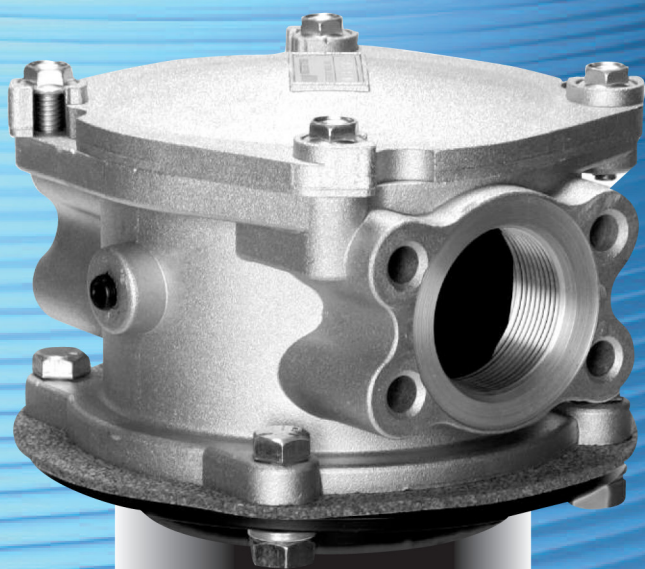




High Performance Filtration Systems



Spin-ons • Intank • Low Pressure • Medium Pressure • High Pressure • Duplex

www.westernfilter.com

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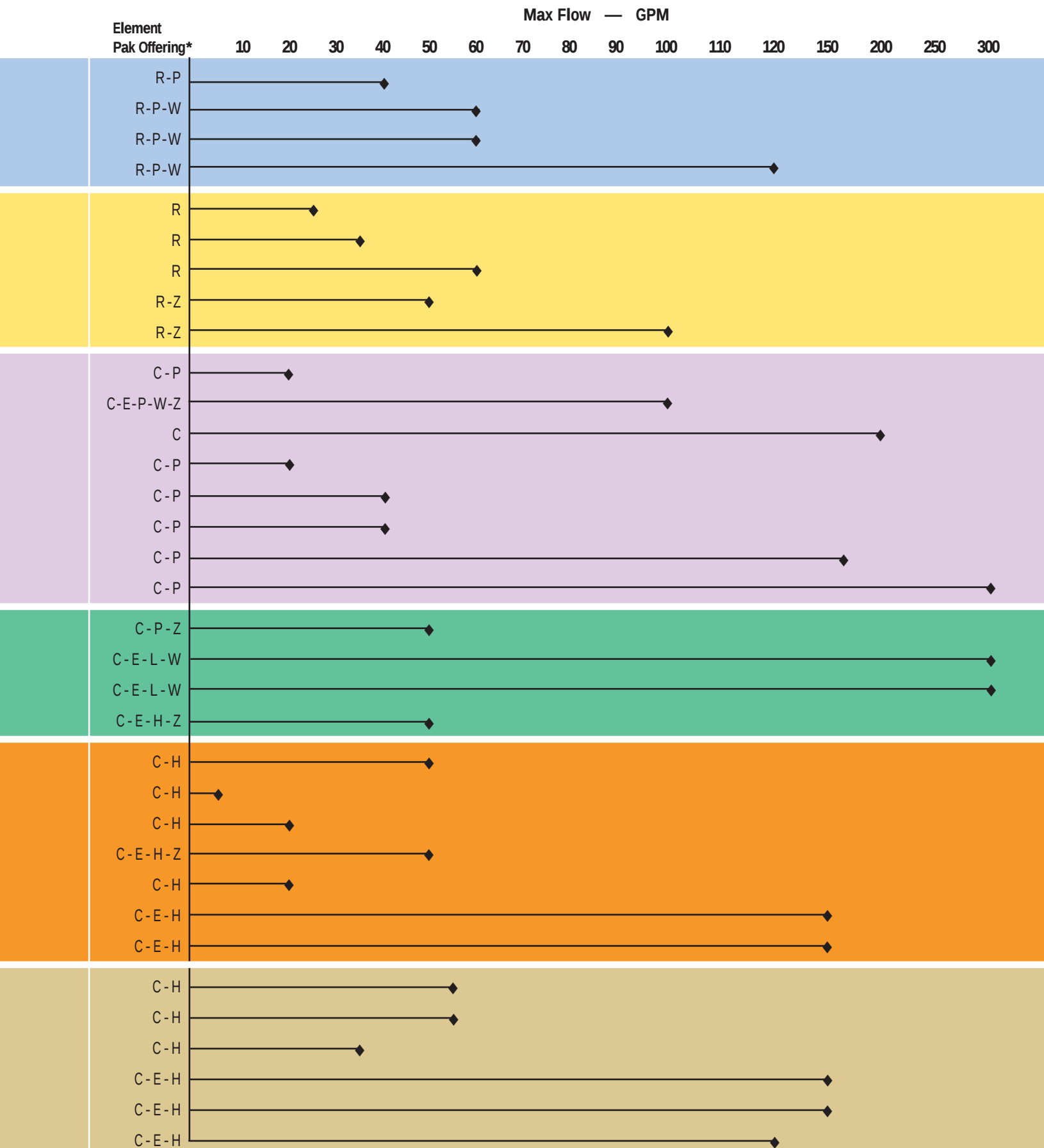
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PRODUCT OVERVIEW CHART

