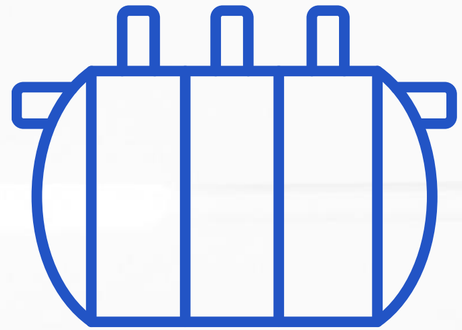
MIFAB®

WSA
a project of pprc.org

# Grease Interceptor 101

Tony Cole
National Sales Manager - Interceptors
MIFAB



# Agenda

Interceptor Types
How they Operate
Certification
Efficiency Comparison
Sizing (UPC/OPC/IPC/GPS)

# Types of Grease Interceptors

## 3 Main Types

### Gravity (GGI)

### Hydromechanical (HGI)

### Automatic Grease Removal Device (AGRD)

Difference in specific gravity

Sized on physical capacity (UPC) or Peak Flow x Retention Time (IPC)

Uncontrolled gravity flow

Retention time (min 30 mins)

Sized on flow rate

Flow Control

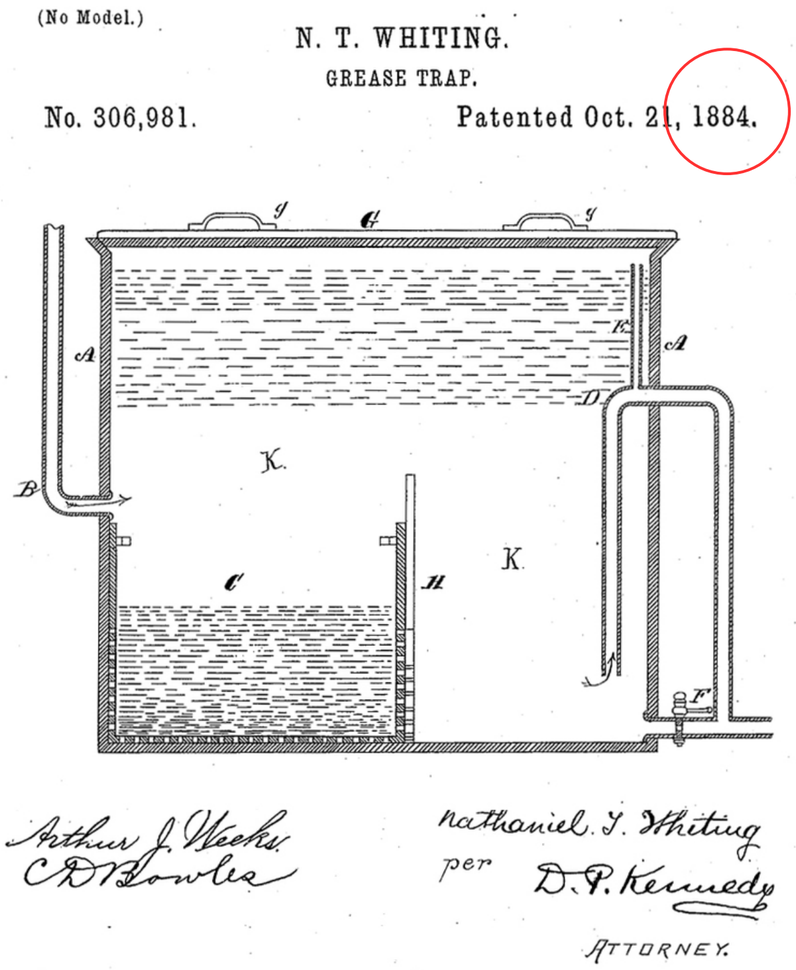
Generally smaller than GGIs

Similar to HGI

Electronic & mechanical components

# When was the first grease interceptor patented?

# Gravity Grease Interceptors (GGI)



(No Model.)

