21st Century FOG Management

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SCHIER

LOCATED IN SHAWNEE, KS

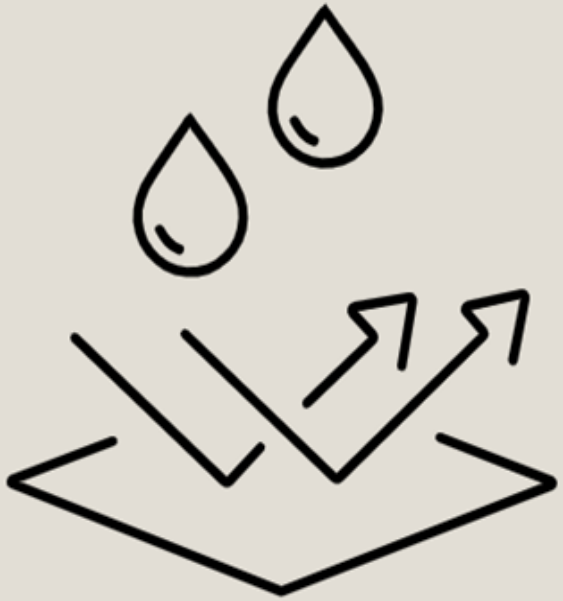
—

100% USA-MADE

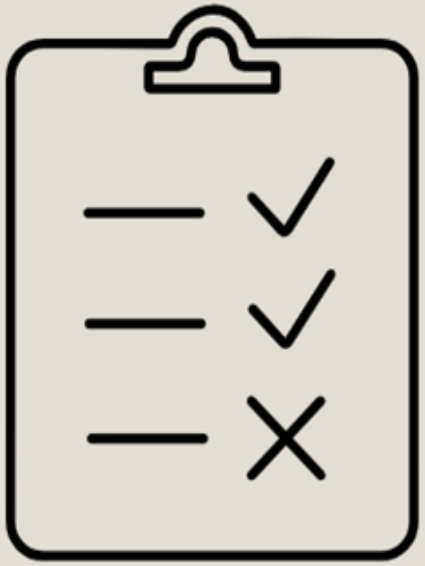

SCHIER
100%
EMPLOYEE
OWNED

THREE PILLARS OF

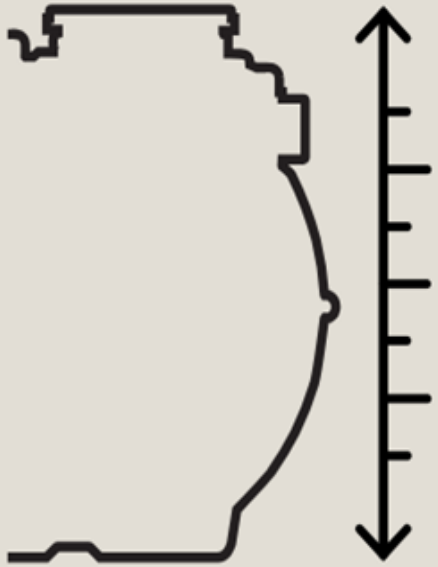
A HOLISTIC FOG PROGRAM



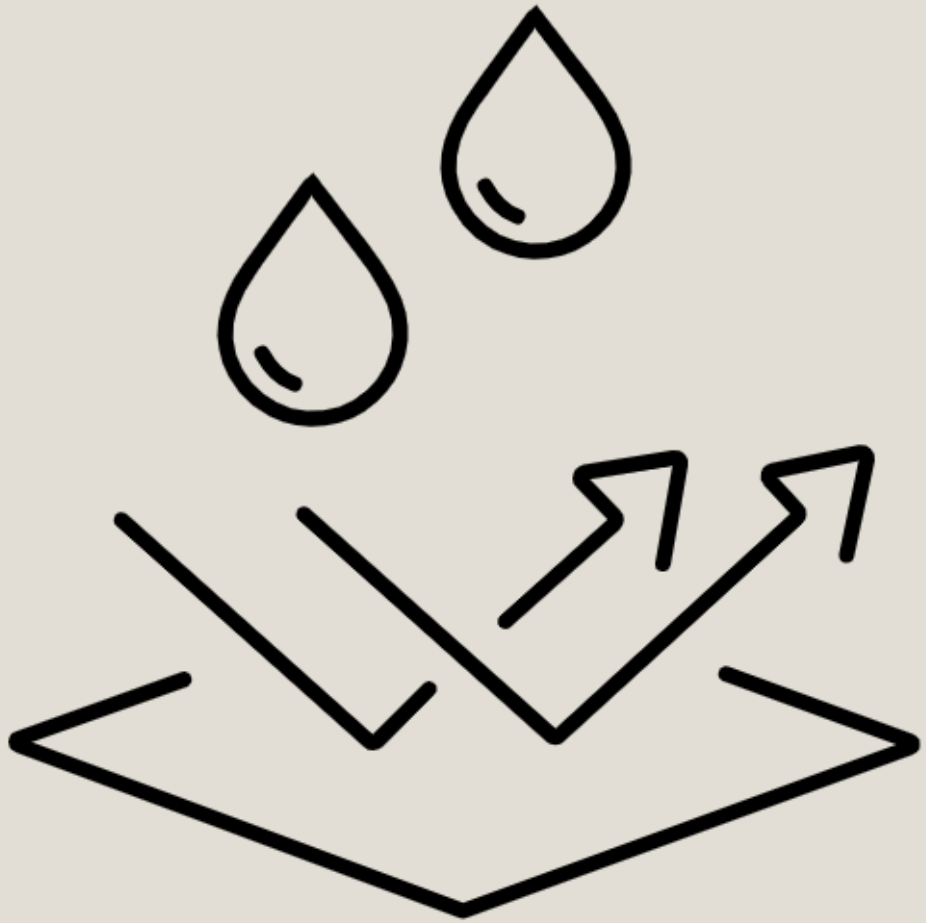
Corrosion resistant grease interceptors



3rd-party certified performance testing



Right sizing for optimal pumpout frequency



Corrosion resistant grease interceptors

#1 - Corrosion Resistance

Animal fats, dairy, sugars, salts, and all other food waste will decay over time inside a grease interceptor. The average lifespan of a steel grease interceptor is 5 years and the average lifespan of a concrete grease interceptor is 10 years. The solution is mandating only non-corrosive materials such as polyethylene.

