

Medium Pressure Filter

K9



Features and Benefits (K9)

- Extremely versatile multiple inlet and outlet ports; can be used alone or in series with another K9
- Top loading for easy access for element change-out
- Allows consolidation of inventoried replacement elements by using K-size elements
- Multiple inlet and outlet porting options reduce the need for additional adaptors on installation
- Can be fitted with test ports for oil sampling
- Small profile allows filter to be mounted in tight areas
- Various Dirt Alarm[®] options
- Meets HF4 automotive standard

Part of Schroeder Industries Energy Savings Initiative

100 gpm
380 L/min
900 psi
60 bar

GH

RLT

KF5

SRLT

K9

2K9

3K9

QF5

QF5i

3QF5

QFD5

QF15

QLF15

SSQLF15

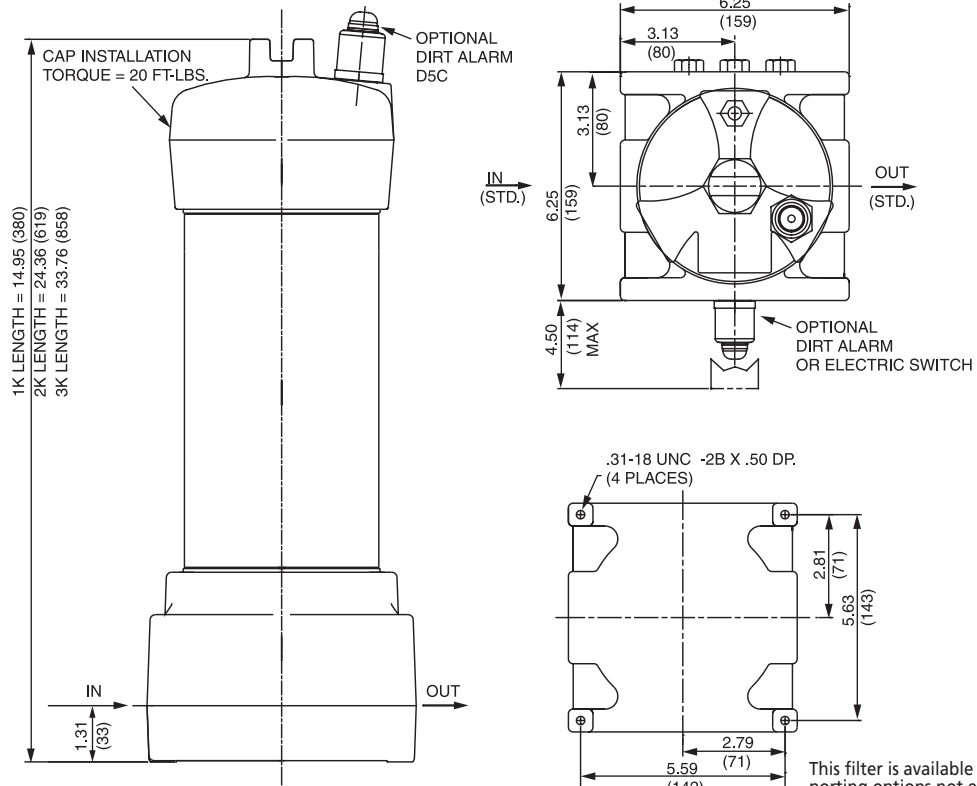
Model No. of filter in photograph is K91KZ5BP20NP20ND5C.

Flow Rating:	Up to 100 gpm (380 L/min) for 150 SUS (32 cSt) fluids
Max. Operating Pressure:	900 psi (60 bar)
Min. Yield Pressure:	3200 psi (220 bar), per NFPA T2.6.1
Rated Fatigue Pressure:	750 psi (52 bar) per NFPA T2.6.1-R1-2005
Temp. Range:	-20°F to 225°F (-29°C to 107°C)
Bypass Setting:	Cracking: 40 psi (2.8 bar) Full Flow: 80 psi (5.5 bar)
Porting Head & Cap:	Cast Aluminum
Element Case:	Steel
Weight of K9-1K:	19 lbs. (8.6 kg)
Weight of K9-2K:	30 lbs. (13.6 kg)
Weight of K9-3K:	41 lbs. (18.6 kg)
Element Change Clearance:	8.50" (215 mm) for 1K; 17.50" (445 mm) for KK; 26.5" (673 mm) for 27K

