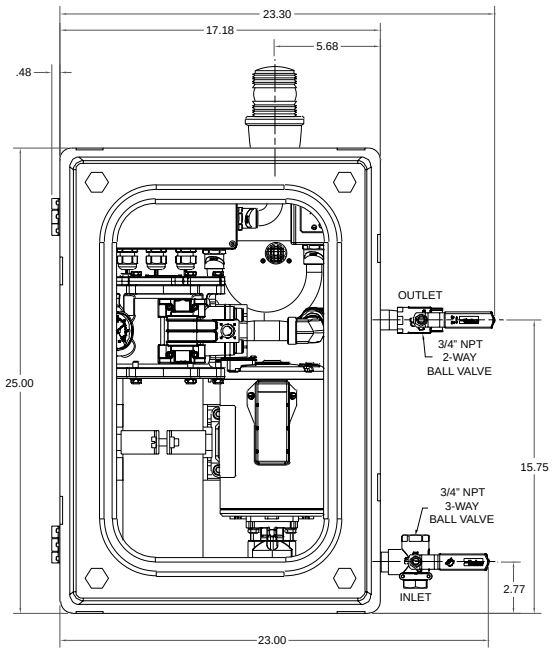
Compatible with most petroleum based fluids, including dielectric oils. Rated for continuous duty.

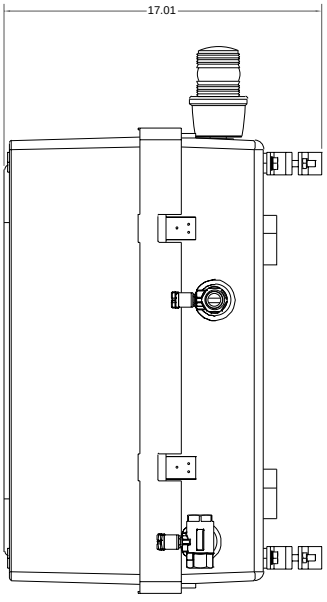


The Moduflow™ Plus filter is known for its performance and durability. It has been engineered to provide the highest level of performance for today's demanding filtration requirements.









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

Dimensions are in inches.

SOS Series

Stationary Offline 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
SOS	5	02Q	BG	E	I	N12	1

BOX 1: Filter Series	
Symbol	Description
SOS	Stationary Offline System

BOX 2: Flow Rate	
Symbol	Description
5	5 gpm (38 lpm)

BOX 3: Element Media[1]	
Symbol	Description
02Q	Microglass, 2 micron
05Q	Microglass, 5 micron
10Q	Microglass, 10 micron
WR	Water Removal

BOX 4: Seals	
Symbol	Description
B	Nitrile

BOX 5: Indicator	
Symbol	Description
E	Electrical w/ visual gauge and external beacon

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

BOX 7: Ports	
Symbol	Description
N16	3/4" NPT threaded ports

BOX 8: Options	
Symbol	Description
1	No Options

Note:
1. Includes the elements you select already installed.

Replacement Elements

Media	Fluorocarbon	Ethylene Propylene
02Q	933218Q	CF
05Q	933219Q	CF
10Q	933220Q	CF

Note: "CF" = Consult Factory

Par-Test™

Fluid Analysis

Parker

ENGINEERING YOUR SUCCESS.

Fluid Analysis

Par-Test™

Fluid analysis has proven to be a critical tool for any preventive maintenance program. 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.

Par-Test is a complete laboratory analysis, performed on a small volume of fluid. The report you receive is a neatly organized three page format. One may quickly analyze the test results of an individual sample and/or look at a trend analysis for up to five different samples. Two types of services are offered through Par-Test, a water base fluid analysis kit or a petroleum base fluid analysis kit. For both types of services the Par-Test kit includes a pre-cleaned glass bottle, mailing container with pre-addressed label, sample information data sheet (to be completely filled out by end user) and the following analysis:

Fluid sampling 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.

Petroleum Base Kit

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

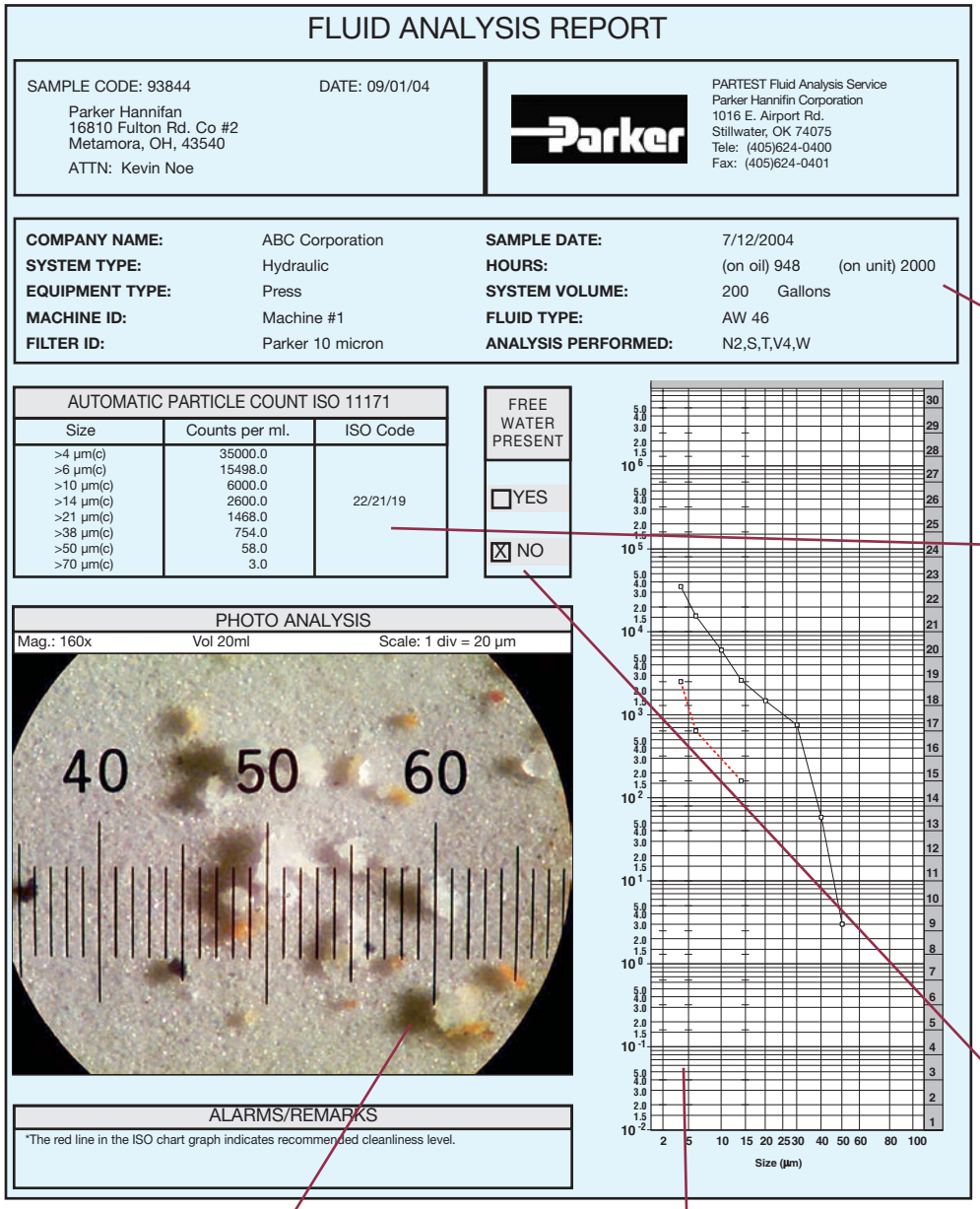
Water Base Kit

Particle Count
Photomicrograph
Spectrometric Analysis
Viscosity Analysis
Neutralization Analysis

Description	Part Number
Petroleum base fluid kit (Carton of 10 test bottles)	927293
Water base fluid kit (single test bottle)	932995

Fluid Analysis

Par-Test™



FLUID ANALYSIS REPORT

SAMPLE CODE: 93844 DATE: 09/01/04

Parker Hannifan
16810 Fulton Rd. Co #2
Metamora, OH, 43540

ATTN: Kevin Noe

PARTEST Fluid Analysis Service
Parker Hannifin Corporation
1016 E. Airport Rd.
Stillwater, OK 74075
Tele: (405)624-0400
Fax: (405)624-0401

COMPANY NAME:	ABC Corporation	**SAMPLE DATE:**	7/12/2004
SYSTEM TYPE:	Hydraulic	**HOURS:**	(on oil) 948 (on unit) 2000
EQUIPMENT TYPE:	Press	**SYSTEM VOLUME:**	200 Gallons
MACHINE ID:	Machine #1	**FLUID TYPE:**	AW 46
FILTER ID:	Parker 10 micron	**ANALYSIS PERFORMED:**	N2,S,T,V4,W

AUTOMATIC PARTICLE COUNT ISO 11171

Size	Counts per ml.	ISO Code
>4 µm(c)	35000.0	22/21/19
>6 µm(c)	15498.0	
>10 µm(c)	6000.0	
>14 µm(c)	2600.0	
>21 µm(c)	1468.0	
>38 µm(c)	754.0	
>50 µm(c)	58.0	
>70 µm(c)	3.0	

FREE WATER PRESENT

☐ YES

☒ NO

PHOTO ANALYSIS

Mag.: 160x Vol 20ml Scale: 1 div = 20 µm

ALARMS/REMARKS

*The red line in the ISO chart graph indicates recommended cleanliness level.

For our Par-Test™ customers, the analysis report is available online for your ease and convenience. Historical data is also available. **Visit www.partestlab.com**

Sample Data

Information supplied by the user regarding the fluid to be analyzed. Complete and accurate information is crucial for a useful analysis.

Particle Count

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; ie. 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.

Free Water Analysis

Determines if the water present is beyond the saturation point of the fluid. At the saturation point, the fluid can no longer dissolve or hold any more water. Its appearance becomes cloudy or “milky”. Many hydraulic oils saturate between 500 and 1000 PPM of water.

Photo Analysis

A photomicrograph of a small volume of fluid (20 ml) magnified 100X. This analysis gives a quick glance at the contamination present in the fluid. Each line of the graduated scale represents 20 microns in size.

The full color photomicrograph helps identify particles which would otherwise be grouped by class.

ISO Chart

Graphically illustrates the particle count on a graph. The recommended cleanliness code level, if given on the submittal form, is shown by a broken line on the ISO chart.

Fluid Analysis

Par-Test™

FLUID ANALYSIS REPORT

SAMPLE CODE: 93844 DATE: 09/01/04

Parker Hannifan
16810 Fulton Rd. Co #2
Metamora, OH, 43540

ATTN: Kevin Noe

PARTEST Fluid Analysis Service
Parker Hannifin Corporation
1016 E. Airport Rd.
Stillwater, OK 74075
Tele: (405)624-0400
Fax: (405)624-0401

SPECTROMETRIC ANALYSIS

WEAR METALS AND ADDITIVES	PPM BY WEIGHT	STATUS*
IRON	120.0	H
COPPER	510.0	H
CHROMIUM	< 1.0	N
LEAD	< 1.0	N
ALUMINUM	1.0	N
TIN	< 1.0	N
SILICON	< 1.0	N
ZINC	423.0	N
MAGNESIUM	< 1.0	N
CALCIUM	540.0	H
PHOSPHORUS	10.0	L
BARIUM	1.0	N
BORON	< 1.0	N
SODIUM	< 1.0	N
MOLYBDENUM	< 1.0	N
SILVER	< 1.0	N
NICKEL	< 1.0	N
TITANIUM	< 1.0	N
MANGANESE	< 1.0	N
ANTIMONY	< 1.0	N

L = LOW N = NORMAL H= HIGH

The Spectometic Analysis reports the ppm level of 20 different wear metals and additives in the sample. Generally the first 7 and last 5 elements are considered wear elements not normally present in hydraulic oil. Zinc through molybdenum (shaded) represent some common additives in oil. If a baseline oil sample (new oil out of a drum) is provide, then comments on the analyzed sample can be provided on whether the status of the elements are low, normal, or high.

