

# Return Line Filter

# TF1



## Features and Benefits

- 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

**30 gpm**  
**120 L/min**  
**300 psi**  
**20 bar**

IRF  
TF1  
KF3  
KL3  
LF1-2"  
MLF1  
RLD  
GRTB  
MTA  
MTB  
ZT

Model No. of filter in photograph is TF11AZ10SD5.



INDUSTRIAL



AUTOMOTIVE  
MANUFACTURING



MACHINE  
TOOL



RAILROAD



STEEL  
MAKING



PULP & PAPER



AGRICULTURE



MOBILE  
VEHICLES

## Applications

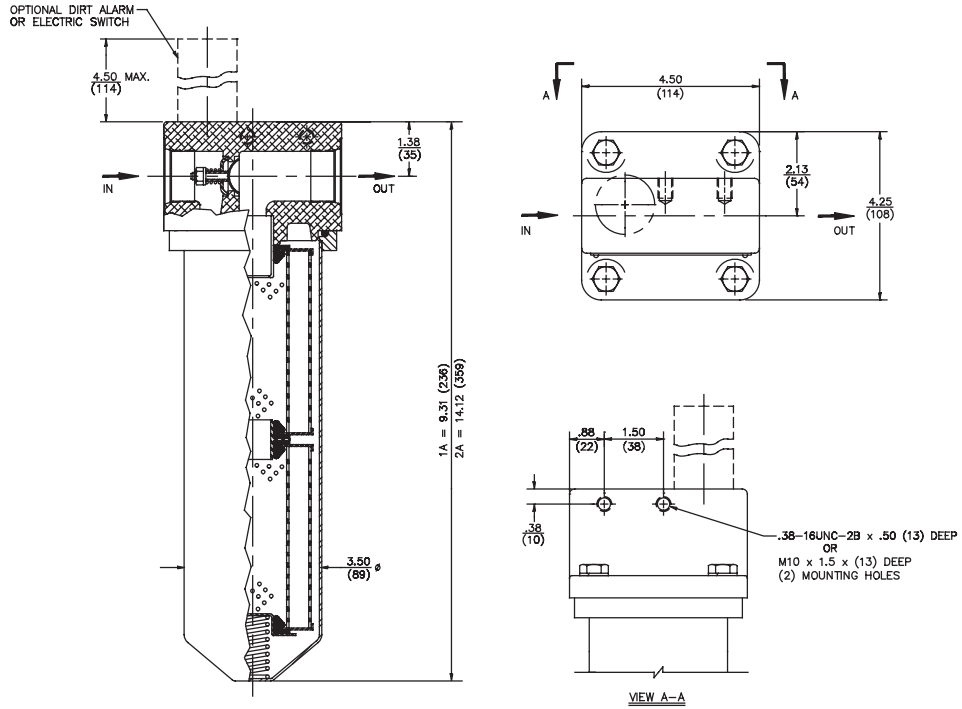
KFT  
RT  
RTI  
LRT  
ART  
BFT  
QT  
KTK  
LTK  
MRT

|                           |   |
|---------------------------|---|
| Flow Rating:              | Up to 30 gpm (120 L/min) for 150 SUS (32 cSt) fluids  |
| Max. Operating Pressure:  | 300 psi (20 bar)                                      |
| Min. Yield Pressure:      | 1200 psi (80 bar), per NFPA T2.6.1                    |
| Rated Fatigue Pressure:   | 270 psi (19 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)<br>Full Flow: 51 psi (4 bar) |
| Porting Head:             | Cast Aluminum   |
| Element Case:             | Steel   |
| Weight of TF1-1A:         | 5.1 lbs. (2.3 kg)                                     |
| Weight of TF1-2A:         | 6.3 lbs. (2.9 kg)                                     |
| Element Change Clearance: | 3.50" (90 mm)   |

## Filter Housing Specifications

Accessories for Tank-Mounted Filters

PAF1  
MAF1  
MF2



Metric dimensions in ( ).

## Element Performance Information

| Element | Filtration Ratio Per ISO 4572/NFPA T3.10.8.8<br>Using automated particle counter (APC) calibrated per ISO 4402 |                    |                    | Filtration Ratio wrt ISO 16889<br>Using APC calibrated per ISO 11171 |                        |
|---------|--|--------------------|--------------------|--|------------------------|
|         | $\beta_x \geq 75$  | $\beta_x \geq 100$ | $\beta_x \geq 200$ | $\beta_x(c) \geq 200$  | $\beta_x(c) \geq 1000$ |
| A3      | 6.8  | 7.5                | 10.0               | N/A  | N/A                    |
| A10     | 15.5   | 16.2               | 18.0               | N/A  | N/A                    |
| AZ1     | <1.0   | <1.0               | <1.0               | <4.0   | 4.2                    |
| AZ3     | <1.0   | <1.0               | <2.0               | <4.0   | 4.8                    |
| AZ5     | 2.5  | 3.0                | 4.0                | 4.8  | 6.3                    |
| AZ10    | 7.4  | 8.2                | 10.0               | 8.0  | 10.0                   |
| AZ25    | 18.0   | 20.0               | 22.5               | 19.0   | 24.0                   |