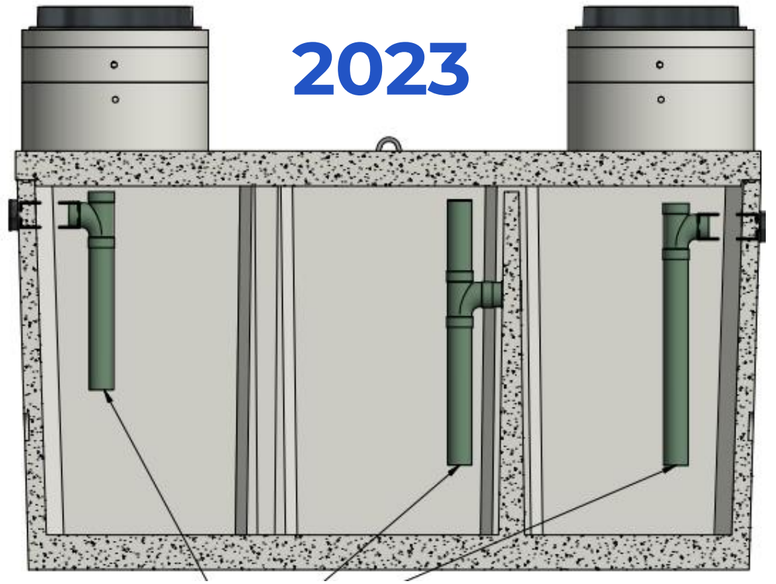
N. T. WHITING.

GREASE TRAP.

No. 306,981. Patented Oct. 21, 1884.

Arthur J. Weeks.
C. D. Bowles

Nathaniel T. Whiting
per D. P. Kennedy
ATTORNEY.



