

F High Pressure Filters 3000-6000 psi

Robust carbon steel/ductile iron construction filters, provide reliability in demanding industrial applications. Inline, manifold-mount, reverse-flow, bi-directional-flow configurations provide flexibility to accommodate any application. Duplex filters allow for uninterrupted operation during element change-out.

HIGH PRESSURE FILTERS

DF/DFF Series

Inline Filters
6090 psi • up to 200 gpm



Features

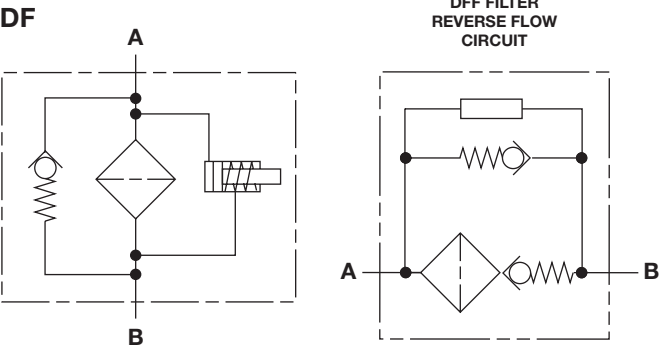
- Non-welded housing design reduces stress concentrations and prevents fatigue failure.
- Choice of NPT, BSPP, SAE straight thread O-ring boss, and SAE 4-bolt flange porting (sizes 160 - 1320) to allow easy installation with maximum flexibility.
- O-ring seals are used to provide positive, reliable sealing. Choice of O-ring materials (nitrile rubber, fluorocarbon elastomer, and ethylene propylene rubber) provides compatibility with petroleum oils, synthetic fluids, water-glycols, oil/water emulsions, and high water based fluids.
- Screw-in bowl or lid (on 2-pc. bowls) mounted below the filter head requires minimal clearance to remove the element for replacement and contaminated fluid cannot be washed downstream when element is serviced.
- HYDAC Differential Pressure Indicators have no external dynamic seal. This results in a high system reliability due to magnetic actuation, thus eliminating a potential leak point.
- A poppet-type bypass valve located in the filter head provides positive sealing during normal operation and fast opening during cold starts and flow surges. (Optional non-bypass available)
- For special finishes and coatings – consult HYDAC for minimum quantities, availability and pricing.
- Fatigue pressure ratings equal maximum allowable working pressure rating.
- DFF filters are suitable for flow in both directions.

Note: QPD is available in sizes 160-1320 only.

Applications



Hydraulic Symbol



Technical Specifications

| | | |
|---|--|----------------------|
| Mounting Method | 4 mounting holes | |
| Port Connection | | |
| 30 | SAE-8, 1/2" NPT, 1/2" BSPP | |
| 60/110 | SAE-12, 3/4" NPT, 3/4" BSPP | |
| 160/240/280 | SAE-20, 1 1/4" NPT, 1 1/4" BSPP | |
| | 1 1/4" SAE, Code 62 | |
| 330/660/1320 | SAE-24, 1 1/2" NPT, 1 1/2" BSPP | |
| | 2" SAE Flange Code 62 | |
| Flow Direction | Inlet: Side | Outlet: Side |
| Construction Materials | | |
| Head | Ductile iron | |
| Bowl (30-660) | Steel | |
| Housing/Bowl (660-1320 - 2.0) | Steel | |
| Cap/Lid (660-1320 type) | Steel | |
| Flow Capacity | | |
| 30 | 8 gpm (30 lpm) | |
| 60 | 16 gpm (60 lpm) | |
| 110 | 29 gpm (110 lpm) | |
| 160 | 42 gpm (160 lpm) | |
| 240 | 63 gpm (240 lpm) | |
| 280 | 74 gpm (280 lpm) | |
| 330 | 87 gpm (330 lpm) | |
| 660 | 174 gpm (660 lpm) | |
| 1320 | 200 gpm (757 lpm) | |
| Housing Pressure Rating | | |
| Max. Allowable Working Pressure | 6090 psi (420 bar) | |
| Fatigue Pressure | 6090 psi (420 bar) @ 1 million cycles | |
| Burst Pressure | 30 | 15950 psi (1100 bar) |
| | 60/110 | 17400 psi (1200 bar) |
| | 160/240/280 | 17110 psi (1180 bar) |
| | 330/660/1320 | 15080 psi (1040 bar) |
| Element Collapse Pressure Rating | | |
| BH4HC, V | 3045 psid (210 bar) | |
| ON, W/HC | 290 psid (20 bar) | |
| Fluid Temp. Range | 14°F to 212°F (-10°C to 100°C) | |
| Consult HYDAC for applications operating 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 | | |
| ΔP = 29 psid (2 bar) -10% (optional) | | |
| ΔP = 72 psid (5 bar) -10% (standard) | | |
| ΔP = 116 psid (8 bar) -10% (optional non bypass) | | |
| Bypass Valve Cracking Pressure | | |
| ΔP = 43 psid (3 bar) +10% (optional) | | |
| ΔP = 87 psid (6 bar) +10% (standard) | | |
| Non Bypass Available | | |

Model Code

DF ON 30 T B 5 D 1 . X / 12 - V B6 QPD L24

Filter Type —
 DF = Inline filter
 DFF = Reverse flow inline filter

Element Media —
 ON = Optimicron® BH/HC = Betamicon® (High Collapse)
 W/HC = Wire Mesh V = Metal Fiber

Size —
 DF: 30, 60, 110, 160, 240, 280, 330, 660, 1320
 DFF: 160, 240, 280, 330, 660, 1320

Pressure Range —
 T = 420 bar

Size and Nominal Connection —
 B = 1/2" Threaded (size 30 only)
 C = 3/4" Threaded (sizes 60-110 only) J = 1 1/4" SAE Code 62 Flange (sizes 160-280 only)
 E = 1 1/4" Threaded (sizes 160-280 only) L = 2" SAE Code 62 Flange (sizes 330-1320 only)
 F = 1 1/2" Threaded (sizes 330-1320 only)

Filtration Rating (microns) —
 1, 3, 5, 10, 15, 20 = ON 3, 5, 10, 20 = BH/HC 25, 50, 100, 200 = W/HC 3, 5, 10, 20 = V

Type of ΔP Clogging Indicator —
 A, B, BM, C, D (Others available upon request, see Clogging Indicators section.)