Effects of Corrosion

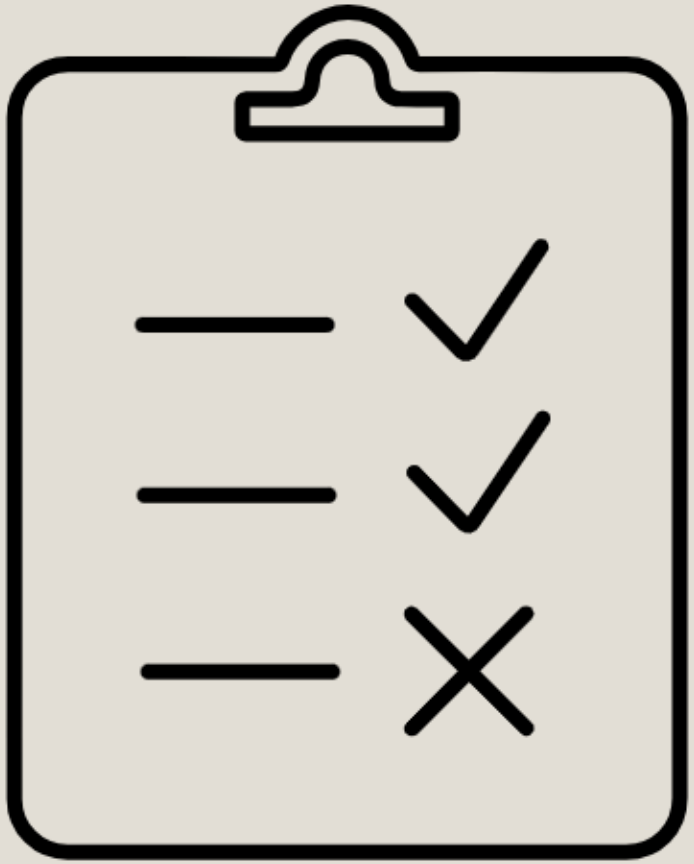
Sulfuric acid reacts with calcium hydroxide ($Ca(OH)_2$), forming calcium sulfate ($CaSO_4$) that, in the presence of water (H_2O), creates gypsum ($CaSO_4 \cdot 2H_2O$). This process damages the concrete.

Damaged Baffle Popeye’s

Collapsed Interceptor Garst

Damaged Baffle Mexican Villa

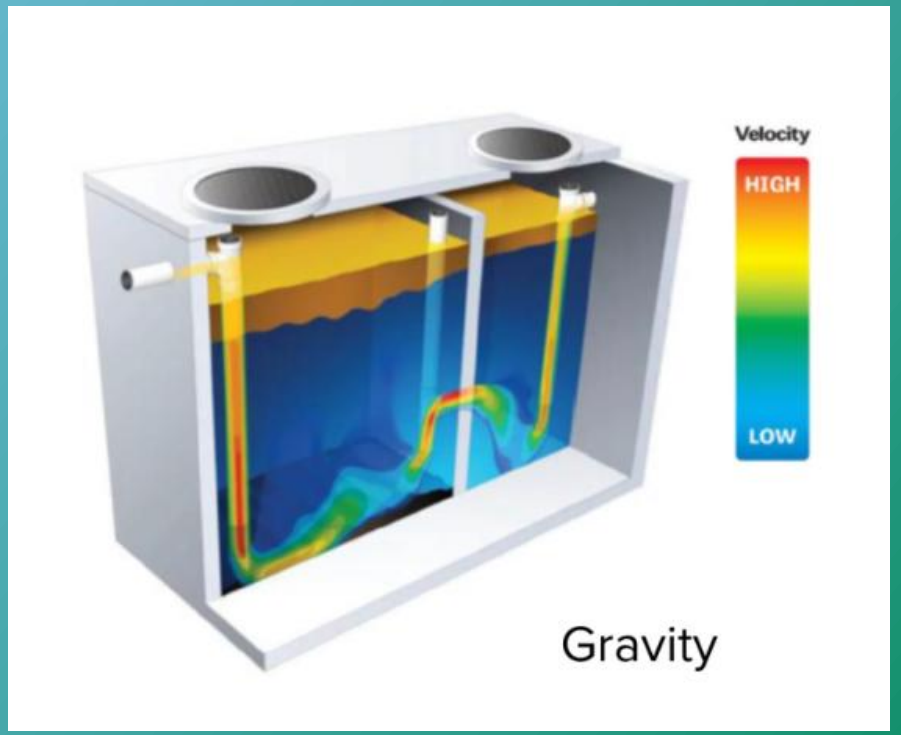
Polyethylene is Corrosion Proof!



3rd-party certified performance testing

#2 - Performance Testing

Laminar or quiescent; turbulent-free environment that promotes rapid separation of fats, oils, grease and solids.



Turbulent environment with uncontrolled velocity causing short-circuiting and bypass.


Water
Grease
Solids

3rd Party Test Reports

IAPMO R&T LAB

TEST REPORT

5001 East Philadelphia Street
Ontario, California – USA 91761-2816
Ph: 909.472.4100 | Fax: 909.472.4243
http://www.iapmortl.org

