

Filter Facts *hard facts*

There are lots of septic tank effluent filters on the market. And there are real differences between them. How can you tell which filter is best, especially when each manufacturer describes its filters using different terms? Here are important terms and facts that should help you make comparisons between filters.

Average TSS Removal

A good effluent filter prevents large solids from leaving the tank, dramatically improving the quality of effluent and extending drainfield life.

Orenco's Biotube® effluent filters reduce TSS by about two thirds. This filter performance data is based on more than 3,000 documented installations. That's why Dr. George Tchobanoglous, author of America's leading textbook on decentralized wastewater systems, used Orenco's data in his section on effluent filters (*Small and Decentralized Wastewater Management Systems*, page 183, footnote). If you would like to see the data that Orenco provided to Dr. Tchobanoglous, turn to Table 2 on the back page.

Total Filter Surface Area vs. Total Flow Area

When comparing filters, be sure to note how filter area is being reported. It's important to compare both the Total Filter Surface Area and the Total Flow Area. Why?

Because *both* are equally important.

Picture this: You have a huge filter with a huge filter surface area. But your huge filter only has one tiny hole, which clogs up right away. How useful is all that filter surface area, now? Or maybe your huge filter has giant holes in it, providing unrestricted flow through the filter without blocking any solids. Not much of a filter, is it?

In a Biotube® effluent filter, *Total Filter Surface Area* is defined as the total surface area of all



Orenco's patented Biotube® Effluent Filters reduce Total Suspended Solids (TSS) from tank effluent by two-thirds.

individual Biotubes within the filter cartridge. Filter surface area is important because that's where solids are caught as they try to pass through the individual openings in the filter tubes.

The *Total Flow Area* of a Biotube effluent filter is defined as the total open area (area of the mesh openings) of all the individual Biotubes within the filter cartridge. Flow area is as important as filter surface area, because flow area is what prevents the filter surface area from premature clogging. It's through those mesh openings that filtered effluent flows.

Filter Facts

In a Biotube® effluent filter, about 30% of the filter surface area of each filter tube is open. This means that the total flow area (“open area”) of the effluent filter is about 30% of the total surface area. This makes it easy to calculate the surface area or flow area of our filters.

For example, our most popular residential effluent filter — the FT0444-36 — has a total filter surface area of 5.1 ft² (0.047 m²). To find the total flow area of the FT0444-36, just multiply the total filter surface area by 0.3 (5.1ft² × 0.3 = 1.53 ft²). If you know the flow area of a Biotube effluent filter, but not the total surface area, just divide the flow area (1.53 ft² or 0.14 m² for the FT0444-36) by 0.3. In the case of the FT0444-36, that’s, again, 5.1 ft² (0.47 m²). See Table 1 for more information on calculating surface area and flow area for Biotube effluent filters.

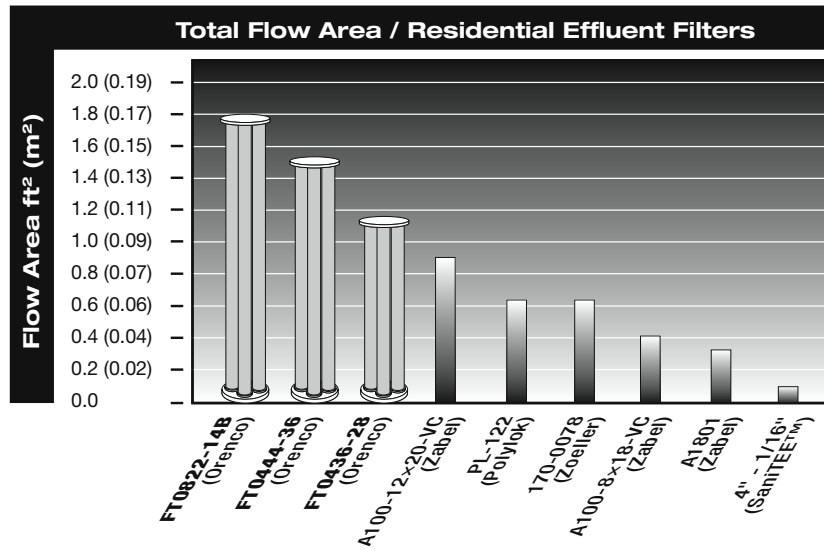
Graphs 1a and 1b compare the Total Flow Area of nine residential and nine commercial filters commonly sold today. The graphs show that the Total Flow Area of Orenco’s Biotube effluent filters is typically two to four times higher than that of competing brands, and sometimes much, much, more. That means our filters go longer between cleaning, because the higher the Total Flow Area, the slower the filter clogging process.

