

GREASE SEPARATION DEVICE SIZING OPTIONS

Method 1. Evaluation Based upon 20-25 Minute Hydraulic Retention

Grease Separation Device Sizing Table

Maximum, worst-case hydraulic loading conditions typified below for new construction projects. Grease interceptor type not specified in this table. Size of device is listed as wetted holding volume (gallons).

<i>Kitchen Drainage Fixtures</i>	<i>using 1½” drain pipe gallons</i>	<i>2” drain pipe gallons</i>
One pre-rinse sink and dishwasher	300	500
One 2- or 3-compartment pot sink	300	500
One 2- or 3-compartment pot sink (and) one 1-compartment prep sink	500	750
One 3-compartment pot sink (and) one 2-compartment prep sink	750	1,000
One 3-compartment pot sink (and) one 2-compartment prep sink (and) one pre-rinse sink	1,000	1,500
One 3-compartment pot sink (and) one 2-compartment prep sink (and) one pre-rinse sink (and) dishwasher (and) one utility sink	2,000	3,000
One 3-compartment pot sinks (and) one 3-compartment prep sinks (and) one pre-rinse sink (and) dishwasher (and) one utility sink	2,000	3,000
One or more 3-compartment pot sinks (and) one or more 3-compartment prep sinks (and) one or more pre-rinse sinks (and) dishwasher(s) (and) one or more utility sinks	3,000	4,000

- Drain outlet size, as provided by sink or drainage fixture manufacturer
- Other configurations can be considered
- If food grinder is used, add 30 percent to each size listed.
- Hood-cleaning wash water should be collected in buckets and transferred to waste oil rendering/collection barrel. It should not be discharged into grease interceptor. Check with rendering service contractor prior to commencement of this activity to determine if such procedure is acceptable with rendering service provider.
- If bona fide hardship exists, use of interior grease separation device (using hot water pre-rinse procedure) may be considered.

Methods 2 & 3. Evaluations Based Upon EPA Standards for On-site Wastewater Systems

The most commonly used numerical limit is 100 mg/L. This limit of 100 mg/L does not appear to be based upon any empirical evidence but rather, is based on general correlations and an industry consensus that this level prevents the build-up of oil and grease in the collection system. Numeric values listed in this document are indicative of technology-based criteria.

Standards have been developed for sizing grease separation devices. EPA-1 procedure is provided for determining grease separation device size for restaurants and EPA-2 is for hospitals, nursing homes and other commercial kitchens with varied seating capacity. These design models were developed to achieve the necessary reduction for grease and oils for on-site wastewater systems specific to the on-site food service operations.

EPA-1 Procedure for Restaurants

Minimum of 750 gallons

$(\# \text{ of seats}) \times (\text{gallons}) \times (\text{storage factor}) \times (1/2 \# \text{ of hours open}) \times (\text{loading factor}) = \text{grease separation device volume (gallons)}$

Loading Factor

Minimum = .5 other

Highways

1.25inter-

state freeways

1.0 for other freeways and

recreational freeways,

0.8 is provided for main

highways

Storage Factor

Minimum = 1.7

Maximum = 2.5

Gallons

Wastewater gallons

per meal, usually5 Maximum =

gallons

Example: For a restaurant with a 50-seat dining area, an 8-hour per day operation, with 5 gallons of wastewater per meal, a storage capacity factor of 2.0, and a loading factor of 1.0, the size of the grease trap is calculated as follows:

$$(50) \times (5) \times (2.0) \times (1.0) \times (8/2) = 2,000 \text{ gallons}$$

Based on precast tank manufacturing in North Carolina, thousand gallon increments are typical; therefore, a minimum 2,000-gallon tank size would be recommended.

