

# Bulk Diesel Filter

\*Coalescing Elements Patent Pending

**BDF**

## Applications

POINT OF USE  
FUEL DISPENSINGFLEET FILL / BULK FUEL  
TRANSFERBULK FUEL  
UNLOADINGPROTECTION FOR  
HIGH-FLOW FUEL  
INJECTION SYSTEMSBULK TANK  
KIDNEY LOOP /  
RECIRCULATION

## Features and Benefits

- Designed with integrated particulate removal pre-filtration for maximum coalescing filter element life in the down stream housing
- Routine element change is only needed on KL3 particulate filter which saves time and money
- Particulate filtration at 1 or 3 microns utilizing Excellement® synthetic Z-Media® element for contamination control
- Optional electrical Dirt Alarm® with, amber colored, particulate element change indicator light
- Patent-pending, three-phase, particulate and fuel/water separation media technology
- A revolutionary element designed for the highest single-pass water and particulate removal efficiencies in today's ultra-low sulfur diesel (ULSD) fluids
- Protects expensive Tier 3 and Tier 4 engine components against failures caused by particulate and water transferred from the bulk fuel tank to the vehicle
- Allows users to achieve or exceed the particulate and water removal specifications of the injection system OEMs
- Previously acceptable industry standard products no longer provide the high-efficiency separation needed in today's ULSD fluids
- Housing design allows for field upgrade of any available option
- Anti-Static Pleat Media (ASP®) is standard for all coalescing elements
- Bypass indication for the coalescing ICF filter at 36 psi, with bypass cracking at 40 psi, and for the KL3 particulate filter bypass indication at 25 psi with bypass cracking at 30 psi, allows for early indication before by-pass of filter for advanced time for maintenance
- Complete automation is achievable with a water and fuel sensor and fail-safe auto-drain feature using a remote 5 gallons (18L) or 20 gallons (75L) sump with alarm and auto shutdown in application >32°F (0°C)
- Easy mounting and element service

Model no. of filter in photograph is:  
BDF1VS16LEEPModel no. of filter in photograph is:  
BDF2VS16LEEP

16-32 gpm  
60-120 L/min

150 psi  
10 bar

## Markets



INDUSTRIAL

MOBILE  
VEHICLES

MARINE

MINING  
TECHNOLOGY

AGRICULTURE

POWER  
GENERATIONCOMMON RAIL  
INJECTOR SYSTEMS

FLEET



RAILROAD

BULK FUEL  
FILTRATION

**BDF****Bulk Diesel Filter****Filter  
Housing  
Specifications**

Flow Rating: BDF1: up to 16 gpm (60 L/min)

BDF2: up to 32 gpm (120 L/min)

Inlet/Outlet Connection: SAE J1926 - 16 (ORB)

Max. Operating Pressure: 150 psi (10 bar)

Min. Yield Pressure: 450 psi (31 bar)

Temp. Range: -20°F to 165°F (-29°C to 74°C) w/ optional water sump heater 32°F to 165°F (0°C to 74°C) standard with AWD options

Bypass Indication: Particulate Filter  
25 psi (1.7 bar)Coalescing Filter  
36 psi (2.5 bar)Bypass Valve Cracking: Particulate Filter  
30 psi (2.1 bar)Coalescing Filter  
40 psi (2.8 bar)Materials of Construction: Particulate Filter  
Porting Head/Cap: Cast Aluminum  
Element Bowl: SteelCoalescing Filter  
Aluminum - Coating Option see Box 8  
Element Bowl: Epoxy Paint w/ High-phos  
Electroless Nickel Plating (Standard)

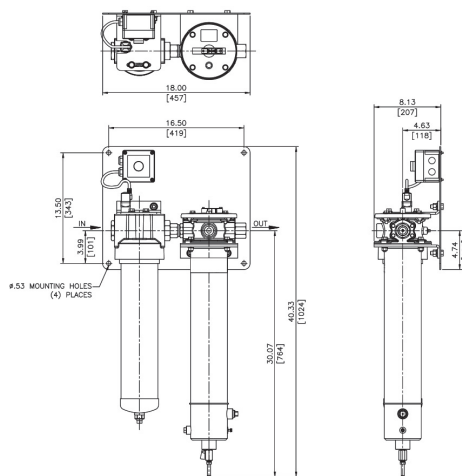
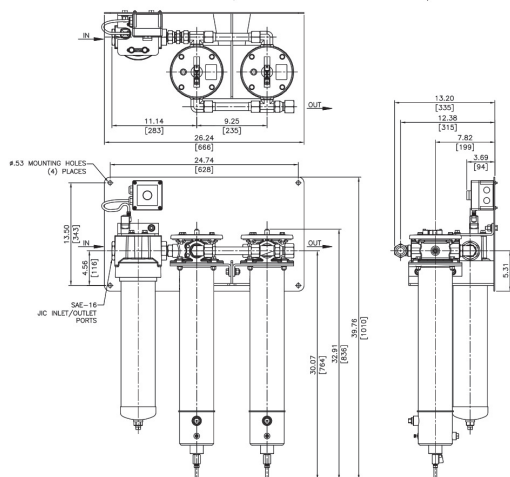
Weight: BDF1: 46 lbs