Flow Rates and Cleaning Intervals

Orenco believes that flow rates (“design flows,” “maximum flows,” “average flows,” whatever) for effluent filters need to be tied to service intervals in order to be meaningful. Not all competitors make this connection apparent. In fact, some competitors who have filters with very low Total Flow Areas (which plug up easily) claim their filters can handle very high flow rates. If their filters really are used with those flows, they will have to be cleaned frequently.

Graphs 2a and 2b (on the next page) show the relationship between Orenco’s effluent filter models (residential and commercial), design flow, and the “mean time between cleaning.” As you can see, the larger the filter and the smaller the flow, the longer you can go

Graph 1a: Total Flow Area for Nine Residential Effluent Filters



Graph 1b: Total Flow Area for Nine Commercial Effluent Filters

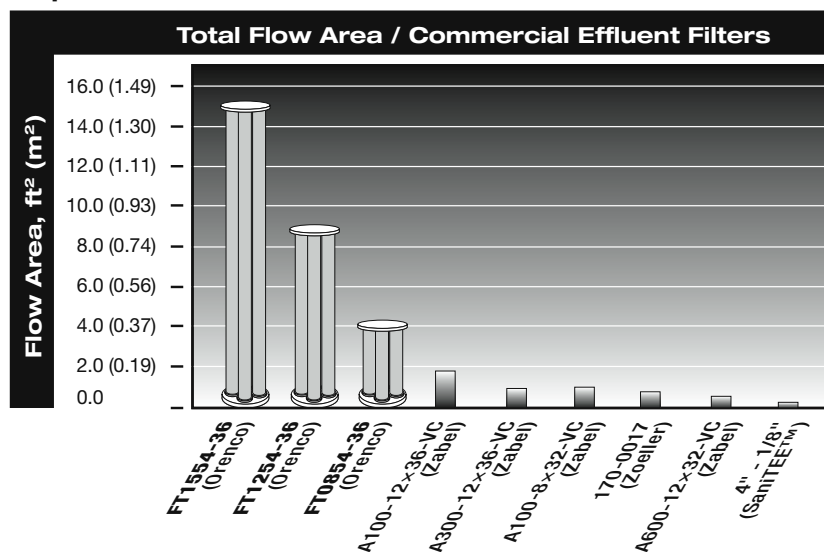


Table 1: Calculating Surface Area and Flow Area for Biotube® Effluent Filters

Filter Surface Area (A_s)

$$A_s = \pi d \times L$$

Flow Area (A_f)

$$A_f = (\pi d \times L) \times 0.3$$

where

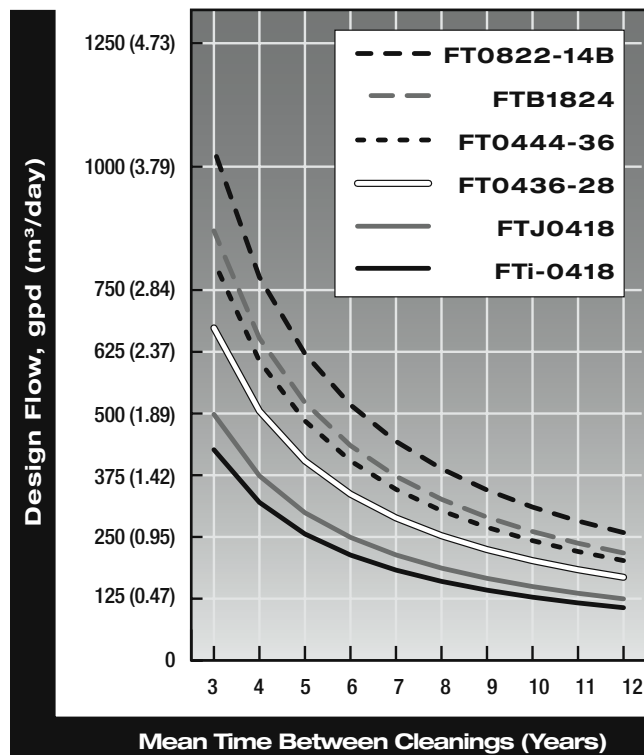
d = diameter of filter tube material in feet or meters