# Gravity Grease Interceptors (GGI)

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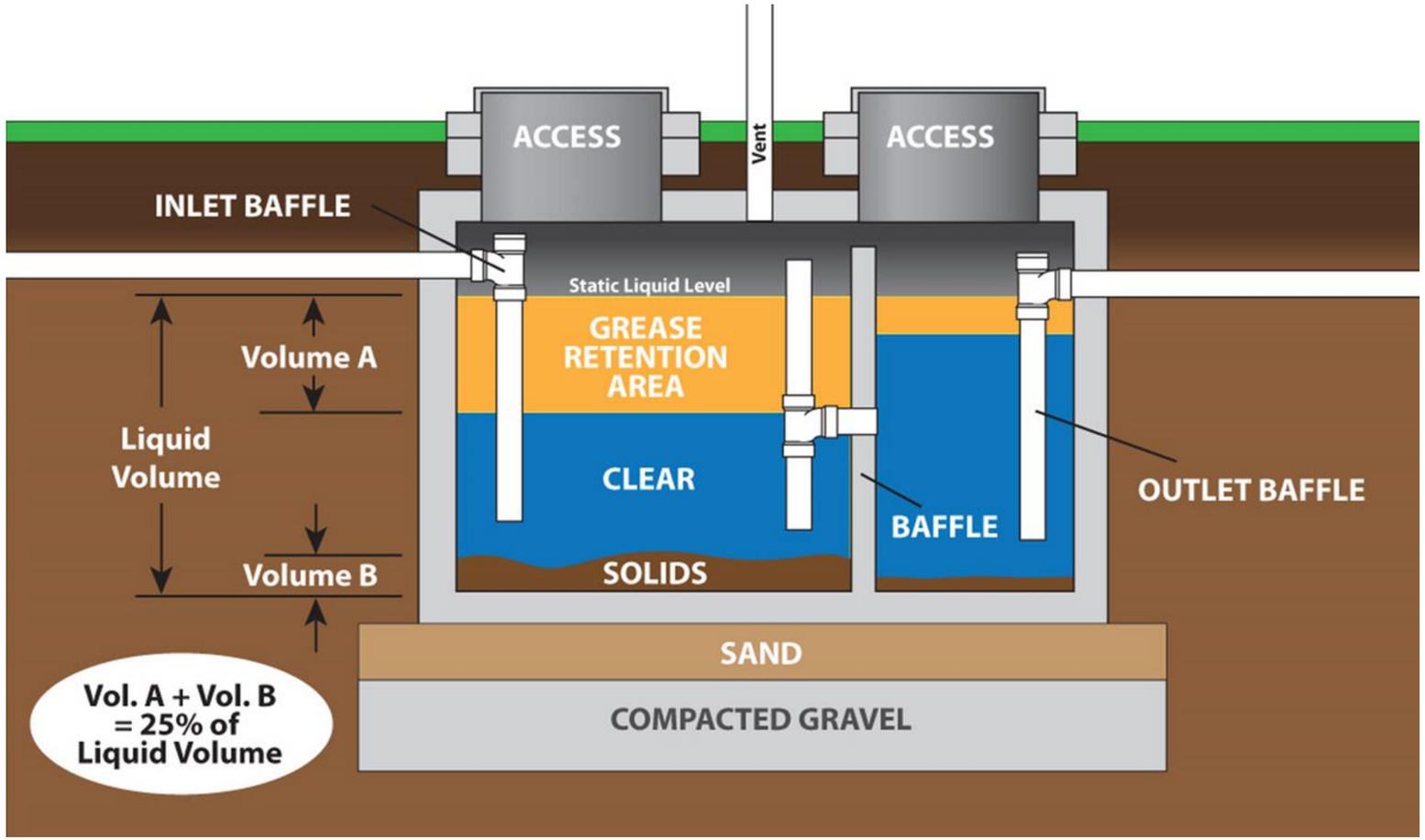
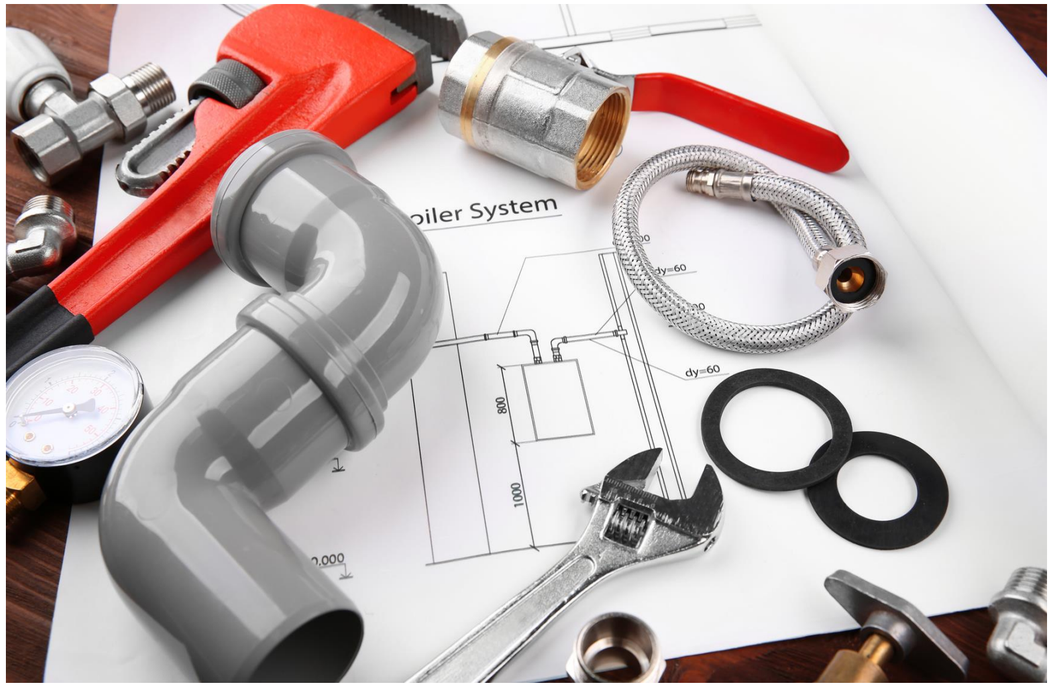


