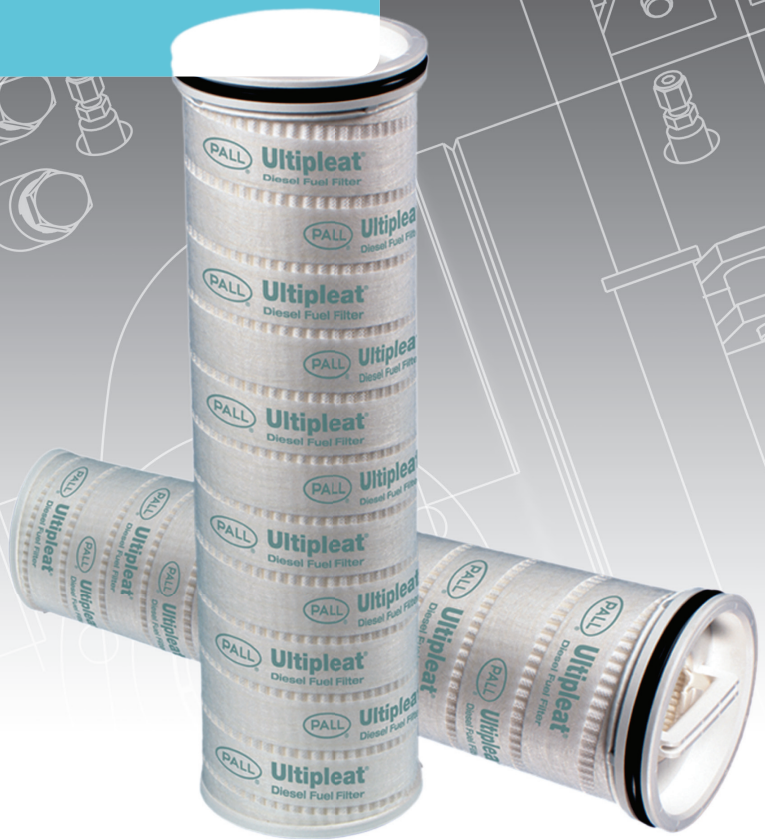


# Ultipleat® Diesel Fuel Filters

For particulate removal in bulk diesel fuel and filling applications



## Technical Information

### Ultipleat Diesel Elements

Ultipleat diesel fuel filters are specifically designed for the removal of solid particulate contamination in high volume, high flow diesel fuel applications.



**Biodiesel:** to support biodiesel applications where higher fatty Acid Methyl Ester (FAME) content is present, Pall has also developed a specific gel-resistant media that minimizes fouling in these challenging applications.

Ultipleat diesel, large diameter filter elements feature a unique wave-shaped pleat geometry that significantly increases filter area for low pressure drop and long service life. This allows the use of significantly fewer elements and smaller housings, which is beneficial in bulk diesel fuel applications with high flow and contamination ingress rates.

### Element Features

- 6" diameter Ultipleat (wave-shaped pleat) filter medium pack
- In-to-out filter element flow path
- Coreless element configuration
- Reproducible and consistent removal rating (see Table 1, Element Ordering Information)

### Ultipleat Diesel Housings

Ultipleat diesel fuel housings have been designed so that all sizes have the same installation footprint. This allows users to easily replace a smaller housing with a larger one – with no costly pipework modifications – should process changes require additional filtration capacity.

