Winston-Salem/Forsyth County
Utility Commission

Grease Control Design and Structural Criteria
For New Facilities

Grease Interceptors shall conform to the following criteria when being designed and constructed:

A. A 24-minute retention time under *actual peak flow*. See Sizing Criteria below.
B. New in-ground grease interceptors shall be **no less than 1,000 gallons** total capacity unless otherwise approved by the Director.
C. Interior baffles to distribute flows. Will extend six (6) inches above water line but cannot flood the inlet pipe.
D. Minimum 2:1 length to width ratio.
E. Low velocity flow near outlet.
F. Baffle wall located a distance from inlet wall of 2/3 to 3/4 of the total length of the interceptor as shown on detail drawing.
G. Nine (9) inches of freeboard at grease interceptor top.
H. Each grease interceptor shall have inlet and outlet tees. The outlet tee shall extend 50% into the liquid depth. The inlet tee shall extend 25% into the liquid depth. Inlet and outlet tees must be plugged at the top of the sanitary tee and be a minimum of three (3) inches in diameter.
I. Access openings over the inlet, outlet, and each compartment within the grease interceptor. Each opening shall be twenty-four (24) inches in diameter and contain pick holes. All covers shall be constructed of cast iron or equivalent traffic bearing material. Manholes/covers must extend to the finished grade and be installed to exclude the entrance of surface or storm water into the interceptor.
J. Full size cleanouts shall be installed on the inlet and outlet sides of the interceptor and extended to grade.
K. Grease interceptors must be vented in accordance with the NC State Plumbing Code with a minimum 2" diameter vent piping. Vent connections may be made through the top of the interceptor, in which case the bottom of the vent shall extend no closer than 6" to the static water level, or may be made through the side of the interceptor's access opening.
L. In-ground grease interceptors shall receive kitchen wastes. Kitchen wastes include: pot sinks, prep sinks, can wash, floor drains, and dishwasher.
M. Minimum concrete compressive strength of 3,500 psi.
N. Joints should be properly sealed to prevent infiltration or exfiltration.
O. Grease interceptors must meet a minimum structural design of 150-pounds/square foot for non-traffic installations. For vehicular traffic conditions the grease interceptor shall be designed to withstand a H-20 wheel load.
P. Grease interceptors shall meet the following standards: ASTM C-1227 for Septic Tanks, C-913 for Precast Concrete Water and Wastewater Structures, ACI-318 for Design and ASTM C-890 for establishing Minimum Structural Design Loading.
Q. Grease interceptors made of polyethylene or fiberglass tanks shall be able to withstand the appropriate loading (traffic or non-traffic) or perform under a vacuum test to stimulate loading and include 12,000 psi ultimate tensile strength, 19,000 psi flexural

strength, and 800,000 psi flexural modulus of elasticity as per ASTM D790. Tanks shall be listed and labeled.

R. A North Carolina design professional will specifically design cast in place or masonry tanks.

Sizing

How to Determine the Size of an <u>Exterior, In-ground</u> Grease Interceptor Using the Manning Formula:

<u>The formula for calculating grease interceptor sizing is</u>:

Gallons of interceptor = [[**<u>(1)</u>** = GPM/fixture (derived from Manning formula) x **<u>(2)</u>** = total # fixture ratings of grease-laden waste streams] + **<u>(3)</u>** direct flow from a dishwasher, laundry washer, glass washer (in GPM)]] x **<u>(4)</u>** = 24 minute retention time

Components of equation =

1. **<u>GPM/fixture</u>** – This is derived from the Manning Formula. It takes into account the slope; roughnesses of the pipe (plastic) used, and pipe diameter size. When applying the Manning Formula, we arrive at the drainage rates of various pipe diameter sizes:
   0.5 inch pipe diameter = 0.8 GPM/fixture
   1.0 inch pipe diameter = 5.0 GPM/fixture
   1.5 inch pipe diameter = 15 GPM/fixture
   2.0 inch pipe diameter = 33 GPM/fixture
   2.5 inch pipe diameter = 59 GPM/fixture
   3.0 inch pipe diameter = 93 GPM/fixture

2. **<u>Fixture Ratings of Grease-Laden Waste Streams</u>**: Fixtures that have more grease in their waste stream received higher values while less grease corresponds to a lower value. The table is shown below:

   Table of Common Commercial Kitchen Fixtures and their Corresponding Rating (each):
   2, 3, or 4 compartment pot sink = 1.0
   1 or 2 compartment **meat** prep sink = 0.75
   Pre-rinse sink = 0.5
   1 or 2 compartment **vegetable** prep sink = 0.25
   Can wash = 0.25
   Mop sink = 0.25
   Floor drain = 0.00

3. **<u>Direct Flow from Dishwashers, Laundry washer, and Glass washer</u>**: These flows must be added directly to the GPM flow because:
   Their potential for discharging large quantities of water in a short time period.
   Since these appliances have pumps, the Manning Formula cannot be applied to predict flow; must use manufacturer's discharge rate for flow in GPM but not less than the draw down rate.

4. **<u>Twenty-four minute retention time</u>**: Engineers have determined that when applying several criteria to determine proper grease (animal and vegetable lipids) separation (using Stokes's Law, specific gravity of lipids, etc.), a twenty-four minute retention time is required.