# Hydromechanical Grease Interceptors

# What makes up an HGI?




## Flow Control

1 of 4 Methods
Faster Separation
Laminar Flow
Lower Retention Time

## 3rd Party Certification

90% Efficient
150-160 Degree F
Test Reports
Rated Grease Capacities

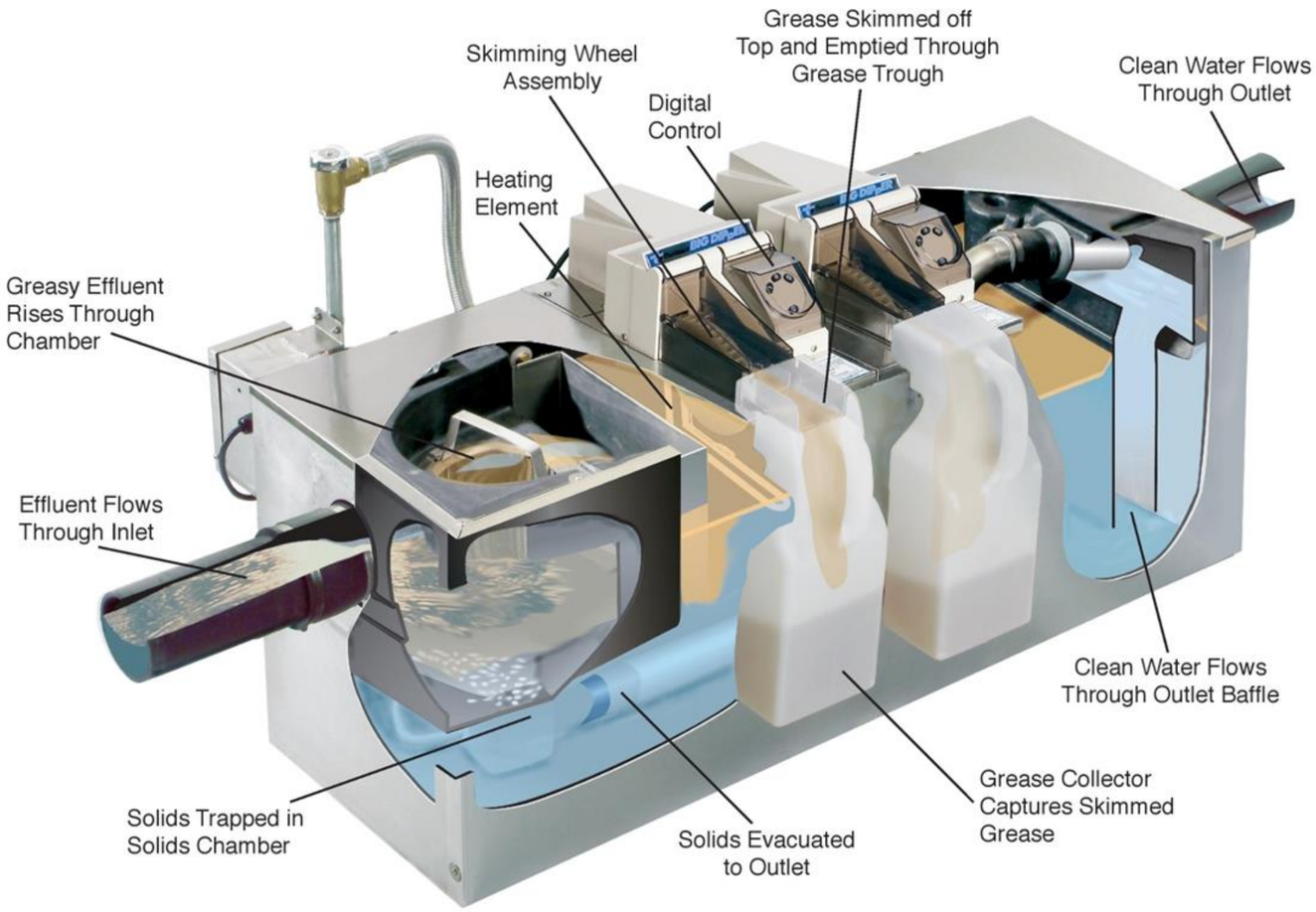
## GPM vs Liquid Capacity

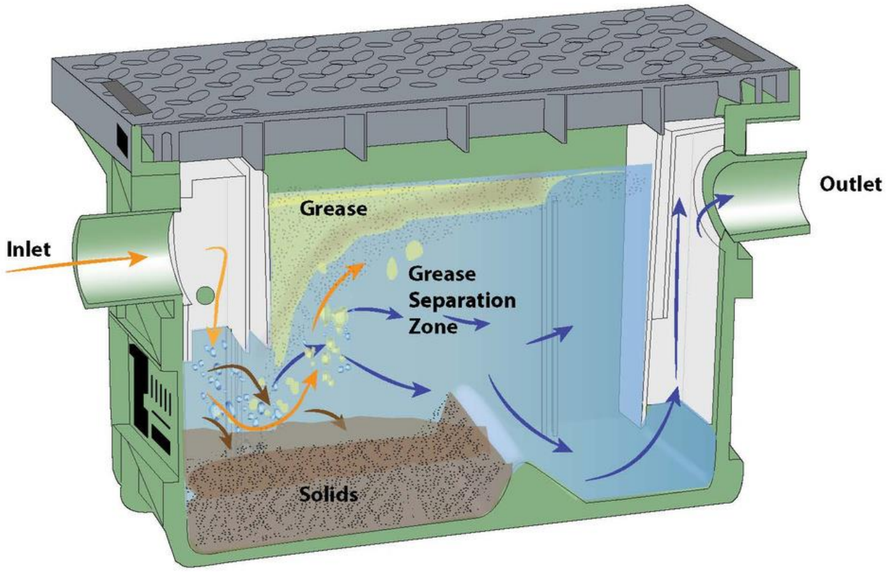
Gallon per Minute Flow
~~25% Rule~~
Liquid Capacity is Gravity

