

## Chapter 3

### 3.0 Jellyfish Filter Design Guidelines

The Jellyfish Filter has many flexible design features to accommodate a wide range of specific site requirements and constraints. For design assistance, please contact Imbrium Systems.

### 3.1 Configurations and Design Capacities

Design flow capacities and pollutant capacities for standard Jellyfish Filter manhole configurations are shown in **Tables 1 and 2**.

The Jellyfish Filter standard model numbers provide information about the manhole inside diameter (expressed in U.S. customary units) and cartridge counts for hi-flo and draindown cartridges. For example, Jellyfish Filter Model Number JF6-4-1 is a 6-ft (1.8 m) diameter manhole with four hi-flo cartridges and one draindown cartridge. Standard model numbers assume the use of 54-inch (1372 mm) long cartridges. Specific designations for non-standard structures or cartridge lengths are noted in the **Jellyfish Filter Owner's Manual**.



**Table 1**  
**Design Flow Capacities**  
**Standard Jellyfish Filter Manhole Configurations**

Manhole Diameter (ft / m) <sup>1</sup>	Model No.	Hi-Flo Cartridges <sup>2</sup> 54 in / 1372 mm	Draindown Cartridges <sup>2</sup> 54 in / 1372 mm	Treatment Flow Rate (gpm / cfs)	Treatment Flow Rate (L/S)
<b>4 / 1.2</b>	<b>JF4-2-1</b>	<b>2</b>	<b>1</b>	<b>200 / 0.45</b>	<b>12.6</b>
<b>6 / 1.8</b>	<b>JF6-3-1</b>	<b>3</b>	<b>1</b>	<b>280 / 0.62</b>	<b>17.7</b>
	JF6-4-1	4	1	360 / 0.80	22.7
	JF6-5-1	5	1	440 / 0.98	27.8
	JF6-6-1	6	1	520 / 1.16	32.8
<b>8 / 2.4</b>	<b>JF8-6-2</b>	<b>6</b>	<b>2</b>	<b>560 / 1.25</b>	<b>35.3</b>
	JF8-7-2	7	2	640 / 1.43	40.4
	JF8-8-2	8	2	720 / 1.60	45.
	JF8-9-2	9	2	800 / 1.78	50.5
	JF8-10-2	10	2	880 / 1.96	55.5
<b>10 / 3.0</b>	<b>JF10-11-3</b>	<b>11</b>	<b>3</b>	<b>1000 / 2.23</b>	<b>63.1</b>
	JF10-12-3	12	3	1080 / 2.41	68.1
	JF10-12-4	12	4	1120 / 2.50	70.7
	JF10-13-4	13	4	1200 / 2.67	75.7
	JF10-14-4	14	4	1280 / 2.85	80.8
	JF10-15-4	15	4	1360 / 3.03	85.8
	JF10-16-4	16	4	1440 / 3.21	90.8
	JF10-17-4	17	4	1520 / 3.39	95.9
	JF10-18-4	18	4	1600 / 3.56	100.9
	JF10-19-4	19	4	1680 / 3.74	106
<b>12 / 3.6</b>	<b>JF12-20-5</b>	<b>20</b>	<b>5</b>	<b>1800 / 4.01</b>	<b>113.6</b>
	JF12-21-5	21	5	1880 / 4.19	118.6
	JF12-22-5	22	5	1960 / 4.37	123.7
	JF12-23-5	23	5	2040 / 4.54	128.7
	JF12-24-5	24	5	2120 / 4.72	133.8
	JF12-25-5	25	5	2200 / 4.90	138.8
	JF12-26-5	26	5	2280 / 5.08	143.8
	JF12-27-5	27	5	2360 / 5.26	148.9

<sup>1</sup> Smaller and larger systems may be custom designed

<sup>2</sup> Shorter length cartridge configurations are available



**Table 2**  
**Design Pollutant Capacities**  
**Standard Jellyfish Filter Manhole Configurations**

<b>Model Diameter (ft / m)</b>	<b>Wet Volume Below Deck (ft<sup>3</sup> / L)</b>	<b>Sediment Capacity<sup>1</sup> (ft<sup>3</sup> / L)</b>	<b>Oil Capacity<sup>2</sup> (gal / L)</b>
<b>JF4</b>			
4 / 1.2	82 / 2313	12 / 0.34	100 / 379
<b>JF6</b>			
6 / 1.8	184 / 5205	28 / 0.79	224 / 848
<b>JF8</b>			
8 / 2.4	327 / 9252	50 / 1.42	388 / 1469
<b>JF10</b>			
10 / 3.0	511 / 14,456	78 / 2.21	608 / 2302
<b>JF12</b>			
12 / 3.6	735 / 20,820	113 / 3.20	732 / 2771