Type Number —
 1 = One piece bowl (sizes 30-660 only) 2 = Two piece bowl (sizes 660-1320 only)
 3 = Upside down mount (two-piece bowl) - (sizes 330-1320)

Modification Number (latest version always supplied) —

Port Configuration —
 0 = BSPP 12 = SAE straight thread O-ring boss ports
 3 = NPT ports – NPT ported filters will be SAE with adaptors in each port 16 = SAE flange ports (sizes 160-1320 only)

Seals —
 (omit) = Nitrile rubber (NBR) (standard) V = Fluorocarbon elastomer (FKM) EPR = Ethylene propylene rubber (EPR)

Bypass Valve —
 (omit) = Non-bypass B3 = Bypass (3 bar) B6 = Bypass (6 bar)

Version —
 (omit) = No quality protection QPD = Quality Protection Design

Supplementary Details —
 SO263 = Modification of elements for Skydrol or HYJET phosphate ester fluids
 SO184 = G-1/2 Drain in Bowl Option For Sizes 60 - 280 (comes standard for sizes 330, 660, & 1320)
 SO210H = Alternate Bowl (sizes 160, 240, & 280) - 16 mm longer
 W = "VD..." indicator modified with a brass piston for use with High water based emulsions/solutions (HFA) & (HFC) or when using "V" elements
 L24, L48, L110, L220 = Lamp for D-type clogging indicator (LXX, XX = voltage)
 T100 = Indicator Thermal Lockout, 100°F (C and D indicators only)
 cRUus = Electrical Indicators with underwriter's recognition
 SFREE = Element specially designed to minimize electrostatic charge generation
 SO376 = Modification of ON and W/HC elements for HFA, HFB, HFC, and HFD flame retardant liquids

Replacement Element Model Code

0030 D 005 ON / V QPD

Size —
 0030, 0060, 0110, 0160,
 0240, 0280, 0330, 0660, 1320

Filtration Rating (micron) —
 3, 5, 10, 20 = BH4HC
 1, 3, 5, 10, 15, 20 = ON
 25, 50, 100, 200 = W/HC
 3, 5, 10, 20 = V

Element Media —
 BH4HC, ON, W/HC, V

Seals —
 (omit) = Nitrile rubber (NBR) (standard)
 V = Fluorocarbon elastomer (FKM)
 EP = Ethylene propylene rubber (EPR)

Version —
 (omit) = No quality protection
 QPD = Quality Protection Design

Supplementary Details —
 SO263 = (same as above)
 W = Modification of "V" elements for use with oil water emulsions (HFA) and water polymer solutions (HFC) usually polyglycol
 SFREE = (same as above)
 SO376 = (same as above)

Clogging Indicator Model Code

VD 5 D . X / V L24

Indicator Prefix —
 VD = G 1/2 6000 psi

Trip Pressure —
 2 = 29 psid (2 bar) (option)
 5 = 72 psid (5 bar) (standard)
 Optional 15 psid (1 bar) & 116 psid (8 bar) available upon request

Type of Indicator —
 A = No indicator, plugged port
 B = Pop-up indicator (auto reset)
 BM = Pop-up indicator (manual reset)
 C = Electric switch – SPDT
 D = Electric switch and LED light – SPDT

Modification Number —

Supplementary Details —

Seals —
 (omit) = Nitrile rubber (NBR) (standard)
 V = Fluorocarbon elastomer (FKM)
 EP = Ethylene propylene rubber (EPR)

Light Voltage (D type indicators only) —
 L24 = 24V L110 = 110V

Thermal Lockout (VM, VD types C, D, J, and J4 only) —
 T100 = Lockout below 100°F