BDF2: 78 lbs

Element Change Clearance: Particulate Filter  
2.50" (64 mm)Coalescing Filter  
With mounting bracket - 18" (457.2 mm) -  
Access from top (remove cap)  
Without mounting bracket - Access from  
below 2.5" (63.5 mm) (remove bowl)

Housing Sump: 32 oz (95 L)

Optional Water Sump Heater: 120VAC, 1 x 235W (BDF1) / 2 x 235W (BDF2)

Optional Remote Mount Visual  
Electrical Indicator: 120VAC**BDF1****BDF2**

Metric dimensions in (

## Bulk Diesel Filter

BDF



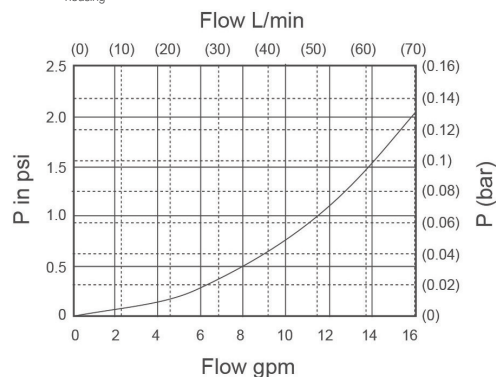
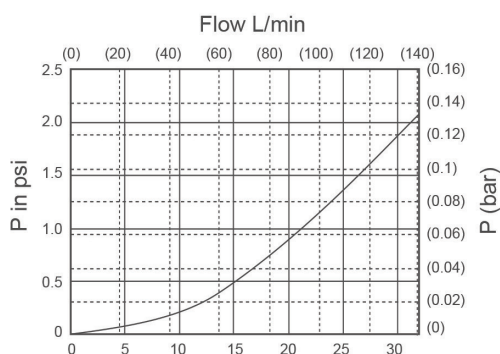
Filtration Ratio per ISO 16889  
Using APC calibrated per ISO 11171

Particulate Elements	DHC	$\beta_x (c) \geq 200$	$\beta_x (c) \geq 1000$
KKZ1V	224 grams	<4.0	4.2
KKZ3V	230 grams	<4.0	4.8

Coalescing Elements	Pressure Side Coalescing	
	Max Flow	Single Pass Water Removal Efficiency
C184Z5V	16 gpm	$\geq 99.5\%$
C184Z3V	16 gpm	$\geq 99.5\%$

Particulate Element  
Flow Direction: Outside In  
Element Nominal Dimensions: 4.0" (102 mm) O.D. x 18.5" (470 mm) long

Coalescing Element  
Flow Direction: Inside Out  
Element Nominal Dimensions: 4.0" (102 mm) O.D. x 18.5" (470 mm) long

 $\Delta P_{\text{housing}}$ BDF1  $\Delta P_{\text{housing}}$  for fluids with sp gr = 0.86 $\Delta P_{\text{housing}}$ BDF2  $\Delta P_{\text{housing}}$  for fluids with sp gr = 0.86

sp gr = specific gravity

## Notes

 $\Delta P_{\text{element}}$  $\Delta P_{\text{element}} = \text{flow x element } \Delta P \text{ factor x viscosity factor}$ El.  $\Delta P$  factors @ 37 SUS (3 cSt).

C184Z3V = 0.2 C184Z5V = 0.2

KKZ1V = 0.02

KKZ3V = 0.01

If working in units of bars &amp; L/min, divide above factor by 54.9.

Viscosity factor: Divide viscosity by 37 SUS (3 cSt).

$$\Delta P_{\text{filter}} = \Delta P_{\text{housing}} + \Delta P_{\text{KKZ}} + \Delta P_{\text{C18}}$$

**Exercise:** Determine  $\Delta P$  at 12 gpm (45 L/min) for BDF1VS16LVMEP Using (KKZ1)

**Solution:**

$$\Delta P_{\text{housing}} = 1.1 \text{ psi} = [0.08 \text{ bar}]$$

$$\Delta P_{\text{element (KKZ1)}} = 12 \times 0.02 = .24 \text{ psi} [0.02 \text{ bar}]$$

$$\Delta P_{\text{element (C184Z5V)}} = 12 \times 0.2 = 2.4 \text{ psi} [0.17 \text{ bar}]$$

$$\Delta P_{\text{total}} = 1.1 + 2.4 + .24 = 3.74 \text{ psi} [0.26 \text{ bar}]$$

$$\Delta P_{\text{filter}} = \Delta P_{\text{housing}} + \Delta P_{\text{KKZ}} + \Delta P_{\text{C18}}$$

