Return Line Filter KF3

Features and Benefits
- Meets HF4 automotive standard
- Offered in pipe, SAE straight thread, flange and ISO 228 porting
- Various Dirt Alarm® options
- Available with No-Element indicator
- Available with NPTF inlet and outlet female test ports
- Available with magnet inserts
- Available with housing drain plug
- Takes the standard “K” element in K, KK or 27K lengths
- Allows consolidation of inventoried replacement elements by using K-size elements
- Also available with DirtCatcher® elements (KD & KKD)
- Available with quality-protected GeoSeal® Elements (GKF3)

Part of the Schroeder Industries 2030 Initiative

Model No. of filter in photograph is KF31K10SD5.

Flow Rating: Up to 100 gpm (380 L/min) for 150 SUS (32 cSt) fluids
Max. Operating Pressure: 300 psi (20 bar)
Min. Yield Pressure: 1000 psi (70 bar), per NFPA T2.6.1
Rated Fatigue Pressure: 290 psi (20 bar), per NFPA T2.6.1-2005
Temp. Range: -20°F to 225°F (-29°C to 107°C)
Bypass Setting: Cracking: 30 psi (2 bar)
Full Flow: 51 psi (4 bar)
Porting Head: Die Cast Aluminum
Element Case: Steel
Weight of KF3-1K: 10.5 lbs. (4.8 kg)
Weight of KF3-2K: 14.2 lbs. (6.4 kg)
Weight of KF3-3K: 18.5 lbs. (8.4 kg)
Element Change Clearance: 1.50" (40 mm) for all lengths

Filter Housing Specifications

Fluid Compatibility

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)

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Model No. of filter in photograph is KF31K10SD5.
**Return Line Filter**

**Element Performance Information & Dirt Holding Capacity**

<table>
<thead>
<tr>
<th>Element</th>
<th>Performance Information &amp; Dirt Holding Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Filtration Ratio per ISO 4572/NFPA T3.10.8.8</strong></td>
<td>Using automated particle counter (APC) calibrated per ISO 4402</td>
</tr>
<tr>
<td><strong>Filtration Ratio per ISO 16889</strong></td>
<td>Using APC calibrated per ISO 11171</td>
</tr>
<tr>
<td>$\beta_0 \geq 75$</td>
<td>$\beta_0 \geq 100$</td>
</tr>
<tr>
<td>KZ1/KKZ1/27KZ1</td>
<td>$&lt;1.0$</td>
</tr>
<tr>
<td>KZ3/KKZ3/27KZ3</td>
<td>$&lt;1.0$</td>
</tr>
<tr>
<td>KZ5/KKZ5/27KZ5</td>
<td>2.5</td>
</tr>
<tr>
<td>KZ10/KKZ10/27KZ10</td>
<td>7.4</td>
</tr>
<tr>
<td>KZ25/KKZ25/27KZ25</td>
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<td>KZW1</td>
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<tr>
<td>KZW3/KKZW3</td>
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<tr>
<td>KZW5/KKZW5</td>
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<tr>
<td>KZW10/KKZW10</td>
<td>N/A</td>
</tr>
<tr>
<td>KZW25/KKZW25</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**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
- KC: 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

Metric dimensions in ( ).

**Element DHC (g)**

<table>
<thead>
<tr>
<th>Element</th>
<th>DHC (g)</th>
<th>Element</th>
<th>DHC (g)</th>
<th>Element</th>
<th>DHC (g)</th>
<th>Element</th>
<th>DHC (g)</th>
<th>Element</th>
<th>DHC (g)</th>
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</thead>
<tbody>
<tr>
<td>KZ1</td>
<td>112</td>
<td>KKZ1</td>
<td>224</td>
<td>27KZ1</td>
<td>336</td>
<td>KDZ1</td>
<td>89</td>
<td>KKDZ1</td>
<td>188</td>
</tr>
<tr>
<td>KZ3</td>
<td>115</td>
<td>KKZ3</td>
<td>230</td>
<td>27KZ3</td>
<td>345</td>
<td>KDZ3</td>
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<td>150</td>
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<tr>
<td>KZ5</td>
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<td>238</td>
<td>27KZ5</td>
<td>357</td>
<td>KDZ5</td>
<td>100</td>
<td>KKDZ5</td>
<td>210</td>
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<tr>
<td>KZ10</td>
<td>108</td>
<td>KKZ10</td>
<td>216</td>
<td>27KZ10</td>
<td>324</td>
<td>KDZ10</td>
<td>80</td>
<td>KKDZ10</td>
<td>168</td>
</tr>
</tbody>
</table>

**Element Nominal Dimensions in ( ).**
Return Line Filter

Pressure Drop Information Based on Flow Rate and Viscosity

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

KF3 $\Delta P_{\text{housing}}$ for fluids with sp gr \(\text{(specific gravity)}\) = 0.86:

\[
\Delta P_{\text{housing}} = \Delta P_{\text{filter}} = \Delta P_{\text{housing}} + (\Delta P_{\text{element}} \times V_f)
\]

Exercise:
Determine $\Delta P_{\text{filter}}$ at 70 gpm (265.3 L/min) for KF31KZ10SD5 using 160 SUS (34 cSt) fluid.

Use the housing pressure curve to determine $\Delta P_{\text{housing}}$ at 70 gpm. In this case, $\Delta P_{\text{housing}}$ is 4 psi (.27 bar) on the graph for the KF3 housing.