<sup>1</sup> Assumes 12 inches (305 mm) of sediment depth in sump  
Systems may be designed with increased sediment capacity

<sup>2</sup> Assumes 24 inches (610 mm) of pre-treatment channel depth for oil storage

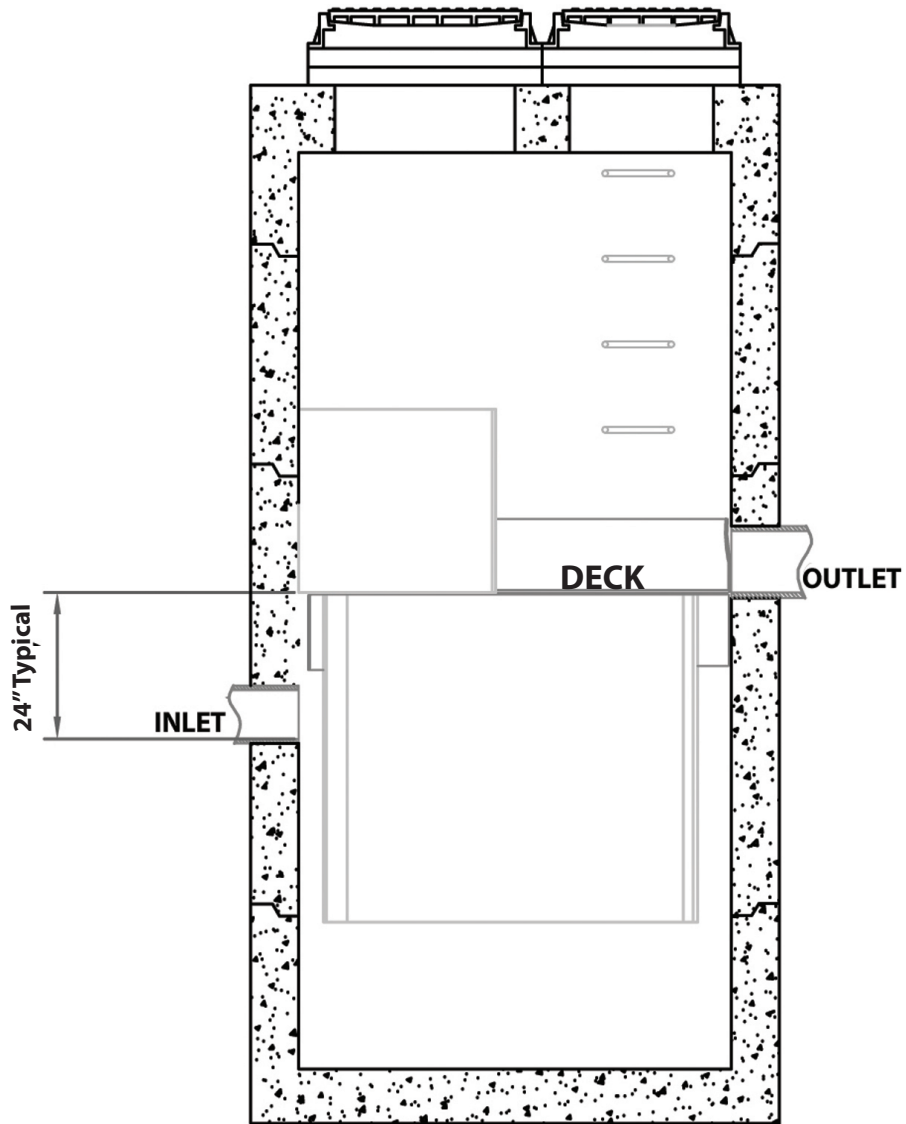
### 3.2 Inlet and Outlet Pipes

The Jellyfish Filter is available in both the standard **above-deck inlet pipe** configuration and optional **below-deck inlet** pipe configuration. Specific site requirements generally determine the configuration that is most favorable for the site. For both configurations, the invert elevation of the outlet pipe is identical to the cartridge deck elevation. Please refer to **Figures 4 and 5**.