### Housing Features

- Designed to ASME Section VIII Div. 1 requirements with code stamping as an available option
- 10 barg (150 psi) pressure rated
- Carbon Steel and 316 Stainless Steel options
- Horizontal and vertical configurations

### Filter Sizing

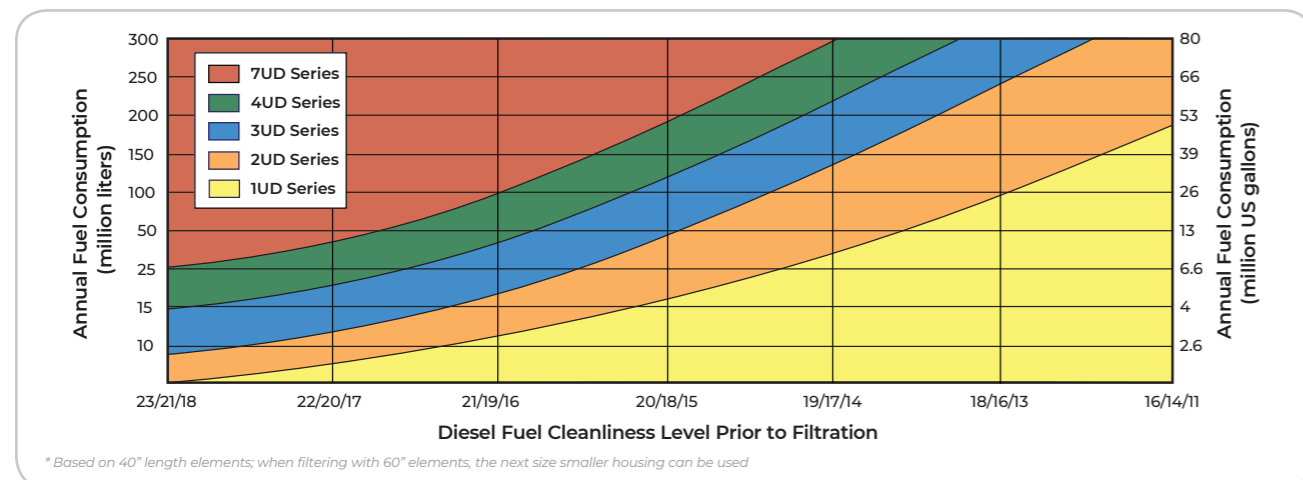
There are two key aspects that must be understood when sizing a bulk diesel filtration system:

1. The single-pass filtration efficiency, since the filter element must remove the majority of contamination in a single pass
2. The annual fuel consumption and mass of contamination expected to be removed. Figure 1 illustrates the amount of solid contamination (mass) that is present in fuel, based on different fuel cleanliness levels, and annual fuel consumption rates. Experience has shown that many bulk fuel filtration solutions have been drastically undersized when sizing is based solely on flow rate, fuel viscosity, fuel density, and system pressure. The sizing recommendations for Ultipleat diesel fuel filter systems, shown in Figure 2, ensure solid contamination is removed efficiently, consistently, cost-effectively.

**Figure 1: Annual Fuel Contamination Mass, kg (lb)\***

Annual Fuel Consumption, Million Liters (Million US gal)	Delivered Fuel ISO Cleanliness Level			
	22/20/17	20/18/15	18/16/13	16/14/11
<b>25 (6.6)</b>	400 (882)	100 (220)	25 (55)	6.3 (14)
<b>75 (19.8)</b>	1,200 (2,646)	300 (661)	75 (165)	19 (41)
<b>100 (26.4)</b>	1,600 (3,527)	400 (882)	100 (220)	25 (55)
<b>200 (52.8)</b>	3,200 (7,055)	800 (1,764)	200 (441)	50 (110)
<b>300 (79.3)</b>	4,800 (10,582)	1,200 (2,646)	300 (661)	75 (165)