Use the element pressure curve to determine $\Delta P_{\text{element}}$ at 70 gpm. In this case, $\Delta P_{\text{element}}$ is 3 psi (.21 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 ($V_f$) 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, $\Delta P_{\text{filter}}$, is calculated by adding $\Delta P_{\text{housing}}$ with the true element pressure differential, $\Delta P_{\text{element}} \times V_f$. 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:

\[
\begin{align*}
\Delta P_{\text{housing}} &= 4 \text{ psi} (.227 \text{ bar}) \\
\Delta P_{\text{element}} &= 3 \text{ psi} (.21 \text{ bar}) \\
V_f &= 160 \text{ SUS (34 cSt)} / 150 \text{ SUS (32 cSt)} = 1.1 \\
\Delta P_{\text{filter}} &= 4 \text{ psi} + (3 \text{ psi} \times 1.1) = 7.7 \text{ psi} \\
\text{OR} & \\
\Delta P_{\text{filter}} &= .27 \text{ bar} + (21 \text{ bar} \times 1.1) = .50 \text{ bar}
\end{align*}
\]
## Return Line Filter

**How to Build a Valid Model Number for a Schroeder KF3:**

**Example:** NOTE: Only box 10 may contain more than one option

<table>
<thead>
<tr>
<th>BOX 1</th>
<th>BOX 2</th>
<th>BOX 3</th>
<th>BOX 4</th>
<th>BOX 5</th>
<th>BOX 6</th>
<th>BOX 7</th>
<th>BOX 8</th>
<th>BOX 9</th>
<th>BOX 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>KF3</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>1K</td>
<td>Z</td>
<td>10</td>
<td></td>
<td></td>
<td>S</td>
<td>DS</td>
<td></td>
<td></td>
<td>KF31KZ10SDS</td>
</tr>
</tbody>
</table>

**Filter Model Number Selection**

**Filter Series**
- KF3
- GKF3 (GeoSeal®)
- WKF3 (Water)

**Number & Size of Elements**
- 1K, KK, 2K
- 3K
- GeoSeal®
  - 1KG, KKG, 27KG
  - 2KG
  - 3KG

**Seal Material**
- Omit = Buna N
- H = EPR
- V = Viton®
- H.5 = Skydrol® Compatibility
- W = Buna N with anodized parts

**Media Type**
- Omit = E media (cellulose)
- AS = Anti-Static Pleat Media
- Z = Excellement® Z-Media® (synthetic)
- ZW = Aqua-Excellement® Z Media
- W = Water Removal media
- M = M Media (reusable metal)
- DZ = DirtCatcher® Excellement® Z-Media®

**Micron Rating**
- 1 = 1 μ
- 3 = 3 μ
- 5 = 5 μ
- 10 = 10 μ
- 25 = 25 μ
- 60 = 60 μ

**Water System Element Options**
- KM10 = K size 25 μ M media (reusable metal)
- KM25 = K size 10 μ M media (reusable metal)
- KM60 = K size 60 μ M media (reusable metal)
- KM150 = K size 150 μ M media (reusable metal)
- KM260 = K size 260 μ M media (reusable metal)

**Magnet Option**
- Omit = None
- M = Magnet

**Porting**
- P = 1 1/4” NPTF
- S = SAE-24
- F = 1 1/4” SAE-4-bolt flange Code 61
- B = ISO 228 G-1 1/2”

**Dirt Alarm® Options**
- Omit = None
- Visual
  - D = Pointer
  - DS = Visual pop-up
- Visual with Thermal Lockout
  - DB = Visual w/ thermal lockout
  - Electrical
    - M55 = Electrical w/ 12 in. 18 gauge 4-conductor cable
    - MSSLC = Low current MSS
    - 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
  - Electrical with Thermal Lockout
    - MS17LC = Electrical w/ 4 pin Brad Harrison male connector
    - MS5ST = MS5 (see above) w/ thermal lockout
    - MSSLCT = Low current MSS
    - MS10ST = Low current MS10
    - MS11T = MS11 (see above) w/ thermal lockout
    - MS12T = Low current MS12
    - MS121CT = Low current MS12T
    - MS16T = MS16 (see above) w/ thermal lockout
    - MS161CT = Low current MS16T
    - MS17LC = Low current MS17T
  - Electrical
    - MS13 = Cam operated switch w/ 1/4” conduit female connection
    - MS13CT = MS13 (see above) direct current, w/ thermal lockout
    - MS13DCLCT = Low current MS13DCT
    - MS14 = Supplied w/ threaded connector & light
    - MS14CT = MS14 (see above) direct current, w/ thermal lockout
    - MS14DCLCT = Low current MS14DCT

**Additional Options**
- Omit = None
- L = Two 1/4” NPTF inlet and outlet test ports
- N = No-Element indicator
- G426 = 3/4” drain on bottom of housing
- G440 = 1/2” drain on bottom of housing

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**NOTES:**

- Box 2. Double and triple stacking of K-size elements can be replaced by single KK and 27K elements, respectively. Number of elements must equal 1 when using KK or 27K elements. ZW media not available in 27K.

- Box 3. Replacement element part numbers are identical to contents of Boxes 2, 3, 4, and 5.

- Box 5. For options H, W, 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 7. For option F, bolt thread depth 63° (16 mm). B porting option supplied with metric mounting holes.

- Box 10. Option L not available with MS Dirt Alarm

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