

Media Calculations

AFM

10X54 Vessel (Total Volume of Vessel 61 litres)

What flow rate can I achieve using AFM in a 10X54 vessel?

Diameter of vessel is 0.258m

Therefore radius is 0.129m (Half the circle area)

$TTr^2 = 3.142 \times (0.129 \times 0.129) = 0.052m^2$ (Surface area via surface area calculator)

0.052m² is the filtration media surface area.

Let's work on a filtration rate of 15 m³/hr per 1m² of filtration media surface area.

Therefore $15 \times 0.0052 = 0.78$

Therefore 0.78 m³/hr flow rate through a 10X54 vessel. Round this to 0.8 m³/hr (800 ltr/hr)

You will then also need to work out how many bags (the volume) based on the size of the vessel and the height of the media bed. AFM recommend if possible media bed depth of 1 – 1.2m.

To work out the volume $TTr^2 \times$ height (height is bed depth)

You already know that $TTr^2 = 0.052$, so just multiply this by the height. Lets work on a bed depth of 1.0m.

Therefore $0.052 \times 1.0 = 0.052m^3$ volume (52lts round this to 50lts)

1ltr of AFM weighs 1.25kg therefore a 25kg bag is 20lts (25kg divided by 1.25kg = 20lts)

Therefore an 10X54 will need 2.5 bags of AFM Grade 1 (Lets use slightly less and put 2 bags of AFM Grade 1 in to make it easier for branches otherwise they will be left with half a bag)

A 10x54 has a total Volume of 61 litres so with 2 bags of grade 1 in it you will be left with 19 litres (let's call it 20 Litres) expansion space.

GAC – Granular Activated Carbon

10X54 (Total Volume of Vessel 61 litres)

How much carbon will be required for a flow rate of 1000 lts/hr when using a 3min contact time?

Flow rate in lts x contact time ÷ 60 = lts of carbon required

1000 x 3 ÷ 60 = 50 lts of carbon.

To work out what size vessel to use look at the total volume of the vessel and use 2/3rds of this volume and leave 1/3rd empty for media expansion in back wash.

It will never be exact but use the closest vessel and adjust the volume accordingly and try and make even in terms of bag volume of carbon. 25kg bag of carbon has a rough litre volume of 50lts.

For the 50lts of carbon as above: 2/3rds of 10X54 is 41 lts. I would round the 41lts to 50 lts which would be 1 bag of carbon.

Specification

Size (Inches)	Opening		Volume		Base	Dimensions (mm)			
	Top	BTM	Liter	Gallon		A	B (Ø)	C	D (Ø)
6 x 13	2.5" 8-NPSM	/	4.6	1.2	Standard	337	165	/	155
6 x 17	2.5" 8-NPSM	/	6.6	1.7	Standard	435	165	/	155
6 x 35	2.5" 8-NPSM	/	13.7	3.6	Standard	918	165	/	155
7 x 13	2.5" 8-NPSM	/	6.3	1.7	Standard	335	197	/	182
7 x 17	2.5" 8-NPSM	/	8.6	2.3	Standard	438	197	/	182
7 x 35	2.5" 8-NPSM	/	20.1	5.3	Standard	895	197	/	182
7 x 44	2.5" 8-NPSM	/	25.6	6.8	Standard	1125	197	/	182
8 x 13	2.5" 8-NPSM	/	8.5	2.2	Standard	335	216	/	210
8 x 17	2.5" 8-NPSM	/	10.9	2.9	Standard	435	216	/	210
8 x 35	2.5" 8-NPSM	/	25	6.6	Standard	890	216	/	210
8 x 44	2.5" 8-NPSM	/	32.1	8.5	Standard	1115	216	/	210
9 x 17	2.5" 8-NPSM	/	13.8	3.7	Standard	440	240	/	232
9 x 35	2.5" 8-NPSM	/	32.1	8.5	Standard	900	240	/	232
9 x 42	2.5" 8-NPSM	/	38.4	10.2	Standard	1075	240	/	232
9 x 48	2.5" 8-NPSM	/	44.4	11.7	Standard	1225	240	/	232
10 x 17	2.5" 8-NPSM	/	16.7	4.4	Standard	440	269	/	260
10 x 35	2.5" 8-NPSM	/	39.4	10.4	Standard	890	269	/	260
10 x 44	2.5" 8-NPSM	/	51.2	13.5	Standard	1130	269	/	260
10 x 47	2.5" 8-NPSM	/	54.1	14.1	Standard	1190	269	/	260
10 x 54	2.5" 8-NPSM	/	63.3	16.7	Standard	1385	269	/	260
12 x 48	2.5" 8-NPSM	/	89	23.5	Standard	1230	318	/	310
12 x 52	2.5" 8-NPSM	/	97	25.7	Standard	1330	318	/	310
13 x 44	2.5" 8-NPSM	/	86.8	23.0	Standard	1125	343	/	336
13 x 54	2.5" 8-NPSM	/	105.3	27.9	Standard	1380	343	/	336
13 x 54	4" 8-UN	/	105.3	27.9	Standard	1380	343	/	336
14 x 52	2.5" 8-NPSM	/	115.7	30.6	Standard	1340	369	/	362
14 x 52	4" 8-UN	/	115.7	30.6	Standard	1340	369	/	362
14 x 65	2.5" 8-NPSM	/	148.5	39.3	Standard	1655	369	/	362
14 x 65	4" 8-UN	/	148.5	39.3	Standard	1655	369	/	362