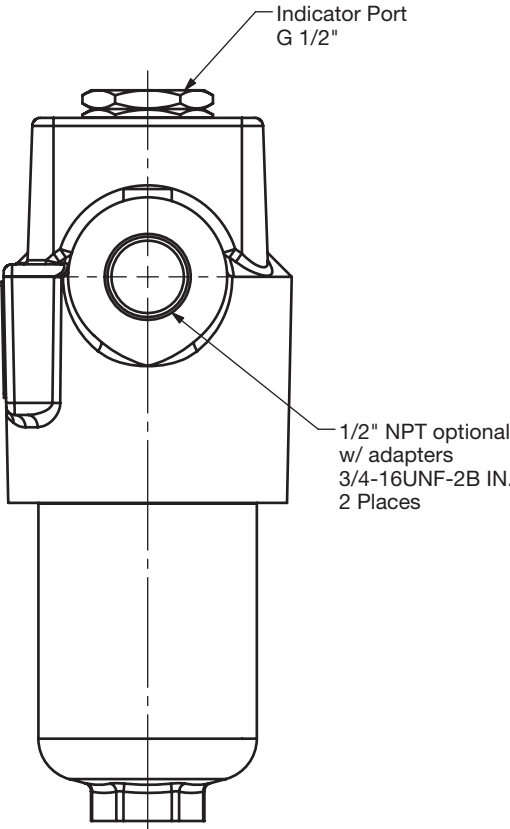
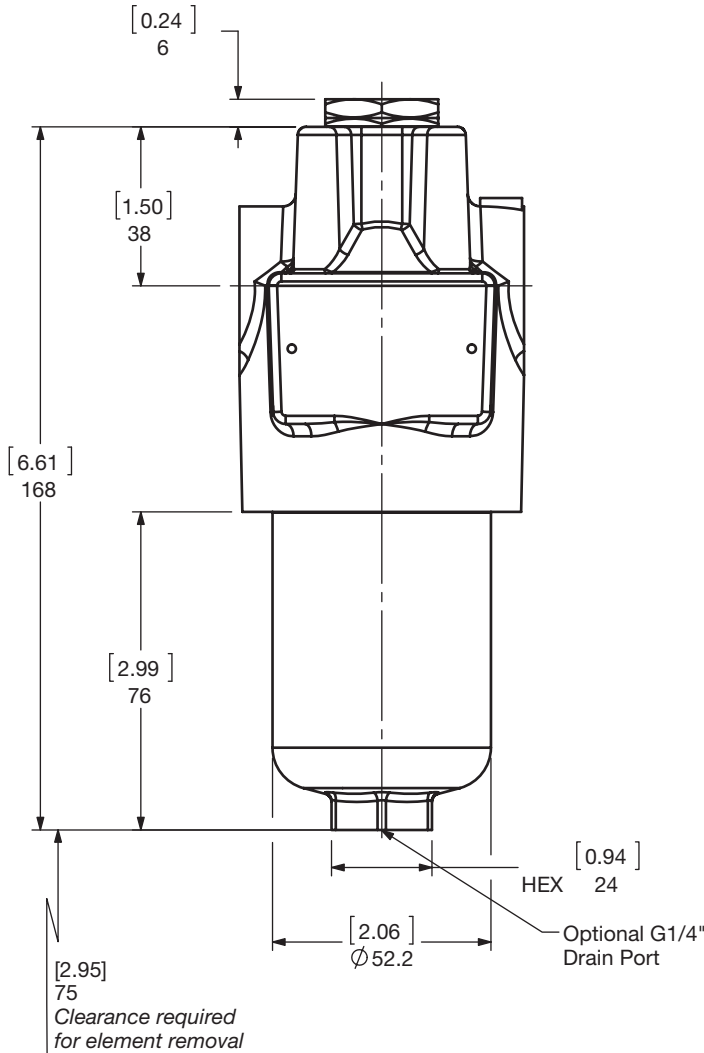
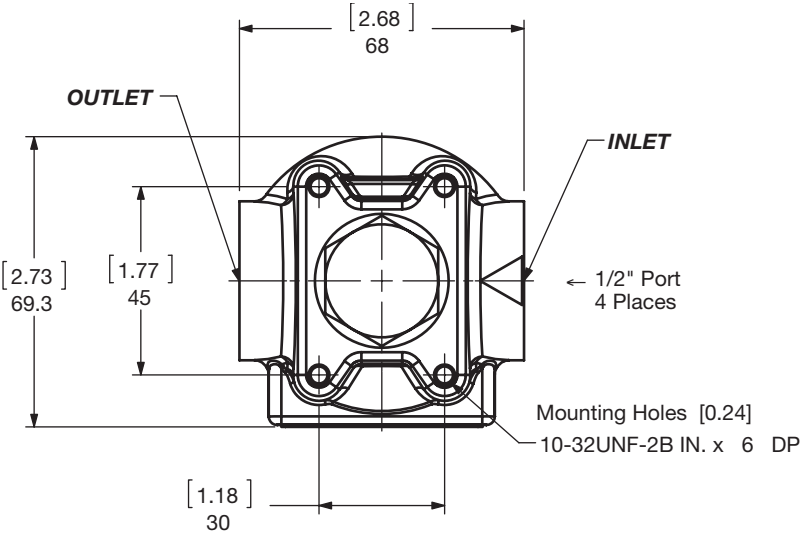
Underwriters Recognition (VM, VD types C, D, J, and J4 only) —
 cRUus = Electrical Indicators with underwriter's recognition
 W = "VD..." indicator modified with a brass piston for use with High water based emulsions/solutions (HFA) & (HFC)

(For additional details and options, see Clogging Indicators section.)

