## LOW PRESSURE FILTERS **NFH Series**

Modular Inline Return Line Filters 500 psi • up to 450 gpm



## Hydraulic Symbol



2 mounting holes - filter head

SAE DN 102 Flange Code 61 (single tower)

Outlet: Bottom

Floor mounting brackets

SAE DN 102 (multi-tower)

Inlet: Side

**Ductile Iron** 

343 gpm (1300 lpm) 450 gpm (1700 lpm)

500 psi (34.5 bar)

500 psi (34.5 bar) > 1440 psi (100 bar)

290 psid (20 bar)

145 psid (10 bar)

14°F to 212°F (-10°C to 100°C)

(Flow limited by 4" pipe size)

Steel

#### Features

- Top access for easy element changeout.
- All models have an air bleed valve (vent) installed in the lid.
- Single large element with no leak points for highest efficiency and dirt capacity
- Lid with swing bolts for fast servicing without tools
- Drain port (right side of Inlet Port) SAE 12 (3/4")
- Clogging Indicator for local and/or remote signals •
- Easily banked in parallel (manifolded) for high viscosity applications.
- Notes: This filter is configured with an .....R.... type (return/low pressure) element, so if the filter requires a bypass, the bypass is located in the closed end cap of the cartridge element.

### Applications



Gearboxes



Pulp & Paper

D94









Industry

Industrial



#### P/HC **Fluid Temperature** Range Consult HYDAC for applications below 14°F (-10°C) Fluid Compatibility

Compatible with all hydrocarbon based, synthetic, water glycol, oil/water emulsion, and high water based fluids when the appropriate seals are selected.

Indicator Trip Pressure

 $\Delta P = 29 \text{ psid} (2 \text{ bar}) - 10\% (standard)$  $\Delta P = 72 \text{ psid (5 bar) -10\% (optional)}$ 

Element Collapse Pressure Rating

**Technical Specifications** 

Mounting Method

NFH Manifold

**Flow Direction** 

Manifolds

Housing Flow Capacity 1300

Pressure

ON. W/HC

Fatigue Pressure

ECON2, BN4AM, AM,

**Burst Pressure** 

Port Connection

**Construction Materials** 

2600, 5200, 7800, 10400

Housing Pressure Rating Max. Allowable Working

Head, Lid, Elbows,

NFH

#### Bypass Valve Cracking Pressure

 $\Delta P = 43 \text{ psid } (3 \text{ bar}) + 10\%$  $\Delta P = 87 \text{ psid (6 bar) } +10\%$ 



Shipbuilding

Model Code	
Filter Type	$\underbrace{\mathbf{NFH}}_{e} \underbrace{ON}_{filter} \underbrace{S200}_{e} \underbrace{E}_{P} \underbrace{P}_{f} \underbrace{C}_{f} \underbrace{1}_{f} \underbrace{1}_{f} \underbrace{f}_{f} \underbrace{A}_{f} \underbrace{V}_{f} \underbrace{T10}_{f} \underbrace{Filter}_{f} \underbrace{Filter}_{f} \underbrace{C}_{f} \underbrace{1}_{f} \underbrace{1}_{f} \underbrace{f}_{f} \underbrace{A}_{f} \underbrace{V}_{f} \underbrace{T10}_{f} \underbrace{Filter}_{f} \underbrace{Filter}_{f} \underbrace{C}_{f} \underbrace{1}_{f} \underbrace{I}_{f} \underbrace{C}_{f} \underbrace{I}_{f} \underbrace{I} \underbrace{I}_{f} \underbrace{I}_{f} \underbrace{I} \mathsf$
Element Media	
ON = Optimicron <sup>®</sup> ECON2 = ECOmicron <sup>®</sup> W/HC = Wire Mesh	BN/AM = Betamicron® Aquamicron® AM = Aquamicron® P/HC = Polyester
Size	
1300 = Single NFH 2600 = Single NFH 5200 = Manifold: 2 size 2600 H	7800 = Manifold: 3 size 2600 Housings 10400 = Manifold: 4 size 2600 Housings ousings
<b>Operating Pressure</b> F = 500 psi (34 bar)	
Type of Connection	
P = SAE DN 102 Code	e 61 (4") flange
Filtration Rating (microns) 1, 3, 5, 10, 15, 20 = ON 40 = AM 2	
Type of ∆P Clogging Indicator – A, BM, C, D	
Type Number	
Modification Number (latest versi	
Port Configuration	
16 = SAE-64, (4") Cod	e 61 Flange
Flow Path (facing connecting manife (omit) = Sizes 1300 and 2600 or A = Left inlet, Left outlet B = Right inlet, Right outlet	old) C = Left inlet, Right outlet   Ily D = Right inlet, Left outlet   (sizes 5200 - 10400 only) (sizes 5200 - 10400 only)
Seals	( ) ( Elizero carbon electoreau (El/M) EDD Ethylene even der similar (EDD)
(omit) = Nitrile rubber (NBR) (star	radiard $V = Fluorocarbon elastomer (FKW) EPR = Ethylene propylene rubber (EPR)$
Bypass Valve   43 psid (3 bar) (state     (omit)   =   43 psid (3 bar) (state     B1   =   14.5 psid (1 bar) (state     B6   =   87 psid (6 bar) (rete     KB   =   no bypass (flushing)	ndard) ube or coolant) urn line extended life) g system) not available with ECON2
Supplementary Details —	
SO263 = Modification of el L24, L48, L110, L220 = Lamp fo T100 = Indicator Thermal SFREE = Element specially	ements for Skydrol or HYJET phosphate ester fluids or D-type clogging indicator ( <i>LXX, XX = voltage</i> )   Lockout, 100°F ( <i>C and D only</i> ) r designed to minimize electrostatic charge generation

cRUus = Electrical Indictor with underwriter's recognition

Replacement Element Model Code





Model Codes Containing RED are non-stock items - Minimum quantities may apply - Contact HYDAC for information and availability

### Dimensions NFH 1300 / 2600



Bottom View

Size	1300	2600
Weight (lbs.)	87.1	115.5

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.



