

Inline Return Filter

IRF



Features and Benefits

- Low pressure top servicing in-line filter
- Meets HF4 automotive standard
- Unique side mounting flange provides reliable seal arrangement between head and bowl
- The use of K-size elements allows consolidation of inventoried replacement elements
- Single and double length options provide optimal size for specific applications
- Also available with new DirtCatcher® elements (KDZ and KKDZ)
- Various Dirt Alarm® options

100 gpm
380 L/min
100 psi
7 bar

IRF

TF1

KF3

KL3

LF1-2"

MLF1

RLD

GRTB

MTA

MTB

ZT

Model No. of filter in photograph is IRF1KZ10S20Y2.



INDUSTRIAL



AUTOMOTIVE
MANUFACTURING



MACHINE
TOOL



CONSTRUCTION



STEEL
MAKING



MINING
TECHNOLOGY



AGRICULTURE



MOBILE
VEHICLES

Applications

KFT

RT

RTI

LRT

ART

BFT

QT

KTK

LTK

MRT

Filter Housing Specifications

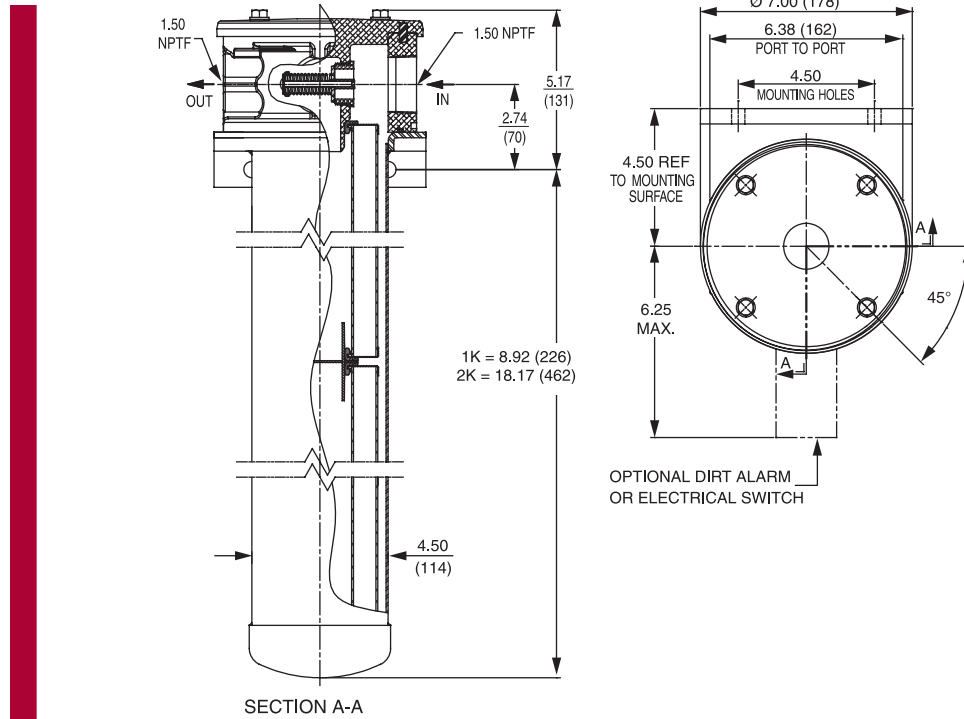
Accessories
for Tank-
Mounted
Filters

PAF1

MAF1

MF2

Flow Rating:	Up to 100 gpm (380 L/min) for 150 SUS (32 cSt) fluids
Max. Operating Pressure:	100 psi (7 bar)
Min. Yield Pressure:	400 psi (28 bar), per NFPA T2.6.1
Rated Fatigue Pressure:	90 psi (6 bar), per NFPA T2.6.1-2005
Temp. Range:	-20°F to 225°F (-29°C to 107°C)
Bypass Setting:	Cracking: 25 psi (1.7 bar) Full Flow: 48 psi (3.3 bar)
Porting Head:	Sand Cast Aluminum
Element Case:	Steel
Weight of IRF-1K:	13.5 lbs. (6.12 kg)
Weight of IRF-2K:	17.0 lbs. (7.71 kg)
Element Change Clearance:	8.0" (205 mm) for 1K; 17.50" (445 mm) for KK



Metric dimensions in ().