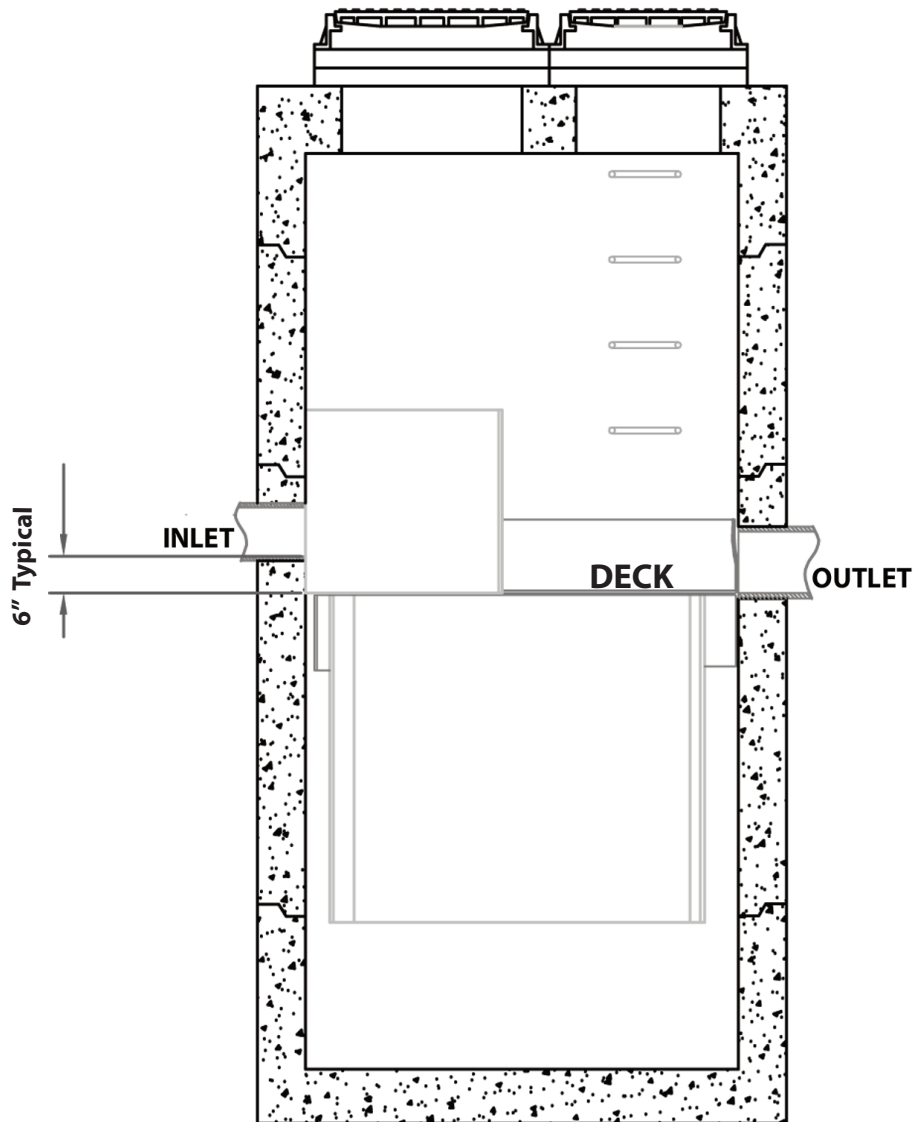
**FIGURE 4**

**Jellyfish Configuration  
with Below-Deck Inlet Pipe**



**FIGURE 5**

**Jellyfish Configuration  
with Above-Deck Inlet Pipe**



For the standard above-deck inlet pipe configuration, the invert elevation of the inlet pipe is typically set 6 inches (150 mm) higher than the invert elevation of the outlet pipe. This generally ensures that the inlet pipe will drain completely at the conclusion of each rainfall/runoff event, while providing sufficient volume within the maintenance access wall zone for surface accumulation of floatables below the inlet pipe. The elevation of the inlet pipe can be varied as required.