Filter Housing Specifications

Type Fluid	Appropriate Schroeder Media
Petroleum Based Fluids	All E media (cellulose), Z-Media [®] and ASP [®] media (synthetic)
High Water Content	All Z-Media [®] (synthetic), 3, 5 and 10 μ ASP [®] media (synthetic)
Invert Emulsions	10 and 25 μ Z-Media [®] (synthetic), 10 μ ASP [®] media (synthetic)
Water Glycols	3, 5, 10 and 25 μ Z-Media [®] (synthetic), 3, 5 and 10 μ ASP [®] media (synthetic)
Phosphate Esters	All Z-Media [®] (synthetic) with H (EPR) seal designation and 3 and 10 μ E media (cellulose) with H (EPR) seal designation, 3, 5 and 10 μ ASP [®] media (synthetic)
Skydrol [®]	3, 5, 10 and 25 μ Z-Media [®] (synthetic) with H.5 seal designation (EPR seals and stainless steel wire mesh in element, and light oil coating on housing exterior), 3, 5 and 10 μ ASP [®] Media (synthetic)

Fluid Compatibility



Metric dimensions in ().
 Dimensions shown are inches (millimeters) for general information and overall envelope size only.
 For complete dimensions please contact Schroeder Industries to request a certified print.

Element Performance Information & Dirt Holding Capacity

Element	Filtration Ratio Per ISO 4572/NFPA T3.10.8.8 Using automated particle counter (APC) calibrated per ISO 4402			Filtration Ratio per ISO 16889 Using APC calibrated per ISO 11171	
	$\beta_x \geq 75$	$\beta_x \geq 100$	$\beta_x \geq 200$	$\beta_x(c) \geq 200$	$\beta_x(c) \geq 1000$
KZ1/KKZ1/27KZ1	<1.0	<1.0	<1.0	<4.0	4.2
KZ3/KAS3/KKZ3	<1.0	<1.0	<2.0	<4.0	4.8
KZ5/KAS5/KKZ5	2.5	3.0	4.0	4.8	6.3
KZ10/KAS10/KKZ10	7.4	8.2	10.0	8.0	10.0
KZ25/KKZ25/27KZ25	18.0	20.0	22.5	19.0	24.0
KZW1	N/A	N/A	N/A	<4.0	<4.0
KZW3/KKZW3	N/A	N/A	N/A	4.0	4.8
KZW5/KKZW5	N/A	N/A	N/A	5.1	6.4
KZW10/KKZW10	N/A	N/A	N/A	6.9	8.6
KZW25/KKZW25	N/A	N/A	N/A	15.4	18.5

Dirt Holding Capacity

Element	DHC (gm)	Element	DHC (gm)	Element	DHC (gm)	Element	DHC (gm)	Element	DHC (gm)
KZ1	112	KKZ1	224	27KZ1	336	KZW1	61		
KZ3	115	KKZ3	230	27KZ3	345	KZW3	64	KKZW3	128
KZ5	119	KKZ5	238	27KZ5	357	KZW5	63	KKZW5	126
KZ10	108	KKZ10	216	27KZ10	324	KZW10	57	KKZW10	114
KZ25	93	KKZ25	186	27KZ25	279	KZW25	79	KKZW25	158

Element Collapse Rating: 150 psid (10 bar) for standard elements

Flow Direction: Outside In

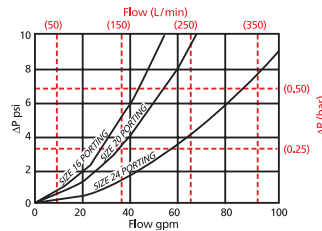
Element Nominal Dimensions: K: 3.9" (99 mm) O.D. x 9.0" (230 mm) long
 KK: 3.9" (99 mm) O.D. x 18.0" (460 mm) long
 27K: 3.9" (99 mm) O.D. x 27.0" (690 mm) long