Filter Types	Model Series	Max Oper. Pressure	Max Flow G.P.M.	HF2/3/4	Port Configuration	Porting Types	Element Collapse Rating (PSID)	Page #	
Low Pressure Spin-Ons Pages 7–22	W012	150	40	—	Inline	3/4" NPT & SAE 12	150	7	
	W015	200	60	—	Inline	1-1/4" NPT & SAE 20	150	11	
	W021/023	200	60	—	Inline	1-1/4" NPT & SAE 20	150	15	
	W022	200	120	—	Inline, Dual Head	1-1/2" NPT, SAE 24 & 1-1/2" SAE 4-Bolt Flange	150	19	
Medium Pressure Spin-Ons Pages 23–36	WM25	1000	25	—	Inline	SAE 12	150	23	
	WM35	500	35	—	Inline	3/4" NPT, 1" NPT, SAE 20 & SAE 16	150, 300	27	
	WM60	500	60	—	Inline, Dual Head	SAE 20, 1-1/4" NPT, & 1-1/4" SAE 4-Bolt Flange	150, 300	27	
	WM50	350	50	—	Inline	1-1/4" NPT, SAE 12	200	31	
	WM100	350	100	—	Inline, Dual Head	SAE 24, 1-1/2" NPT, and 1-1/2" SAE 4-Bolt Flange	200	31	
Intank Pages 37–68	WT15	100	20	—	Intank	SAE 12	150	37	
	WL16	200	100	HF4	Inline	1-1/2" NPT, SAE 24 & 1-1/2" SAE 4-Bolt Flange	150	41	
	WL18	200	200	—	Inline	1-1/2" NPT, SAE 24 & 1-1/2" SAE 4-Bolt Flange	150	45	
	WR10	100	20	—	Intank	3/4" NPT, SAE 8 & SAE 12	45	49	
	WR11	100	40	—	Intank	3/4" & 1" NPT, SAE 12 & SAE 16	45	53	
	WR14	150	160	—	Intank	3/4", 1" & 1-1/4" NPT, SAE 12, SAE 16 & SAE 20	150	57	
	WR15	150	160	—	Intank	1-1/2" NPT, SAE 24 & 1-1/2" SAE 4-Bolt Flange	150	61	
	WR17	150	320	—	Intank	2-1/2" SAE 4-Bolt Flange	150	65	
Low Pressure Pages 69–84	W033	300	100	HF4	Inline, T-Type	1-1/2" NPT, SAE 24 & 1-1/2" SAE 4-Bolt Flange	150	69	
	W041/51	500	300	—	Inline, L-Type	SAE 24, 2" & 2-1/2" SAE 4-Bolt Flange	100, 150	73	
	W042	400	300	—	Inline, Duplex	3" SAE 4-Bolt Flange	100, 150	77	
	W061	800	100	HF3	Inline	1" & 1-1/4" NPT, SAE 12, SAE 16, SAE 20, 1" & 1-1/4" SAE 4-Bolt Flange	150, 600	81	
Medium Pressure Pages 85–116	W322	3000	50	—	Inline, Duplex	SAE 16	150, 3000	85	
	W331	3000	6	—	Inline	SAE 8	150, 3000	89	
	W341	3000	20	—	Inline, T-Type	SAE 12	150, 3000	93	
	W350	3000	50	HF3	Inline, T-Type	SAE 12 & SAE 16	150, 3000	97	
	W440	4000	20	HF2	Inline, Manifold	SAE 12 & Manifold Mounting	150, 3000	101	
	W451	4500	150	HF4	Inline, Manifold	1-1/2" NPT, SAE 24, 1-1/2" SAE 4-Bolt Flange, Manifold Mount	150, 3000	105	
	W551	5250	150	HF4	Inline, Manifold	1-1/2" NPT, SAE 24 & 1-1/2" 4-Bolt Flange, Manifold Mount	150, 3000	109	
High Pressure Pages 117–136	W610	6000	55	—	L-Type, Manifold	SAE 12, SAE 16, 1" SAE 4-Bolt Flange, Manifold Mounting	150, 3000	113	
	WS610	6000	55	—	Side Head Manifold	Manifold Mounting	150, 3000	117	
	W613	6500	35	—	Inline, T-Type	SAE 12, SAE 16, & 1" SAE 4-Bolt Flange	150, 3000	121	
	W620	6000	150	HF3	Inline, L-Type	SAE 16, SAE 20, SAE 24, 1-1/4" & 1-1/2" SAE 4-Bolt Flange	150, 3000	125	
	WS620	6000	150	HF3	Side Head Manifold	Manifold Mounting	150, 3000	129	
	W621	6000	120	HF3	Inline, T-Type	SAE 20, SAE 24, 1-1/4" & 1-1/2" SAE 4-Bolt Flange	150, 3000	133	