Viscosity Analysis - ASTM D445

CST@100C:		SSU@210F:	
CST@40C:	46.25	SSU@100F:	215.0

Viscosity at 40C (100F) is reported in Centistokes (cST) and SUS (Saybolt Universal Seconds). The test is conducted in accordance with ASTM D445 procedures for determining the kinematic viscosity of fluids

Neutralization Analysis - ASTM D794

TAN: 0.44

The Total Acid Number (TAN) test measures the acidity of a hydraulic fluid. The higher the number, the more acidic the fluid. Over time this may mean the fluid is becoming oxidized.

Water Analysis - ASTM D6304

WATER CONTENT (PPM): 410.0

The water analysis test shows the actual parts per million of water in a sample. This is known as the Karl Fischer titration test and is conducted in accordance with ASTM D6304.

Comments

*Please check spectrometric status for abnormal conditions.

WEAR METALS AND ADDITIVES

Iron: Ferrous wear particle typically from pumps, gears, cylinders, or rust

Copper: Brass (copper/zinc) and bronze (copper/tin) in bearings and bushings

Chromium: (white non ferrous metal) Chrome from cylinder rods, bearings, valve spools

Lead: Babbitt or copper lead bearings

Aluminum: White nonferrous metal from pump bodies, bushings, bearings, and grinding compounds

Tin: Babbitt bearings, plating

Silicon: Sand/dirt contamination or antifoaming additive in oil

Zinc: Plating or anti-wear additive in oil

Magnesium: Detergent, dispersive additive in oil, bearings, water

Calcium: Dispersant additive or acid neutralizer

Phosphorous: Anti-wear or fire resistant additive in fluid

Barium: Corrosion, rust inhibitor additive in oil

Boron: Detergent, dispersive additive in oil

Sodium: Detergent or coolant additive

Molybdenum: Alloy metal or anti friction additive

Silver: White non ferrous metal

Nickel: Alloy metal

Titanium: White non ferrous metal

Manganese: White non ferrous metal

Antimony: Babbit bearings, greases

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. Both SSU at 100° F and cSt at 40° C are reported.

Neutralization Analysis

Referred to as the Total Acid Number (TAN) this titration test measures the acid level of the sample fluid. The production of acidic material causes oxidation degradation or aging of most fluids. This activity is promoted by elevated temperatures, presence of entrained metal particles, and intimate contact with air. It is the rate of increase of the TAN during any given time period that is significant, not just the absolute value.

Water Analysis

Karl Fischer test gives accurate measure of water concentration in the sample fluid. The results are reported in parts per million (PPM) and allow for detection of water levels well below the saturation point.

Remarks

Quick statements or alerts about any unusual results from one of the tests reported on this page.

Spectrometric Analysis

Results obtained by Rotating Disk Electrode (ROE) Spectrometer and reported in terms of parts per million (PPM). Twenty different 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.

Fluid Analysis

Par-Test™

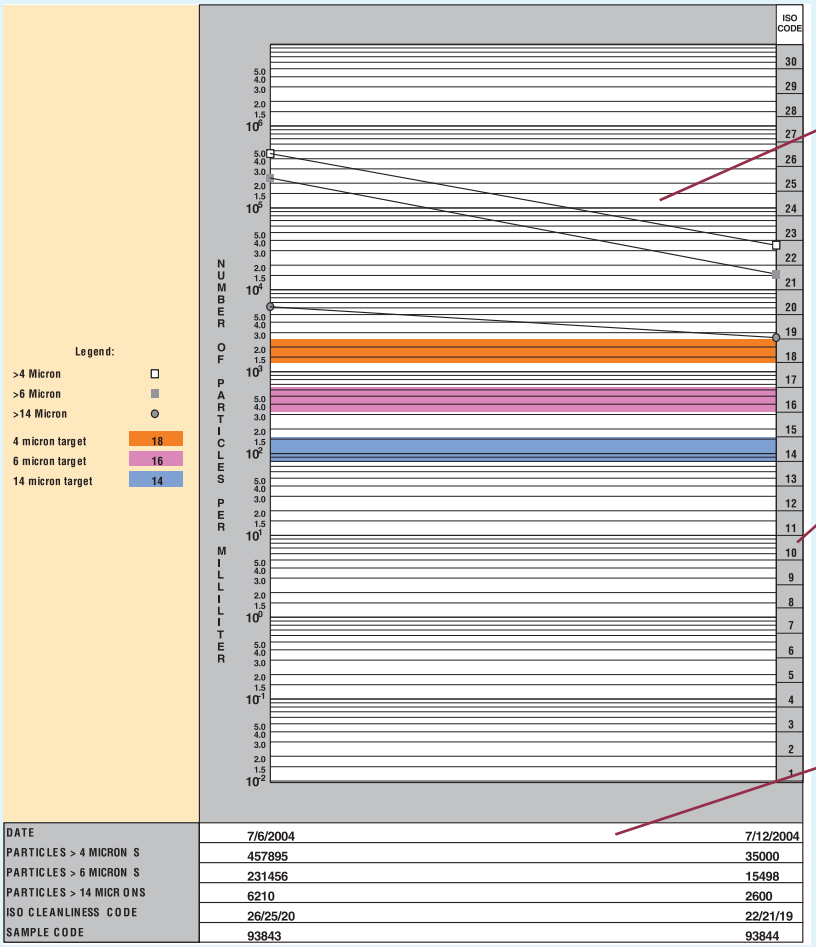
FLUID ANALYSIS REPORT

SAMPLE CODE: 93844 DATE: 09/01/04

Parker Hannifan
16810 Fulton Rd. Co #2
Metamora, OH, 43540

ATTN: Kevin Noe

PARTEST Fluid Analysis Service
Parker Hannifin Corporation
1016 E. Airport Rd.
Stillwater, OK 74075
Tele: (405)624-0400
Fax: (405)624-0401



DATE	7/6/2004	7/12/2004
PARTICLES > 4 MICRON S	457895	35000
PARTICLES > 6 MICRON S	231456	15498
PARTICLES > 14 MICR ONS	6210	2600
ISO CLEANLINESS CODE	26/25/20	22/21/19
SAMPLE CODE	93843	93844

For our Par-Test™ customers, the analysis report is available online for your ease and convenience. Historical data is also available. Visit www.partestlab.com

Trend Analysis

Graphical history for up to 5 samples plotted for 2, 5 and 15 micron and greater size particles. This analysis is a valuable tool for tracking the progress of a system over a given time period.

ISO Range Code

Index Number that is associated with a range of particles. Below is a list of the range numbers and the corresponding particle quantities.

Sample Code

Assigned to the test kit form for a ready reference. This code can be used to track the sample from start to finish.

NUMBER OF PARTICLES PER ML

Range Code	More than	Up to and including	Range Code	More than	Up to and including
30	5,000,000	10,000,000	18	1,300	2,500
29	2,500,000	5,000,000	17	640	1,300
28	1,300,000	2,500,000	16	320	640
27	640,000	1,300,000	15	160	320
26	320,000	640,000	14	80	160
25	160,000	320,000	13	40	80
24	80,000	160,000	12	20	40
23	40,000	80,000	11	10	20
22	20,000	40,000	10	5	10
21	10,000	20,000	9	2.5	5
20	5,000	10,000	8	1.3	2.5
19	2,500	5,000	7	.64	1.3
			6	.32	.64

Fluid Analysis

Par-Test™

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 came 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.

ON-SITE FLUID ANALYSIS PRODUCT

DuraClean™

Premium Hydraulic Fluid

Parker

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™
Oil Flow	Leaves critical system components starved for lubrication and leads to part failure	Keeps system protected and extends component life
Filters	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
Valves	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
Friction	Creates higher friction causing increases in fuel and energy consumption, component wear and lower productivity	Improves system efficiency, extends component life and maintains productivity
Thermal Stability	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
Varnish Protection	Increases the need for frequent cleaning and repairs	Minimizes the need for frequent cleaning and repairs
	Varnish	No Varnish

Parker DuraClean™

DuraClean™ vs. Varnish

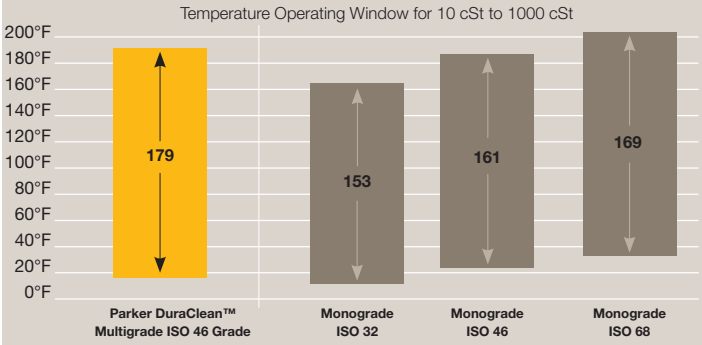
Without Parker DuraClean™ – Varnish

Varnish is attracted to metal surfaces, this results in an overall decrease in productivity.

With Parker DuraClean™ – No Varnish

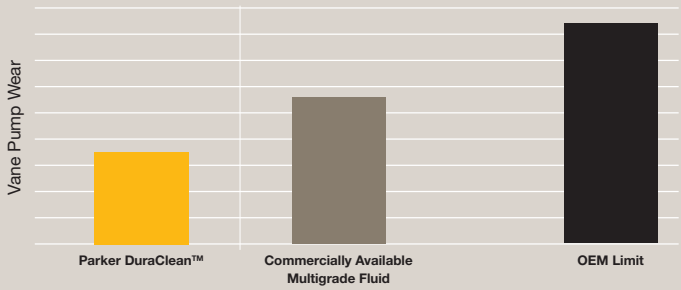
Parker DuraClean™ prevents the harmful build-up of varnish, keeping systems clean and operating at peak efficiency.

Comparison of Parker DuraClean™ to Monograde Hydraulic Fluids



Parker DuraClean™ provides a wider temperature operating window than common monograde hydraulic fluids.

Parker DuraClean™ has Excellent Antiwear Performance



Parker DuraClean™ outperforms typical commercially available multigrade fluids and exhibits 60% less wear than is required for OEM approval.

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.

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	**141**
Acid Number, mg KOH/g TAN	D664	0.6
Oxidation, hrs.	D943	**5500 - 6000 Typical**
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		**2.5** (25 maximum limit)
Shear Stability	KRL	
% viscosity loss after 20 test hours		**4.3** (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

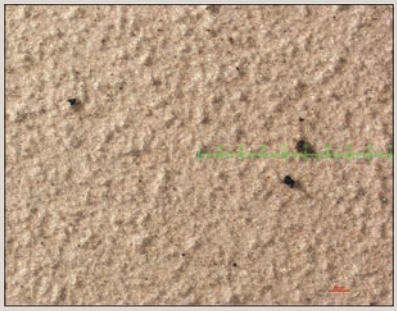
Other volumes may be available. Please consult factory.