## Benefits

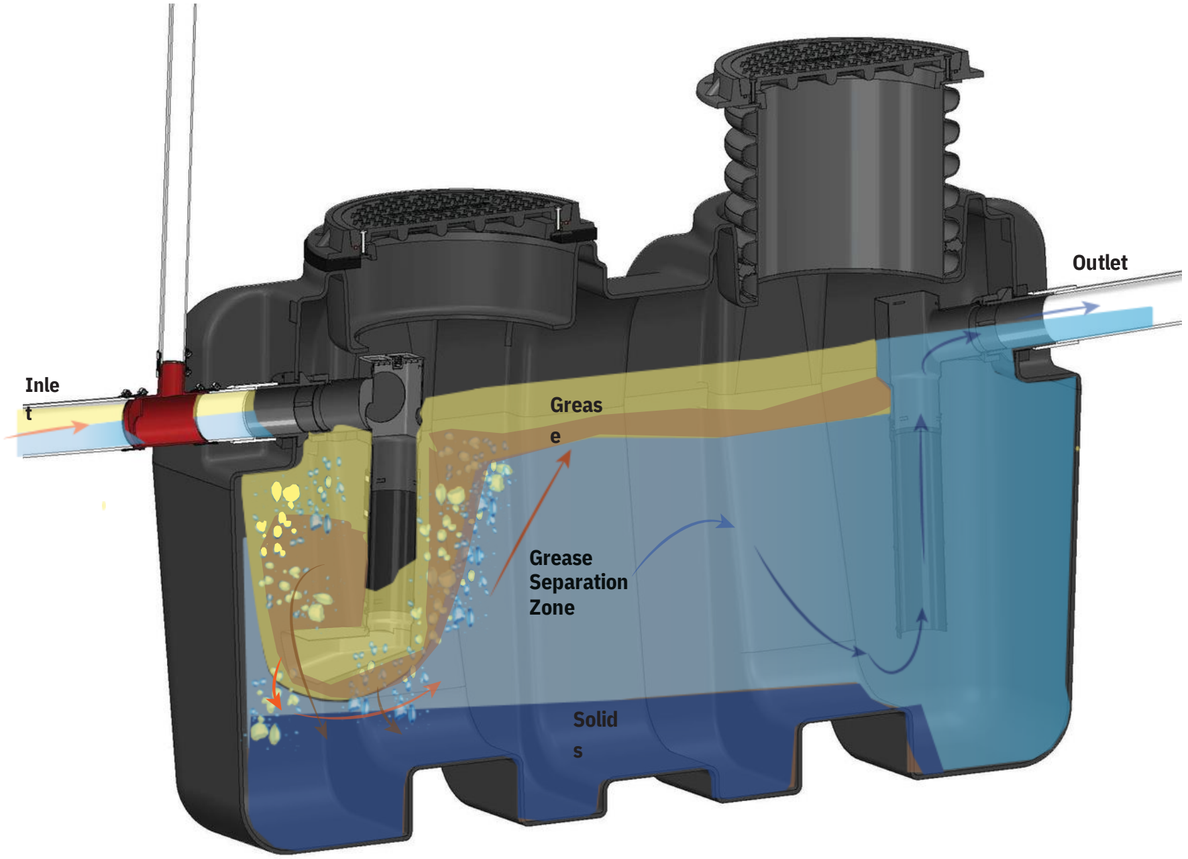
More Grease Capacity
Smaller Footprint
Lower Installation Costs

# Automatic Grease Removal Devices (AGRDs)






# Hydromechanical Grease Interceptors



# Flow Control Types

TYPE

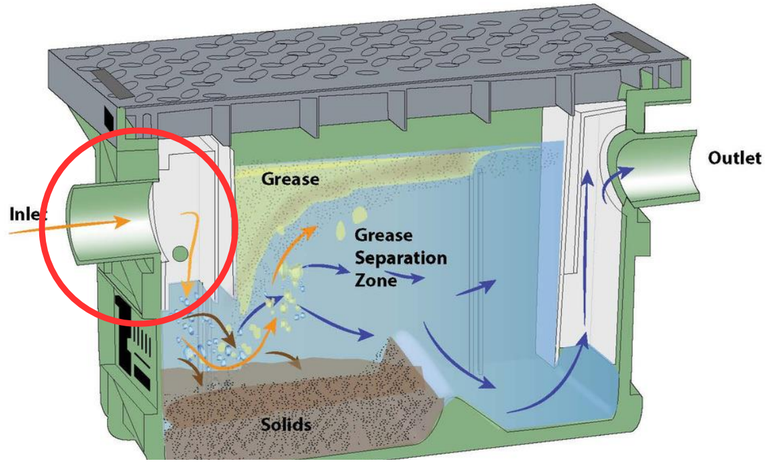
**A** External flow control, with air intake (vent); *directly connected*