Report Number: 1757-23042 **Project Number:** 38326-002

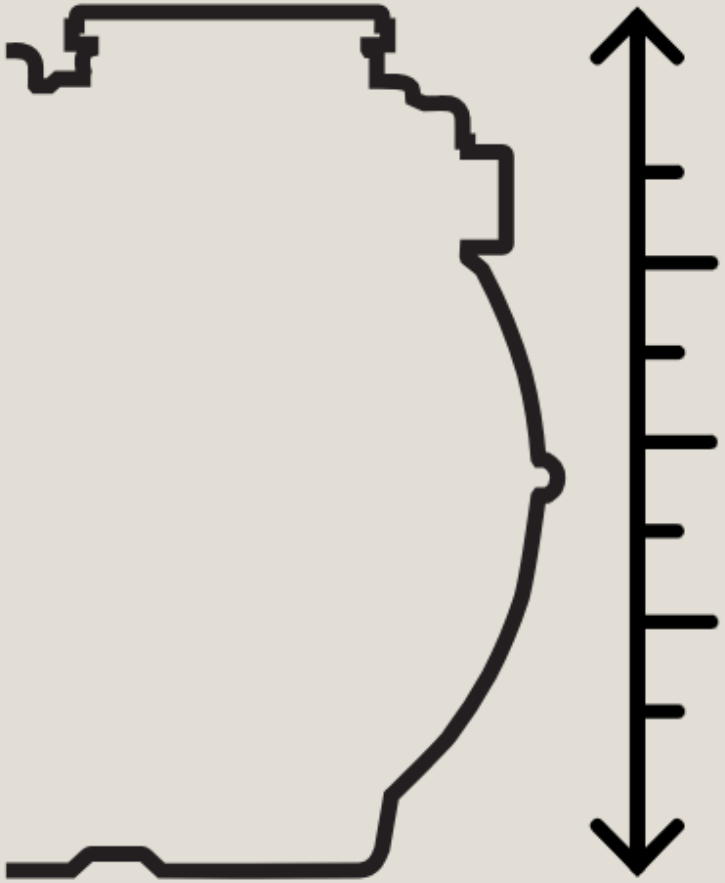
Report Issued: November 2, 2023

Client: Schier Products
6455 Woodland Dr.
Shawnee, KS 66218
Contact: Tad Asay

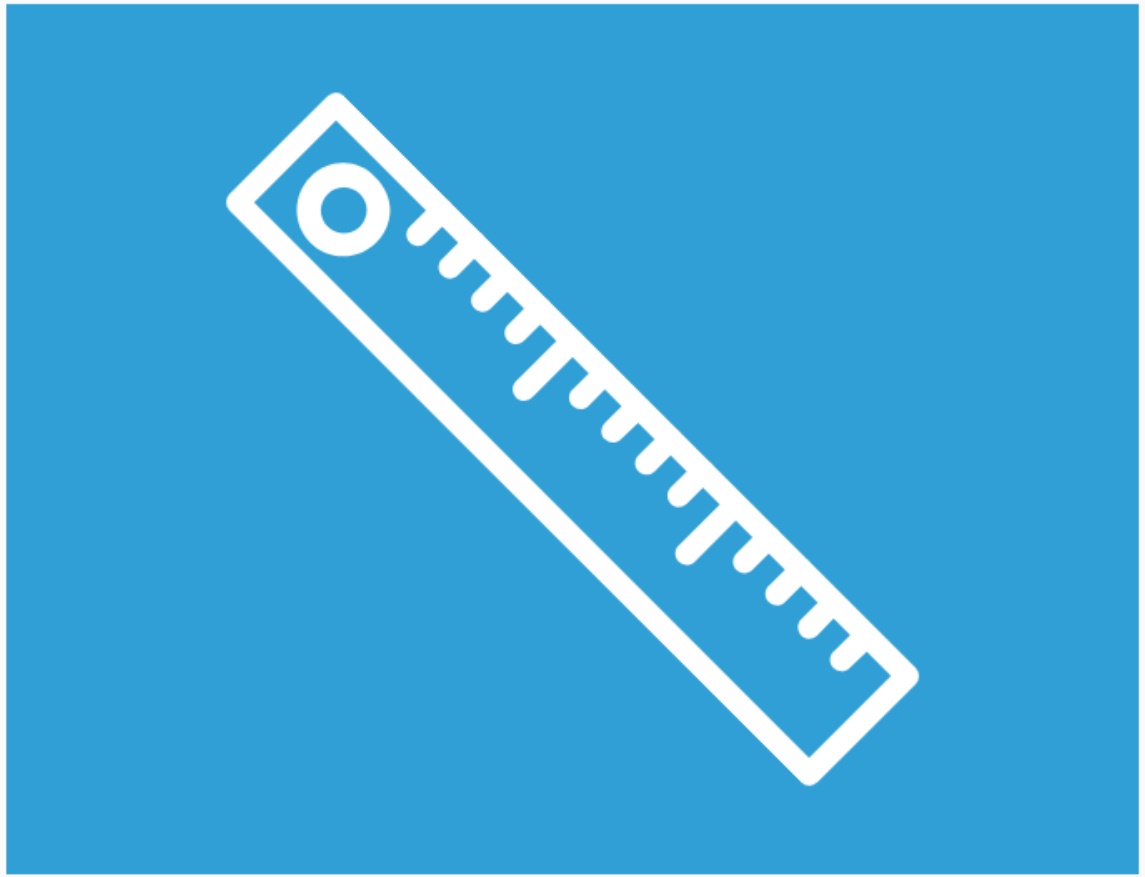
Source of Samples: The samples were manufactured at the client's facility in Shawnee, KS and was witnessed tested by Jeffrey Yu of IAPMO R&T Lab from November 28, 2022 through January 23, 2023. The samples were manufactured in good condition.

Date of Testing: November 28, 2022 through January 23, 2023

Grease Interceptor					INCREMENTAL				ACCUMULATED			
Test No.	Grease Sink	Water Sink	Drop Time (sec)	Flow Rate (GPM)	lbs added	lbs skimmed	lbs retained	Efficiency (%)	lbs added	lbs skimmed	lbs retained	Efficiency (%)
505	1	2	109.0	104.4	20	3.76	16.24	81.2	10100	38.57	10061.43	99.6



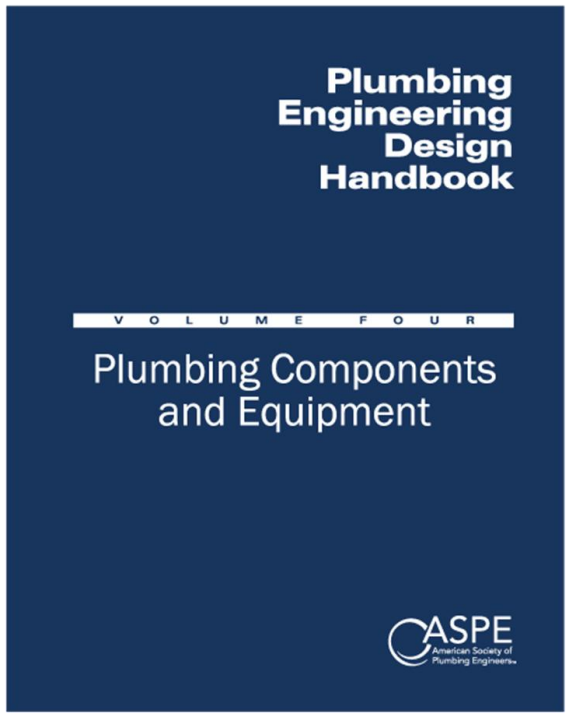
Right sizing for optimal pumpout frequency



GREASE PRODUCTION SIZING METHOD (GPSM)

Introduced by Schier in 2012, GPSM calculates how much grease a restaurant is likely to produce to ensure the grease interceptor has enough capacity to allow for a realistic and affordable pumpout frequency.

GPSM has been used to size more than 100,000 restaurant grease interceptors, adopted by several municipalities, published in the 2016 edition of the ASPE Plumbing Engineering Design Handbook and now powers our Grease Monkey® sizing app.



Example 8-3

To calculate a food service facility's daily potential grease load, multiply the number of meals (customers) per day by the grease production value per meal.

Assume the food service facility is a steak and seafood restaurant serving approximately 300 meals per day on washable dishes and flatware. Select the grease production value for high grease production with flatware from Table 8-3 and then calculate the daily grease load as follows: 300 × 0.0455 = 13.65 lbs of grease per day.

Next, select an interceptor based on its certified grease storage capacity and the desired maintenance frequency as follows:

- Weekly maintenance: 7 days × 13.65 lbs per day = 95.55 lbs of grease storage capacity required
- Monthly maintenance: 30 days × 13.65 lbs per day = 409.5 lbs of grease storage capacity required
- Bimonthly maintenance: 60 days × 13.65 lbs per day = 819 lbs of grease storage capacity required
- Quarterly maintenance: 90 days × 13.65 lbs per day = 1,228.5 lbs of grease storage capacity required

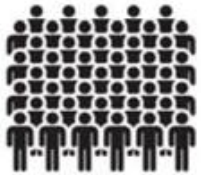
The engineer should work closely with the owner to determine the maintenance frequency that best suits their particular project.

