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Filter Facts *hard facts*

There are lots of 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 67%. 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 1 on the back page.

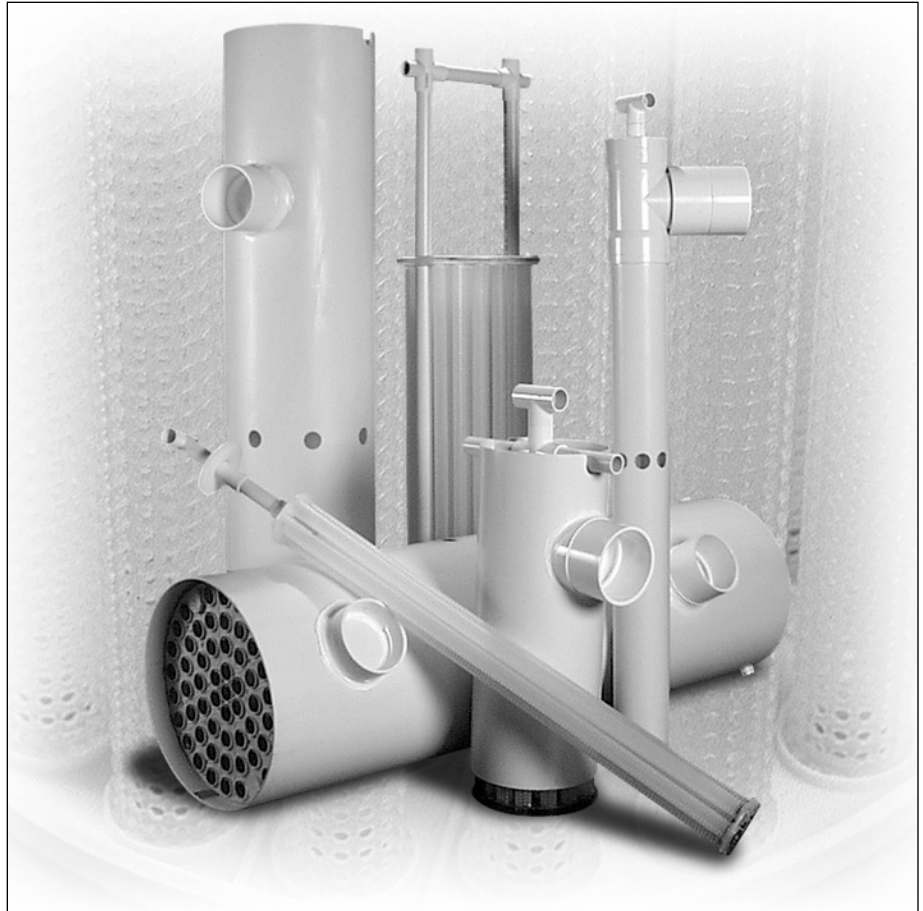
Filter Surface Area vs. Flow Area

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 Flow Area is as important as Filter Surface Area.

Flow Area

The surface area of a filter is important, because that's where solids are caught. But the flow area (the area of the "holes" in the filter) is equally important, because that's what prevents the filter from premature clogging.

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?



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

About 30% of Orenco's filter tubes are open, so the flow area of our filters is 30% of the total surface area.

Graphs 1 and 2 (top of page 2) 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 brands¹, 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.

Filter Facts, continued ...

Surface Area

Since our “open area” or “flow area” is 30% of the filter surface area, it’s easy to calculate the surface area of any of our effluent filters. Just take the flow area and divide by 0.3. That means, for our most popular residential effluent filter — the FT0444-36 — the total surface area is 5.1 ft². (1.53 ft² flow area divided by 0.3 = 5.1).