Weight (lbs.)	356
Dimonsions shown	are linches) millimeters for general information and overall envelope size only. Weights listed include elem

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

### Dimensions NFH 7800



Size	7800
Weight (lbs.)	477.5

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.



Weight (Ibs.)

Dimensions shown are [inches] millimeters for general information and overall envelope size only. Weights listed include element. For complete dimensions please contact HYDAC to request a certified print.

684

## Sizing Information

Total pressure loss through the filter is as follows:

Assembly  $\Delta P$  = Housing  $\Delta P$  + Element  $\Delta P$ 

#### Housing Curve:

Pressure loss through housing is as follows:

Housing  $\Delta P$  = Housing Curve  $\Delta P \times \frac{Actual Specific Gravity}{0.86}$ 

The curve below shows the clean  $\Delta P$  through the housing for a single filter. To determine clean housing  $\Delta P$  for manifolds with multiple housings, multiply the clean  $\Delta P$  curve value by the percentage values in the table.

## $\Delta \mathbf{P}$ Housing



NFH System	Multiplier
5200	73%
7800	61%
10400	48%

Example

Conditions
400 gpm flow NFH 5200 manifold specified
$\begin{array}{llllllllllllllllllllllllllllllllllll$
$\Delta P$ Total System = 1.5 psid + $\Delta P$ Element

Adjustments must be made for viscosity & specific gravity of the fluid to be used! (see "Sizing HYDAC Filter Assemblies" in Section B - Overview)

## **Bypass Valve Curve:**

Curves shown are applicable for mineral oil with a specific gravity of 0.86. Differential pressure increases in proportion to the specific gravity of the fluid.

 $\Delta P$  Valve =  $\Delta P$  Curve x  $\frac{Actual Specific Gravity}{0.86}$ 

## 1300 / 2600 Bypass Valve



### Element $\Delta P$ Calculations:

Sizing (K) Flow Factors below show the pressure drops across clean elements (excluding housings and piping). (K) Factors are calculated from mineral based fluid at viscosity of 141 SUS and specific gravity of 0.86. To determine clean  $\Delta P$  for NFH manifolds with more than one housing, use the appropriate sized single element (K) factor and multiply (total assembly flow rate divided by the number of housings in the manifold), then correct for viscosity.

#### Example 1: Lube System

Conditions
Viscosity = 500 SUS @ 120°F
Specific gravity = 0.86
Flow = 75 gpm
Low pressure drop essential
K Factor = 10 μm Optimicron <sup>®</sup> filter element
Selection - NFH 2600 Filter
An NFH 2600 filter gives an Adjusted Clean Element $\Delta P$ as follows: Clean $\Delta P$ = 75 gpm x 0.01 = 0.75 psid
Clean $\Delta P_{adj.} = 0.75 \times \frac{500}{141} \times \frac{0.86}{0.86} = 2.7 \text{ psid}$
Housing $\Delta P = "0"$ (negligible)

### Example 2: System Return Filter

Conditions
Viscosity = ISO 68 Fluid 220 SUS @ $120^{\circ}$ F Specific gravity = 0.86 Flow = 350 gpm $3\mu$ m Filtration ( <i>depth</i> ) ß ( <i>beta</i> ) = 1000 K Factor = 3 µm Optimicron <sup>®</sup> filter element = 0.04
Selection - NFH 7800 Filter
Element $\Delta P = (350 \div 3 \text{ housings}) \times 0.04 \times \frac{220}{141} \times \frac{0.86}{0.86} = 7.28 \text{ psid}$
Housing $\Delta P = 1.05$ (curve) x 0.61 x $\frac{0.86}{0.86}$ x = 0.64 psid
Assembly $\Delta P = 7.28$ psid + 0.64 psid = 7.92 psid

### **Element K Factors**

 $\Delta P \text{ Elements} = \text{Elements (K) Flow Factor x Flow Rate (gpm) x} \frac{\text{Actual Viscosity (SUS) x Actual Specific Gravity}}{141 \text{ SUS}} \\ 0.86$ 

Optimicron	RON					
Size	1 µm	3 µm	5 µm	10 µm	15 µm	20 µm
1300 R XXX ON	0.094	0.04	0.032	0.019	0.018	0.012
2600 R XXX ON	0.046	0.02	0.016	0.01	0.009	0.006

ECOmicron	RECON2			
Size	3 µm	5 µm	10 µm	20 µm
1300 R XXX ECON2	0.044	0.033	0.022	0.016
2600 R XXX ECON2	0.022	0.016	0.011	0.005

Betamicron/Aquamicron	RBN4AM		
Size	3 µm	10 µm	
1300 R XXX BN4AM	0.088	0.033	
2600 R XXX BN4AM	0.055	0.016	

Aquamicron	RAM
Size	40 µm
1300 R 040 AM	0.026
2600 R 040 AM	0.013

Wire Mesh	RW/HC
Size	25, 50, 100, 200 μm
1300 R XXX W/HC	0.002
2600 R XXX W/HC	0.001

Polyester	RP/HC								
Size	10 µm	20 µm							
1300 R XXX P/HC	0.004	0.002							
2600 R XXX P/HC	0.002	0.001							

All Element K Factors in psi / gpm.

#### **Notes**

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