*C & R-Pak™ = BetaPore™ 5 layer media; E-Pak™ = Coreless; H-Pak™ = High Collapse; L-Pak™ = Deep Pleat; P-Pak™ = Cellulose; W-Pak™ = Water Removal

MEDIA INFORMATION

Western Filter offers a wide selection of high efficiency filter media designed to meet a full range of pressure requirements.

BetaPore™ 5-Layered High Performance Series:

Available in element media codes C, E, H and L

Available in 5 different absolute micron ratings: ($\beta_x = >200$)

(01 μ , 03 μ , 05 μ , 10 μ , 20 μ)

An exceptionally durable and highly efficient proprietary 5-layered synthetic media that assures trouble-free operation for all hydraulic and lubrication oil applications.

With β ratios exceeding 200 (certain medias/sizes exceed $\beta_x=1,000$), and exceptionally high dirt holding capacities, BetaPore™ elements are *the best choice* for achieving target fluid cleanliness levels while maintaining high fluid quality and providing superior system longevity.

WestaPore™ Cost Effective Series:

Element media code: P

Available in 2 different

nominal micron ratings: 10 μ and 20 μ

A mainstay in the filter industry, WestPore™ is a cellulose-based media offering economical effective filtration in less sensitive, and/or low usage hydraulic systems such as certain agricultural applications. Westapore™ elements offer an alternative low-cost approach to nominal filtration while maintaining comparable clean element Δp and reasonable dirt holding capacities.

WPore™ Water Removal Series:

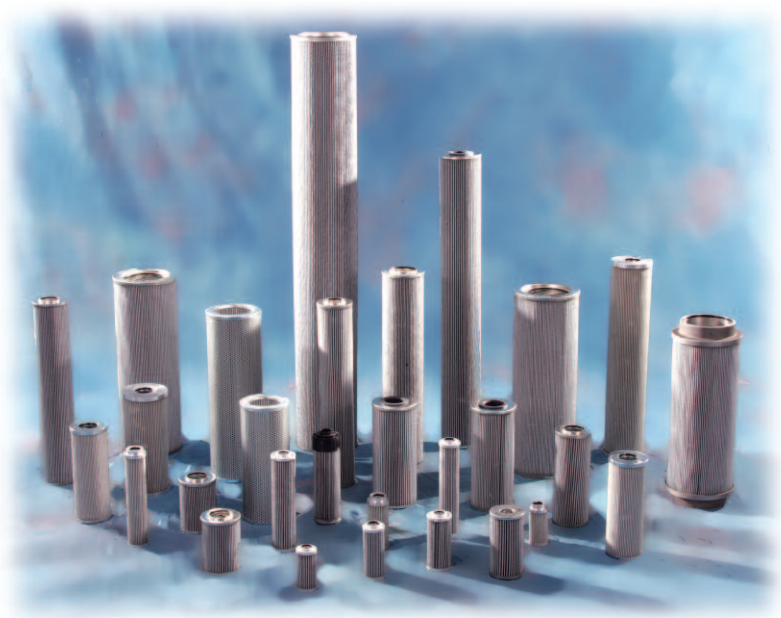
Element media code: W

WPore™, is a highly absorbent copolymer media with a high affinity for water retention. This media is designed to provide effective removal of emulsified and free water from *low-flow* systems. Kidney loop systems are ideal for WPore™ media applications.

ZPore™ Stainless Steel Series

Element media code Z

ZPore™ media is designed specifically for applications when fine micron filtration is undesirable or could be detrimental such as in suction filters. It is also useful in “cascade” filtration systems for clean-up after a catastrophic system failure or with extremely contaminated fluid when used up-stream of a finer micron element. ZPore™ is available in both HF3 and HF4 configurations.



PAK™ INFORMATION

Over 50 years in media research and development have yielded a standard media Pak™ selection for industrial, mobile, and marine applications. Depending on your specific requirements, Western Filter elements can be specified with the following standard media options:

<i>Series / Description</i>	<i>Media</i>
C-Pak™ & R-Pak™ (Standard) Our standard media pack and the foundation of our product line, this ever-evolving state-of the-art media provides extremely high efficiency, low clean ΔP, and substantially higher dirt holding capacity than our competitors' elements. Constructed in five-layers with three proprietary inner layers surrounded by an inner and outer layer of epoxy-coated steel mesh for pleat stability and overall pack support, C- and R-Pak™ medias are the ideal choice for petroleum, high-water-based, and synthetic fluids.	BetaPore™
E-Pak™ (Coreless) Our environmentally friendly E-Pak™ elements reduce disposal cost with a design that can be crushed to less than 50% of their operating volume. Coreless elements provide the performance advantages of our C- and R-Pak™ metal core elements but are manufactured without any metal components. E-Pak™ media construction utilizes our five-layered Pak™ with a polymer inner and outer mesh support along with a proprietary polymer mesh outer wrap to stabilize pleat spacing and support the entire Pak™ under surge and inadvertent reverse flow conditions. E-Pak™ elements are more than 50% lighter than traditional elements making it easier for the operator to change elements in large filter assemblies such as those used in lubrication applications.	BetaPore™
L-Pak™ (Deep Pleat) Specifically designed for lubrication applications and utilizing the same five-layer construction as the C-Pak™, our L-Pak™ series are designed with an extra deep pleat construction for even greater dirt holding capacity while still providing high efficiency filtration in steady-flow low-pulsation systems.	BetaPore™
H-Pak™ (High Collapse) For critical system applications where a bypass valve is undesirable (such as servo systems), our H-Pak™ media provides high-collapse elements up to the rated housing pressures they are used in (up to 3,000 PSID). H-Pak™ elements take advantage our five-layer C-Pak™ for optimum efficiency and dirt holding capacity while utilizing a 304 stainless steel inner and outer mesh support along with a heavier core tube to protect the system against failures under the most extreme conditions.	BetaPore™
P-Pak™ (Cellulose) Natural fiber cellulose media provides cost-effective filtration of a variety of petroleum-based fluids. It is ideal in less-critical or limited usage applications where cost is an over-riding issue. P-Pak™ cellulose media provides dependable performance and nominal filtration contamination control.	WestaPore™
W-Pak™ (Water Removal) WPore™ is a highly absorbent combination of BetaPore™ and absorbent copolymer media designed to provide effective removal of emulsified and free water from low-flow systems that have become contaminated because of natural condensation or worn actuators in the system. With effective water removal combined with nominal particulate filtration you can be assured that your system is protected while undergoing the water removal process.	WPore™
Z-Pak™ (Stainless Steel) Z -Pak™ pleated stainless steel media is available in both HF3 and HF4 configurations in 60μ, 125μ, and 240μ ratings. Designed primarily for suction applications, these higher micron rated elements are also useful in cascade filtration systems when used up-stream of a fine micron element.	