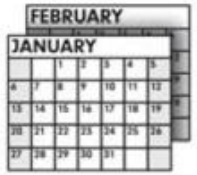
Table 8-3 Example Grease Production Values for Restaurants

Restaurant Type	Grease Production Values	Examples
Low grease producer	0.005 lbs (2.268 g)/meal (no flatware)	Elementary cafeteria, grocery meat department, hotel breakfast bar, sub shop, sushi, take-and-bake pizza
	0.0065 lbs (2.948 g)/meal (with flatware)	
Medium grease producer	0.025 lbs (11.340 g)/meal (no flatware)	Cafe, coffee shop, convenience store, grocery deli, Greek, Indian, Japanese, Korean, Thai, Vietnamese
	0.0325 lbs (14.742 g)/meal (with flatware)	
High grease producer	0.035 lbs (15.876 g)/meal (no flatware)	Full-fare family, fast-food hamburger, hamburger bar and grill, German, Italian, fast-food Mexican
	0.0455 lbs (20.638 g)/meal (with flatware)	
Very high grease producer	0.058 lbs (26.308 g)/meal (no flatware)	Full-fare BBQ, fast-food fried chicken, full-fare Mexican, steak and seafood, Chinese, Hawaiian
	0.075 lbs (34.019 g)/meal (with flatware)	

#3 - Right Sizing

Meals or Customers Per Day ✖ Grease Production (lbs.) Per Meal (see A B C D E F below) ✖ Days Per Pump-Out Cycle = **Grease Capacity Needed**





Low Grease Production[5]

- **A No Flatware:** 0.005 lbs./meal
- **B With Flatware:** 0.0065 lbs./meal

Examples: Sandwich Shop, Convenience Store, Fresh, Bar, Sushi Bar, Delicatessen, Snack Bar, Frozen Yogurt, Hotel Breakfast Bar, Residential

Medium Grease Production[5]

- **C No Flatware:** 0.025 lbs./meal
- **D With Flatware:** 0.0325 lbs./meal

Examples: Coffee House, Pizza, Grocery Store (no fryer), Ice Cream Parlor, Cafeteria (no food prep), Japanese, Fast Food, Drive-In, Greek, Indian, Low Grease Output FSE (w/fryer)

High Grease Production[5]

- **E No Flatware:** 0.035 lbs./meal
- **F With Flatware:** 0.0455 lbs./meal

Examples: Cafeteria, Family Restaurant, Italian, Steak House, Bakery/Donut Shop, Chinese, Buffet, Mexican, Seafood, Fried Chicken, Grocery Store (w/fryer), Barbecue

Let’s Size a Steak House

FIXTURES

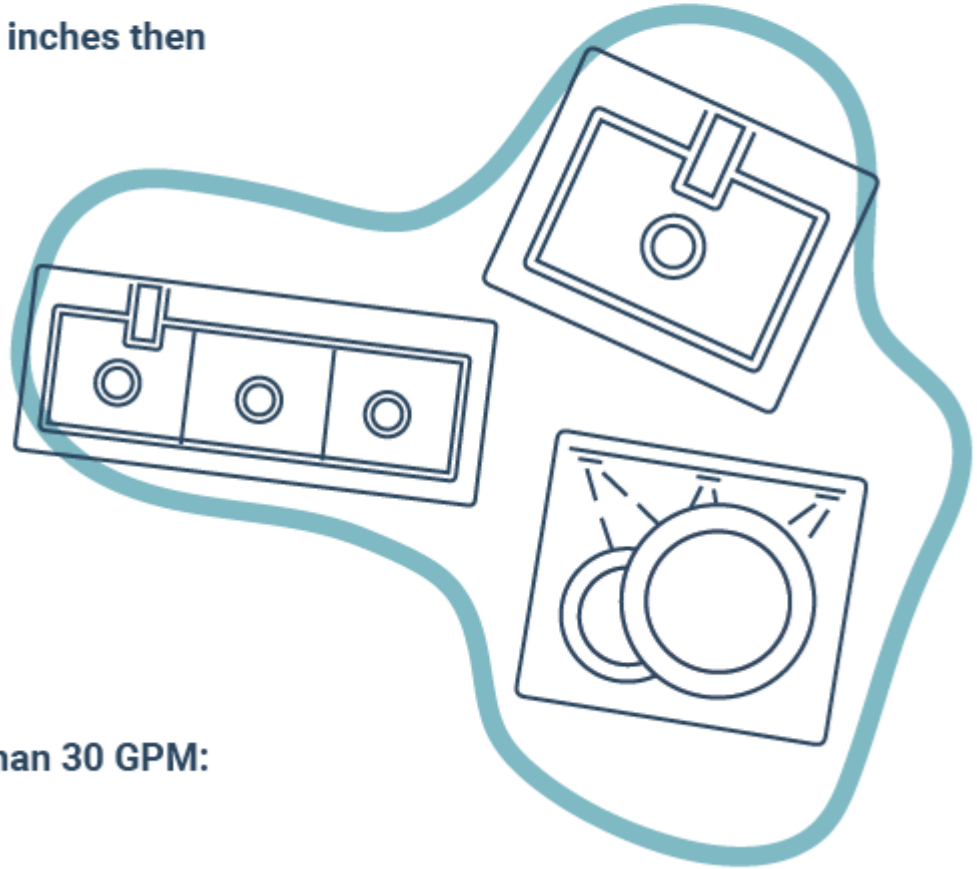
Calculate the volume of the compartment sink bowl(s) in cubic inches then multiply by the number of bowls to determine total volume:
21(L) x 21(W) x 14(H) = 6,174
6,174 x 3 = 18,522 volume in cubic inches

Convert cubic inches to gallons, then consider the fill factor of 0.75 to get the precise volume in gallons:
18,522 / 231 = 80
80 x 0.75 = 60 capacity in gallons

Note: 0.75 represents 75% of the sink filled up, which is typical

Determine one-minute flow rate and two-minute flow rate:
60 / 1 = 60 GPM one-minute drainage period
60 / 2 = 30 GPM two-minute drainage period

The chosen grease interceptor must have a flow rate greater than 30 GPM:

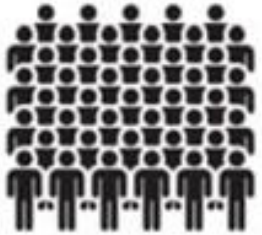
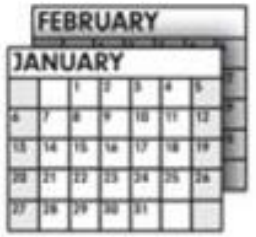