Element Performance Information

Element	Filtration Ratio Per ISO 4572/NFPA T3.10.8.8 Using automated particle counter (APC) calibrated per ISO 4402			Filtration Ratio wrt ISO 16889 Using APC calibrated per ISO 11171	
	$\beta_x \geq 75$	$\beta_x \geq 100$	$\beta_x \geq 200$	$\beta_x(c) \geq 200$	$\beta_x(c) \geq 1000$
K3/KK3/27K	6.8	7.5	10.0	N/A	N/A
K10/KK10/27K10	15.5	16.2	18.0	N/A	N/A
KZ1/KKZ1/27KZ1	<1.0	<1.0	<1.0	<4.0	4.2
KZ3/KAS3/KKZ3/KKAS3	<1.0	<1.0	<2.0	<4.0	4.8
KZ5/KAS5/KKZ5/KKAS5	2.5	3.0	4.0	4.8	6.3
KZ10/KAS10/KKZ10/KKAS10	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 (g)	Element	DHC (g)	Element	DHC (g)	Element	DHC (g)	Element	DHC (g)	Element	DHC (g)		
K3	54	KK3	108	27K3	162								
K10	44	KK10	88	27K10	132								
KZ1	112	KKZ1	224	27KZ1	336	KDZ1	89	KKDZ1	188	KZW1	61		
KZ3/KAS3	115	KKZ3/KKAS3	230	27KZ3/27KAS3	345	KDZ3	71	KKDZ3	150	KZW3	64	KKZW3	128
KZ5/KAS5	119	KKZ5/KKAS5	238	27KZ5/27KAS5	357	KDZ5	100	KKDZ5	210	KZW5	63	KKZW5	126
KZ10/KAS10	108	KKZ10/KKAS10	216	27KZ10/27KAS10	324	KDZ10	80	KKDZ10	168	KZW10	57	KKZW10	114
KZ25	93	KKZ25	186	27KZ25	279	KDZ25	81	KKDZ25	171	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

Inline Return Filter

IRF

Type Fluid	Appropriate Schroeder Media
Petroleum Based Fluids	All E media (cellulose), Z-Media® and ASP media (synthetic)
High Water Content	All Z-Media® and 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 and all 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) and all ASP media (synthetic)

Fluid Compatibility

- IRF
- TF1
- KF3
- KL3
- LF1-2"

Skydrol® is a registered trademark of Solutia Inc.

Pressure	Element		Element selections are predicated on the use of 150 SUS (32 cSt) petroleum based fluid and a 25 psi (1.7 bar) bypass valve.					
	Series	Part No.	1K3	2K3	3K3			
To 100 psi (7 bar)	E Media	K3	1K3	2K3	3K3			
		K10	1K10		2K10			
	Z- Media®	KZ1	1KZ1	2KZ1	3KZ1			
		KZ3	1KZ3		2KZ3			
		KZ5	1KZ5		2KZ5			
		KZ10	1KZ10		2KZ10			
		KDZ1	1KDZ1	2KDZ1				
		KDZ3	1KDZ3		2KDZ3			
		KDZ5	1KDZ5		2KDZ5			
		KDZ10	1KDZ10					
	Flow	gpm	0	20	40	60	80	100
		(L/min)	0	50	150		250	380

Element Selection Based on Flow Rate

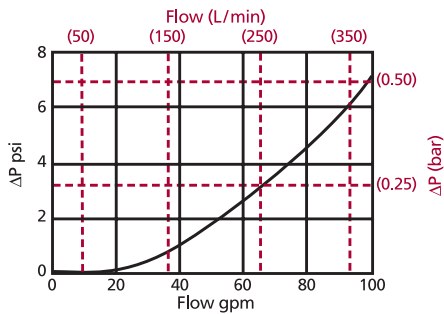
- MLF1
- RLD
- GRTB
- MTA
- MTB
- ZT
- KFT
- RT
- RTI
- LRT
- ART
- BFT
- QT
- KTK
- LTK
- MRT

Double stacking of K-size elements can be replaced by single KK. Shown above are the elements most commonly used in this housing.

Note: Contact factory regarding use of E media in High Water Content, Invert Emulsion and Water Glycol Applications. For more information, refer to Fluid Compatibility: Fire Resistant Fluids, pages 19 and 20.

ΔP_{housing}

IRF ΔP_{housing} for fluids with sp gr = 0.86:



sp gr = specific gravity

Sizing of elements should be based on element flow information provided in the Element Selection chart above.

$$\Delta P_{\text{filter}} = \Delta P_{\text{housing}} + \Delta P_{\text{element}}$$

Exercise:

Determine ΔP at 40 gpm (151 L/min) for IRF2KZ10S20Y5 using 200 SUS (44 cSt) fluid.