**B** External flow control, without air intake (vent); *directly connected*

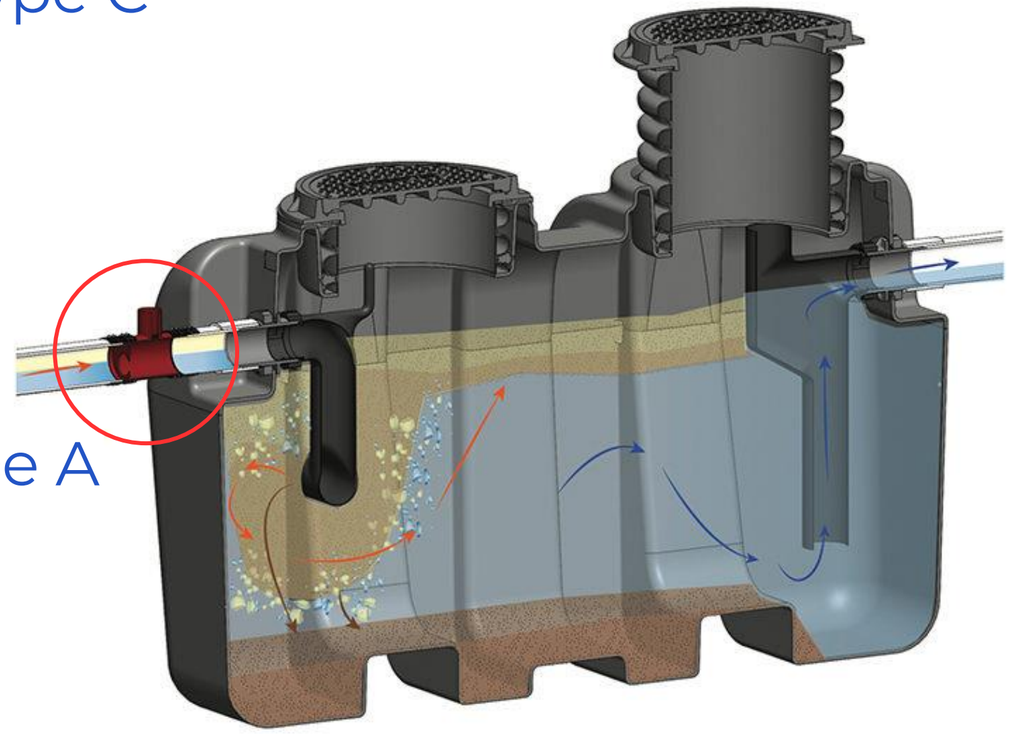
**C** Without external flow control; *directly connected* ***[internal flow control]***