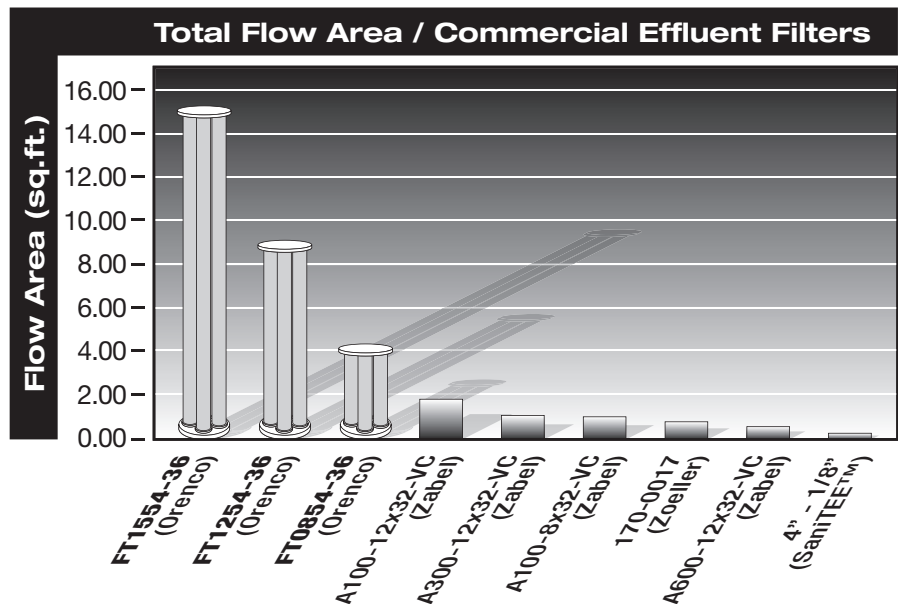
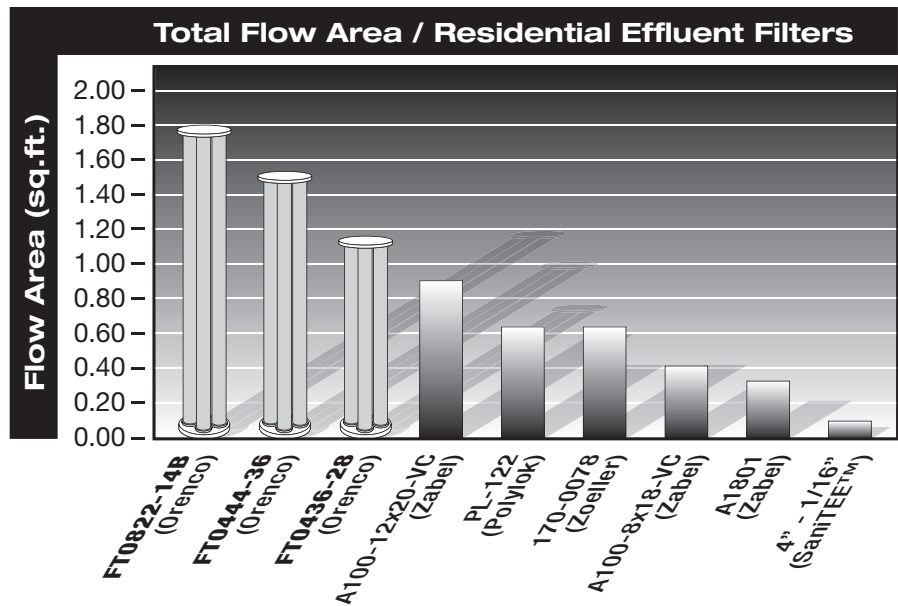
Flow Rates and Cleaning Intervals

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 3 and 4 (bottom of page 3) 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 between cleanings.

For example, if your customer wanted a three-year cleaning interval for a system with larger flows, he or she would buy an 8" filter (FT0854-36) for flows up to 2,500 gpd, a 12" filter (FT1254-36) for flows up to

Graphs 1 and 2: Comparison of Total Flow Area in residential and commercial effluent filters, by brand and model number.



Here’s how we calculate total flow area ...

Orenco’s FT0822-14B has 20.3 lineal feet of 1.125-inch-diameter screen tube, with 30% open area.
 $(20.3 \text{ lineal ft.}) (1.125 \text{ in.}) \left(\frac{1 \text{ ft.}}{12 \text{ in.}}\right) (3.1416) (0.3) = 1.8 \text{ ft}^2 \text{ total flow area.}$

Orenco’s FT0444-36 has 17.3 lineal feet of 1.125-inch-diameter screen tube, with 30% open area.
 $(17.3 \text{ lineal ft.}) (1.125 \text{ in.}) \left(\frac{1 \text{ ft.}}{12 \text{ in.}}\right) (3.1416) (0.3) = 1.5 \text{ ft}^2 \text{ total flow area.}$

Another manufacturer’s A100-12x20 has 173.17 lineal feet of 1/16-inch slots.
 $(173.17 \text{ lineal ft.}) (.0625 \text{ in.}) \left(\frac{1 \text{ ft.}}{12 \text{ in.}}\right) = 0.9 \text{ ft}^2 \text{ total flow area.}$

Filter Facts, continued ...

5,000 gpd, and a 15" filter (FT1554-36) for flows up to 8,500 gpd. Based on maintenance records, we know that our standard 4" residential filter (FT0444-36) 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 **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 slots to our 1/8-inch-diameter 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 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, in case 1/8-inch still isn'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.