Solution:

$$\begin{aligned} \Delta P_{\text{housing}} &= 1.0 \text{ psi } [.07 \text{ bar}] \\ \Delta P_{\text{element}} &= 40 \times .03 \times (200 \div 150) = 1.6 \text{ psi} \\ &\text{or} \\ &= [151 \times (.03 \div 54.9) \times (44 \div 32) = .11 \text{ bar}] \\ \Delta P_{\text{total}} &= 1.0 + 1.6 = 2.6 \text{ psi} \\ &\text{or} \\ &= [.07 + .11 = .18 \text{ bar}] \end{aligned}$$

ΔP_{element}

$$\Delta P_{\text{element}} = \text{flow} \times \text{element } \Delta P \text{ factor} \times \text{viscosity factor}$$

El. ΔP factors @ 150 SUS (32 cSt):

	1K	2K		1K	2K
K3	.25	.12			
K10	.09	.05			
K25	.02	.01			
KZ1	.20	.10	KDZ1	.24	.12
KZ3/KAS3	.10	.05	KDZ3	.12	.06
KZ5/KAS5	.08	.04	KDZ5	.10	.05
KZ10/KAS10	.05	.03	KDZ10	.06	.03
KZ25	.04	.04	KDZ25	.04	.02
	1K	2K			
KZW1	.43				
KZW3	.32	.16			
KZW5	.28	.14			
KZW10	.23	.12			
KZW25	.14	.07			

If working in units of bars & L/min, divide above factor by 54.9.

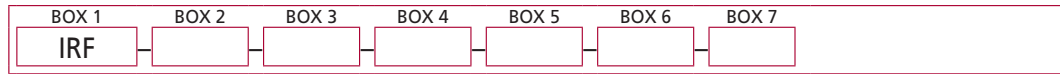
Viscosity factor: Divide viscosity by 150 SUS (32 cSt).

Pressure Drop Information Based on Flow Rate and Viscosity

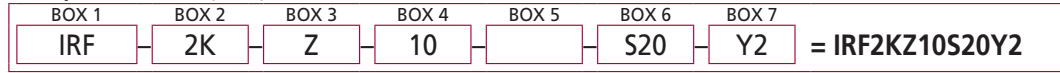
- ART
- BFT
- QT
- KTK
- LTK
- MRT
- Accessories for Tank-Mounted Filters
- PAF1
- MAF1
- MF2

Filter Model Number Selection

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



Example: NOTE: One option per box



BOX 1	BOX 2	BOX 3				
Filter Series	Number and Size of Elements	Element Type				
IRF	<table border="1"> <tr> <td>1</td> <td>K, KK</td> </tr> <tr> <td>2</td> <td>K</td> </tr> </table>	1	K, KK	2	K	Omit = E media (cellulose) ASP = Anti-Stat Pleat media Z = Excellement® Z-Media® (synthetic) ZW = Aqua-Excellement® ZW media W = Water Removal media M = M media (reusable metal) DZ = DirtCatcher® Excellement® Z-Media®
1	K, KK					
2	K					

BOX 4	BOX 5	BOX 6
Micron Rating	Seal Material	Inlet Porting
1 = 1 μ (Z, ZW and DZ media) 3 = 3 μ (E, AS, Z, ZW and DZ media) 5 = 5 μ (AS, Z, ZW and DZ media) 10 = 10 μ (E, AS, Z, ZW and DZ media) 25 = 25 μ (E, AS, Z, ZW and DZ media) 60 = 60 μ (M media)	Omit = Buna N H = EPR V = Viton®	P16 = 1" NPTF P20 = 1¼" NPTF S16 = SAE-16 S20 = SAE-20 F20 = 1¼" SAE 4-bolt flange Code 61 F24 = 1½" SAE 4-bolt flange Code 61 B24 = ISO 228 G-1½"

BOX 7 Dirt Alarm® Options		
		Omit = None
Located @ Port D (Standard)	Visual	Y2 = Back-mounted tri-color gauge
	Electrical	ES = Electrical switch ES1 = Heavy-duty electrical switch with conduit connector
Located @ Port C (Optional)	Visual	Y2R = Back-mounted gauge mounted on opposite side of standard location
	Electrical	ESR = Electrical switch mounted on opposite side of standard location ES1R = Heavy-duty electrical switch with conduit connector

NOTES:

- Box 2. Number of elements must equal 1 when using KK elements.
- Box 3. Replacement element part numbers are identical to contents of Boxes 2, 3, 4, and 5. Double stacking of K-size elements can be replaced by single KK elements.
- Box 5. Viton® is a registered trademark of DuPont Dow Elastomers.