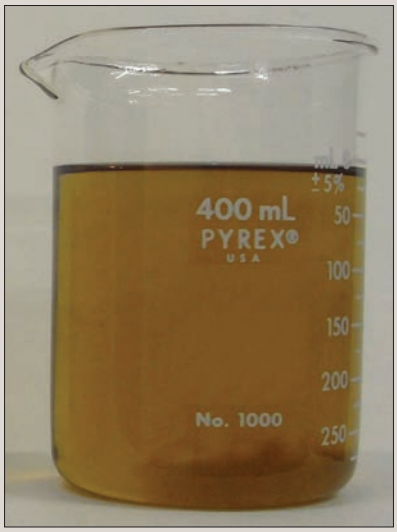
Visual Representation of New Fluid Cleanliness vs. Fluid Oxidation After 1,300 Hours

DuraClean™
ISO 15/14/12
100X

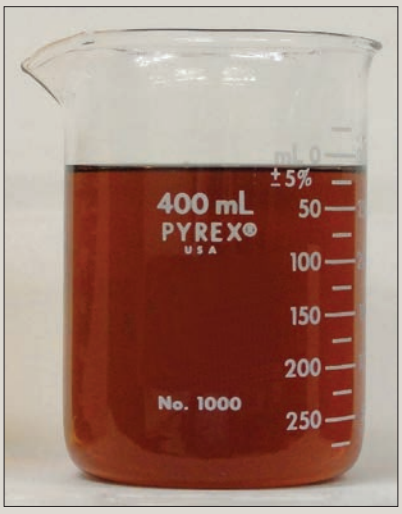
Product B
ISO 22/20/14
100X

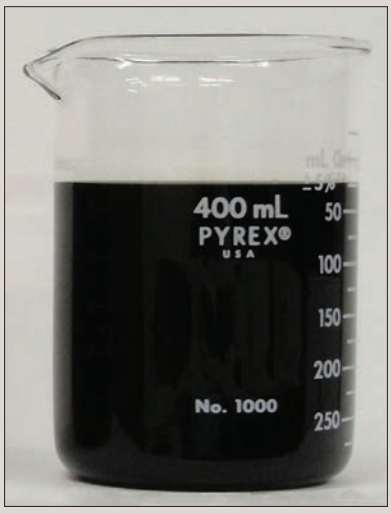
Product C
ISO 25/24/21
100X





Initial samples taken directly from a 5 gallon pail





Same samples after 1,300 hours of exposure @ 200°F

Lab Report #8090 On-File

Reservoir Accessories

Filler Breathers, Strainers, Diffusers, Fluid Level/Temperature Gauges

Parker

ENGINEERING YOUR SUCCESS.

Reservoir Accessories

Non-Metallic Filler Breathers

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)

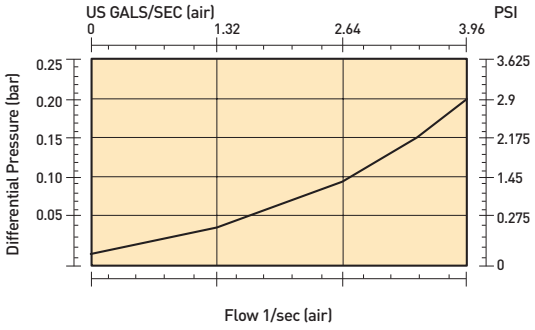
Seals: Nitrile (single-hole), cork gasket (six-hole)

Pressurization Options: 3 psi (0.2 bar)

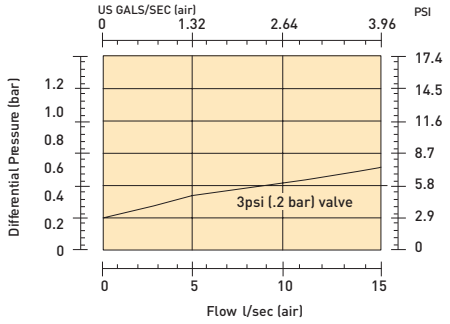
Dipstick: (optional) 7.9 in. (200 mm) or 15.8 in. (400 mm) lengths with adjustable Hi/Lo indicators

Anti-Splash Design!

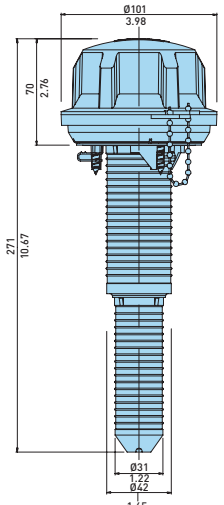
(Non-pressurized)



(Pressurized)

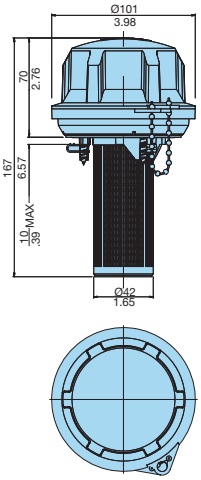


Telescopic Strainer

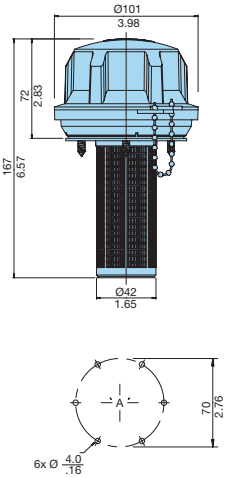


TANK MOUNTING HOLE Ø63
NOTE: REFER TO UCC PRODUCTION INSTRUCTIONS FOR ASSEMBLY DETAILS AND PACKING REQUIREMENTS

Single-Hole Option



Six-Hole Option



Linear Measurement= $\frac{mm}{in}$

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

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

Reservoir Accessories

Non-Metallic Breathers

Non-Metallic Breathers
Threaded Type

Anti-Splash Design!

Specifications
Materials:
Body: Nylon 66
Valve: Nylon/Nitrile
Dipstick: ABS, acetal Hi/Lo indicators

Filtration Element: Expanded polyurethane foam, 10 micron

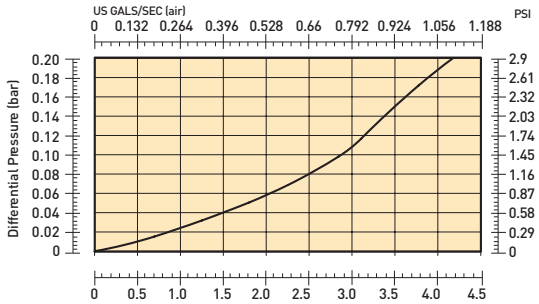
Operating Temperatures: -22°F (-30°C) to 195°F (90°C)

Seals: Nitrile

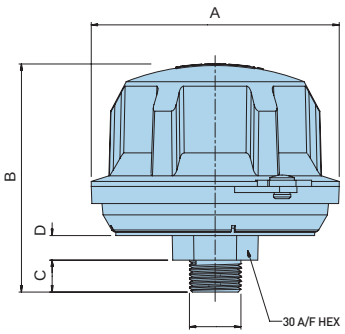
Pressurization Options: 3 psi (0.2 bar)

Dipstick: (optional) 7.9 in. (200 mm) or 15.8 in.(400mm) lengths with adjustable Hi/Lo indicators

COMPACT THREADED

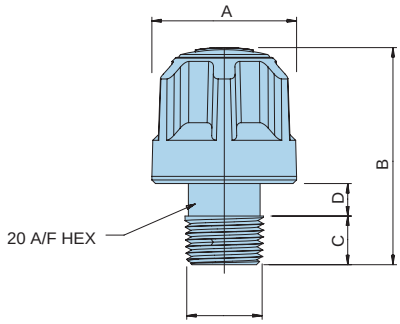


Standard Threaded



Thread size

Compact Threaded



Thread size

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)
983297	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	3/8" NPT	3 psi (.2 bar)				

Dipsticks

Part Number	Description
B68206	Pack of (10) x 7.9"
B68207	Pack of (10) x 15.8"

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

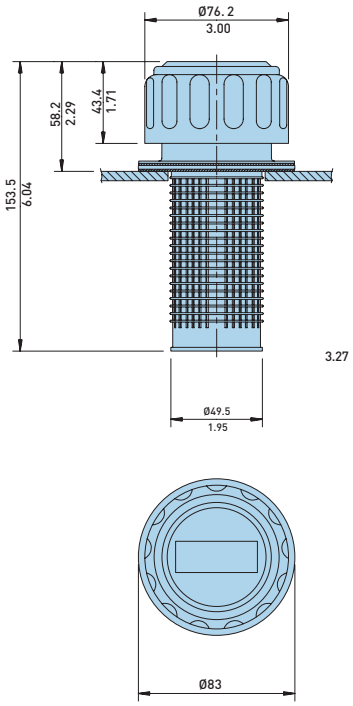
Filtration Element: Expanded polyurethane foam, 10 micron

Operating Temperatures: -22°F (-30°C) to 195°F (90°C)

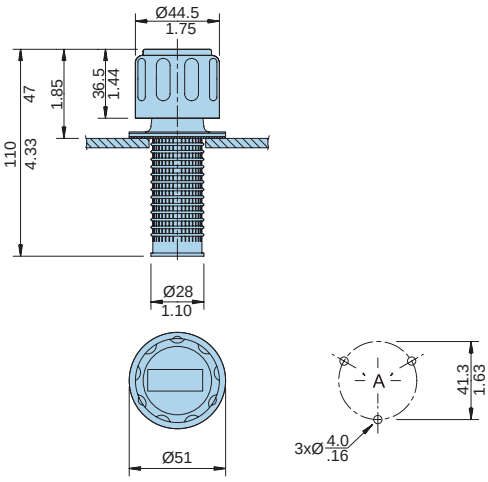
Seals: Nitrile

Pressurization Options: none, 5 psi (0.35 bar)

3" Diameter



1.75" Diameter



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

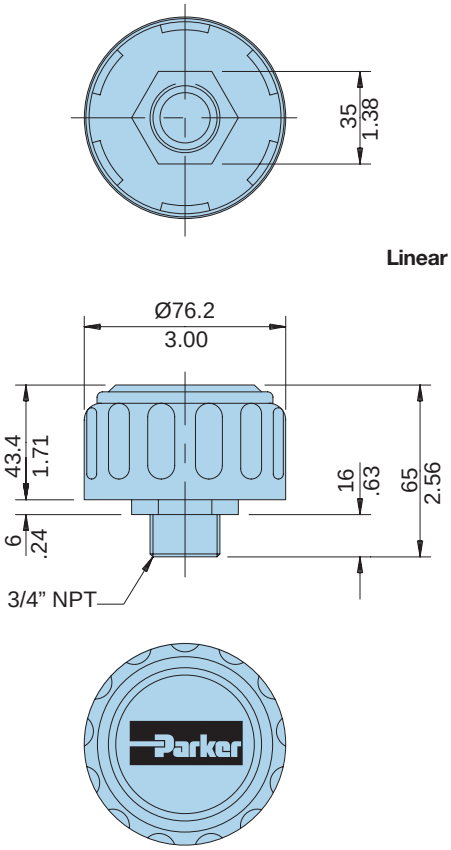
Filtration Element: Expanded polyurethane foam, 10 micron

Operating Temperatures: -22°F (-30°C) to 195°F (90°C)