L = total length of filter tube material in feet or meters

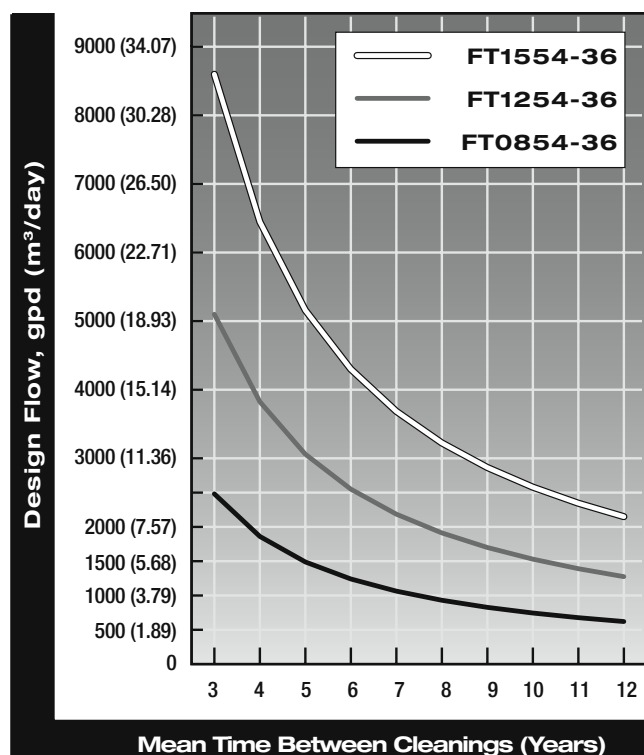
Example

Orenco’s FT0444-36 filter has 17.3 linear feet (5.3 m) of 1.125-inch (28.6-mm) diameter filter material. This equates to about 5.1 ft² (0.47 m²) of filter surface area. Since the flow area of a Biotube effluent filter is 30% of the filter surface area, you can find the flow area of the filter by multiplying the filter surface area by 0.3.

Graph 2a:
Time Between Cleanings for Residential Biotube® Filters



Graph 2b:
Time Between Cleanings for Commercial Biotube® Filters



between cleanings. For example, if your customer wanted a three-year cleaning interval for a system with flows up to 2,500 gpd (9.5 m³/day), he or she would use an 8-inch (200-mm) FT0854-36 filter. If system flows were up to 5,000 gpd (18.9 m³/day) and a three-year service interval was required, the 12-inch (300-mm) FT1254-36 filter would be the one to use. And for flows up to 8,500 gpd (32.2 m³/day), he or she could use the 15-inch (375-mm) FT1554-36 filter or use two 12-inch (300-mm) FT1254-36 filters for even more time between filter cleanings.

Based on maintenance records, we know that our standard 4-inch (100-mm) FT0444-36 residential filter has an average maintenance interval in excess of 10 years, when used with typical residential flows.

Level of Filtration

A good filter has a LARGE Total Flow Area to prevent premature filter clogging, as noted on page 1, along with many SMALL individual openings or holes, to prevent the passing of biosolids. That's what's meant by a good "level of filtration."

Some competitors like to compare their 1/16-inch (1.6-mm) slots to our 1/8-inch-diameter (3.2-mm) holes, hoping you'll assume that their slots offer better filtration. But the proof is in TSS reduction. Our field test data from thousands of installations using filters with 1/8-inch-diameter (3.2-mm) holes prove that our effluent filters reduce Total Suspended Solids by an average of two-thirds.