Media Collapse Ratings:

Various collapse ratings are available and are determined by the filter series and application. Please refer to the specific product pages for more information.

FILTER LOCATION

With no defined rules regarding location of filters in a fluid system, every effort should be made to achieve the optimum positioning so that the fluid system will function with the highest degree of efficiency. Several types of filters perform various functions required in the fluid system, and can be described by their location. The most frequently used terms are pressure, return, kidney loop, and point-of-use.

Pressure filters are the primary filters in fluid systems and are located down-stream from the main pump. They are exposed to full

system pressure and must not allow fluid to bypass the filtration medium. Fluid bypass can be prevented by use of a non-bypass filter or device that restricts flow as differential pressure across a dirty filter increases. The main function of a pressure filter is to protect all components from contamination generated by the pump. However, it does not protect components from contamination generated by each other.

Return filters are located downstream of working system components and upstream of fluid reservoir. The function of a return filter is to remove contaminants generated by system components before the fluid returns to the reservoir.

Kidney loop filters are located in a separately powered, independently operated loop of the main fluid system. The purpose of the kidney loop filter is to cleanse reservoir fluid.

Point-of-use filters are pressure filters located immediately upstream of critical components for the purpose of collecting contaminants generated by other components.

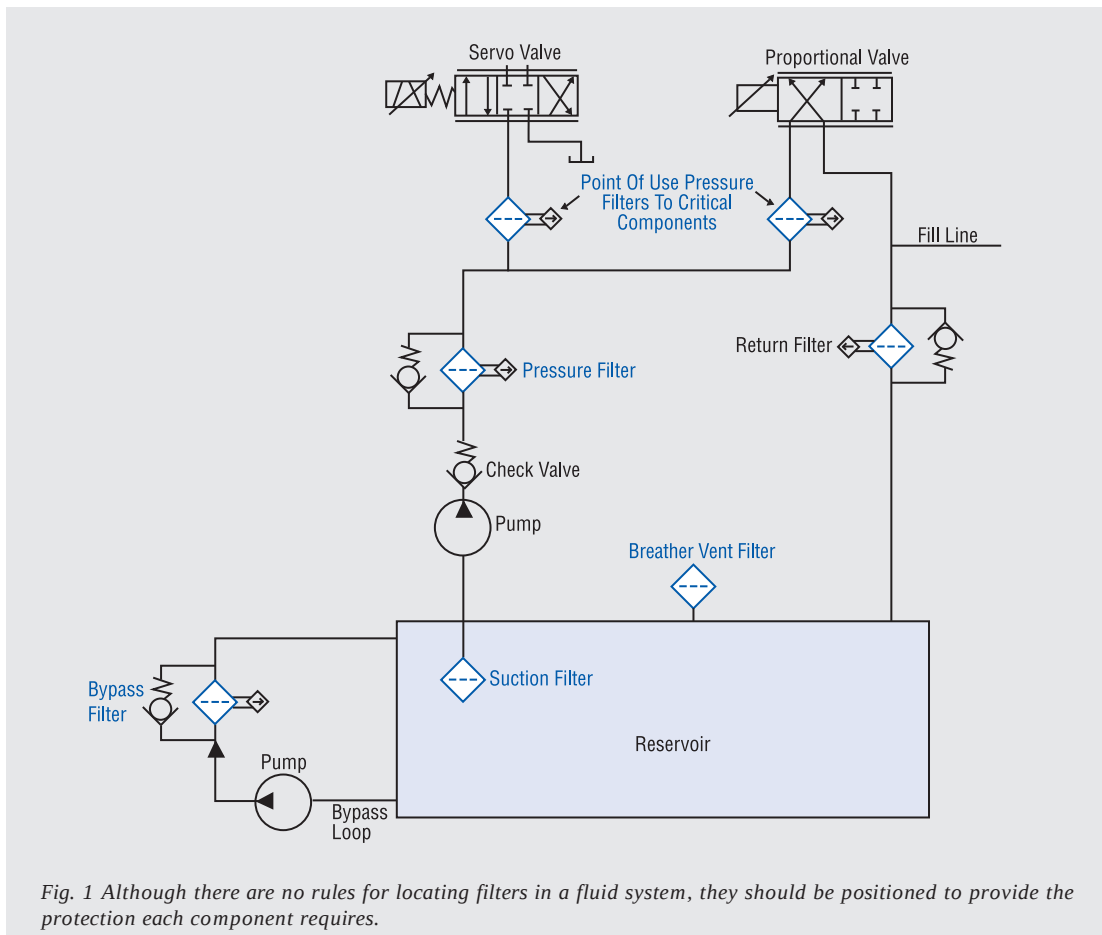


Fig. 1 Although there are no rules for locating filters in a fluid system, they should be positioned to provide the protection each component requires.

MEDIA GRADE SELECTION GUIDE

The selection of a suitable filter element media* depends on first determining the target cleanliness for the system. Established cleanliness levels for a variety of hydraulic components based on service experience and manufacturer's recommendations are listed in the chart above. The next step is to adjust the level based on consideration of specific system operating conditions. These stress factors result in an adjusted target cleanliness level that can be used to select the proper media code.