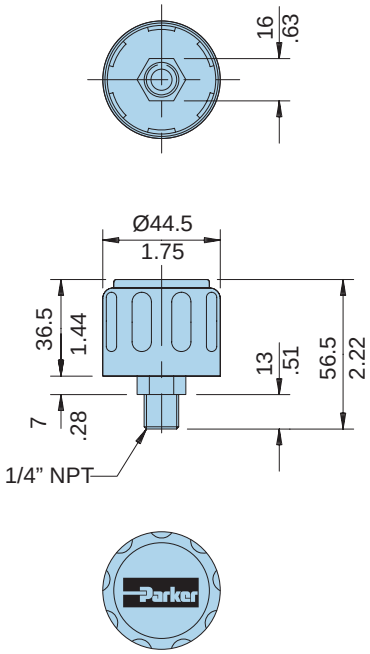
Seals: Nitrile

Pressurization Options: none, 5 psi (0.35 bar)

¾" Threaded



¼" 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

Desiccant Type

Specifications

Materials:
Casing: Clarified copolymer polypropylene
Cap: Copolymer polypropylene
Stand pipe: PVC

Filtration Element: Polyester, silica gel

Operating Temperatures: -20°F (-29°C) to 250°F (121°C)

Seals: None

Maximum Allowable Operating Pressure (MAOP): 5 psi (.34 bar)

Particle Removal Efficiency:
98.7% (beta 75) @ 3 micron
99.5% (beta 200) @ 4 micron
99.9% (beta 1000) @ 5.3 micron

Weight:

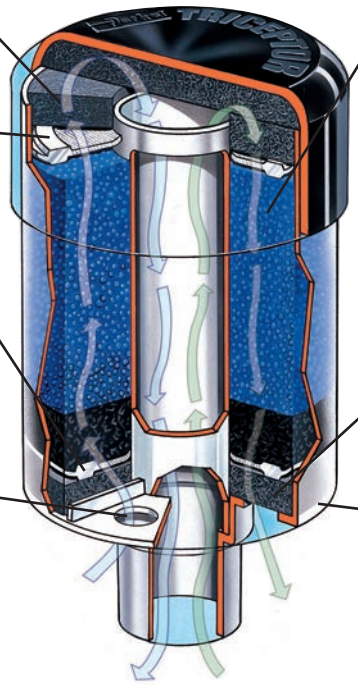
934330T	1.25 lbs. (.57 kg) each.
934331T	1.75 lbs. (.79 kg) each.
934332T	2.25 lbs. (1.02 kg) each.

Features

Foam Pads
Isolates the removal materials from contact with heavy reservoir mist and securely holds materials in place.

Filter Pads
Specially designed filter pads remove solid particulate on up-stream side and then regenerate by releasing those particles when air flow reverses direction. Lower pad removes airborne contamination and second pad protects against any migration of desiccant.

Air Intakes
A total of eight air intakes may be exposed to allow air to freely flow in and out of the TriCeptor.



Silica Gel Desiccant
Has the highest removal capability by volume of any adsorption method. Indicates condition by changing color.

Foam pad
Insures filter pad is properly positioned and protects it from external damage.

Molded Housing
Durable shock absorbing casing provides reliable service and simple press in mounting.

Reservoir Accessories

Breathers

Installation

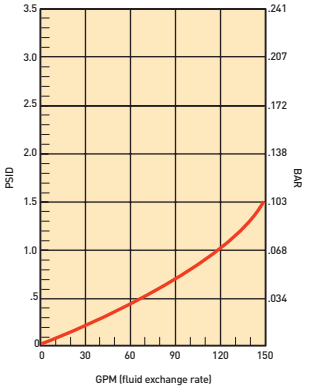
TriCeptor breathers are designed for simple installation on most equipment, regardless of mounting connection. Since TriCeptor breathers are disposable, the threaded connection allows for quick and easy maintenance. Several mounting adapters (shown below) are available to provide the desired mounting. The installation/replacement process consists of four easy steps:

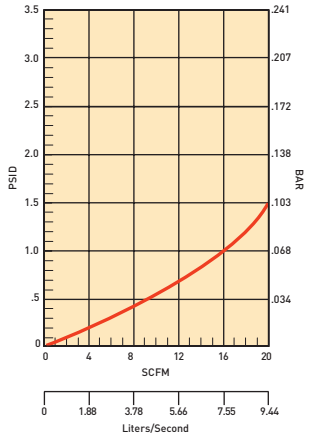
1. **Remove from protective plastic wrap.**
2. **Remove 1" blue cap from standpipe.**
3. **Remove foil label to expose the necessary amount of air intake holes.**
4. **Twist TriCeptor into mounting adapter.**

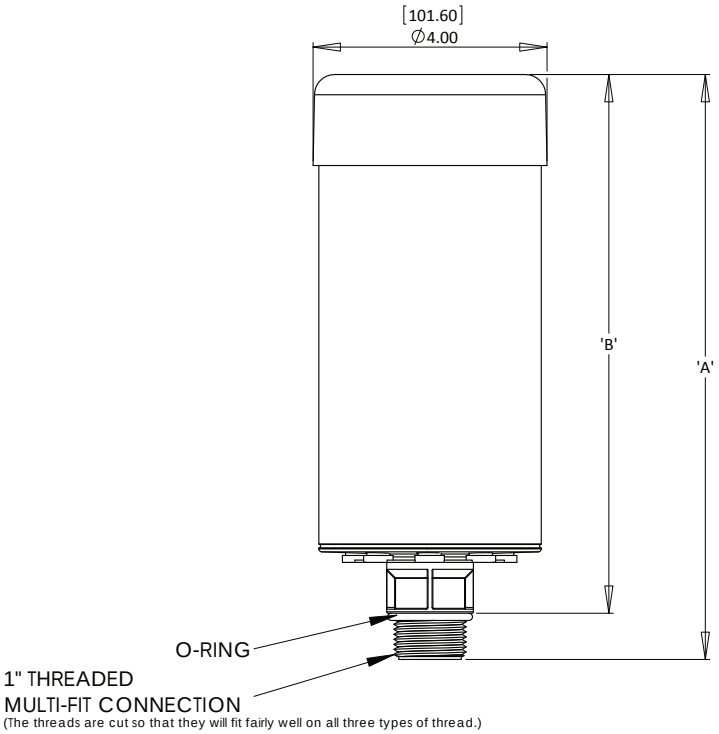
Servicing the TriCeptor breather is also very easy. When the silica gel changes color from blue to a pink, the breather is no longer active and needs to be replaced. Simply remove the unit and discard properly.

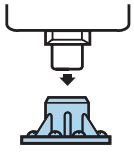
Air Flow Performance

The curves below show the air flow performance of the three TriCeptor breathers. To insure the longest life possible, the initial clean pressure drop should not exceed 1.5 psid (.103 bar).

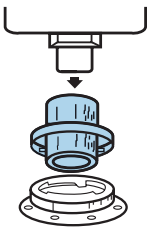








Field Adapter



Flange Adapter

Linear Measurement= $\frac{mm}{in}$

Part Number	'A' (mm/in)	'B' (mm/in)	Quantity
934330T	155.58/6.125	135.256/5.325	6 pcs.
934331T	206.38/8.125	186.06/7.325	6 pcs.
934332T	257.18/10.125	236.86/9.325	6 pcs.
937546	Field Adapter	937546	1 pc.
937463	Flange Adapter	937463	1 pc.

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

Reservoir Accessories

Mobile Triceptor

941655

New Design in Mobile Triceptor:

Parker's new mobile Triceptor desiccant filter breather incorporates a design that replaces both the spin-on can and the optional check valve adaptor.

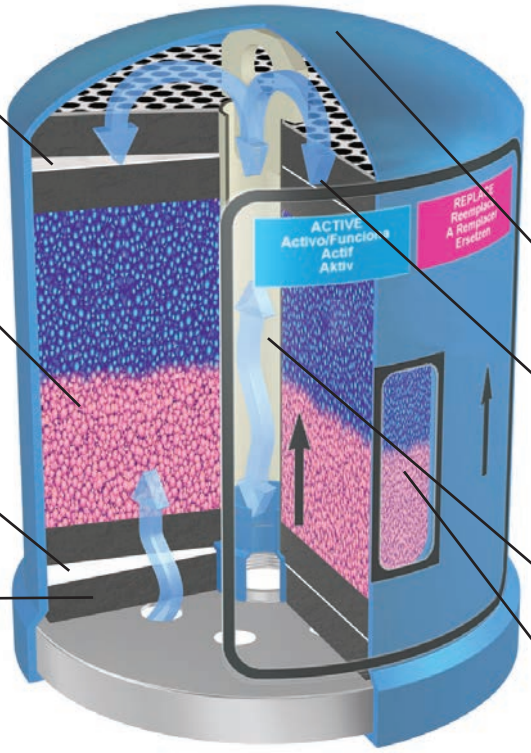
Optimized for mobile applications, the mobile Triceptor is equipped to handle high air flow surges as cylinders unload, while providing reliable protection from ingressed contaminants. Controlling rust-forming water vapor and airborn particulates, the breather protects against sludge deposits and water contaminated oil resulting in longer oil and filter life while reducing operating costs.

941747

3/4" NPT Vent Valve Adapter

Prolongs breather life by diverting air exhausting from reservoir away from desiccant bed.

For mobile applications where oil sloshing can occur, it prevents oil coating desiccant bed. Resulting in diminished performance of the breather's water absorption efficiency.



Second filter element protects against any migration of desiccant dust.

Color indicating silica gel, absorbs water from incoming air. During exhalation, dry system air is passed back through the silica gel bed partially regenerating the desiccant.

High performance filter element provides 1-micron filtration.

Foam pads evenly disperse incoming air over filtration and drying media.

Rugged aluminum housing.

Foam pad stops oil mist and ensures air is evenly disbursed through the filters and desiccant, providing maximum efficiency for "backflushing" and silica gel regeneration.

Stainless steel standpipe.

Visual indicator window. Replace breather when desiccant color changes from blue to pink.

*Patented technology

Reservoir Accessories

Mobile Triceptor

General Data

Amount of Silica Gel	0.79 kg 1 lb. 12 oz.
Adsorption Capacity	318 mL 1.34 cups
Net Weight of Unit	1.8 kg 4 lbs. 3 oz.
Filtration Area	31.1 in^2 / 79 cm^2
Direction of Flow	Bidirectional
Operating Temperature Range	-20°F to 300°F / -29°C to 148.89°C

Unit Material Data

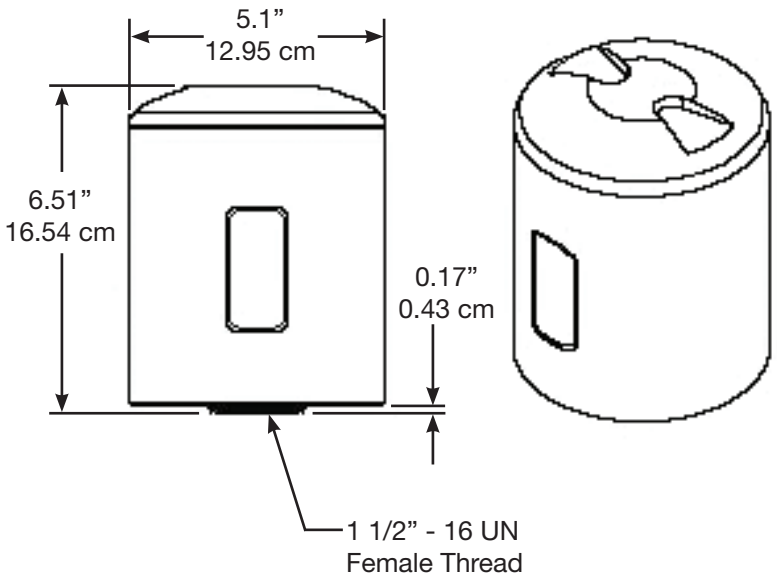
Material	Nylon and MXD6
Maximum Operating Temperature	300°F / 148.89°C
Melting Point	320°F / 160°C
Check Valve Adapter	Zinc Plated Steel

