

# TFR1

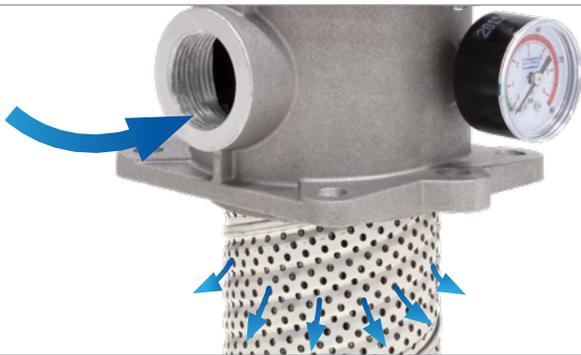
## In-Tank Return Line Filter Assemblies

Hy-Pro TFR1 in-tank filter assemblies are ideal for particulate contamination removal in high velocity hydraulic power unit return line and compact mobile hydraulic OEM installations.

**Max Operating Pressure: 150 psi (10 bar)**



[hyprofiltration.com/](http://hyprofiltration.com/)



### Inside to out flow.

The dirtiest fluid in your system can be found before the filter element in the filter housing. Here, contaminants collect in the filter media and unless disposed of properly, can wreak havoc on your system after element service. That's why when you service the TFR1 element, which utilizes inside-to-outside flow, you remove all the dirt and contaminated fluid with the element.

### Dirt removal's never been so easy.

Included with each TFR1 element is a specially designed tool to make element removal easier than ever. Simply squeeze the tool into the top of the element and release to seat inside the endcap, then pull using the handle to remove both the filter and all of the dirt contained inside from your system.

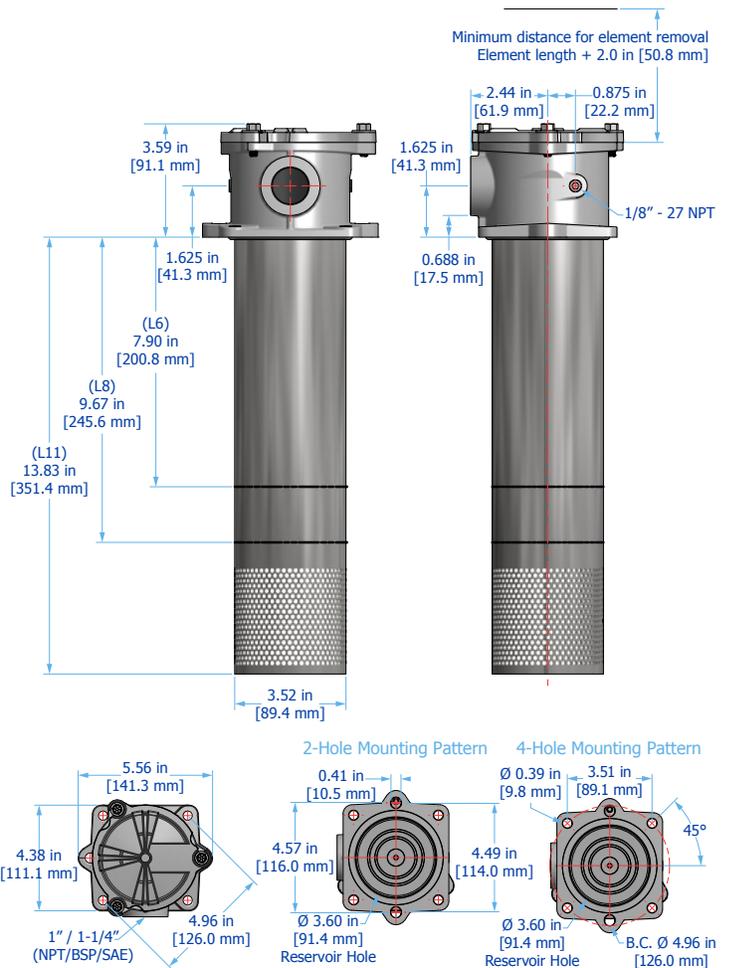


### Eliminate aeration.

Smaller reservoirs with higher turnover and less settling time typically lead to aeration as fluids are churned and recirculated. The unique TFR1 element design minimizes turbulence and integral diffuser tube prevents aeration in compact hydraulic and high velocity return line applications by maintaining a column of fluid outside the filter element and above the fluid line to ensure your fluids are returned clean and without aeration.