The Jellyfish Filter can accommodate a wide range of angles between the inlet and outlet pipes. The inlet pipe can be located anywhere about the circumference of the structure. The separation angle relationship of the inlet pipe to the outlet pipe can vary from 0 to 360 degrees to provide maximum design flexibility. Typical off-line layouts (external bypass using an upstream diversion structure) will have an inlet to outlet separation angle of 90 to 120 degrees. See **Table 3** below for the minimum separation angle for standard manhole configurations with an above-deck inlet pipe.

The Jellyfish Filter can accommodate **multiple inlet pipes** within certain restrictions.

The Jellyfish Filter can be built at all depths of cover generally associated with conventional stormwater conveyance systems.

<b>Model Diameter (ft / m)</b>	<b>Minimum Angle<sup>1</sup> Inlet / Outlet Pipes</b>	<b>Minimum Inlet Pipe Diameter (in / mm)</b>	<b>Minimum Outlet Pipe Diameter (in / mm)</b>
<b>JF4</b>			
4 / 1.2	62 °	6 / 152	8 / 203
<b>JF6</b>			
6 / 1.8	59 °	8 / 203	10 / 254
<b>JF8</b>			
8 / 2.4	52 °	10 / 254	12 / 305
<b>JF10</b>			
10 / 3.0	48 °	12 / 305	18 / 457
<b>JF12</b>			
12 / 3.6	40 °	12 / 305	18 / 457

<sup>1</sup> Assumes off-line (external bypass) configuration



### 3.3 Bypass Design

The Jellyfish Filter can be designed with either an off-line or on-line configuration. All stormwater filter systems will perform for a longer duration between required maintenance services when designed and applied in off-line configurations.

A standard off-line configuration has an external bypass that uses an upstream diversion structure. The elevation difference between the top of the diversion structure weir and the Jellyfish Filter outlet pipe invert establishes the design driving head associated with the design flow rate. Excess flow that overtops the diversion weir bypasses the Jellyfish Filter and proceeds downstream. Drawings that illustrate relative system elevations are available by contacting Imbrium Systems.

For some sites an off-line configuration may not be practical and use of an on-line configuration is advantageous. In these cases, an optional internal bypass pressure relief pipe(s) can be placed in one or multiple cartridge receptacles within the Jellyfish Filter. The pressure relief pipe height and diameter can be varied to accommodate the design peak flow rate and system driving head requirements. For these systems the driving head is calculated as the difference in elevation between the top of the pressure relief pipe and the invert of the outlet pipe. When the internal bypass option is utilized, peak flow rates receive membrane filtration treatment up to the filtration design flow rate, with the balance of the peak flow receiving pre-treatment. Increased sump depth may be required to increase sediment storage capacity and to minimize re-suspension of previously captured sediment at peak flow rates.

Please contact Imbrium Systems for design assistance.

### 3.4 Shallow or Low Cover Installations

For sites that require minimal depth of cover for the stormwater infrastructure, the Jellyfish Filter can be applied in a shallow application using a hatch cover to provide adequate access to all the cartridges within the unit. The general minimum depth of cover is 36 inches (915 mm) from the Jellyfish outlet pipe invert to the underside of the top slab. Further custom modifications may be possible. A typical drawing is included in **Appendix A** and **B**.

### 3.5 Submerged Installations

When properly designed, the Jellyfish Filter will function effectively under submerged conditions. For systems that may experience submerged or backwater conditions due to dry weather base flow or tidal effects, driving head calculations must account for water elevation during the backwater condition. The Jellyfish Filter treatment functions will continue to operate during forward flow despite backwater conditions. A customized increase to the maintenance access wall height may be required to ensure floatables capture and an increase in the height of the backwash pool weir may be required to ensure function of the automatic passive backwash feature.

### 3.6 Grated Inlet and Curb Inlet Jellyfish Filters

Existing drainage systems can be retrofitted by replacing conventional storm inlets with a Jellyfish Filter inlet. Imbrium Systems has two standard options, curb inlet and grated inlet configurations. Both configurations utilize



the shorter 27-inch (686 mm) length Jellyfish filter cartridges and require minimal cover. Two typical drawings are included in **Appendix A** and **B**. Further custom modifications may be possible.