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

HIGH PRESSURE FILTERS

Dimensions
DF 30



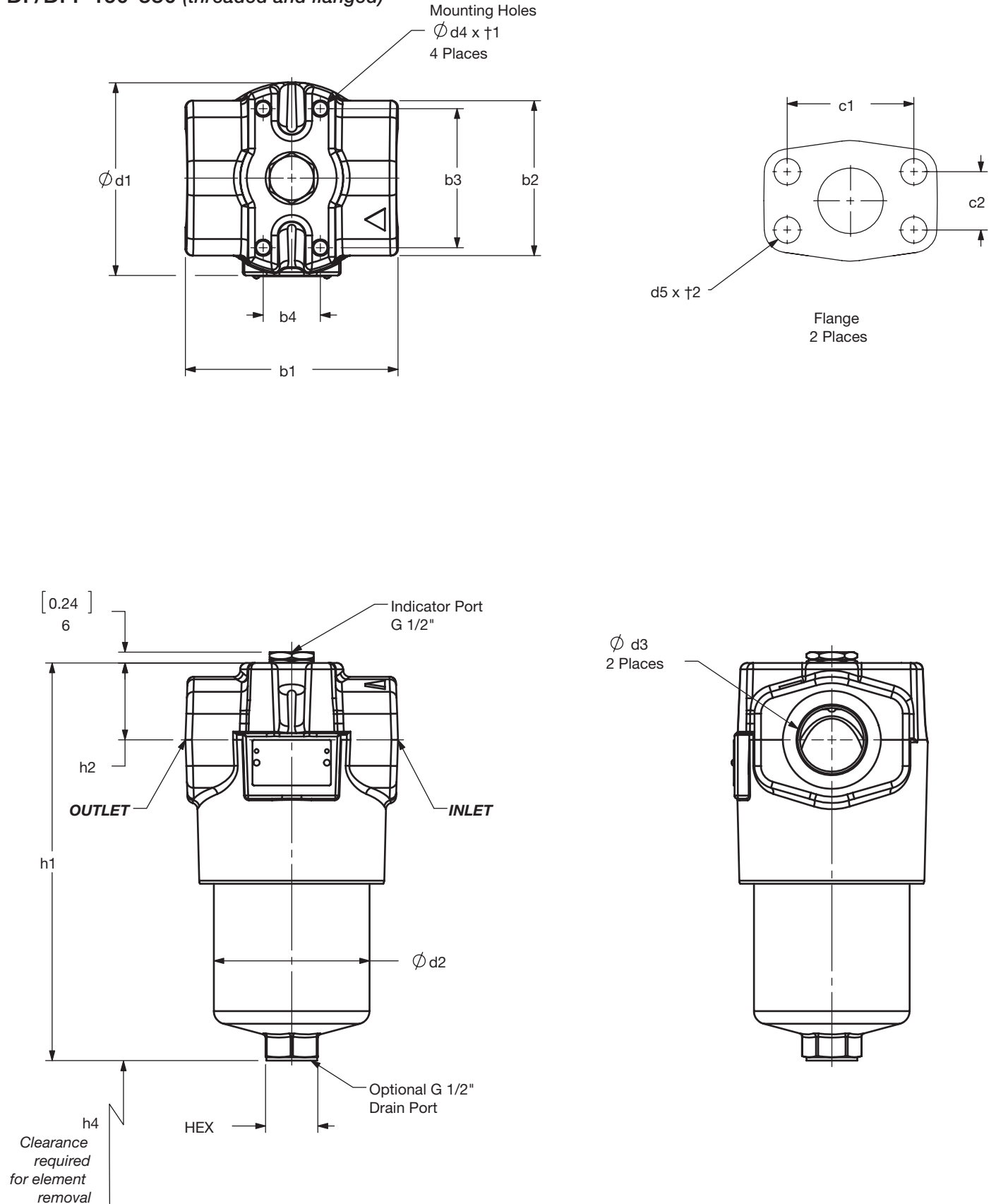
| | |
|---------------|-----|
| Size | 30 |
| Weight (lbs.) | 5.1 |

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

DF 60-110 (threaded only)

DF/DFE 160-330 (threaded and flanged)



| Size | 60 | 110 | 160 | 240 | 280 | 330 |
|---------------|----|-----|------|------|-----|------|
| Weight (lbs.) | 10 | 12 | 22.8 | 26.1 | 36 | 54.1 |

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.

HIGH PRESSURE FILTERS

Dimensions (cont'd)

DF 60-110 (threaded only)

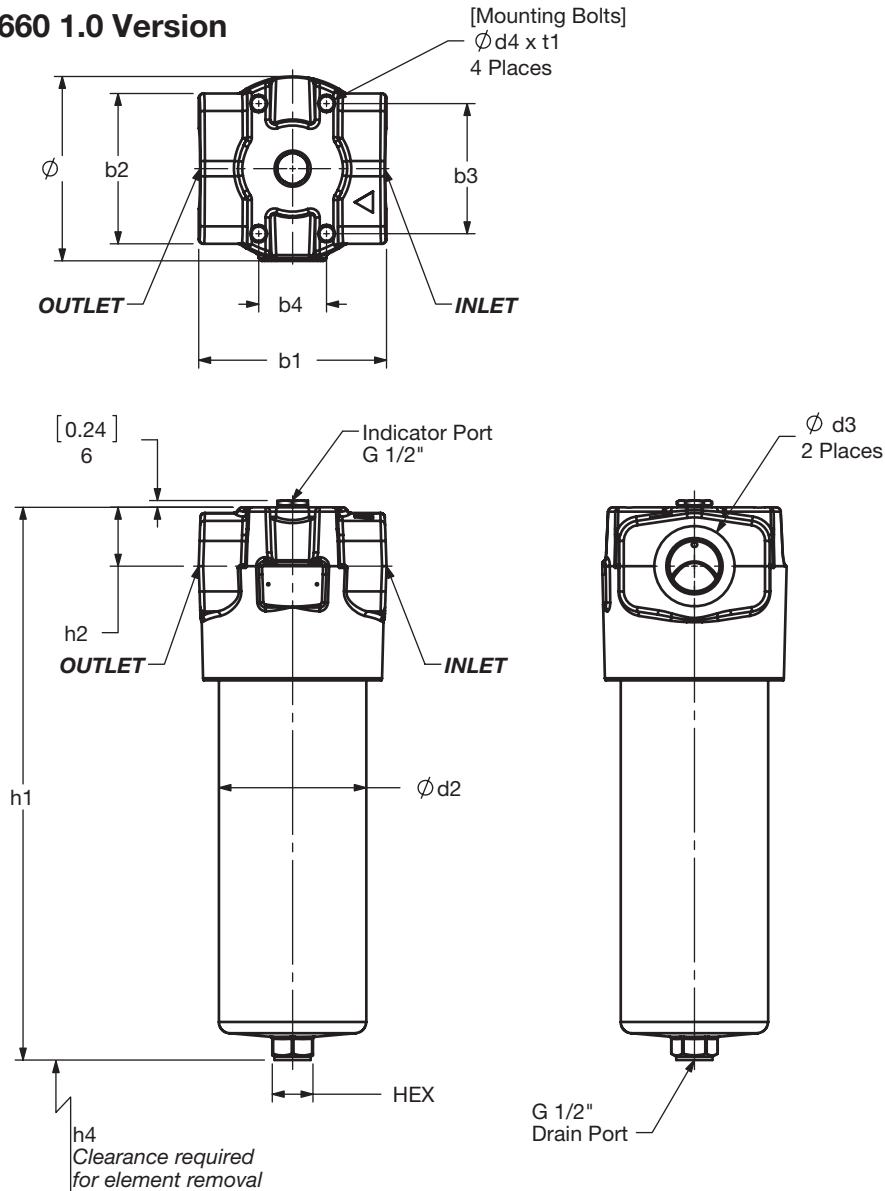
DF/DFF 160-330 (threaded and flanged)