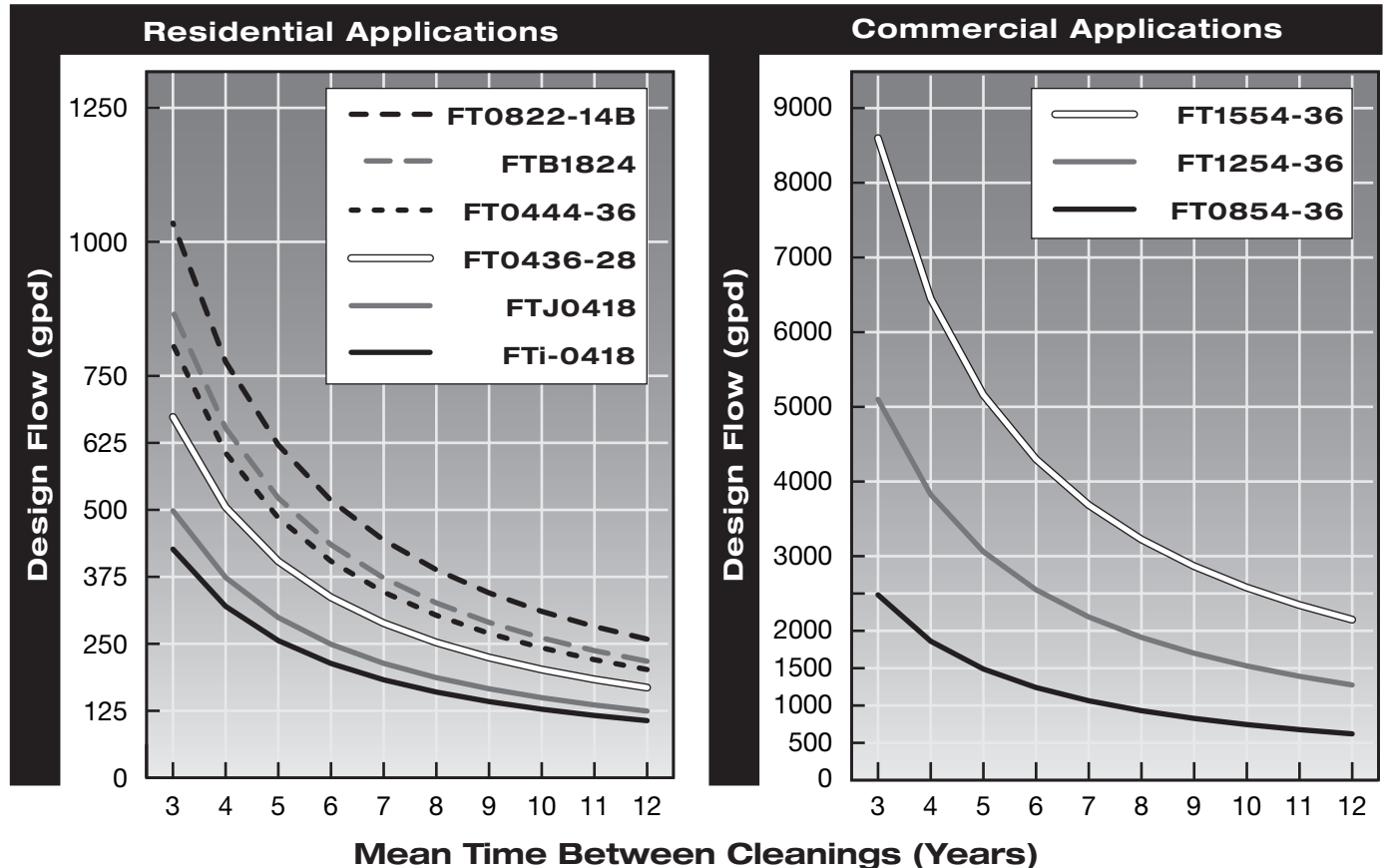
Alarm Feature

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

Warranty

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

Graphs 3 and 4: Relationship between effluent filter size (model), design flow, and cleaning interval, for Orengo filters.



Filter Facts, continued ...

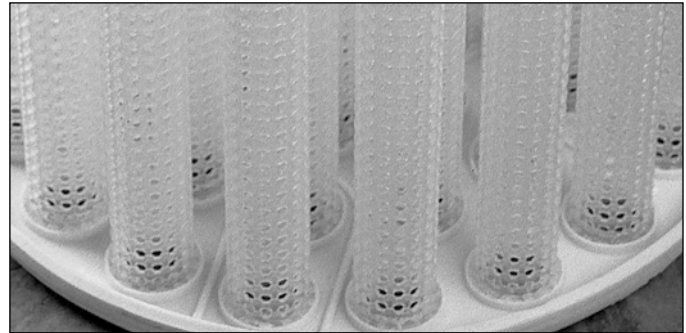
Documented Performance from Thousands of Installations

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 1, below.

Table 1: 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

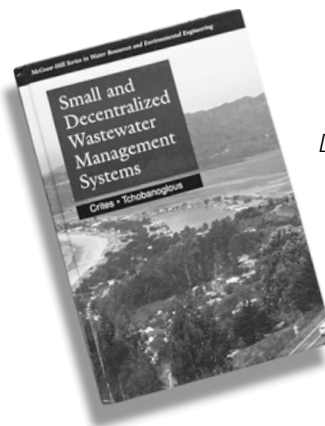
This is some of the data provided to Crites and Tchobanoglous for use in their textbook, *Small and Decentralized Wastewater Management Systems*. Since Dr. Tchobanoglous notes that residential wastewater typically includes 85 mg/L of TSS, our data shows that our effluent filters reduce residential TSS 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 or orifices (to limit the flow rate leaving the tank, mitigating surges and increasing 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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