GREASE INTERCEPTOR CALCULATIONS

Step 1: Flow rate to grease interceptor

Fixture flow rate: (cu in / 231) = gal x 0.75 / 2 min = 2 min flow rate

NAME	TYPE	DIMENSIONS	QTY	CU IN	FLOW RATE
3 Compartment Sink	3 Compartment Sink	21" x 21" x 14" (3)	1	18,522	30.07 GPM
Bar Sink One Bowl	Bar Sink One Bowl	14" x 14" x 14"	2	5,488	8.9 GPM
Dishwasher	Dishwasher (Conveyor)	25 gal.	1	5,775	12.5 GPM
Floor Drain	Floor Drain	N/A	4	N/A	0 GPM
Floor Sink	Floor Sink	N/A	1	N/A	0 GPM
Hand Sink	Hand Sink	10" x 14" x 5"	3	2,100	3.42 GPM
Mop Basin	Mop Basin	24" x 24" x 10"	1	5,760	9.35 GPM
Pre-Rinse Sink One Bowl	Pre-Rinse Sink One Bowl	20" x 20" x 5"	2	4,000	6.5 GPM
Total					**70.73 GPM**

Meals or Customers Per Day	×	Grease Production (lbs.) Per Meal (see A B C D E F below)	×	Days Per Pump-Out Cycle	=	**Grease Capacity Needed**
						

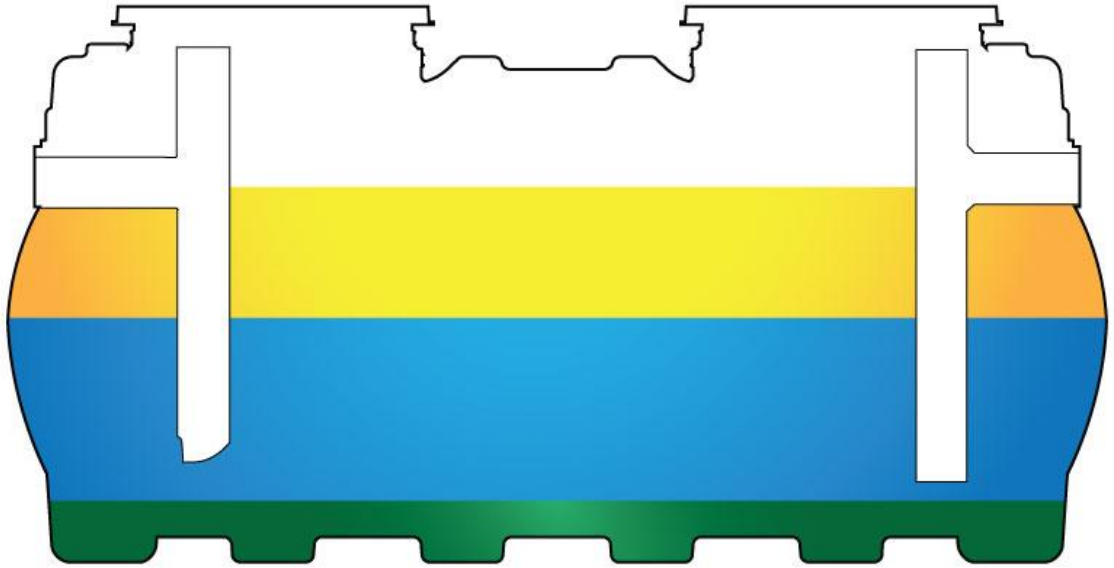
<u>700</u> meals/day x <u>.0455</u> x <u>90</u> days = 2,866 lbs.

Any grease interceptor certified to hold more that 2,866 pounds of grease.

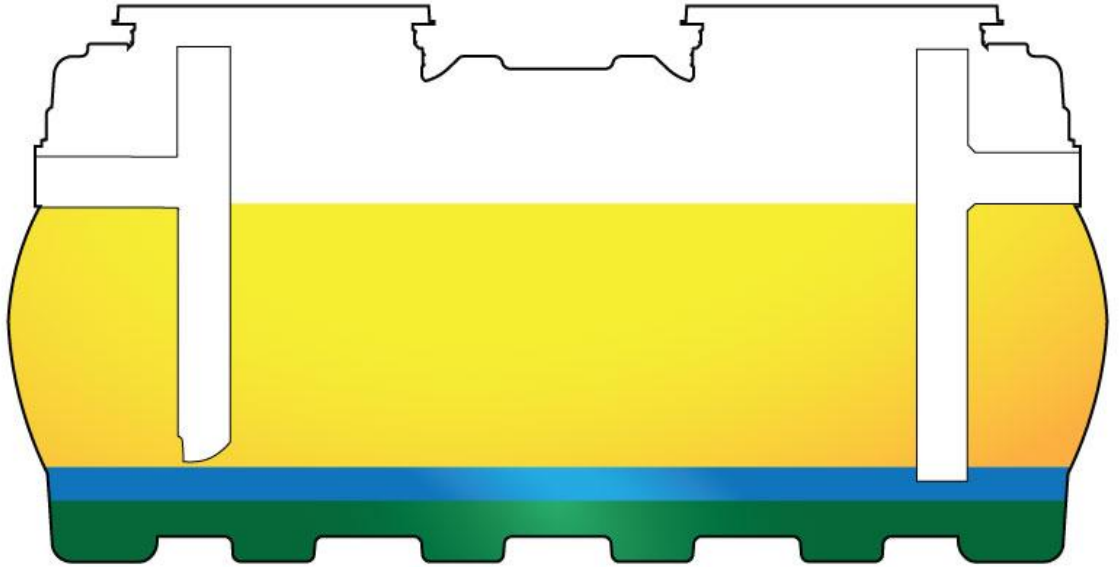
GREASEMONKEY®

RIGHT SIZE WITH GREASE MONKEY

In 2012, Schier authored the Grease Production Sizing Method (GPSM). It's been published by ASPE, codified by dozens of municipalities, and accepted by hundreds more. The Grease Monkey® sizing app uses GPSM to guide you through all aspects of sizing and produces easy-to-read sizing calculations. Grease Monkey® also comes with our complimentary Sizing Service where we double-check your work to confirm local code approval for your grease interceptor installation.



Full - when using the 25% rule.



Full - according to the **ASME A112.14.3** standard, tested to failure.

Grease Water Solids

SCHIER

What is the cost of the 25% Rule?

Number of FSE's	Gravity Interceptor	Total Gallons	Unused Gallons
1,000	1,000 liquid gallons	1,000,000	750,000
	Estimated Grease Capacity = 913 pounds (25% rule with ½ grease ½ solids or 125 gallons X 7.3 lbs per gallon of grease)		

	Hydromechanical Interceptor			
1,000	277 liquid gallons		277,000	69,250
	Certified Grease Capacity	Percentage of Grease		
	1,895 lbs.	75%		

BIGGEST Industry TRENDS in 21st Century FOG Program REGULATIONS…

Rejecting CONCRETE and METAL as acceptable materials for Grease Interceptors.

DISCRIMINATING against Gravity Grease Interceptors as there is **no performance testing** for these products.

Requiring **3rd Party PERFORMANCE** validation for any Grease Interceptors.

Adopting **GREASE PRODUCTION Sizing** instead of Flow Rate only sizing.