*Applies only to BetaPore™ media (codes C, E, & H Paks™)

STEP 1

DETERMINE TARGET CLEANLINESS

The code levels below show typical recommended target cleanliness levels that are based on data from the technical papers of several hydraulic component manufacturers. For recommendations for your specific system requirements contact Western Filter or your distributor.

COMPONENT	1-3000 psi	3000 < psi
SERVO VALVE	16/14/11	15/13/10
PROPORTIONAL DIRECTIONAL VALVE	17/15/12	16/14/11
FIXED DISPLACEMENT PISTON MOTOR	17/15/13	16/14/11
CARTRIDGE VALVE	18/16/13	17/15/12
VARIABLE DISPLACEMENT PISTON MOTOR	18/16/13	17/15/12
SOLENOID DIRECTIONAL CONTROL VALVE	18/16/13	17/15/12
FIXED DISPLACEMENT PISTON PUMP	18/16/13	17/15/12
VARIABLE DISPLACEMENT PISTON PUMP	18/16/13	17/15/12
VARIABLE DISPLACEMENT VANE PUMP	18/16/13	17/15/12
HYDROSTATIC TRANSMISSION	18/16/14	16/14/11
VANE MOTORS	19/17/14	18/16/13
GEAR PUMP	20/18/15	19/17/14
INDUSTRIAL GEARBOX BEARINGS	17/15/13	16/14/11

Determine the target cleanliness requirement by selecting the most contaminant sensitive component in the system (lower codes are cleaner).

Media Grade Selection Process

STEP 1:

Determine target cleanliness

STEP 2:

Adjust target for stress factors

STEP 3:

Select a media grade to achieve target

STEP 2

ADJUST TARGET FOR STRESS FACTORS

BASED ON APPLICATION	YES/NO"
MINIMUM TEMPERATURE < 0°F	
MAXIMUM TEMPERATURE > 160°F	
HIGH VIBRATION OR SHOCK	
PROCESS CRITICAL COMPONENT	
SAFETY HAZARD	
FLUID NOT 100% PETROLEUM OIL	

If any TWO answers are "YES", DECREASE the ISO cleanliness levels by ONE code: (i.e. 19/17/14 becomes 18/16/13)

STEP 3

SELECT A MEDIA GRADE

ADJUSTED TARGET CLEANLINESS	SUGGESTED MEDIA GRADE
20/18/16 >	C20
Between 18/16/15 and 20/18/15	C10
Between 16/14/13 and 18/16/14	C05
16/14/12 <	C03

Cleanliness levels assume full flow through pressure line and return line filters.

For systems with long periods of pump compensation, a "kidney loop" system connected to the main reservoir is recommended.

For systems with expensive or dirt sensitive components, add a filter of the same media grade as the main filter of that component upstream.