

GREASE INTERCEPTOR DESIGN

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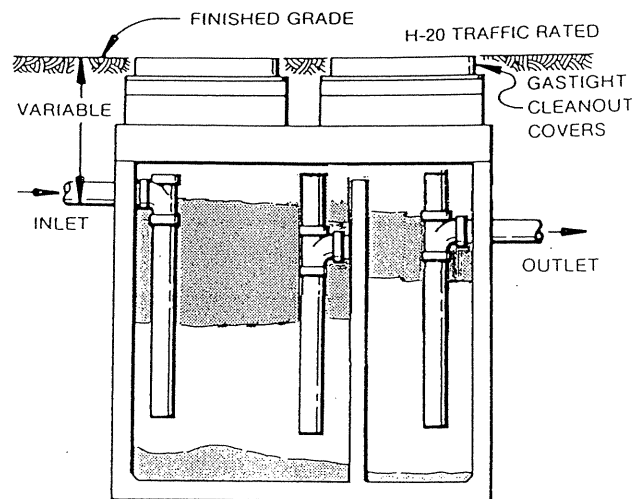
Grease interceptors are used to remove excessive amounts of grease that may interfere with subsequent treatment. In almost every commercial/institutional application grease can clog sewer lines, hinder treatment at wastewater treatment plants, clog inlet and outlet structures in septic tanks and leach fields resulting in restricted flows and poor septic tank and septic system performance. The purpose of a grease interceptor is simply to remove grease from the wastewater stream prior to treatment.

Grease interceptors are small flotation chambers where grease floats to the water surface and is retained while the clearer water underneath is discharged. There are no moving mechanical parts.

The grease interceptors discussed here are the large, outdoor-type units, and should not be confused with the small grease traps found on some kitchen drains.

Grease interceptors are rarely used for individual homes. Their main application is in treating kitchen wastewaters from motels, cafeterias, restaurants, hospitals, schools, and other institutions with large volumes of kitchen wastewaters. According to Uniform Plumbing Code all facilities with a commercial kitchen with more than 3 fixtures should have a grease interceptor.

Influents to grease interceptors usually contain high organic loads, including grease, oils, fats, and dissolved food particles, as well as detergents and suspended solids. Wastewaters from garbage grinders should not be discharged to grease interceptors, as high solids loadings can upset grease interceptor performance, and greatly increase both solids accumulation and the need for frequent pumpout.



TYPICAL CROSS-SECTION — GREASE INTERCEPTOR

See page 2 and 3 of grease interceptor design for sizing criteria

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GREASE INTERCEPTOR SIZING CRITERIA - EPA DESIGN

The recommended method for sizing a grease interceptor, as published in the EPA Design Manual, "Onsite Wastewater Treatment and Disposal Systems", is as follows:

1. RESTAURANTS:

$$(D) \times (GL) \times (ST) \times (HR/2) \times (LF) = \text{Size of Grease Interceptor, gallons}$$

where:

- D = Number of seats in dining area
- GL = Gallons of wastewater per meal, normally 5 gallons
- ST = Storage capacity factor - minimum of 1.7, onsite disposal, 2.5
- HR = Number of hours open
- LF = Loading factor -
 - 1.25 interstate freeways
 - 1.0 other freeways
 - 1.0 recreational areas
 - 0.8 main highways
 - 0.5 other highways

Thus, for a restaurant with 75-seat dining area, an 8 hour per day operation, a typical discharge of 5 gallons per meal, a storage capacity factor of 1.7, and a loading factor of 0.8, the size of the grease interceptor is calculated as follows:

$$(75) \times (5) \times (1.7) \times (8/2) \times (0.8) = 2,040 \text{ gallons}$$

2. HOSPITALS, NURSING HOMES, OTHER TYPE COMMERCIAL KITCHENS WITH VARIED SEATING CAPACITY

$$(M) \times (GL) \times (ST) \times (2.5) \times (LF) = \text{Size of Grease Interceptor, gallons}$$

where:

- M = Meals per day
- GL = Gallons of wastewater per meal, normally 4.5
- SC = Storage capacity factor - minimum of 1.7, onsite disposal, 2.5
- LF = Loading factor -
 - 1.25 garbage disposal and dishwashing
 - 1.0 without garbage disposal
 - 0.75 without dishwashing
 - 0.5 without dishwashing and garbage disposal

A check of local ordinances and codes should always be made before the grease interceptor is purchased.

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H 4 GREASE INTERCEPTOR SIZING CRITERIA - ACCORDING TO UNIFORM PLUMBING CODE

From section H 4 Of Uniform Plumbing Code

(a) Parameters. The parameters for sizing a grease interceptor are hydraulic loading and grease storage capacity, for one or more fixtures.

(b) Sizing Formula. The size of the interceptor shall be determined by the following formula:

$$\begin{array}{ccccccc} \text{Number of meals} & & \text{Waste flow} & & \text{Retention} & & \text{Storage} & & \text{Interceptor size} \\ \text{per peak hour}^1 & \times & \text{rate}^2 & \times & \text{time}^3 & \times & \text{factor}^4 & = & \text{(liquid capacity)} \end{array}$$

1. Meals Served at Peak Hour
2. Waste Flow Rate
 - a. With dishwashing machine6 gallon (22.7 L) flow
 - b. Without dishwashing machine.....5 gallon (18.9 L) flow
 - c. Single service kitchen.....2 gallon (7.6 L) flow
 - d. 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

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