Ordinances Leading By Example

Schier's Regulatory Compliance team has provided the pretreatment community with research, education and resources to help in developing or amending FOG discharge management programs.

- Bentonville, AR
- Bothell, WA
- Butler Area Sewer Authority, PA
- Chesapeake, VA
- Colorado Springs, CO
- Columbus, OH
- Flagstaff, AZ
- Hampton Roads Sanitation District, VA
- Independence, MO
- Kalispell, MT
- Miami/DERM
- Newport News, VA
- Norfolk, VA
- Northglenn, CO
- Paso Robles, CA
- Peoria, AZ
- Portsmouth, VA
- Richmond, VA
- Sarasota County, FL
- Senoia, GA
- Virginia Beach, VA
- York County, VA
- York Sewer District, ME

Thank You

Gonzalo Lagos | Regulatory Compliance Manager

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Schier Products Grease Interceptor Inspections

Todd Uhlenhake
Local Representative
todd@antsalesco.com
(970) 420-2842

Schier Models

GB1

GB2

GB3

GB-50

GB-75

GB-250

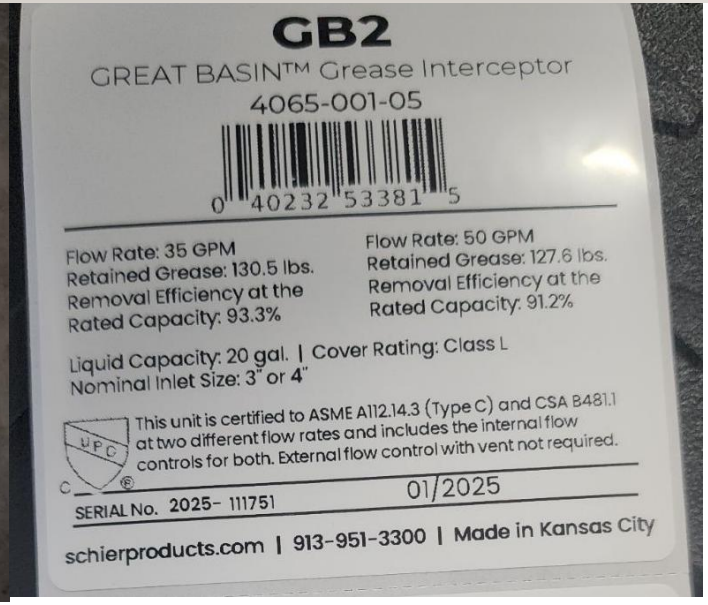
GB-500

GB-1000

GB-1500

Indoor Models

- ➔ Underside of cover
- ➔ Flow Control
- ➔ Pump Out Ports
- ➔ Type C Flow Control



Outdoor Models

- ➔ Cast Iron Cover
- ➔ Safety Star
- ➔ Tank Adapter w/ labels

Outdoor Models

- ➔ Type D - No Flow Control Installed
- ➔ Diffuser Foot on Inlet
- ➔ Triple Outlet / Pump Out Port

Core Sampling

- ➔ All measurements needed for inspection
- ➔ Grease Height and Solids are the critical measurements

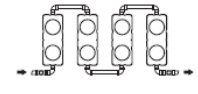
Core Samples

If you prefer not to rely solely on the GPSM to dictate pre-scheduled monthly pumpouts, you can take a more commanding role in dictating pump-out frequency with some simple tools and regular inspections. To do this you will need a core sampler. Popular brand names include DipStick Pro and Sludge Judge .

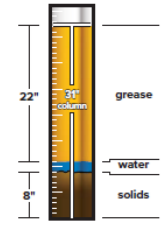
Once you have your core sampler, it can be outfitted with some simple labeling (via high adhesive tape or permanent marker) to indicate your pump-out levels (see below). Contact customer service if unsure what model you have.

NOTE: Series Installations

When installed in series, initially the first unit will fill up with grease while passing some grease to subsequent unit(s). As the grease layer in the first unit grows, more grease will pass to subsequent units. When it reaches maximum capacity, the first unit will pass all grease to subsequent unit(s). Core samples should be taken from the final tank in the series and pump-out scheduling should be conducted when it is near full capacity.



GB-250 (100 GPM) Core Sample at Full Capacity



Core Sample Measurements at Full Capacity*

Model	ASME Certification Type	Flow Rate (GPM)	Maximum Grease Capacity (lbs)	Total Liquid Height (In)	Maximum Grease Height (In)	Maximum Grease % of Volume	Maximum Solids Height (In)
GB1	C	20	70	5.25	5	95%	0.75
GB1	C	25	64	5.25	4.6	88%	0.75
GB2	C	35	130	7	6.25	89%	0.75
GB2	C	50	127	7	6.1	87%	0.75
GB2-2 (99%)	C	35	180	7	2.6	62%	0
GB3	C	50	272	13.75	12.8	93%	0.75
GB3	C	75	175	13.75	8.25	60%	0.75
GB-15	C	15	74	9	5	63%	2
GB-20	C	20	109	10	6.6	68%	2
GB-25	C	25	75	10	4.4	47%	2
GB-35	C	35	142	14	6.2	56%	2.6
GB-50 (Gen 1)	C	50	249	16	9.1	66%	3.3
GB-50 (Gen 2)	D	50	439	17.5	13	75%	3.25
GB-50 (Gen 2)	D	75	287	16.25	9.5	58%	3.25
GB-75 (Gen 1)	C	75	616	24	16.6	68%	1.5
GB-75 (Gen 2)	C	75	653	24	17.3	71%	1.5
GB-75 (Gen 3)	D	75	861	24	17.5	75%	6.75
GB-75-2-Series (Gen 2, 99%)	C	75	861	24	5.5	75%	1.5
GB-75-B (Gen 3, 99%)	D	50	623	24	16.5	68%	6
GB-250 (Gen 1)	C	100	1,076	36	18.8	54%	12.8
GB-250 (Gen 2)	C	100	1,751	36	30	87%	2.6
GB-250 (Gen 3)	D	100	1,895	29.5	22	75%	8.5
GB-250 (Gen 2 & 3)	C	200	1,196	36	20	59%	2.6
GB-250-2 Series (Gen 2, 99%)	C	100	2,593	36	14.5	64.5%	0
GB-250-B (Gen 3, 99%)	D	75	1,817	29.5	22.75	89%	8.5
GB-500	C	100	3,048	35	25.8	82%	10.9
GB-500-B (99%)	D	100	2,817	35	30.5	76%	0
GB-1000 (Gen 1)	C	100	6,547	53	42	89%	4.8
GB-1000 (Gen 2)	D	100	5,495	53	42	74%	21
GB-1000 (Gen 2)	D	200	4,959	53	34.5	67%	21
GB-1000 (Gen 1, 99%)	C	100	6,237	53	39.75	85%	4.8
GB-1000 (Gen 2, 99%)	D	100	5,272	53	35.5	71%	21
GB-1000 (Gen 2, 99%)	D	200	3,127	53	21.5	42%	21
GB-1000-B (99%)	D	200	3,681	53	42	50%	0
GB-1500	D	100	10,061	57	47	80%	16