| Size | b1 | b2 | b3 | b4 | c1 | c2 | d1 | d2 | d3 NOM | d4* | d5 | h1 | h2 | h4 | HEX | †1 | †2 |
|-------------------|---------------|---------------|---------------|--------------|----------------|----------------|---------------|---------------|------------|-------------------------------|--------------------------------|------------------|--------------|---------------|--------------|--------------|--------------|
| 60...C... 1.X | (3.54) 90 | (2.8) 71 | (2.2) 56 | (1.26) 32 | - | - | (3.39) 86 | (2.68) 68 | 3/4" | 1/4- 28UNF- 2B M6x1.0 | - | (7.22) 183.5 | (1.57) 40 | (3.35) 85 | (1.06) 27 | (0.35) 9 | - |
| 110...C... 1.X | (3.54) 90 | (2.8) 71 | (2.2) 56 | (1.26) 32 | - | - | (3.39) 86 | (2.68) 68 | 3/4" | 1/4- 28UNF- 2B M6x1.0 | - | (9.88) 251 | (1.57) 40 | (3.35) 85 | (1.06) 27 | (0.35) 9 | - |
| 160...E... 1.X | (4.92) 125 | (3.74) 95 | (3.35) 85 | (1.38) 35 | - | - | (4.69) 119 | (3.74) 95 | 1- 1/4" | 3/8- 24UNF- 2B M10x1.5 | - | (9.57) 243 | (1.85) 47 | (4.13) 105 | (1.26) 32 | (0.55) 14 | - |
| 160...J... 1.X | (4.92) 125 | (3.74) 95 | (3.35) 85 | (1.38) 35 | (2.63) 66.7 | (1.25) 31.8 | (4.69) 119 | (3.74) 95 | | | 1/2- 13UNC- 2B M14 X 2 | (9.57) 243 | (1.85) 47 | (4.13) 105 | (1.26) 32 | (0.55) 14 | (0.75) 19 |
| 240...E... 1.X | (4.92) 125 | (3.74) 95 | (3.35) 85 | (1.38) 35 | - | - | (4.69) 119 | (3.74) 95 | 1- 1/4" | 3/8- 24UNF- 2B M10x1.5 | - | (11.91) 302.5 | (1.85) 47 | (4.13) 105 | (1.26) 32 | (0.55) 14 | - |
| 240...J... 1.X | (4.92) 125 | (3.74) 95 | (3.35) 85 | (1.38) 35 | (2.63) 66.7 | (1.25) 31.8 | (4.69) 119 | (3.74) 95 | | | 1/2- 13UNC- 2B M14 X 2 | (11.91) 302.5 | (1.85) 47 | (4.13) 105 | (1.26) 32 | (0.55) 14 | (0.75) 19 |
| 280...E... 1.X | (4.92) 125 | (3.74) 95 | (3.35) 85 | (1.38) 35 | - | - | (4.69) 119 | (3.74) 95 | 1- 1/4" | 3/8- 24UNF- 2B M10x1.5 | - | (19.06) 484 | (1.85) 47 | (4.13) 105 | (1.26) 32 | (0.55) 14 | - |
| 280...J... 1.X | (4.92) 125 | (3.74) 95 | (3.35) 85 | (1.38) 35 | (2.63) 66.7 | (1.25) 31.8 | (4.69) 119 | (3.74) 95 | | | 1/2- 13UNC- 2B M14 X 2 | (19.06) 484 | (1.85) 47 | (4.13) 105 | (1.26) 32 | (0.55) 14 | (0.75) 19 |
| 330...F... 1.X | (6.30) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | - | - | (6.42) 163 | (5.12) 130 | 2" | 1/2- 20UNF- 2B M12x1.75 | - | (12.16) 309 | (2.05) 52 | (4.53) 115 | (1.42) 36 | (0.67) 17 | - |
| 330...L... 1.X | (6.30) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | (3.81) 96.8 | (1.75) 44.5 | (6.42) 163 | (5.12) 130 | | | 3/4- 10UNC- 2B M20 X 2.5 | (12.16) 309 | (2.05) 52 | (4.53) 115 | (1.42) 36 | (0.67) 17 | (0.98) 25 |
| 330...F... 2.X | (6.30) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | - | - | (6.42) 163 | (5.12) 130 | 2" | 1/2- 20UNF- 2B M12x1.75 | - | (12.16) 309 | (2.05) 52 | (7.09) 180 | (1.42) 36 | (0.67) 17 | - |
| 330...L... 2.X | (6.30) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | (3.81) 96.8 | (1.75) 44.5 | (6.42) 163 | (5.12) 130 | | | 3/4- 10UNC- 2B M20 X 2.5 | (12.16) 309 | (2.05) 52 | (7.09) 180 | (1.42) 36 | (0.67) 17 | (0.98) 25 |