## Dirt Holding Capacity

| Element | DHC (gm) |
|---------|----------|
| A3      | 16       |
| A10     | 13       |
| AZ1     | 25       |
| AZ3     | 26       |
| AZ5     | 30       |
| AZ10    | 28       |
| AZ25    | 28       |

Element Collapse Rating: 150 psid (10 bar)

Flow Direction: Outside In

Element Nominal Dimensions: 3.0" (75 mm) O.D. x 4.5" (115 mm) long

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|                        |  |
|------------------------|--|
| Type Fluid             | Appropriate Schroeder Media  |
| Petroleum Based Fluids | All E media (cellulose) and Z-Media® (synthetic)   |
| High Water Content     | All Z-Media® (synthetic)   |
| Invert Emulsions       | 10 and 25 µ Z-Media® (synthetic)   |
| Water Glycols          | 3, 5, 10 and 25 µ Z-Media® (synthetic)   |
| Phosphate Esters       | All Z-Media® (synthetic) with H (EPR) seal designation   |
| 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) |

## Fluid Compatibility

IRF

TF1

KF3

KL3

LF1-2"

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| Pressure                  | Element      |          | Element selections are predicated on the use of 150 SUS (32 cSt) petroleum based fluid and a 30 psi (2.1 bar) bypass valve. |      |      |     |
|---------------------------|--------------|----------|---|------|------|-----|
|                           | Series       | Part No. |   |      |      |     |
| To<br>300 psi<br>(20 bar) | E<br>Media   | A3       | 1A3   | 2A3  |      |     |
|                           |              | A10      | 1A10  |      | 2A10 |     |
|                           |              | A25      | 1A25  |      |      |     |
|                           | Z-<br>Media® | AZ1      | 1AZ1  | 2AZ1 |      |     |
|                           |              | AZ3      | 1AZ3  |      | 2AZ3 |     |
|                           |              | AZ5      | AZ5   |      |      |     |
|                           |              | AZ10     | AZ10  |      |      |     |
|                           |              | AZ25     | AZ25  |      |      |     |
| Flow                      | gpm          | 0        | 10  | 20   | 30   |     |
|                           | (L/min)      | 0        | 25  | 50   | 75   | 100 |

## Element Selection Based on Flow Rate

MLF1

RLD

GRTB

MTA

MTB

ZT

KFT

RT

RTI

LRT

ART

BFT

QT

KTK

LTK

MRT

Accessories for Tank-Mounted Filters

PAF1

MAF1

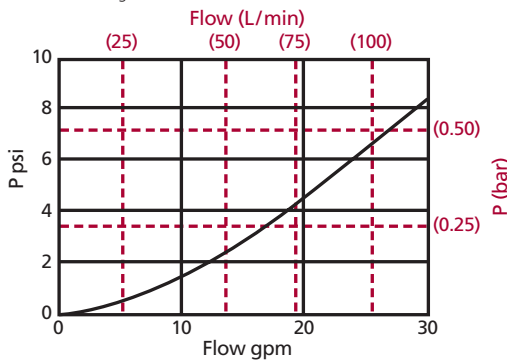
MF2

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<sub>housing</sub>

TF1 ΔP<sub>housing</sub> 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.

### ΔP<sub>element</sub>

ΔP<sub>element</sub> = flow x element ΔP factor x viscosity factor

El. ΔP factors @ 150 SUS (32 cSt):

|      | 1A  | 2A  |
|------|-----|-----|
| A3   | .53 | .27 |
| A10  | .36 | .18 |
| A25  | .05 | .03 |
| AZ1  | .70 | .35 |
| AZ3  | .50 | .25 |
| AZ5  | .32 | .16 |
| AZ10 | .25 | .13 |
| AZ25 | .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

| Notes |
|-------|
|       |
|       |
|       |
|       |
|       |
|       |

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

### Exercise:

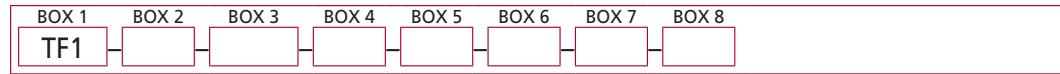
Determine ΔP at 20 gpm (75 L/min) for TF12AZ3PD using 200 SUS (44 cSt) fluid.