Medium Pressure Filter

K9

$\Delta P_{\text{housing}}$

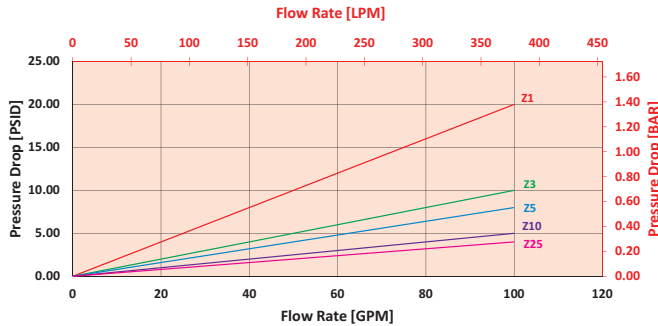
K9 $\Delta P_{\text{housing}}$ for fluids with sp gr (specific gravity) = 0.86:



$\Delta P_{\text{element}}$

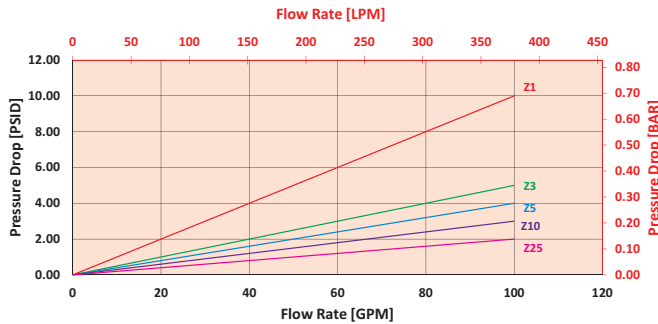
KZ

Element Pressure Drop versus Flow Rate at 32 cSt (150 SUS)



2KZ/KKZ

Element Pressure Drop versus Flow Rate at 32 cSt (150 SUS)



$$\Delta P_{\text{filter}} = \Delta P_{\text{housing}} + (\Delta P_{\text{element}} * \mathbf{V}_f)$$

Exercise:

Determine ΔP_{filter} at 50 gpm (189.5 L/min) for K91KZ10BP16NP16ND5 using 160 SUS (34 cSt) fluid.

Use the housing pressure curve to determine $\Delta P_{\text{housing}}$ at 50 gpm. In this case, $\Delta P_{\text{housing}}$ is 8 psi (.55 bar) on the graph for the K9 housing.

Use the element pressure curve to determine $\Delta P_{\text{element}}$ at 50 gpm. In this case, $\Delta P_{\text{element}}$ is 2 psi (.14 bar) according to the graph for the KZ10 element.

Because the viscosity in this sample is 160 SUS (34 cSt), we determine the **Viscosity Factor (\mathbf{V}_f)** by dividing the **Operating Fluid Viscosity** with the **Standard Viscosity** of 150 SUS (32 cSt). To best determine your Operating Fluid Viscosity, please reference the chart in Appendix D.

Finally, the overall filter pressure differential, ΔP_{filter} , is calculated by adding $\Delta P_{\text{housing}}$ with the true element pressure differential, $(\Delta P_{\text{element}} * \mathbf{V}_f)$. The $\Delta P_{\text{element}}$ from the graph has to be multiplied by the viscosity factor to get the true pressure differential across the element.

