

Primary Tank Sizing

At Orenco Systems, we believe a structurally sound, watertight, and well-maintained septic tank is one of the most effective and economical wastewater treatment devices available. Adequate septic tankage will anaerobically digest organic material, remove settleable and floatable solids, help modulate flow, and consistently discharge effluent that meets “primary treatment” standards.

The *Primary Tank Sizing Chart* on the next page lists Orenco’s tank sizing recommendations for various applications. The table includes *minimum* and *preferred* tankages for a dozen common types of facilities. We acknowledge that both the minimum and preferred tankages listed exceed EPA minimum sizes. After conducting extensive research on septic tankage, we are convinced that the smaller tankage arrived at using the EPA formula will result in suboptimal performance. Moreover, although smaller tanks may cost less initially, long-term cost of ownership is greater when their higher maintenance costs are taken into consideration. From an economic standpoint, ensuring adequate tankage of onsite wastewater treatment systems is an effective way to reduce operational costs. Consequently, we base our numbers on long-term performance satisfaction with regard to nominal (minimum) and high quality (preferred) effluent.

Here are a few tips on how to use this chart:

- To calculate the appropriate tank size for your job, multiply the *design flow* in gallons per day specified by your regulatory commission (according to facility type) by the *hydraulic retention time (HRT)* in days, listed in the *Minimum* and *Preferred* columns. For example, if local regulations require a 10,000 gpd system design for an office facility, Orenco recommends tankage of 30,000 gpd (minimum) or 40,000 gpd (preferred).
- Because grease and oil can inhibit microbial action and seal the pores in a packed bed filter or soil absorption system, Orenco recommends a **grease tank** for any facility with a commercial kitchen. A grease tank, which provides the longer retention time required to cool grease and oil to a point at which separation is possible, is an economical means of cooling and removing grease and oil before integrating the kitchen flow into the primary tankage.
- Several types of facilities--such as churches, schools, weekend campsites, etc.--may experience large fluctuations in daily flow; some may even receive all of their weekly flow over the course of one or two days. For facilities like these that need surge control, **flow equalization** should be included in the tank design.
- For facilities in the upper portion of the table with restrooms and kitchen, primary tankage volume is determined by multiplying the total flow of the restrooms and kitchen combined by the factor in the *Primary Tankage* cell. For larger facilities, such as the bottom three categories on the chart, the values are intended to be cumulative.

This table should be used as a general guideline for decentralized wastewater treatment designs. If you have questions about special cases where larger tankage or other measures may be necessary, or if you have general questions about flow equalization, please call **Orenco Systems at (800) 348-9843** and ask for Systems Engineering.

Primary Tank Sizing Chart

Facility	Minimum		Preferred	
	Grease Tankage ¹ HRT (days)	Primary Tankage ² HRT (days)	Grease Tankage ¹ HRT (days)	Primary Tankage ² HRT (days)
Office/Manufacturing/Light Industrial				
a) restrooms only	n/a	3	n/a	4
Restaurant/Deli				
a) restrooms and kitchen	3	4	5	5
Convenience Store/Gas Station				
a) restrooms only	n/a	3	n/a	4
b) restrooms and kitchen/deli	2	3 ³	4	4 ³
Hotel/Motel/Multiple Dwelling Units				
a) restrooms only	n/a	3	n/a	4
b) restrooms and restaurant/kitchen	3	3 ³	5	4 ³
Church				
a) restrooms only	n/a	2.5 + Surge ⁴	n/a	4 + Surge ⁴
b) restrooms and kitchen	2	2.5 + Surge ^{3,4}	4	4 + Surge ^{3,4}
School				
a) restrooms only	n/a	3 + Surge ⁴	n/a	4 + Surge ⁴
b) restrooms and kitchen	3	3 + Surge ^{3,4}	5	4 + Surge ^{3,4}
Dog Kennel/Veterinary Clinic				
a) restrooms only	n/a	3	n/a	4
b) restrooms and floor drains	n/a	3 + Surge ^{3,4,5}	n/a	4 + Surge ^{3,4,5}
RV Park				
a) RV spaces	n/a	3	n/a	4
b) dump station	n/a	8	n/a	10
Casino				
a) gaming floor	n/a	3	n/a	4
b) hotel/motel	n/a	3	n/a	4
c) restaurant/deli	3	4	5	5
Resort/Camp				
a) bunk houses	n/a	3	n/a	4
b) main houses	n/a	3	n/a	4
c) kitchen	2	3	4	4

- Grease tankage HRT is based on a separate **kitchen peak flow**, which is integrated into the main flow prior to introduction to the primary septic tanks.
- Primary tankage HRT is based on **total peak flow**.
- For facilities with restrooms and kitchen, primary tankage volume is determined by multiplying the total flow of the restrooms and kitchen combined by the factor in the *Primary Tankage* cell.
- To determine surge volume for flow equalization purposes, please call **Oreco Systems** at (800) 348-9843 for assistance.
- To reduce septage pumping in these and other specialized applications, we recommend using multiple tanks: The first should be small (0.5 to 0.75 HRT); subsequent tanks should provide the remaining HRT requirements.

NOTE: Tankages are based on long-term performance satisfaction (with respect to septage removal) and nominal (minimum) to high-quality (preferred) effluent. If effluent strength is higher than the expected level or if a higher level of treatment is required, greater tankage will be necessary. To enhance total nitrogen reduction, primary tankage should be increased for AdvanTex™ Mode 3 systems. Consult Oreco Systems for specifics.