**Figure 2: Recommended Ultipleat diesel fuel filter housing size\***



## Housing Ordering Information

### Vertical Housing Configuration

Part Number	Number of Filter Elements	Housing Diameter mm (in) (Nominal)	Flange face to face mm (in)	40" Ultipleat Diesel Filter		60" Ultipleat Diesel Filter	
				Max. Height mm (in) A	Inlet Port Height mm (in) B	Max. Height mm (in) A	Inlet Port Height mm (in) B
<b>1UDV + Table 1 2 3 4</b>	1	203 (8)	406 (16)*	2243 (88.31)	1934 (76.13)	2751 (108.31)	2442 (96.13)
<b>2UDV + Table 1 2 3 4</b>	2	406 (16)	914 (36)	2577 (101.44)	1934 (76.13)	3085 (121.44)	2442 (96.13)
<b>3UDV + Table 1 2 3 4</b>	3	457 (18)	914 (36)	2620 (103.13)	1934 (76.13)	3128 (123.13)	2442 (96.13)
<b>4UDV + Table 1 2 3 4</b>	4	508 (20)	914 (36)	2661 (104.75)	1934 (76.13)	3169 (124.75)	2442 (96.13)
<b>7UDV + Table 1 2 3 4</b>	7	610 (24)	914 (36)	2756 (108.5)	1934 (76.13)	3264 (128.5)	2442 (96.13)

\* Additional spacer available to maintain 914mm (36") flange face to face dimension

### Horizontal Housing Configuration

Part Number	Number of Filter Elements	Housing Diameter mm (in) (Nominal)	40" Ultipleat Diesel Filter Max. Height mm (in) D		60" Ultipleat Diesel Filter Max. Height mm (in) D	
			Max. Height mm (in) D	Max. Height mm (in) D	Max. Height mm (in) D	Max. Height mm (in) D
<b>1UDH + Table 1 3 4</b>	1	203 (8)	1695 (66.75)	1695 (66.75)	2203 (86.75)	2203 (86.75)
<b>2UDH + Table 1 3 4</b>	2	406 (16)	1883 (74.13)	1883 (74.13)	2391 (94.1)	2391 (94.1)
<b>3UDH + Table 1 3 4</b>	3	457 (18)	1934 (76.13)	1934 (76.13)	2442 (96.1)	2442 (96.1)
<b>4UDH + Table 1 3 4</b>	4	508 (20)	2000 (78.75)	2000 (78.75)	2508 (98.8)	2508 (98.8)
<b>7UDH + Table 1 3 4</b>	7	610 (24)	2188 (86.13)	2188 (86.13)	2696 (106.1)	2696 (106.1)

### Table 1: Housing Size Options

Code	Element Length (in) (Nominal)
<b>4</b>	40
<b>6</b>	60

### Table 2: Port Alignment

Code	Element Length (in) (Nominal)
<b>Omit</b>	90 Degree Offset - Horizontal Option Only
<b>A</b>	Aligned (Same Side) - Vertical Option Only
<b>O</b>	Opposite - Vertical Option

### Table 3: Material of Construction

Code	Material*
<b>CS</b>	Carbon Steel with 304 Tubesheet and Hold Down
<b>SS</b>	316L Stainless Steel

\* Nitrile seals fitted as standard

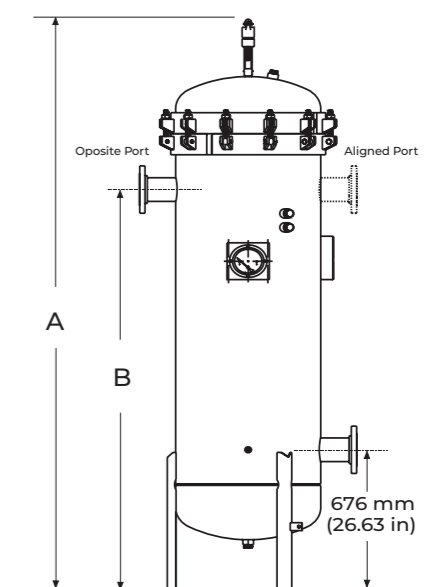
### Table 4: Design Options

Code	Option
<b>U</b>	ASME Section VIII DIV 1
<b>CE</b>	In accordance with PED
<b>SQL</b>	In accordance with GB150
<b>METI</b>	Japanese Ministry of Economy - Standard Case
<b>CRN</b>	CSA B51-97 - Canadian Standard