Solution:

$$\Delta P_{\text{housing}} = 8 \text{ psi } [.55 \text{ bar}] \quad | \quad \Delta P_{\text{element}} = 2 \text{ psi } [.14 \text{ bar}]$$

$$\mathbf{V}_f = 160 \text{ SUS (34 cSt) } / 150 \text{ SUS (32 cSt) } = 1.1$$

$$\Delta P_{\text{filter}} = 8 \text{ psi } + (2 \text{ psi } * 1.1) = 10.2 \text{ psi}$$

OR

$$\Delta P_{\text{filter}} = .55 \text{ bar } + (.14 \text{ bar } * 1.1) = .70 \text{ bar}$$

Pressure Drop Information Based on Flow Rate and Viscosity

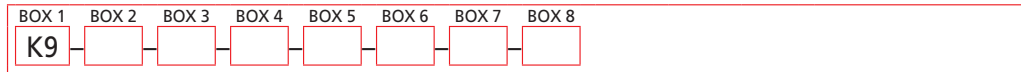
Note:

If your element is not graphed, use the following equation:
 $\Delta P_{\text{element}} = \text{Flow Rate} \times \Delta P_f$ Plug this variable into the overall pressure drop equation.

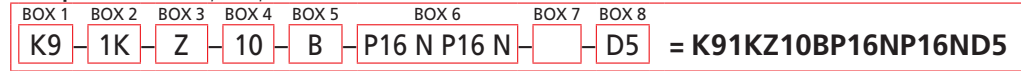
Ele.	ΔP	Ele.	ΔP	Ele.	ΔP
K3	0.25	2K3/ KK3	0.12	3KZ1/ 27KZ1	0.05
K10	0.09	2K10/ KK10	0.05	3KZ3/ 27KZ3	0.03
K25	0.02	2K25/ KK25	0.01	3KZ5/ 27KZ5	0.02
KAS3	0.10	2KAS3/ KKAS3	0.05	3KZ10/ 27KZ10	0.02
KAS5	0.08	2KAS5/ KKAS5	0.04	3KZ25/ 27KZ25	0.01
KAS10	0.05	2KAS10/ KKAS10	0.03	3K3	0.08
KZX10	0.22	2KZX10/ KKZX10	0.11	3K10	0.03
KZW1	0.43	2KZW1	-	3K25	0.01
KZW3	0.32	2KZW3/ KKZW3	0.16	3KAS3/ 27KAS3	0.03
KZW5	0.28	2KZW5/ KKZW5	0.14	3KAS5/ 27KAS5	0.02
KZW10	0.23	2KZW10/ KKZW10	0.12	3KAS10/ 27KAS10	0.02
KZW25	0.14	2KZW25/ KKZW25	0.07	3KZ10/ 27KZ10	0.07

Filter Model Number Selection

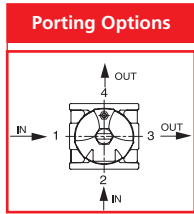
How to Build a Valid Model Number for a Schroeder K9:



Example: NOTE: One option per box



BOX 1	BOX 2	BOX 3	BOX 4	BOX 5
Filter Series	Number & Size of Elements	Media Type	Micron Rating	Seal Material
K9	1 K, KK, 27K 2 K 3 K	Omit = E-media (cellulose) Z = Excellement® Z-Media® AS = Anti-Stat Pleat media (synthetic) ZW = Aqua-Excellement® ZW media ZX = Excellement® Z-Media® (high collapse centertube) W = W media (water removal) M = media (reusable metal mesh)	1 = 1 μ Z, ZW, ZX media 3 = 3 μ AS, E, Z, ZW, ZX media 5 = 5 μ AS, Z, ZW, ZX media 10 = 10 μ AS, E, M, Z, ZW, ZX media 25 = 25 μ E, M, Z, ZW, ZX media 60 = 60 μ M media 150 = 150 μ M media 260 = 260 μ M media	B = Buna N V = Viton® H = EPR H.5 = Skydrol® Compatibility