### 3.7 Series Jellyfish Filter

For sites with water quality treatment flow rates that exceed the design flow rate of the largest standard Jellyfish Filter model, custom systems can be designed that hydraulically connect multiple Jellyfish Filters in series. Please contact Imbrium Systems for assistance.

### 3.8 Jellyfish Filter with Sump Drain

The Jellyfish Filter is typically designed to maintain a pool of water in the lower chamber (below deck) between storms. However, certain sites or jurisdictions may require draindown of the sump between storms. To meet these requirements, a sump drain filter can be installed to slowly drain the lower chamber pool to the sub-grade for infiltration or to an alternate point of discharge. A typical drawing is included in **Appendix A** and **B** of the Jellyfish Technical Manual.

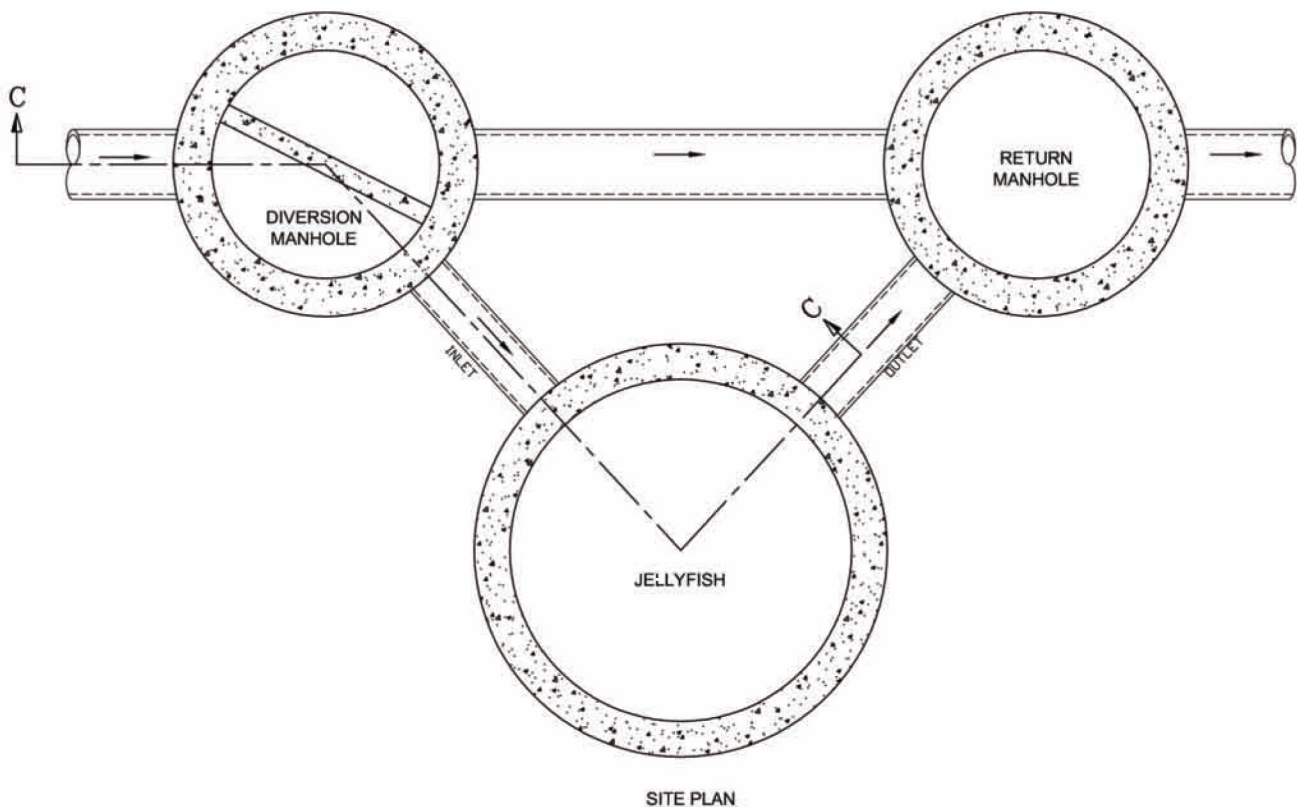


Figure 6