*d4 - UN Threads for SAE (/12) & Flanged (/16) ports
- M Threads for BSPP ports & Flanged metric ports

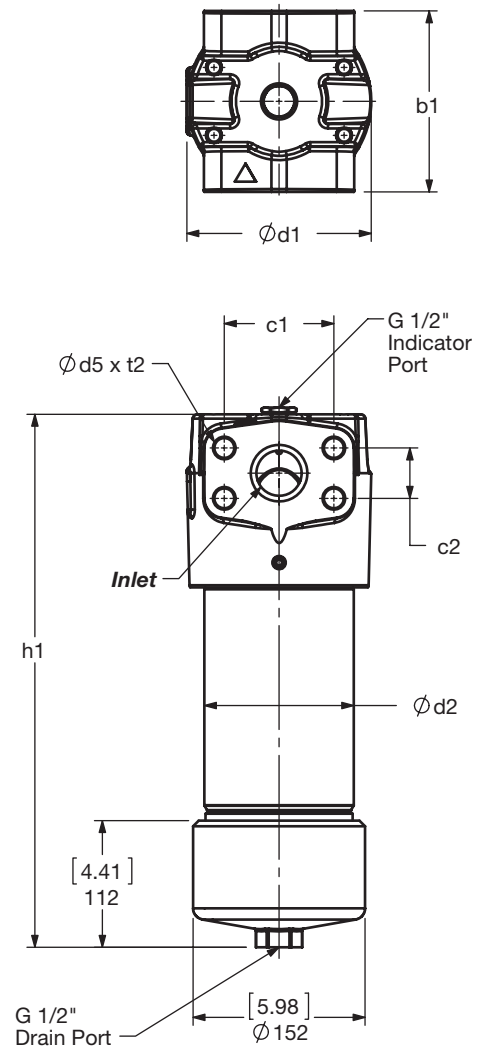
Dimensions DF 660-1320 DFF 660-1320

660 1.0 Version



660-1320 2.0 Version

Note - See 1.X Version for mounting

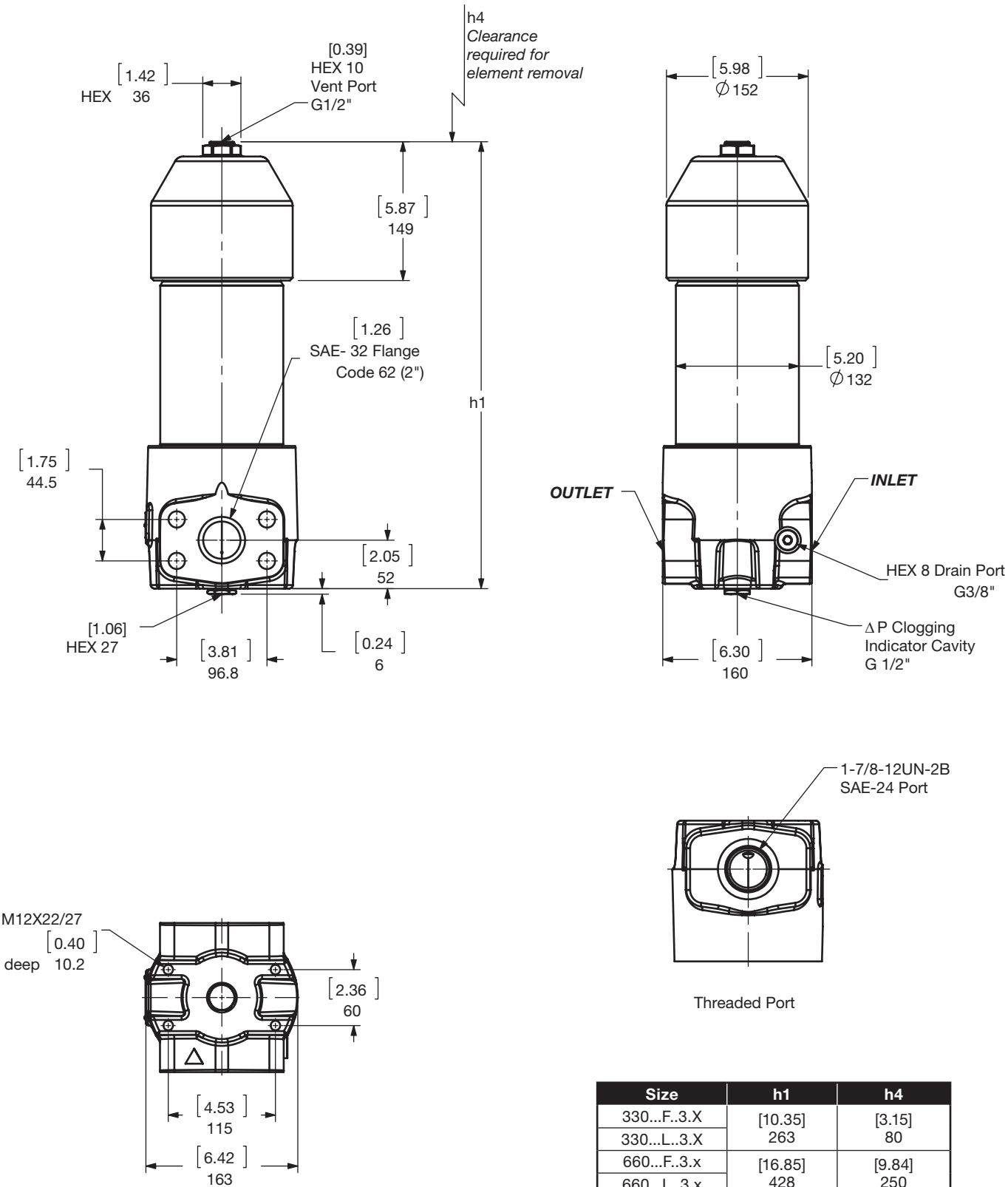


| Size | b1 | b2 | b3 | b4 | c1 | c2 | d1 | d2 | d3 NOM | d4* | d5 | h1 | h2 | h4 | HEX | †1 | †2 |
|--------------------|--------------|---------------|---------------|--------------|----------------|----------------|---------------|---------------|------------|-------------------------------|------------------------------|----------------|--------------|----------------|--------------|--------------|--------------|
| 660...F... 1.X | (6.3) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | - | - | (6.42) 163 | (5.12) 130 | 1- 1/2" | 1/2- 20UNF- 2B M12x1.75 | - | (18.93) 481 | (2.05) 52 | (4.53) 115 | (1.42) 36 | (0.67) 17 | - |
| 660...L... 1.X | (6.3) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | (3.81) 96.8 | (1.75) 44.5 | (6.42) 163 | (5.12) 130 | 2" | | 3/4- 10UNC- 2B M20x2.5 | (18.93) 481 | (2.05) 52 | (4.53) 115 | (1.42) 36 | (0.67) 17 | (0.98) 25 |
| 660...F... 2.X | (6.3) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | - | - | (6.42) 163 | (5.12) 130 | 1- 1/2" | 1/2- 20UNF- 2B M12x1.75 | - | (18.54) 471 | (2.05) 52 | (13.78) 350 | (1.42) 36 | (0.67) 17 | - |
| 660...L... 2.X | (6.3) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | (3.81) 96.8 | (1.75) 44.5 | (6.42) 163 | (5.12) 130 | 2" | | 3/4- 10UNC- 2B M20x2.5 | (18.54) 471 | (2.05) 52 | (13.78) 350 | (1.42) 36 | (0.67) 17 | (0.98) 25 |