<u>Example #1</u>: A restaurant has the following fixtures in their kitchen (all fixtures have a 1.5 inch pipe diameter):

- (1) 3-compartment pot sink
- 1 pre-rinse sink
- (1) 2- compartment vegetable prep sink
- 1 dishwasher that discharges 10 GPM

<u>Using the formula to size exterior grease interceptors, we get</u>:

Gallons needed for grease interceptor
= [[15 GPM x [1 + 0.5 + 0.25] + 10 GPM] x 24 minutes
= [[15 GPM x 1.75] + 10 GPM] x 24 minutes
= 26.25 GPM + 10 GPM x 24 minutes
= 36.25 GPM x 24 minutes
= 870 gallons round up to the next size = ⟶ ***<u>1,000 gallons grease interceptor is required</u>***

<u>Example #2</u>: A restaurant has the following fixtures:

<u>At 0.5 inch pipe diameter</u>: Pre-rinse sink

<u>At 1.5 inch pipe diameter</u>:

- (1) 3-compartment pot sink
- 1 pre-rinse sink
- 1 meat prep sink
- 1 vegetable prep sink

<u>At 3.0 inch pipe diameter</u>:

- 1 can wash

<u>Using the formula to size exterior grease interceptors, we get</u>:

For the pre-rinse sink, we take 0.8 GPM x 0.5 = 0.4 GPM

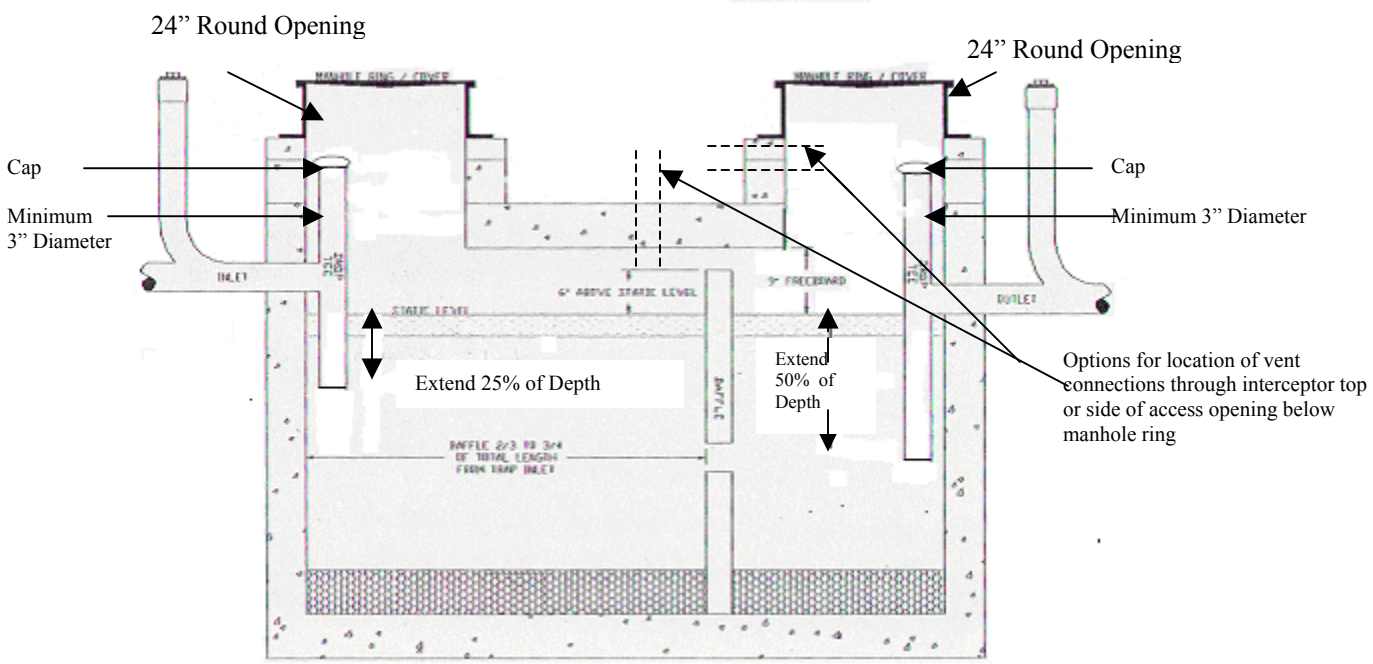
For the 1.5 inch pipe diameter fixtures: 15 GPM x [1+ 0.5 + 0.75 + 0.25] = 15 GPM x 2.5 = 37.5 GPM

For the can wash: 93 GPM x 0.25 = 23.25 GPM

Add 23.25 GPM + 37.5 GPM + 0.4 GPM = 61.15 GPM x 24 minutes = 1,468 gallons; round up to the next size = ***1,500 gallon grease interceptor is required***.

New Buildings (Strip Centers) with the Potential for Food Service Establishments.

All new buildings or strip centers containing sections designated for commercial enterprise of the strip center, are encouraged to provide a stub-out for a separate waste line for future grease interceptor installation. The owner of a new strip center shall consider suitable physical property space and sewer gradient that will be conducive for the installation of an exterior, in-ground grease interceptor(s) for any flex space contained within the strip center. Physical Property Restrictions and sewer gradient shall not be a defense for failure to install an exterior, in-ground grease interceptor.

MANHOLES/COVERS AND CLEAN OUTS MUST EXTEND TO THE FINISHED GRADE AND MUST EXCLUDE THE ENTRANCE OF SURFACE OR STORM WATER INTO THE INTERCEPTOR

GREASE INTERCEPTOR MUST BE VENTED