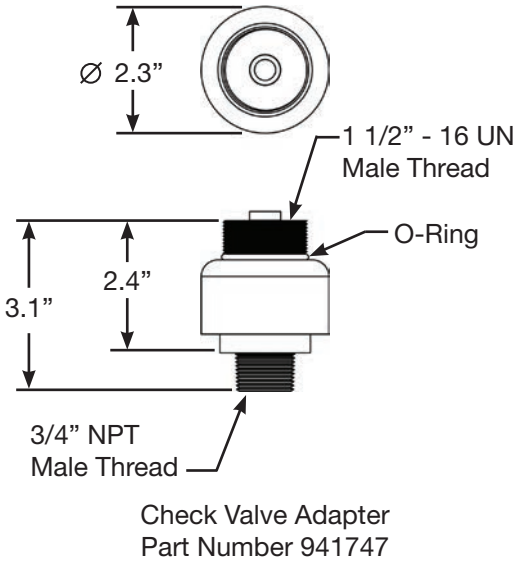
Filter Media

Material	EPTFE
Porosity	3.5 - 7.5 Ft./min. @ 0.5 in. - H2O (ASTM D 737)
Filtration Efficiency	99.97% @ 0.3µ (IES-RP-CC021.1)

Hygroscopic Agent (Silica Gel)

Apparent Bulk Density	700 - 800 kg/m3
Average Particle Diameter	0.145” / 3.68 mm
Specific Heat	0.25 BTU/lb. F
Nomimal Mesh Range	4 x 8
Average Crush Strength	35 lbs. / 15.9 kg





Note: Element removal clearance = 1”

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

Reservoir Accessories

Breathers - Spin-on Type

Specifications

Materials: Low carbon steel

Filtration Element: Cellulose

Operating Temperatures:
-40°F (-40°C) to 225°F (107°C)

Seals: Nitrile.

Weight: 12AT - 1.2 lbs(.54 kg) each
50AT - 2.3 lbs. (1.0 kg) each

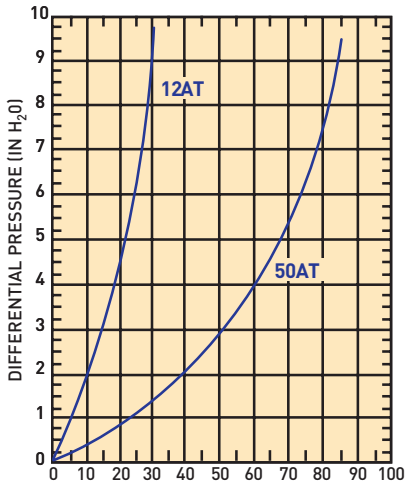
Sizing

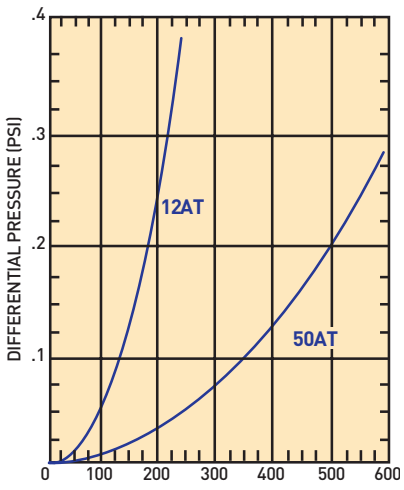
Select the proper size canister for the maximum rate of reservoir draw down or air exchange rate. As a rule of thumb, clean pressure drop should be limited to 0.18 psid (5" H_2O).

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.

Graphs are for 03C canisters only. Total pressure drop across canister, adaptor, 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.



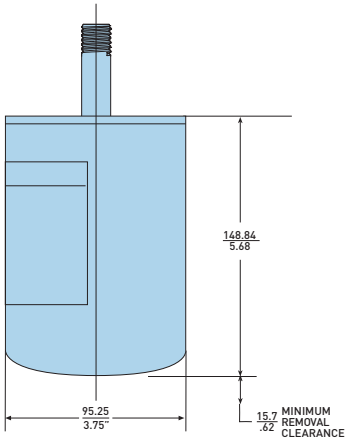


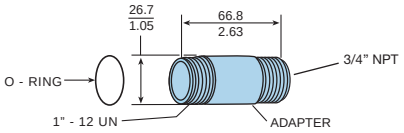
Element	Air Rating*	Diameter	Adapter Kit
926543	1 micron	3.75	926876
921999	2 micron	3.75	926876
925023	5 micron	3.75	926876
926541	1 micron	5.1	926875
926169	2 micron	5.1	926875
926170	5 micron	5.1	926875

*99% removal efficiency for particles larger than stated size in air.

12AT

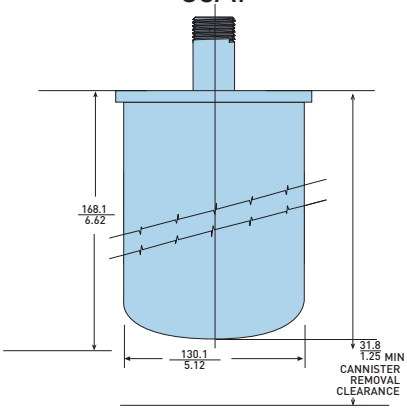
Linear Measurement= mm / in

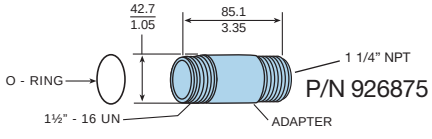




P/N 926876

50AT





P/N 926875

Reservoir Accessories

Diffusers

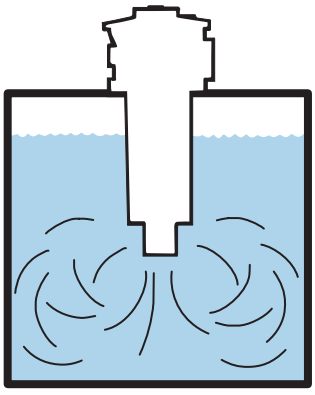
Specifications

Operating Temperatures: 195°F (90°C) maximum

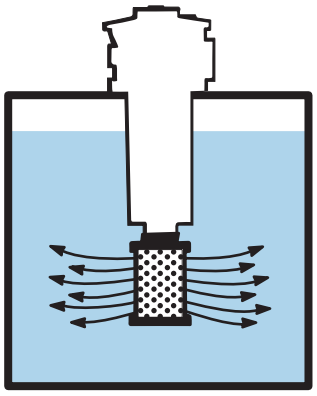
Materials: Body & end cap: Zintec
Head: glass-filled nylon

Weight: See chart below

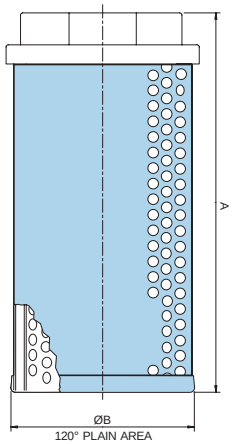
Benefits:
Installing a diffuser in a hydraulic reservoir is a simple change that can make a dramatic difference in system efficiency. With special concentric tubes designed with discharge holes 180° opposed, fluid aeration, foaming and reservoir noise are reduced. Pump life is also extended by reducing cavitation to the pump inlet. The effects of fitting a system with a diffuser are shown below.

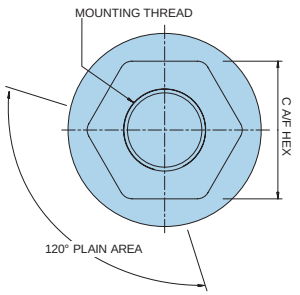


Flow without diffuser



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)
5563	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)

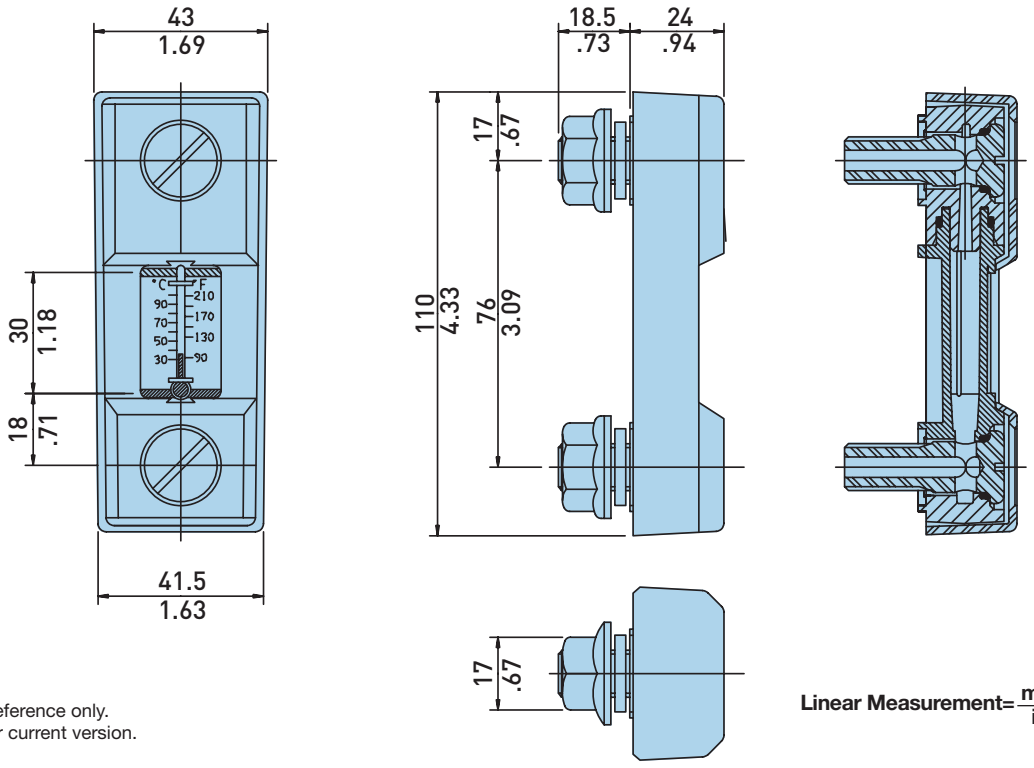
Thermometer Range: 90°F to 210°F (30°C to 90°C)

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.