| 1320...F... 2.X | (6.3) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | - | - | (6.42) 163 | (5.12) 130 | 1- 1/2" | 1/2- 20UNF- 2B M12x1.75 | - | (29.25) 743 | (2.05) 52 | (26.38) 670 | (1.42) 36 | (0.67) 17 | - |
| 1320...L... 2.X | (6.3) 160 | (5.24) 133 | (4.53) 115 | (2.36) 60 | (3.81) 96.8 | (1.75) 44.5 | (6.42) 163 | (5.12) 130 | 2" | | 3/4- 10UNC- 2B M20x2.5 | (29.25) 743 | (2.05) 52 | (26.38) 670 | (1.42) 36 | (0.67) 17 | (0.98) 25 |
| | | | | | | | | | | | | | | | | | |
| Size | 660 1.0 | | | | 660 2.0 | | | | 1320 2.0 | | | | | | | | |
| Weight (lbs.) | 70 | | | | 75.9 | | | | 112.7 | | | | | | | | |

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.

HIGH PRESSURE FILTERS

Dimensions
 DF 330/660/1320 3.0 Version
 DFF 330/660/1320 3.0 Version



| Size | h1 | h4 |
|---------------|---------|---------|
| 330...F..3.X | [10.35] | [3.15] |
| 330...L..3.X | 263 | 80 |
| 660...F..3.x | [16.85] | [9.84] |
| 660...L..3.x | 428 | 250 |
| 1320...F..3.x | [29.49] | [22.44] |
| 1320...L..3.x | 749 | 570 |

| Size | 330 | 660 | 1320 |
|---------------|------|------|-------|
| Weight (lbs.) | 61.5 | 74.8 | 112.0 |

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.

Sizing Information

Total pressure loss through the filter is as follows:

Assembly $\Delta P = \text{Housing } \Delta P + \text{Element } \Delta P$

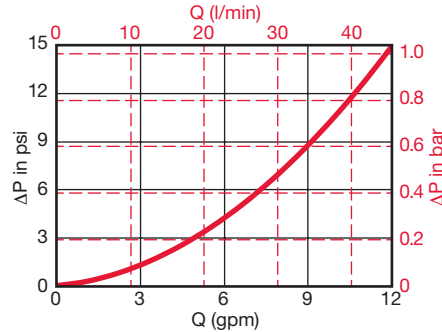
Housing Curve:

Pressure loss through housing is as follows:

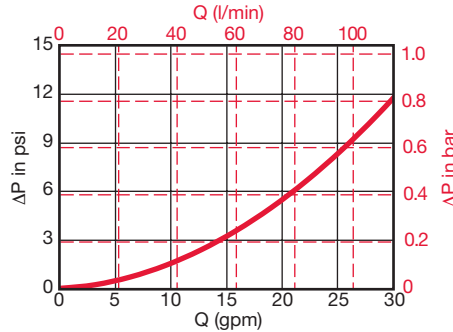
Housing $\Delta P = \text{Housing Curve } \Delta P \times \frac{\text{Actual Specific Gravity}}{0.86}$