EPA-2 Procedure for Hospitals, Nursing Homes and other type commercial kitchens with varied seating

Minimum of 750 gallons

$$(\# \text{ of meals served a day}) \times (\text{gallons}) \times (\text{storage factor}) \times (\text{loading factor}) = \text{grease separation device volume (gallons)}$$

Loading Factor Storage Factor Gallons

Food Grinder & Minimum = 1.7 Wastewater gallons per Dishwasher = 1.25 Maximum = 2.5 meal, usually 4.5 gal W/O Food Grinder = 1.0 W/O Dishwasher = .75 W/O Food Grinder & Dishwasher = .5

Example: 100-person rest home

$$(330 [100 \text{ patients} + 10 \text{ staff} \times 3 \text{ meals/day}]) \times (4.5) \times (1.25 [\text{w/ food grinder \& dish-washer}]) \times (2.0 [\text{typical storage factor}]) = 3,712 \text{ gallons}$$

Based on precast tank manufacturing in North Carolina, thousand gallon increments are typical; therefore, a minimum 3,000-gallon tank size would be recommended.

Method 4. Evaluation Based upon NCDEH Standards

Facility	Grease tank size
salad only or subs	500 gallon
Take-out grilled foods	1,000 to 1,500 gallon depending on size of facility
take-out deep fried foods	1,500 to 2,000 gallon depending on size of facility
pasta and pizza facilities	1,500 to 2,000 gallon depending on size of facility
sit-down full menu restaurants <100 seats	1,500 to 2,000 gallon depending on size of facility
sit-down full menu restaurants >100 seats	2,000 to 3,000 gallon depending on size of facility

Method 5. Limited Facility Design Guideline

This formula is for single fixture only with limited menu, ware washing, etc.

A single fixture is considered a utensil wash sink, prep sink, culinary sink or other fixture where wastewater is discharged through a single outlet that contains fats, grease or oils.

Step 1	Determine the cubic contents of the fixture by multiplying length x width x depth	Number of compartment times 24" long by 24" wide by 14 " deep. Cubic contents $3 \times 24 \times 24 \times 14 = 24,192$ cubic inches
Step 2	Determine the capacity in gallons 1 gallon = 231 cubic in.	Contents in gallons: $24,192 \div 231 = 104.7$ gallons
Step 3	Determine actual drainage load. The fixture is usually filled to about 75 percent of capacity with wastewater. The items to be washed displace about 25 percent of the fixture content. Actual drainage load = 75 percent of fixture capacity.	Actual Load: $.75 \times 104.73 \text{ gals.} = 78.55$ gallons
Step 4	For design considerations, it is good practice to calculate the flow rate in GPM equal to or greater than 75 percent of the fixture capacity.	Calculated flow rate for design capacity in GPM on 75 percent of fixture capacity: 75 percent of fixture capacity = 78.55 gals Flow Rate = 78.55 GPM
Step 5	Select the grease separation device that matches the calculated design flow rate.	For 75 percent fixture capacity = 78.55 GPM

Where a pre-wash sink is installed for dish machines, the pre-wash sink should be considered as a single fixture to include a grease separation device with a design capacity of 45 GPM. This device should also include a solid strainer on the inlet side in order to prevent solid accumulation within the device.

Method 6. Uniform Plumbing Code Procedure

**Table H-1
Sizing of Grease Separation Devices**

Number of meals per peak hour (1)	X	Waste flow rate (2)	X	Retention time (3)	X	Storage factor (4)	=	Grease separation device size (liquid capacity)
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1. Meals Served at Peak Hour
2. Waste Flow Rate
 - With dishwashing machine..... 6 gallon (22.7 L) flow
 - Without dishwashing machine..... 5 gallon (18.9 L) flow
 - Single service kitchen..... 2 gallon (7.6 L) flow
 - Food waste disposer..... 1 gallon (3.8 L) flow
3. Retention Times
 - Commercial kitchen waste
 - Dishwasher 2.5 hours
 - Single service kitchen
 - Single serving 1.5 hours
4. Storage Factors
 - Fully equipped commercial kitchen 8 hour operation: 1
 -16 hour operation: 2
 -24 hour operation: 3
 - Single Service Kitchen..... 1.5

Ref: Uniform Plumbing Code Appendix H.