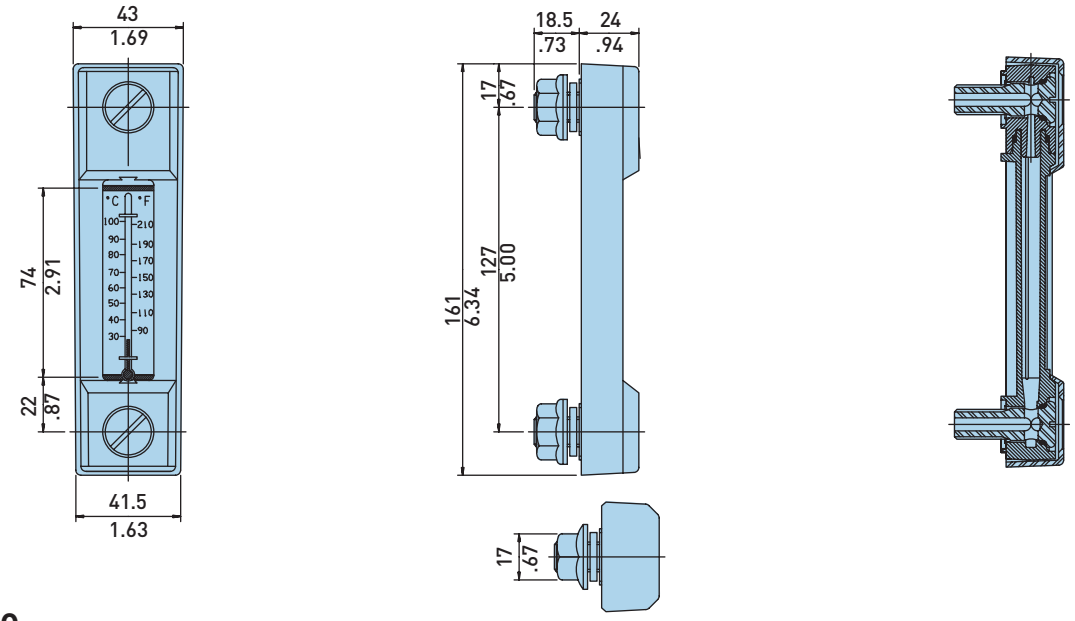
Linear Measurement= mm / in

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

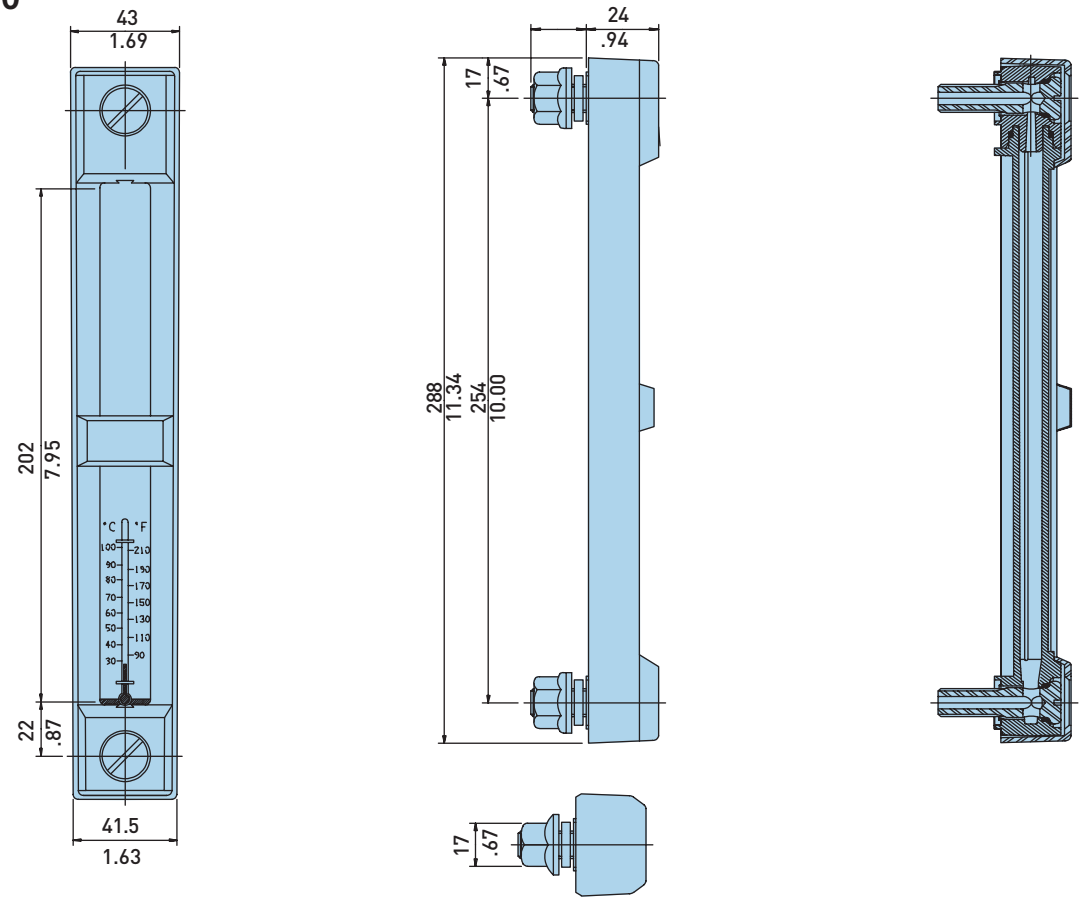
Reservoir Accessories

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

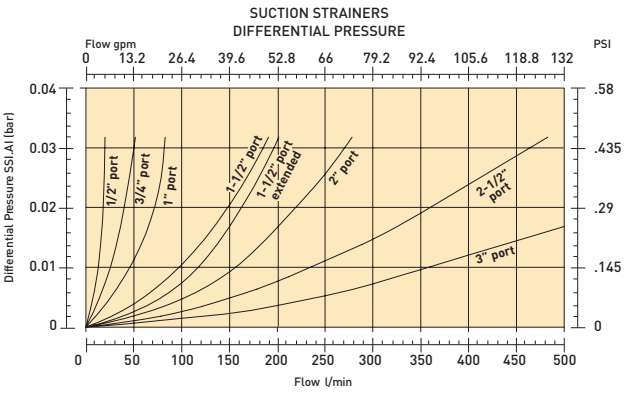
Materials:
Media: Stainless steel
Tube and endcap: Zintec
Head: glass filled nylon

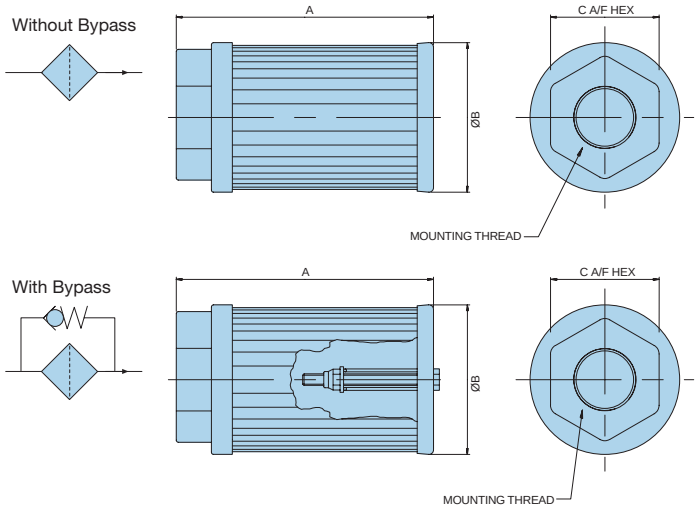
Filtration Element: 100 mesh (149 micron)

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)	BSPP 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 elimantes the possibility of pump cavitation.

Parkers magnetic suction strainers are available in sizes ranging from one to three inches.

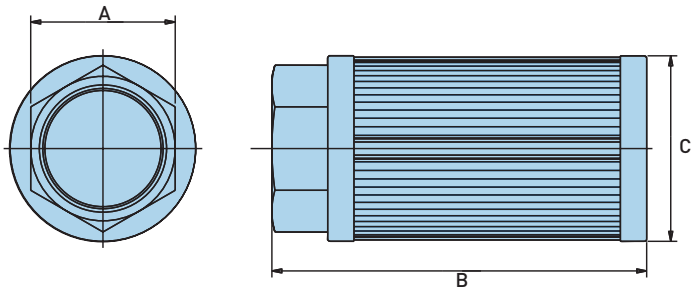
Ordering Information

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).

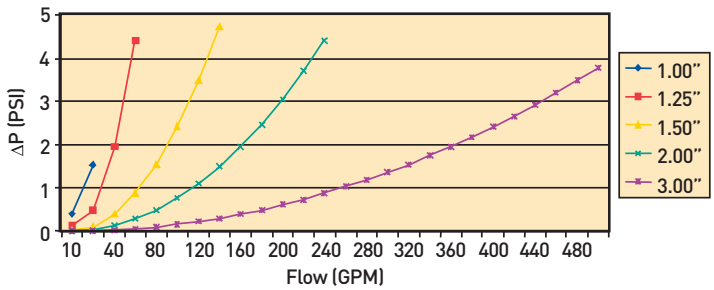
Part Number	NPT Connection	Flow GPM (LPM)	Dimensions			Approx. Shipping Weight lbs. (kg)
			A inches (mm)	B inches (mm)	C inches (mm)	
936547	1.00"	15 (55)	1.88 (47.75)	5.19 (131.83)	3.09 (78.49)	1.59 (0.72)
936548	1.25"	25 (95)	2.38 (60.45)	7.39 (187.71)	3.53 (89.66)	3.16 (1.43)
936549	1.50"	35 (135)	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)

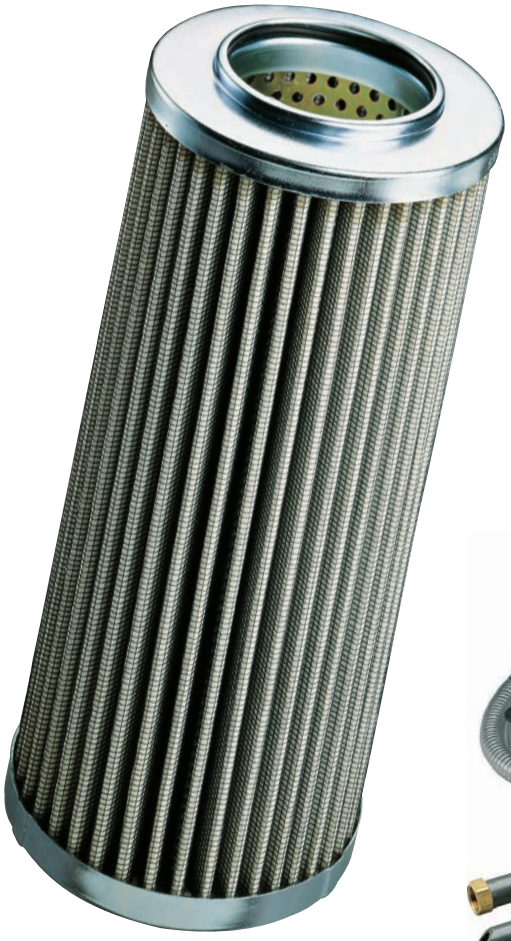
*Part number 936551 features a 3" half coupling, not a hex nut.



The rugged steel construction, combined with the generous filtration area, ensures reliable performance for suction applications

Flow Vs. Pressure Loss





PARGEL™

Water Removal Filter Elements

Parker

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.

PAR◇GEL™

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.*

PAR GEL™

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.

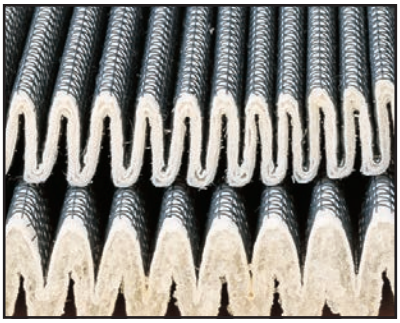


Photo above shows 'dry' Par-Gel filter media and the same media swollen with absorbed water.

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)
   80cc x 0.000264 $\frac{\text{gal}}{\text{cc}}$ = 0.02 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'
Flow Rate	3 gpm (11.4 lpm)	10 gpm (37.8 lpm)
Viscosity	75 SUS	75 SUS
Test Capacity	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'
Flow Rate	20 gpm (75.7 lpm)	10 gpm (37.8 lpm)
Viscosity	75 SUS	75 SUS
Test Capacity	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.