**Exercise:** Determine  $\Delta P$  at 30 gpm (114 L/min) for BDF2VS16LVMEP Using (KKZ3)

**Solution:**

$$\Delta P_{\text{housing}} = 1.8 \text{ psi} = [0.12 \text{ bar}]$$

$$\Delta P_{\text{element (KKZ3)}} = 30 \times 0.01 = 0.3 \text{ psi} [0.02 \text{ bar}]$$

$$\Delta P_{\text{element (C184Z5V)}} = (30/2) \times 0.2 = 15 \times 0.2 = 3 \text{ psi} [0.21 \text{ bar}]$$

$$\Delta P_{\text{total}} = 1.8 + 0.3 + 3 = 5.1 \text{ psi} [0.35 \text{ bar}]$$

## Element Particulate Performance Information

## Element Water Coalescing Performance Information

Elements Sold Separately

## Pressure Drop Information Based on Flow Rate and Viscosity

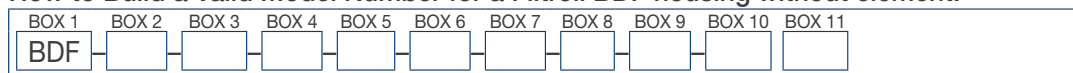
Note:

Based on ULSD15 with 17 Dynes/cm surface tension and 0.25% (2500 ppm) water injection. Discharge water concentration of <100 ppm free and emulsified water.

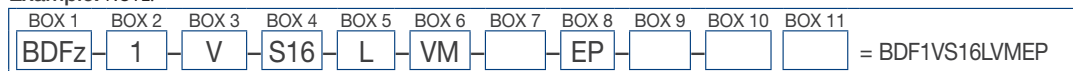
**BDF****Bulk Diesel Filter**

# Filter Model Number Selection

How to Build a Valid Model Number for a Filtroil BDF housing without element:



Example: NOTE:



BOX 1	BOX 2	BOX 3	BOX 4	BOX 5
<b>Filter Series</b>	<b>Flow rate &amp; number of Coalescing Housings</b>	<b>Housing Seal Material</b>	<b>Porting</b>	<b>Coalescing Element Change Indicator</b>
BDF	1 = 16 gpm 2 = 32 gpm	V = Viton®	S16 = SAE J1926 -16 (ORB)	L = In cap bar indicator

BOX 6	BOX 7	BOX 8
<b>KL3 Dirt Alarm® Option</b>	<b>Filter Housing Sump Level Indicator Option</b>	<b>ICF Coating Options</b>
VM = Visual Pop-up w/. Manual Reset (standard) E = MS5 Electrical Indicator with Amber Light in NEMA4X box (option)	S = Sight Glass I = Water In Fuel probe w/ light indicator Omit = None	EP = Epoxy Coated Bowl (standard) A = Anodized Cap & Head (optional)

BOX 9	BOX 10	BOX 11
<b>Heating Option</b>	<b>Automatic Drain &amp; Remote Sump Option</b>	<b>Optional Sump for Manual Drain</b>
H = Filter Sump Heater Omit = None	AWD5 = Auto water drain 5 gal tank w/ failsafe (only offered for applications above 32°F (0°C) and units ordered without heater) AWD20 = Auto water drain 20 gal tank w/ failsafe (only offered for applications above 32°F (0°C) and units ordered without heater) Omit = None	S5 = 5gal sump ztank S20 = 20gal sump tank Omit = None

## NOTES:

Unless automatic drain option is specified, ICF unit will come standard with manual drain

Particulate and Coalescing element sold separately and selected below

Box 3. Viton® is a registered trademark of DuPont Dow Elastomers

Box 6. If MS5 electrical indicator is selected, heater (in Box 9) must be selected as well.

Box 7 and 8. Only two boxes that allow combination of options (S + I or EP + A)

Box 9. Filter sump heater option only available when ordered w/out automatic water drain (AWD5 or AWD20)

Box 10. AWD fail safe is shown on page 25 (ICF)

Filtration Ratio per ISO 16889 Using APC calibrated per ISO 11171

Particulate Elements	DHC	$\beta_x (c) \geq 200$	$\beta_x (c) \geq 1000$
KKZ1V	224 grams	<4.0	4.2
KKZ3V	230 grams	<4.0	4.8

Coalescing Elements	Pressure Side Coalescing	
	Max Flow	Single Pass Water Removal Efficiency
C184Z5V	16 gpm	≥ 99.5%
C184Z3V	16 gpm	≥ 99.5%

## Particulate Element

Flow Direction: Outside In

Element Nominal Dimensions: 4.0" (102 mm) O.D. x 18.5" (470 mm) long

## Coalescing Element

Flow Direction: Inside Out

Element Nominal Dimensions: 4.0" (102 mm) O.D. x 18.5" (470 mm) long

## Fuel Oils

- ULSD15, low sulfur diesel and high sulfur diesel
- Biodiesel blends
- Synthetic diesel and blends
- No. 2 fuel oil and heating oil



## Filtroil, LLC - Headquarters

2600 E. Cary Street, Suite 5102  
Richmond, Virginia 23223

TEL: 800.638.3866

TEL: 804.359.9125

EMAIL: [filtroil@filtroil.com](mailto:filtroil@filtroil.com)

# Element Part Number Selection

# Fluid Compatibility