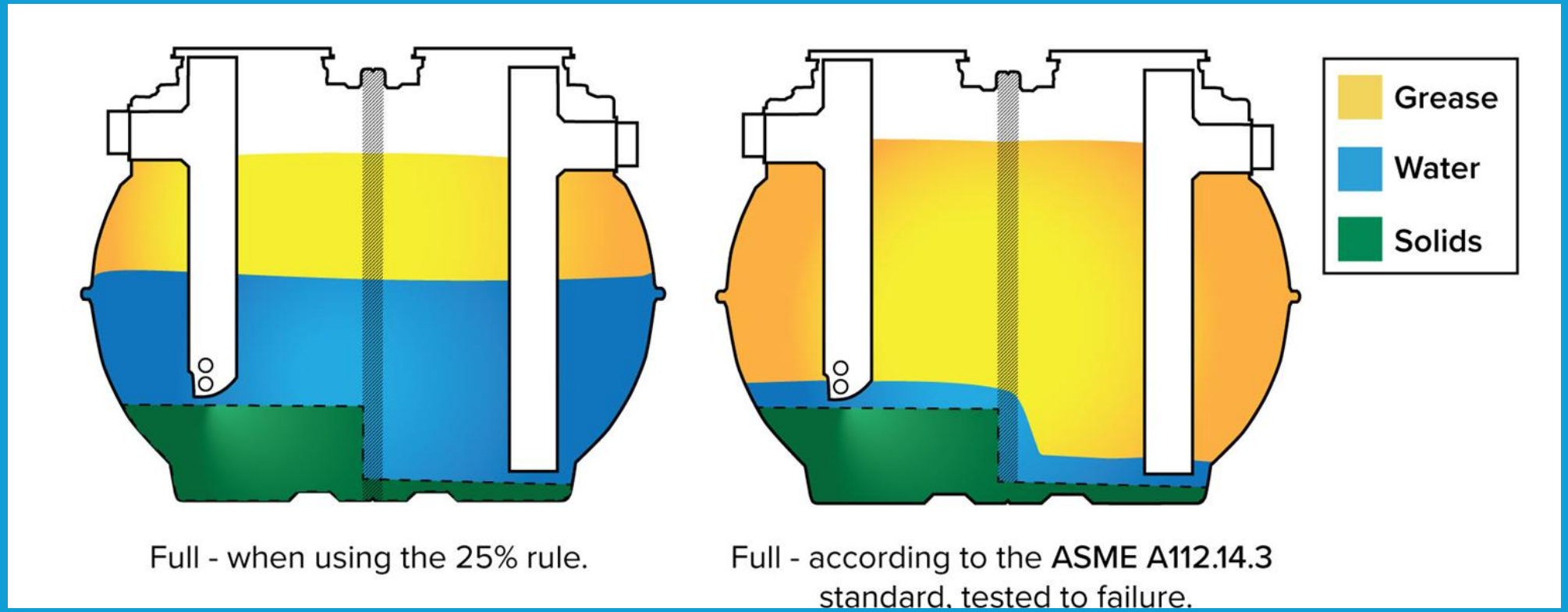
* Please note that as the grease layer inside of a grease interceptor accumulates it displaces the water below it downward. Much like an iceberg this grease layer will partially float above the static water line while the majority of it rests below it. As a result, the static water line of grease interceptor when at total grease capacity is slightly greater than the standard published static water line.

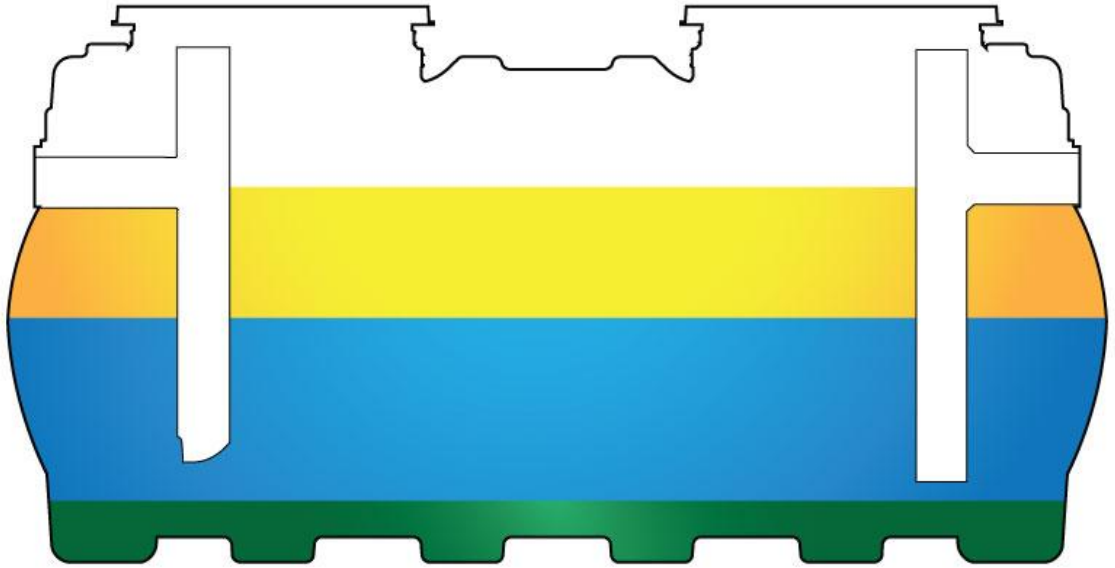
Core Sample Measurements at Full Capacity*

Model	ASME Certification Type	Flow Rate (GPM)	Maximum Grease Capacity (lbs)	Total Liquid Height (In)	Maximum Grease Height (In)	Maximum Grease % of Volume	Maximum Solids Height (In)
GB-250 (Gen 3)	D	100	1,895	29.5	22	75%	8.5

GGI to HGI Comparison

- ➔ GGIs have no performance rating so the 25% rule is used.
- ➔ HGIs are tested and rated to failure for maximum grease retention