PAR GEL™

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
RFP-1	Single	927584
RFP-2	Double	927585
RF4-1	Single	930156
RF4-2	Double	928557
RF7-1	Single	933853
RF7-2	Double	932506
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

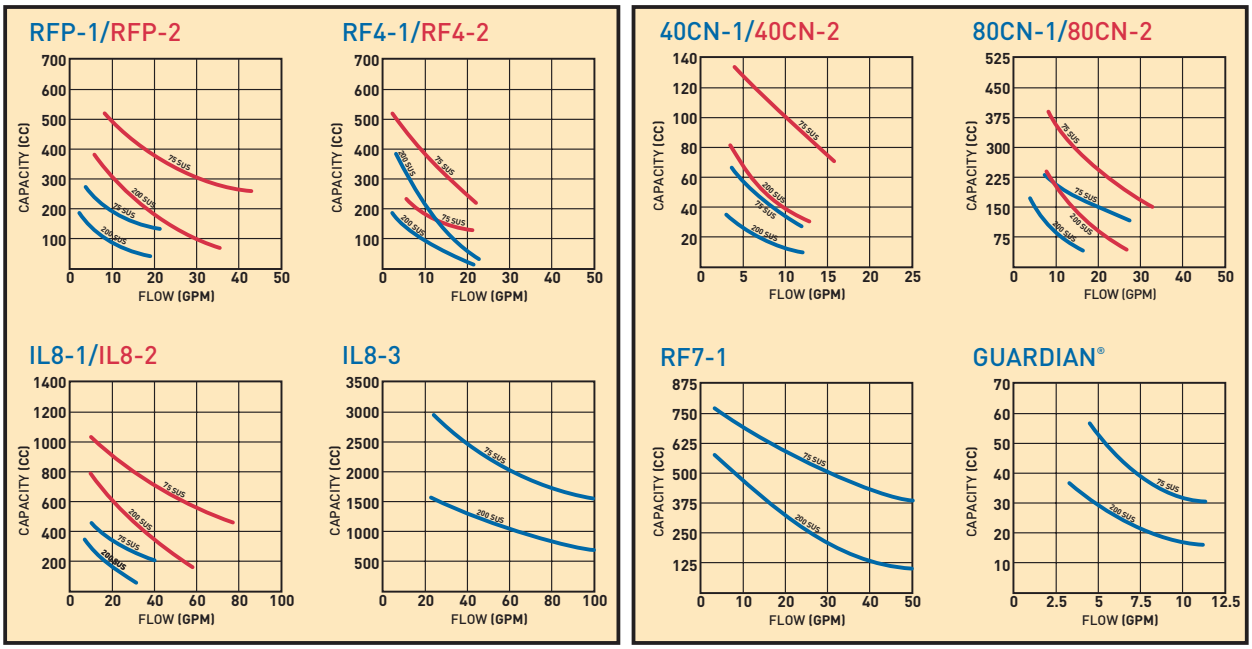
Conversion Factors

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	gallsons

Typical Saturation Points

Fluid	PPM	%
Hydraulic	300	0.03%
Lubrication	400	0.04%
Transformer	50	0.005%

MULTI-PASS WATER CAPACITY



PAR FIT™ Elements

Competitive Interchanges

ENGINEERING YOUR SUCCESS.

PAR◈FIT™ Elements

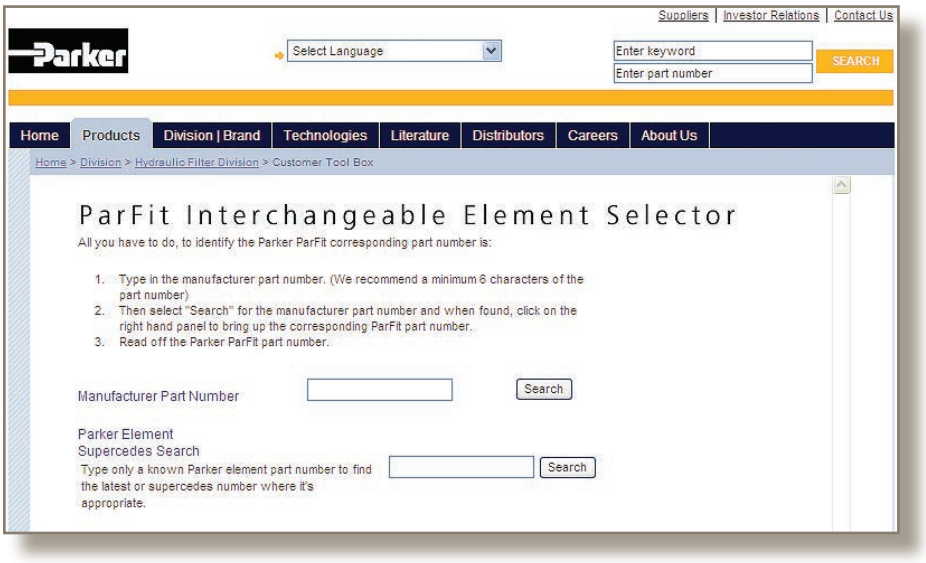
Competitive Interchanges

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:

IS02941	Element Collapse/Burst Resistance
IS02942	Fabrication Integrity
IS02943	Material Compatibility
IS03724	Flow Fatigue Resistance
IS04572/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 **www.parker.com/parfit** or **www.parkerhfde.com/parfit**.



26,000+ interchanges for a variety of competitors, including:

- Pall
- Hydac
- Schroeder
- MP Filtri
- Donaldson
- Stauff
- Cummins Filtration
- EPE
- Fleetguard
- Hy-Pro
- Internorman
- Mahle
- PTI
- Separation Technologies
- Eaton Vickers
- Zinga
- Many Others

Static Control Filter Elements

The Latest Innovation from Parker Hannifin

Parker

ENGINEERING YOUR SUCCESS.

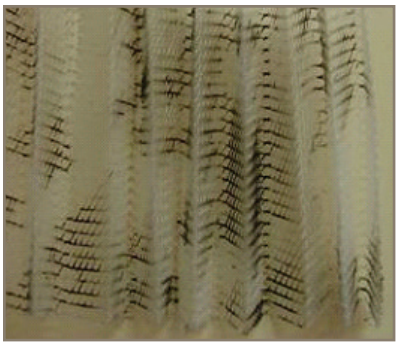
Static Control Filter Elements

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**

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.



Burnt polymer pleat support mesh from arcing

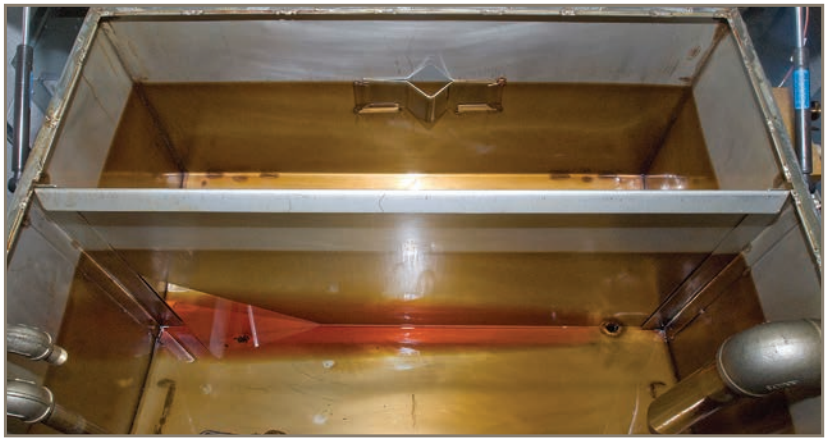
What can Varnish do to a System

- **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.

Pitting on filter end-cap



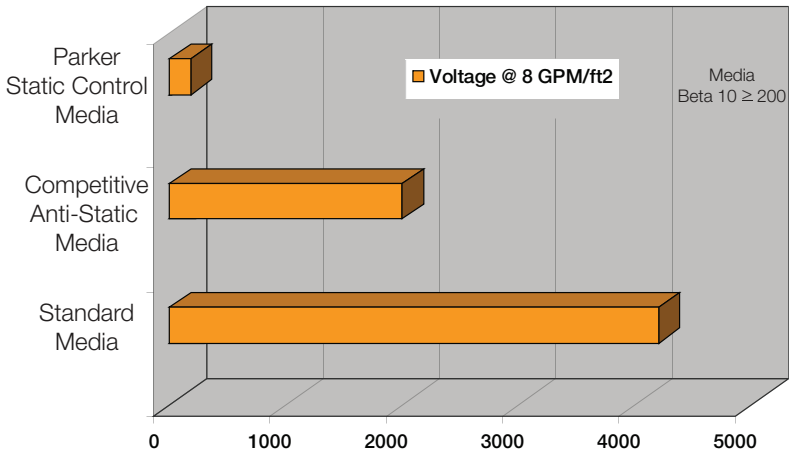
Varnish is attracted to metal surfaces, this results in an overall decrease in productivity.

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^2 (320 LPM/M^2)

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

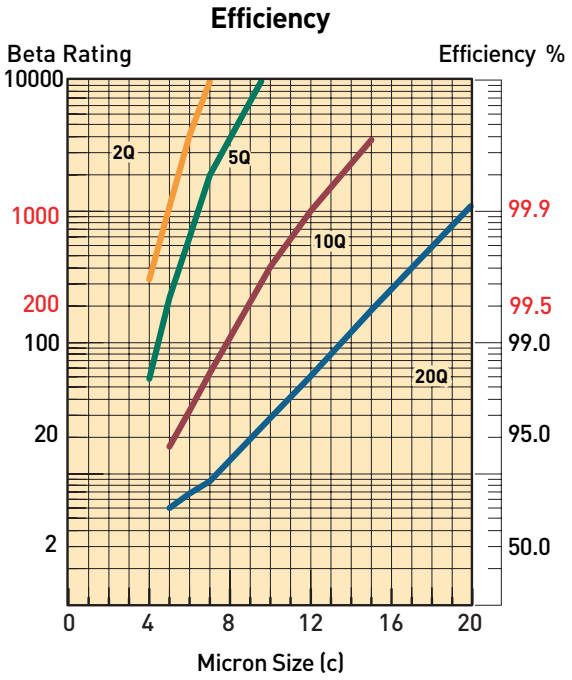
Note:
Replace “Q” with “A” when model coding an assembly with above static control filter elements.

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:

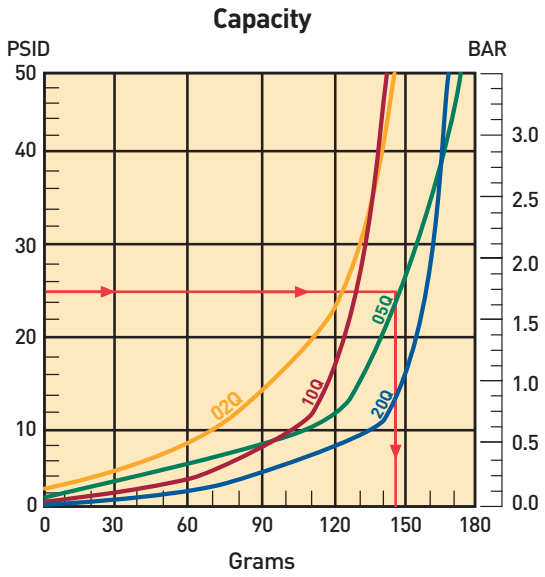
5. Choose beta rating desired on left vertical axis
6. Follow line horizontally across until it intersects media grade.
7. Move downward perpendicular until you intersect the horizontal “Micron Size” axis and record value. If micron value is too low repeat steps until a desired value is achieved.