### Solution:

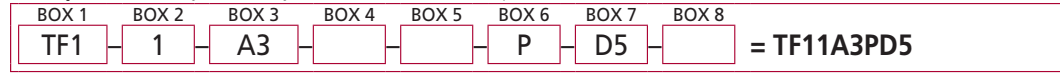
$$\begin{aligned} \Delta P_{\text{housing}} &= 4.5 \text{ psi } [.30 \text{ bar}] \\ \Delta P_{\text{element}} &= 20 \times .25 \times (200 \div 150) = 6.7 \text{ psi} \\ &\text{or} \\ &= [75 \times (.25 \div 54.9) \times (44 \div 32) = .47 \text{ bar}] \\ \Delta P_{\text{total}} &= 4.5 + 6.7 = 11.2 \text{ psi} \\ &\text{or} \\ &= [.30 + .47 = .77 \text{ bar}] \end{aligned}$$

## Filter Model Number Selection

### How to Build a Valid Model Number for a Schroeder TF1:



**Example:** NOTE: Only box 8 may contain more than one option



| BOX 1                | BOX 2                     | BOX 3   | BOX 4  | BOX 5                             |
|----------------------|---------------------------|---|--|-----------------------------------|
| <b>Filter Series</b> | <b>Number of Elements</b> | <b>Element Part Number</b>  | <b>Seal Material</b>   | <b>Magnet Option</b>              |
| TF1                  | 1<br>2                    | A3 = 3 μ E media (cellulose)<br>A10 = 10 μ E media (cellulose)<br>A25 = 25 μ E media (cellulose)<br>AZ1 = 1 μ Excellement® Z-Media® (synthetic)<br>AZ3 = 3 μ Excellement® Z-Media® (synthetic)<br>AZ5 = 5 μ Excellement® Z-Media® (synthetic)<br>AZ10 = 10 μ Excellement® Z-Media® (synthetic)<br>AZ25 = 25 μ Excellement® Z-Media® (synthetic)<br>AM10 = 10 μ M media (reusable metal)<br>AM25 = 25 μ M media (reusable metal) | Omit = Buna N<br>H = EPR<br>V = Viton®<br>H.5 = Skydrol® compatibility | Omit = None<br>M = Magnet inserts |

| BOX 6   | BOX 7   | BOX 8   |
|---|---|---|
| <b>Porting Options</b>                        | <b>Dirt Alarm® Options</b>  | <b>Additional Options</b>   |
| P = 1" NPTF<br>S = SAE-16<br>B = ISO 228 G-1" | Omit = None<br>Visual<br>Visual with Thermal Lockout<br>Electrical<br>Electrical with Thermal Lockout<br>Electrical Visual<br>Electrical Visual with Thermal Lockout  | Omit = None<br>L = Two ¼" NPTF inlet and outlet female test ports<br>N = No-Element indicator<br>G440 = ½" drain on bottom of housing |
|   | MS5 = Electrical w/ 12 in. 18 gauge 4-conductor cable<br>MS5LC = Low current MS5<br>MS10 = Electrical w/ DIN connector (male end only)<br>MS10LC = Low current MS10<br>MS11 = Electrical w/ 12 ft. 4-conductor wire<br>MS12 = Electrical w/ 5 pin Brad Harrison connector (male end only)<br>MS12LC = Low current MS12<br>MS16 = Electrical w/ weather-packed sealed connector<br>MS16LC = Low current MS16<br>MS17LC = Electrical w/ 4 pin Brad Harrison male connector<br>MS5T = MS5 (see above) w/ thermal lockout<br>MS5LCT = Low current MS5T<br>MS10T = MS10 (see above) w/ thermal lockout<br>MS10LCT = Low current MS10T<br>MS12T = MS12 (see above) w/ thermal lockout<br>MS12LCT = Low current MS12T<br>MS16T = MS16 (see above) w/ thermal lockout<br>MS16LCT = Low current MS16T<br>MS17LCT = Low current MS17T<br>MS = Cam operated switch w/ ½" conduit female connection<br>MS13 = Supplied w/ threaded connector & light<br>MS14 = Supplied w/ 5 pin Brad Harrison connector & light (male end)<br>MS13DCT = MS13 (see above), direct current, w/ thermal lockout<br>MS13DCLCT = Low current MS13DCT<br>MS14DCT = MS14 (see above), direct current, w/ thermal lockout<br>MS14DCLCT = Low current MS14DCT |   |

**NOTES:**

Box 3. Replacement element part numbers are identical to contents of Boxes 3 and 4. E media elements are only available with Buna N seals.

Box 4. For option V, 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 6. B porting option supplied with metric mounting holes.