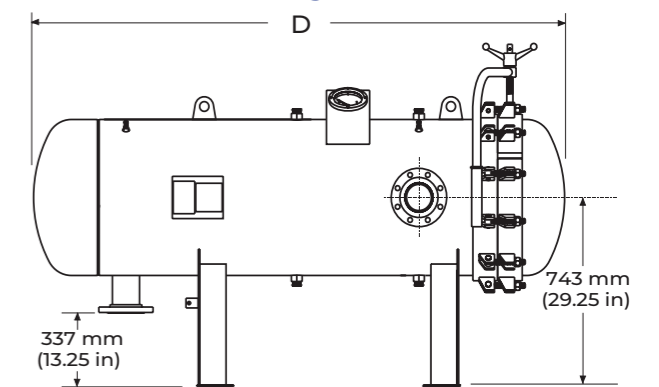
### Example Part Number: 4UDV4OCSU

Denoted by bold option codes in the tables

### Vertical Housing



### Horizontal Housing



## Housing Pressure Drop

Housing pressure drop is negligible for flows up to 1890 L/min (500 USgpm); for applications over 1890 L/min (500 USgpm), please contact Pall.

## Element Pressure Drop

Multiply actual flow rate times appropriate factor in table below to determine pressure drop with diesel fuel at 3 centipoise (cP). Correct for other fluids by multiplying new viscosity in cP/3.

*Note: Factors are per 1000 L/min and per 1 USgpm. Refer to sample calculation below*

## 3389 Series Filter Elements - bard/1000 L/min (psid/USgpm)

Length Code	Diesel Fuel				Biodiesel	
	JZ	JN	JS	JT	GN	GT
40	0.061 (0.0033)	0.050 (0.0027)	0.044 (0.0024)	0.033 (0.0018)	0.051 (0.0028)	0.033 (0.0018)
60	0.040 (0.0022)	0.033 (0.0018)	0.029 (0.0016)	0.022 (0.0012)	0.03 (0.0019)	0.02 (0.0012)

## Sample ΔP Calculation

Ultipleat diesel fuel filter 40" element with JS grade media.

Operating conditions 700 L/min flow rate using a diesel fuel of 2.5 cP.

### Filter Element ΔP

= ΔP Element

= (700 x 0.044/1000) x 2.5/3 bard

= 0.026 bard

## Element P/N: UD 3389 F 1 2 3

## Example Part Number: UD3389FGN40H

*Denoted by bold option codes in the tables*

*Note: G denotes special Biodiesel media.*

## Table 1: Filter Element Options

Code	$\beta_x \geq 1000^*$	Maximum Element Pressure Drop, bard (psid)
JZ	2	3,44 (50)
JN/GN	6	3,44 (50)
JS	12	3,44 (50)
JT/GT	20	3,44 (50)

\* The filtration efficiency is qualified using a modified multi-pass filter performance test procedure, based on ISO 16889 but modified to run in the single-pass mode (i.e., with the system clean-up filter in line throughout the test) using water at ambient temperature as the test fluid, ISO Fine Test Dust (ISO 12103-A2) specially prepared for dispersion in water (referred to as AlChE contaminant) as the test contaminant, and calibration of the automatic particle counters with Latex spheres. The filtration ratios obtained by the above test method should not be directly compared with filtration ratios obtained per ISO 16889.

## Table 2: Filter Element Length Options

Code	Length mm (in) (Nominal)
40	1,016 (40)
60	1,524 (60)

\* Based on typical contamination levels in bulk diesel fuel, we recommend a maximum flow of 700 L/min (185 gpm) through each 40" element and 1100 L/min (200 gpm) through each 60" element. In applications with good diesel fuel cleanliness, the filters can be sized for flows up to 1890 L/min (500 gpm) per element.

## Table 3: O ring option

Code	Seal/O ring material
H13	Nitrile Seal ( Standard for standard Diesel application)
H	Fluorocarbon elastomer, used for Biodiesel



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