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

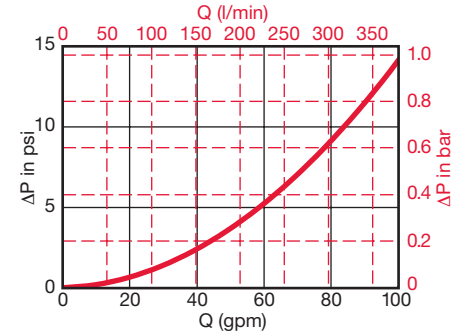
DF 30 Housing



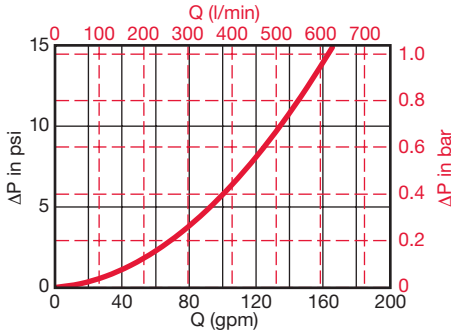
DF 60/110 Housing



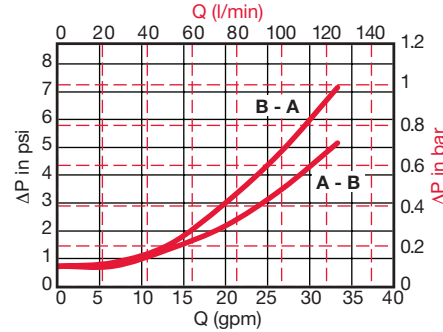
DF 160/240/280 Housing



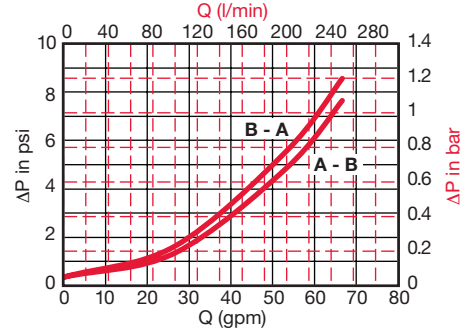
DF 330/660/1320 Housing



DFF 160/240/280 Housing



DFF 330/660/1320 Housing



Element K Factors

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

| Betamicon® | ...D...BH4HC Elements (High Collapse) | | | |
|------------------|---------------------------------------|-------|-------|-------|
| Size | 3 μm | 5 μm | 10 μm | 20 μm |
| 0030 D XXX BH4HC | 5.005 | 2.782 | 1.992 | 1.043 |
| 0060 D XXX BH4HC | 3.216 | 1.789 | 0.993 | 0.670 |
| 0110 D XXX BH4HC | 1.394 | 0.818 | 0.489 | 0.307 |
| 0160 D XXX BH4HC | 0.922 | 0.571 | 0.324 | 0.241 |
| 0240 D XXX BH4HC | 0.582 | 0.373 | 0.214 | 0.159 |
| 0280 D XXX BH4HC | 0.313 | 0.187 | 0.099 | 0.088 |
| 0330 D XXX BH4HC | 0.423 | 0.247 | 0.154 | 0.110 |
| 0660 D XXX BH4HC | 0.181 | 0.104 | 0.055 | 0.049 |
| 1320 D XXX BH4HC | 0.088 | 0.055 | 0.033 | 0.022 |

| Optimicon | ...D...ON Elements | | | | | |
|---------------|--------------------|-------|-------|-------|-------|-------|
| Size | 1 μm | 3 μm | 5 μm | 10 μm | 15 μm | 20 μm |
| 0030 D XXX ON | 4.27 | 3.507 | 2.376 | 1.251 | 0.768 | 0.62 |
| 0060 D XXX ON | 2.936 | 1.427 | 1.004 | 0.664 | 0.537 | 0.347 |
| 0110 D XXX ON | 1.416 | 0.735 | 0.527 | 0.333 | 0.254 | 0.164 |
| 0160 D XXX ON | 1.015 | 0.604 | 0.423 | 0.225 | 0.204 | 0.175 |
| 0240 D XXX ON | 0.631 | 0.379 | 0.293 | 0.175 | 0.134 | 0.115 |
| 0280 D XXX ON | 0.304 | 0.185 | 0.15 | 0.082 | 0.075 | 0.064 |
| 0330 D XXX ON | 0.452 | 0.23 | 0.185 | 0.135 | 0.085 | 0.067 |
| 0660 D XXX ON | 0.207 | 0.106 | 0.086 | 0.051 | 0.039 | 0.031 |
| 1320 D XXX ON | 0.102 | 0.053 | 0.042 | 0.025 | 0.019 | 0.015 |

| Wire Mesh | ...D...W/HC Elements | | | |
|-----------------|----------------------|--|--|--|
| Size | 25, 50, 100, 200 μm | | | |
| 0030 D XXX W/HC | 0.166 | | | |
| 0060 D XXX W/HC | 0.042 | | | |
| 0110 D XXX W/HC | 0.023 | | | |
| 0160 D XXX W/HC | 0.016 | | | |
| 0240 D XXX W/HC | 0.010 | | | |
| 0280 D XXX W/HC | 0.005 | | | |
| 0330 D XXX W/HC | 0.008 | | | |
| 0660 D XXX W/HC | 0.004 | | | |
| 1320 D XXX W/HC | 0.002 | | | |

| Metal Fiber | ...D...V Elements (High Collapse) | | | |
|--------------|-----------------------------------|-------|-------|-------|
| Size | 3 μm | 5 μm | 10 μm | 20 μm |
| 0030 D XXX V | 1.011 | 0.740 | 0.411 | 0.200 |
| 0060 D XXX V | 0.877 | 0.511 | 0.296 | 0.183 |
| 0110 D XXX V | 0.452 | 0.304 | 0.182 | 0.118 |
| 0160 D XXX V | 0.251 | 0.177 | 0.123 | 0.079 |
| 0240 D XXX V | 0.169 | 0.137 | 0.093 | 0.062 |
| 0280 D XXX V | 0.126 | 0.093 | 0.064 | 0.041 |
| 0330 D XXX V | 0.121 | 0.097 | 0.065 | 0.043 |
| 0660 D XXX V | 0.063 | 0.050 | 0.034 | 0.021 |
| 1320 D XXX V | 0.032 | 0.026 | 0.018 | 0.012 |

All Element K Factors in psi / gpm.