BOX 6 Specification of all 4 ports is required				BOX 7
Porting				Options
Port 1 (standard)	Port 2	Port 3	Port 4	
N = None	N = None	N = None	N = None	Omit=None
P16 = 1" NPTF P20 = 1 1/4" NPTF P24 = 1 1/2" NPTF	P16 = 1" NPTF P20 = 1 1/4" NPTF P24 = 1 1/2" NPTF	P16 = 1" NPTF P20 = 1 1/4" NPTF P24 = 1 1/2" NPTF	P16 = 1" NPTF P20 = 1 1/4" NPTF P24 = 1 1/2" NPTF	X=Blocked bypass U= Test point in cap (upstream) UU= Test points in block (upstream and downstream)
S16 = SAE-16 S20 = SAE-20 S24 = SAE-24	F16 = 1" SAE 4-bolt flange Code 61 F20 = 1 1/4" SAE 4-bolt flange Code 61 F24 = 1 1/2" SAE 4-bolt flange Code 61	S16 = SAE-16 S20 = SAE-20 S24 = SAE-24	F16 = 1" SAE 4-bolt flange Code 61 F20 = 1 1/4" SAE 4-bolt flange Code 61 F24 = 1 1/2" SAE 4-bolt flange Code 61	10= 10 psi bypass setting 20= 20 psi bypass setting 25= 25 psi bypass setting 30= 30 psi bypass setting 40= 40 psi bypass setting 60= 60 psi bypass setting 75= 75 psi bypass setting
B16 = ISO 228 G-1" B20 = ISO 228 G-1 1/4" B24 = ISO 228 G-1 1/2"	S16 = SAE-16 S20 = SAE-20 S24 = SAE-24 B16 = ISO 228 G-1" B20 = ISO 228 G-1 1/4" B24 = ISO 228 G-1 1/2"	B16 = ISO 228 G-1" B20 = ISO 228 G-1 1/4" B24 = ISO 228 G-1 1/2"	S16 = SAE-16 S20 = SAE-20 S24 = SAE-24 B16 = ISO 228 G-1" B20 = ISO 228 G-1 1/4" B24 = ISO 228 G-1 1/2"	

BOX 8	
Dirt Alarm® Options	
	Omit = None
Visual	D5 = Visual pop-up D5C = D5 in cap
Visual with Thermal Lockout	D8 = Visual w/ thermal lockout D8C = D8 in cap
Electrical	MS5 = Electrical w/ 12 in. 18 gauge 4-conductor cable MS5LC = Low current MS5 MS10 = Electrical w/ DIN connector (male end only) MS10LC = Low current MS10 MS11 = Electrical w/ 12 ft. 4-conductor wire MS12 = Electrical w/ 5 pin Brad Harrison connector (male end only) MS12LC = Low current MS12 MS16 = Electrical w/ weather-packed sealed connector MS16LC = Low current MS16 MS17LC = Electrical w/ 4 pin Brad Harrison male connector
Electrical with Thermal Lockout	MS5T = MS5 (see above) w/ thermal lockout MS5LCT = Low current MS5T MS10T = MS10 (see above) w/ thermal lockout MS10LCT = Low current MS10T MS12T = MS12 (see above) w/ thermal lockout MS12LCT = Low current MS12T MS16T = MS16 (see above) w/ thermal lockout MS16LCT = Low current MS16T MS17LCT = Low current MS17T
Electrical Visual	MS13 = Supplied w/ threaded connector & light MS14 = Supplied w/ 5 pin Brad Harrison connector & light (male end)
Electrical Visual with Thermal Lockout	MS13DCT = MS13 (see above), direct current, w/ thermal lockout MS13DCLCT = Low current MS13DCT MS14DCT = MS14 (see above), direct current, w/ thermal lockout MS14DCLCT = Low current MS14DCT

NOTES:

Box 2. Double and triple stacking of K-size elements can be replaced by KK and 27K elements, respectively. Number of elements must equal 1 when using KK or 27K elements. Replacement element part numbers are identical to contents of Boxes 2, 3, 4, and 5. ZW media not available in 27K length.

Box 5. For options H, V, and H.5, all aluminum parts are anodized. H.5 seal designation includes the following: EPR seals, stainless steel wire mesh on elements, and light oil coating on housing exterior. Viton® is a registered trademark of DuPont Dow Elastomers. Skydrol® is a registered trademark of Solutia Inc.

Box 8. If location 1 is used as inlet port, dirt alarm will occupy location 2. If location 2 is used as inlet port, dirt alarm will occupy location 1. If dual inlet ports are specified, the only dirt alarm option is pop-up indicator in cap (D5C).