P.S. (We also offer 1/16-inch-diameter holes, if 1/8-inch holes aren't small enough for you.)

NSF Certification

Third-party certification is good, but only if the testing protocol is meaningful. The current NSF Standard 46 effluent filter testing protocol looks at a few short-term characteristics, such as ability to filter out 3/16-inch diameter spheres and not clog at design flow, over a 7-day period. It also evaluates some strength and construction factors. It does not, however, provide long-term information about how well an effluent filter works over time, as our long-term user data does.

Alarm Feature

Orengo's residential filters offer an alarm as an option.

Warranty

Orengo's Biotube® effluent filters come with a lifetime warranty when used in residential applications.

Filter Facts

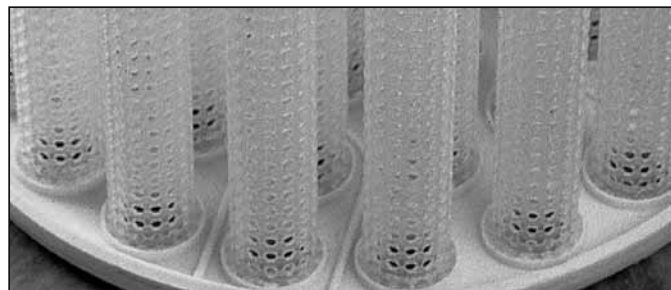
Documented Performance from Thousands of Installations

Orenco's claim that its filters reduce TSS by two-thirds is backed up by long-term performance data from thousands of installations. Orenco is the only manufacturer that has access to such an extensive database of performance data, because we sold filters to large community collection systems that were subsequently sampled by local operators and regulators to fulfill the requirements of state agencies. The results from all that sampling are reported in Table 2, below.

Table 2:
TSS in Septic Tank Effluent
Filtered by Orenco Screened Vault Technology

Source:	Units	TSS (mg/L)
Penn Valley, CA	214	28
West Point, CA	165	32
Brooks, OR	224	37
Elkton, OR	101	31
Irrigon, OR	311	35
Tangent, OR	180	27
Boston Harbor, WA	166	34
Camas, WA	450	35
Montesano, WA	1,179	23
South Prairie, WA	82	34
Total Units:	3,072	Avg. TSS 31.6

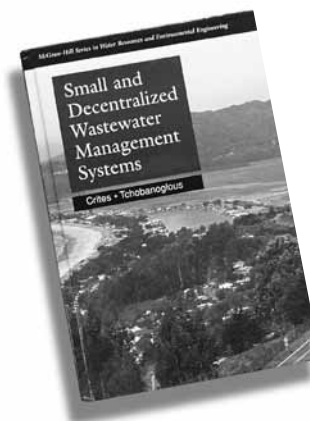
This is some of the data provided to Crites and Tchobanoglous for use in their textbook, *Small and Decentralized Wastewater Management Systems*. Since Dr. Tchobanoglous notes that residential wastewater typically includes 85 mg/L of TSS, our data shows that our effluent filters reduce residential TSS by two-thirds. This is especially meaningful since the data comes from community collection systems, nearly all of which serve restaurants and other commercial establishments, in addition to residences.



Flow area is as important as the filter surface area. The flow area of Orenco's effluent filters is at least two times larger than that of competing brands.

Moreover, all these systems were using an earlier version of Orenco's patented filtering technology. Our newer Biotube® products have much more filter surface area, so we're confident they're performing even better.

In fact, every advance in effluent filter technology developed by Orenco has been copied by competing manufacturers, including flow modulating plates, orifices (to limit the flow rate leaving the tank, which mitigates surges and increases retention time) and gas deflection baffles (to protect the filter from bulking of solids).



Dr. George Tchobanoglous, author of America's leading textbook on decentralized wastewater systems, used the documented performance data from thousands of Orenco's filter installations to develop his findings on effluent filters.

Still have questions?

We know it's hard for consumers to sort out competing claims.
Call your local Orenco Distributor.



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World Does Wastewater®*

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