# TFR1 Specifications

Operating Temperature	<b>Fluid Temperature</b> 30°F to 225°F (0°C to 105°C)	<b>Ambient Temperature</b> -4°F to 140°F (-20C to 60C)
Operating Pressure	150 psi (10 bar) maximum	
Pressure Switch Trigger	22 psi (1.5 bar) 45 psi (3.1 bar)	
Visual Gauge	0-22 psi (0-1.5 bar), green to red 0-45 psi (0-3.1 bar), green to red	
Element Collapse Rating	100 psid (6.9 bard)	
Integral Bypass Setting	25 psid (1.7 bard) standard. For 50 psid (3.4 bard) option, select Bypass Option "3" in Assembly Part Number Builder and add "-50" to the end of Replacement Element part number.	
Materials of Construction	<b>Head</b> Cast aluminum	<b>Diffuser</b> Powder coated or plated steel
	<b>Element Bypass Valve</b> Plated steel	
Media Description	<p><b>M</b> G8 Dualglass, our latest generation of DFE rated, high performance glass media for all hydraulic &amp; lubrication fluids. <math>\beta_{x_{Cl}}</math> <math>\geq</math> 4000</p> <p><b>A</b> G8 Dualglass high performance media combined with water removal scrim. <math>\beta_{x_{Cl}}</math> <math>\geq</math> 4000</p> <p><b>W</b> Stainless steel wire mesh media <math>\beta_{x_{Cl}}</math> <math>\geq</math> 2 (<math>\beta_x \geq</math> 2)</p>	



**Fluid Compatibility** Petroleum and mineral based fluids (standard). For polyol ester, phosphate ester, and other specified synthetic fluids use fluorocarbon seal option or contact factory.

**Filter Assembly Sizing** Filter assembly clean element  $\Delta P$  after actual viscosity correction should not exceed 10% of filter assembly bypass setting. See below for viscosity correction formula. For applications with extreme cold start condition contact Hy-Pro for sizing recommendations.

## Step 1: Calculate $\Delta P$ coefficient for actual viscosity

### Using Saybolt Universal Seconds (SUS)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (SUS)}}{150} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

### Using Centistokes (cSt)

$$\Delta P \text{ Coefficient} = \frac{\text{Actual Operating Viscosity}^1 \text{ (cSt)}}{32} \times \frac{\text{Actual Specific Gravity}}{0.86}$$

## Step 2: Calculate actual clean filter assembly $\Delta P$ at both operating and cold start viscosity

$$\text{Actual Assembly Clean } \Delta P = \text{Flow Rate} \times \Delta P \text{ Coefficient (from Step 1)} \times \text{Assembly } \Delta P \text{ Factor (from sizing table)}$$

$\Delta P$ Factors <sup>1</sup>	Model	Length	Units	Media						
				1M	3M	6M	10M	16M	25M	**W
	TFR1	L6	psid/gpm	0.5640	0.4759	0.3688	0.3308	0.3236	0.3117	0.0571
			bard/lpm	0.0103	0.0087	0.0067	0.0060	0.0059	0.0057	0.0010
		L8	psid/gpm	0.4846	0.4090	0.3170	0.2842	0.2781	0.2679	0.0491
			bard/lpm	0.0088	0.0074	0.0058	0.0052	0.0051	0.0049	0.0009
		L11	psid/gpm	0.3379	0.2852	0.2210	0.1982	0.1939	0.1868	0.0342
			bard/lpm	0.0062	0.0052	0.0040	0.0036	0.0035	0.0034	0.0006

<sup>1</sup>Max flow rates and  $\Delta P$  factors assume  $\mu = 150$  SUS, 32 cSt. See filter assembly sizing guideline for viscosity conversion formula for viscosity change.

# TFR1 Part Number Builder



Connection	<b>G16</b>	1" G thread (BSPP)
	<b>G20</b>	1.25" G thread (BSPP)
	<b>N16</b>	1" NPT
	<b>S16</b>	1" SAE
	<b>S20</b>	1.25" SAE

Element Length <sup>2</sup>	<b>6</b>	6" (15 cm) nominal
	<b>8</b>	8" (20 cm) nominal
	<b>11</b>	11" (28 cm) nominal

Bypass	<b>2<sup>3</sup></b>	Integrated bypass - 25 psid (1.7 bar)
	<b>3<sup>4</sup></b>	Integrated bypass - 50 psid (3.4 bar)