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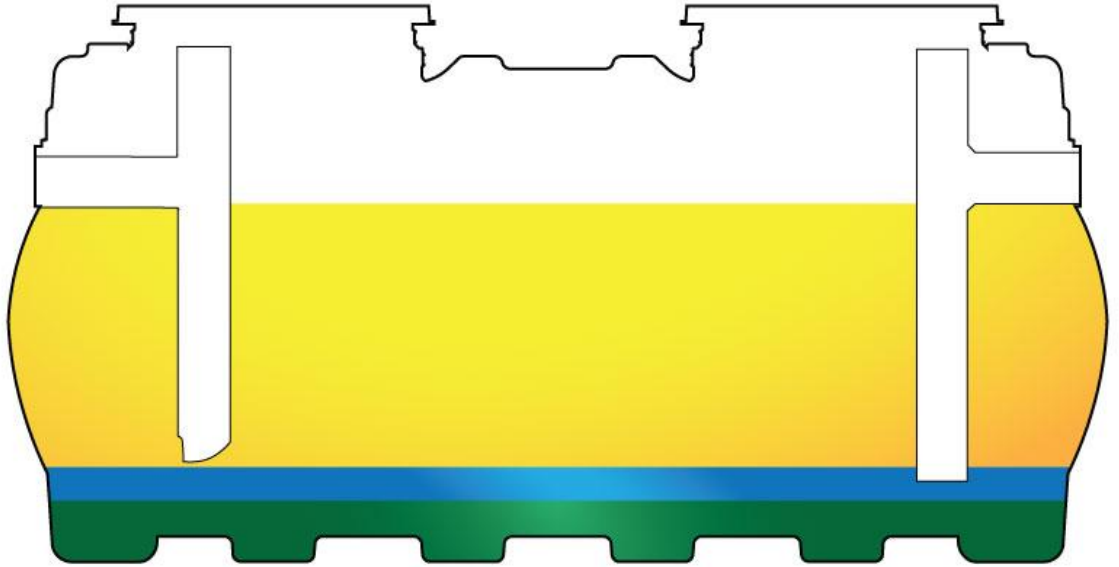

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Grease Water Solids

SCHIER

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1,000	1,000 liquid gallons	1,000,000	750,000
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	Hydromechanical Interceptor			
1,000	277 liquid gallons		277,000	69,250
	Certified Grease Capacity	Percentage of Grease		
	1,895 lbs.	75%		


2016/03/03


2016/03/03

Checking Grease Depth

- Slowly insert core sampler on either side of the inlet diffuser.
- Close valve and slowly raise the sampler and set it on the Safety Star or the edge of the cover.
- Wait 3 minutes for settling
- Measure grease/solids height, record and take photos.
- If grease height and solids height are within limits, no action is needed. If either exceeds the interceptor limits, pump out is required.

What is wrong with this interceptor?

- ➔ Sample taken at inlet side
- ➔ Measurement was allowed to settle ensuring a good grease and solids measurement.

Core Sample Measurements at Full Capacity*

Model	ASME Certification Type	Flow Rate (GPM)	Maximum Grease Capacity (lbs)	Total Liquid Height (In)	Maximum Grease Height (In)	Maximum Grease % of Volume	Maximum Solids Height (In)
GB-250 (Gen 3)	D	100	1,895	29.5	22	75%	8.5

Where is the best place to take a core sample?

- ➔ Outlet side can show false information regarding solids.
- ➔ Grease layer is more uniform on either side of the interceptor.

Coffee Shops

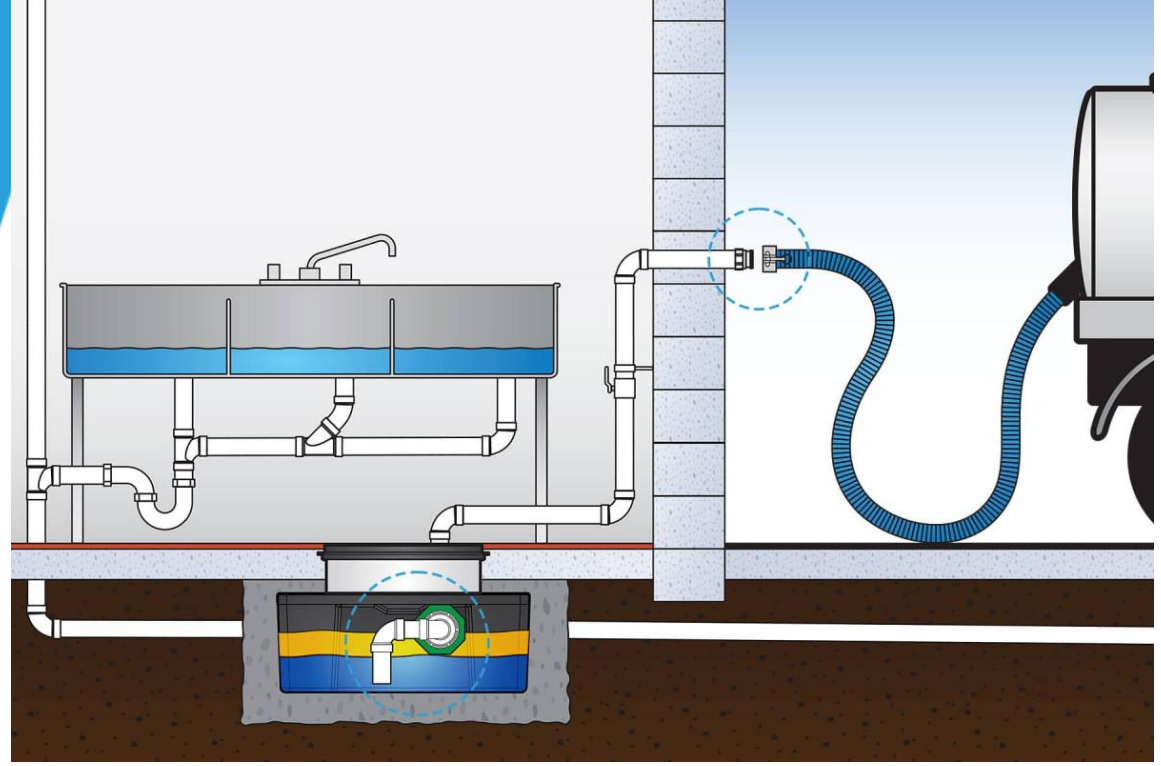
May 8th

May 20th

May 22nd

Pumping Out Interceptor

- ➔ Contents must be completely removed
- ➔ HDPE walls allow for easy spray down and this should be part of the process.
- ➔ Remote pump out is an option – Unit still needs to be sprayed out.
- ➔ Safety Star allows for pump out without compromising the hauler's security
- ➔ Interceptor should be refilled with clean water to put it back in service.



Corrosive effects of FOG

- ➔ 5 years in service
- ➔ Located under major highway
- ➔ Contributing factor: Tea shop with sugary drinks

Concrete Grease Interceptors

Concrete deterioration increases as the pH of the acid decreases from 6.5. In fact, no hydraulic cement concrete, regardless of its composition, will hold up for long if exposed to a solution with a pH of 3 or lower.

Updated Ordinance Language: Grease interceptors shall be made from materials that are compatible with a pH of 3.

Parking Lot Installations

- ➔ Supporting 8” concrete pad needed.
- ➔ Reinforced with rebar per installation instructions
- ➔ Pad extends beyond the interceptor in all directions.

Green Space Installations

- ➔ Supporting 4” concrete pad with rebar still needed.
- ➔ Risers and lids can be damaged by mowing equipment.
- ➔ Debris can fall into the interceptor causing issues.

Questions?

Thank you!