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 then 150 SUS (30 cSt) please use the correction formula below.

Viscosity Correction Formula

$$\text{PSID Element} = \text{PSID from catalog} \times \frac{\text{New Viscosity}}{150} \times \frac{\text{New Specific Gravity}}{.90}$$

$$\text{PSID Housing} = \text{PSID from catalog} \times \frac{\text{New Specific Gravity}}{.90}$$

$$\text{PSID Assembly} = \text{PSID Element} + \text{PSID Housing}$$

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%.

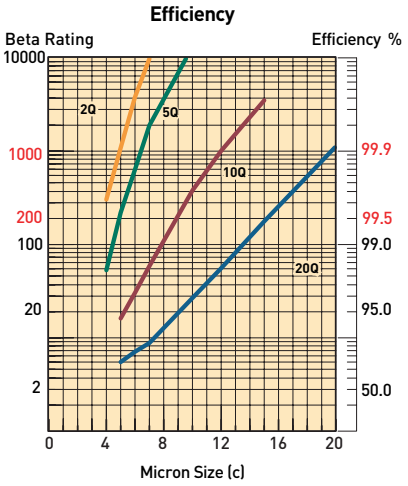
Appendix

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 Filter 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)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 (μm), 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 an 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 form 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

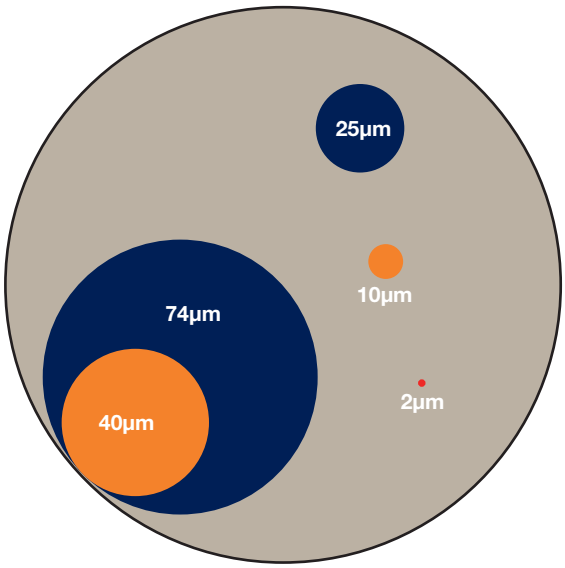
US and ASTM Std Sieve Number	Actual Opening (in)	(µm)
10	0.0787	2000
12	0.0661	1680
14	0.0555	1410
16	0.0469	1190
18	0.0394	1000
20	0.0331	840
25	0.0280	710
30	0.0232	590
35	0.0197	500
40	0.0165	420
45	0.0138	350
50	0.0117	297
60	0.0098	250
70	0.0083	210
80	0.0070	177
100	0.0059	149
120	0.0049	125
140	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	(µm)
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)—40µm

Relative Size of Particles
Magnification 500x



Linear Equivalents

1in	=	25.4 mm	=	25,400 µm
1mm	=	0.0394 in	=	1,000 µm
1µm	=	1/25,400 in	=	0.001 mm
1µm	=	3.94×10^{-5} in	=	0.000039 in

Formulas

$$\text{Velocity (ft per sec)} = \frac{0.4085 \times \text{gpm}}{d^2 \text{ (ID in)}}$$

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/in²	=	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
cm³	=	cu in x 16.39
m³	=	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
A		
atmospheres	33.9	ft of water (at 4×C)
atmospheres	29.92	in mercury (at 0×C)
B		
barrels (US liquid)	31.5	gallons
barrels (oil)	42	gallons (oil)
bars	0.9869	atmospheres
bars	14.5	pounds/sq in
C		
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
F		
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
G		
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
I		
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
K		
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
L		
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
M		
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	0.0000000254	kilometers
O		
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
P		
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
Q		
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
S		
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

Changes to 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.

ACTFD 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**

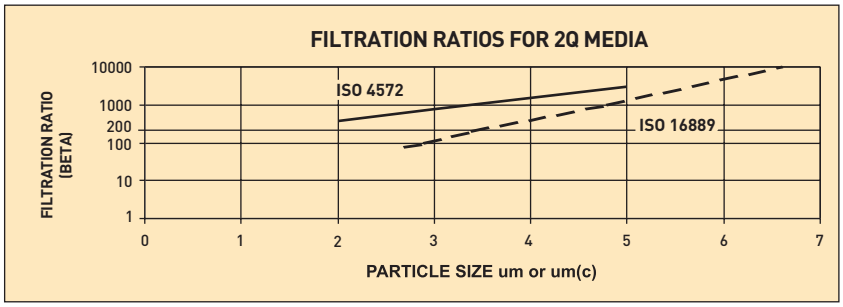
4 um (c) / 6 um (c) / 14 um (c)

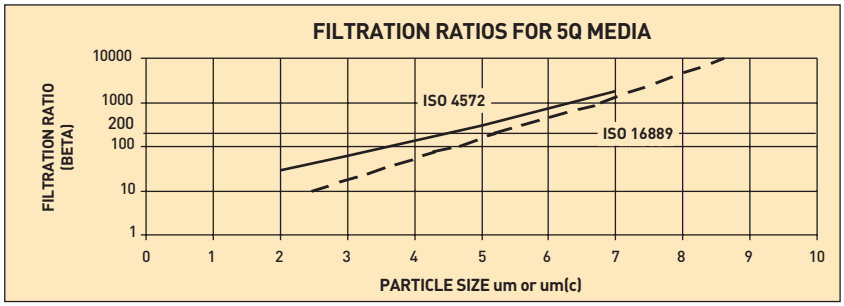
18 14 11

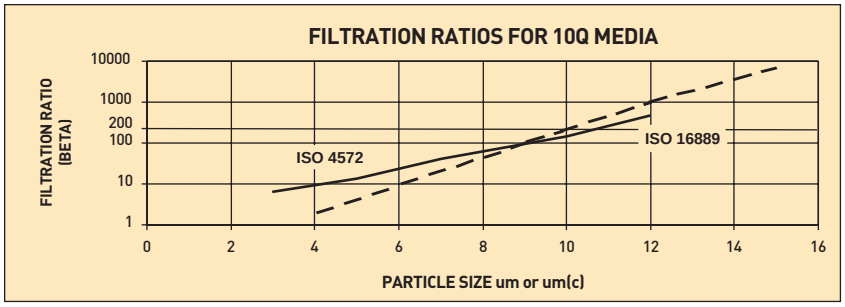
Appendix

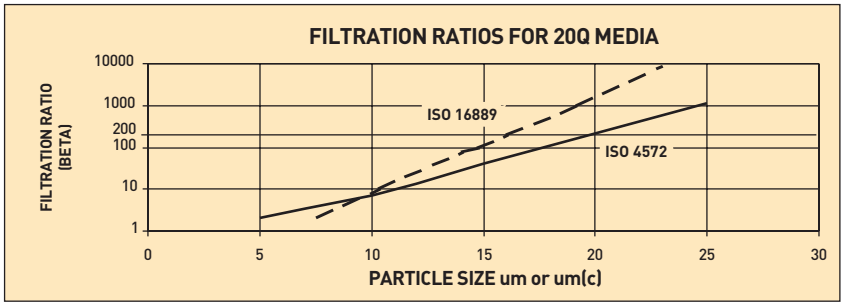
Changes to ISO Standards and their impact on Filter Performance Reporting and the Contamination Code, continued.

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 from Seller.
Goods:	means any tangible part, system or component to be supplied by the Seller.
Products:	means the Goods, Services and/or Software as described in a Quote provided by the Seller.
Quote:	means the offer or proposal made by Seller to Buyer for the supply of Products.
Seller:	means Parker-Hannifin Corporation, including all divisions and businesses thereof.
Services:	means any services to be supplied by the Seller.
Software:	means any software related to the Products, whether embedded or separately downloaded.
Terms:	means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at www.parker.com/saleterms.

2. Terms. All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic date 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 of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. Price; Payment. The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's 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 at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). 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.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. 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 shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective indicated shipping date will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

5. Warranty. The warranty related to 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 completion of the Services by Seller; 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: **DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING 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. BUYER AGREES AND ACKNOWLEDGES THAT 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 the 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 PRODUCT, 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 ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THEREOF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, 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. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become 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 such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Special Tooling. Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture 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 in its sole discretion at any time.

10. Security Interest. To secure payment of all sums due, 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 its security interest.

11. User Responsibility. The 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. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided by the Buyer, the 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 the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. **Unauthorized Uses.** If Buyer uses or resells the Products for any uses prohibited in 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. 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, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (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 or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. Cancellations and Changes. Buyer may not cancel or modify 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. Seller, at any time, may change Product features, specifications, designs and availability.

14. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. Force Majeure. Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

16. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. Termination. Seller may 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) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("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 sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the 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 sold hereunder 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 so as 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; or (ii) directed to any Products provided hereunder 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 provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. Governing Law. These Terms 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.

21. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. 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 acknowledges 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 Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws.

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Aftermarket services
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Helicopters
Launch vehicles
Military aircraft
Missiles
Power generation
Regional transports
Unmanned aerial vehicles

Key Products

Control systems & actuation products
Engine systems & components
Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

Climate Control

Key Markets

Agriculture
Air conditioning
Construction Machinery
Food & beverage
Industrial machinery
Life sciences
Oil & gas
Precision cooling
Process
Refrigeration
Transportation

Key Products

Accumulators
Advanced actuators
CO_2 controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

Electromechanical

Key Markets

Aerospace
Factory automation
Life science & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery & converting
Primary metals
Semiconductor & electronics
Textile
Wire & cable

Key Products

AC/DC drives & systems
Electric actuators, gantry robots & slides
Electrohydrostatic actuation systems
Electromechanical actuation systems
Human machine interface
Linear motors
Stepper motors, servo motors, drives & controls
Structural extrusions

Filtration

Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

Key Products

Analytical gas generators
Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems

Fluid & Gas Handling

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
Truck hydraulics
Turf equipment

Key Products

Accumulators
Cartridge valves
Electrohydraulic actuators
Human machine interfaces
Hybrid drives
Hydraulic cylinders
Hydraulic motors & pumps
Hydraulic systems
Hydraulic valves & controls
Hydrostatic steering
Integrated hydraulic circuits
Power take-offs
Power units
Rotary actuators
Sensors

Pneumatics

Key Markets

Aerospace
Conveyor & material handling
Factory automation
Life science & medical
Machine tools
Packaging machinery
Transportation & automotive

Key Products

Air preparation
Brass fittings & valves
Manifolds
Pneumatic accessories
Pneumatic actuators & grippers
Pneumatic valves & controls
Quick disconnects
Rotary actuators
Rubber & thermoplastic hose & couplings
Structural extrusions
Thermoplastic tubing & fittings
Vacuum generators, cups & sensors

Process Control

Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

Key Products

Analytical Instruments
Analytical sample conditioning products & systems
Chemical injection fittings & valves
Fluoropolymer chemical delivery fittings, valves & pumps
High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/ controllers
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves

Sealing & Shielding

Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
EMI shielding
Extruded & precision-cut, fabricated elastomeric seals
High temperature metal seals
Homogeneous & inserted elastomeric shapes
Medical device fabrication & assembly
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