Pressure Indicator	<b>DX</b>	Electric pressure switch (DIN connection)
	<b>E</b>	Electric switch with flying leads (3-wire connection)
	<b>G</b>	Visual pressure gauge
	<b>X</b>	No indicator (port plugged)

Special Options	<b>R<sup>5</sup></b>	Exclude diffuser tube
	<b>W</b>	Reservoir weld flange

Media Selection	G8 Dualglass	G8 Dualglass + water removal	Stainless wire mesh
<b>1M</b>	$\beta_{3_{[C]}} \geq 4000$	<b>3A</b> $\beta_{5_{[C]}} \geq 4000$	<b>25W</b> 25 $\mu$ nominal
<b>3M</b>	$\beta_{5_{[C]}} \geq 4000$	<b>6A</b> $\beta_{7_{[C]}} \geq 4000$	<b>40W</b> 40 $\mu$ nominal
<b>6M</b>	$\beta_{7_{[C]}} \geq 4000$	<b>10A</b> $\beta_{12_{[C]}} \geq 4000$	<b>74W</b> 74 $\mu$ nominal
<b>10M</b>	$\beta_{12_{[C]}} \geq 4000$	<b>25A</b> $\beta_{22_{[C]}} \geq 4000$	<b>149W</b> 149 $\mu$ nominal
<b>16M</b>	$\beta_{17_{[C]}} \geq 4000$		
<b>25M</b>	$\beta_{22_{[C]}} \geq 4000$		

Seals	<b>B</b>	Nitrile (Buna)
	<b>V</b>	Fluorocarbon
	<b>E-WS</b>	EPR seals + stainless steel support mesh

<sup>1</sup>Maximum recommended flow rate based on velocity through port and internal flow path. Consult sizing guidelines or consult factory for sizing based on flow rate, viscosity, temperature, filter media selection.

<sup>2</sup>Improper length selection could result in reservoir foaming. Consider diffuser and element length and anticipated reservoir fluid level when sizing. To protect against foaming, using longer lengths is recommended.

<sup>3</sup>Standard Bypass Rating. Consult Hy-Pro for alternate valve setting.

<sup>4</sup>When selected, add "-50" to end of replacement element part number.

<sup>5</sup>Excluding diffuser tube can result in reservoir foaming in high flow density applications.

For all up to date option details and compatibilities, please reference our Contamination Solutions Price List or contact customer service.

Replacement Elements To determine replacement elements, use corresponding codes from your assembly part number:

Bypass Code	Filter Element Part Number	Example
2	HPTFR1L[Element Length Code] - [Media Selection Code][Seal Code]	HPTFR1L6-6MV
3	HPTFR1L[Element Length Code] - [Media Selection Code][Seal Code] - 50	HPTFR1L6-6MV-50

# Filtration starts with the filter.



**Lower ISO Codes: Lower Total Cost of Ownership** Hy-Pro filter elements deliver lower operating ISO Codes so you know your fluids are always clean, meaning lower total cost of ownership and reducing element consumption, downtime, repairs, and efficiency losses.

**DFE Rated Filter Elements** DFE is Hy-Pro's proprietary testing process which extends ISO 16889 Multi Pass testing to include real world, dynamic conditions and ensures that our filter elements excel in your most demanding hydraulic and lube applications.

**Delivery in days, not weeks** From a massive inventory of ready-to-ship filter elements to flexible manufacturing processes, Hy-Pro is equipped for incredibly fast response time to ensure you get your filter elements and protect your uptime.

**More than just filtration** Purchasing Hy-Pro filter elements means you not only get the best filters, you also get the unrivaled support, training, knowledge and expertise of the Hy-Pro team working shoulder-to-shoulder with you to eliminate fluid contamination.

## Elements that go beyond industry standard.

Advanced DFE rated filter elements deliver lower operating ISO Codes with high efficiency particulate removal and retention efficiency. With integral element bypasses and a range of media options down to  $\beta_{3, [c]} > 4000$  + water absorption, you get the perfect element for your application, every time.



## Minimize the mess.

With most of the assembly inside the reservoir, the top loading TFR1 housing provides easy and clean access during element service – no slippery spin-ons to handle. Specially designed keyway cover and bolt arrangement mean lost parts during element service become a thing of the past.



## Want to find out more? Get in touch.

hyprofiltration.com  
info@hyprofiltration.com  
+1 317 849 3535

© 2021 Hy-Pro Corporation. All rights reserved.



MKTLITFAS-TFR1-082521-EM