**D** Without external flow control; *indirectly connected* ***[no flow control]***

Type C




Type A



# Certification Process

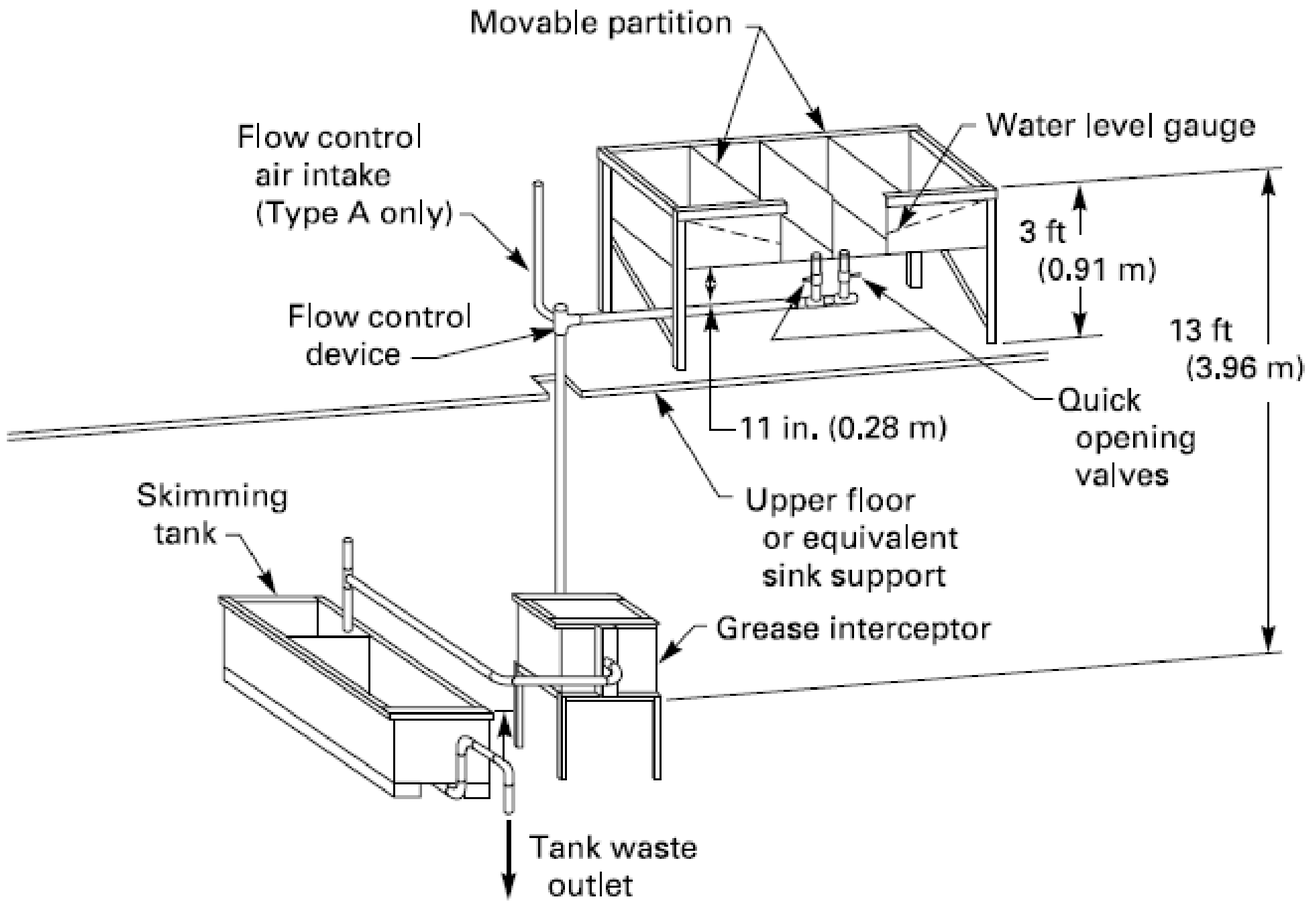
# What is the minimum % separation efficiency for HGI approval?

# Certification - Test Rig

3rd Party Testing
Min 90% Efficient
150-160 Degrees F
Rated Grease
Capacities
Test Report Data

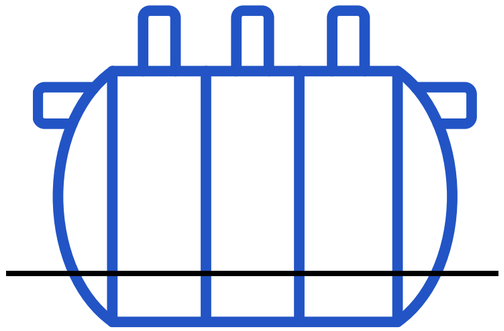
ASME
SETTING THE STANDARD

PDI
G-101

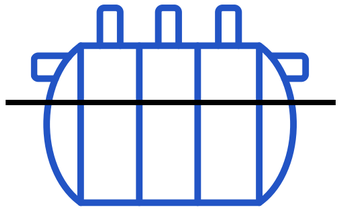


# Capacity Comparison

# Why Does Efficiency Matter?



1000gal Gravity



100gpm/300gal
Hydromechanical

## Capacity Comparison:

1,000 gal x 25% = 250 gal
250 / 2 = 125 gal (liquid & solids)
125 x 7
**= 875 lbs (1000lbs)**

BIG-1150 w/only 300 liquid gallon capacity
**= 1,556 lbs**

# Material Considerations

# AVERAGE LIFE EXPECTANCY

**STEEL**

5-7 Years

**CONCRETE**

4-10 Years

Epoxy Coating will extend this

**FIBERGLASS**

30 Years

**PLASTIC**

Lifetime

***It's only a matter of time, porous materials will corrode***

# Sizing

# Gravity Grease Interceptors

## Uniform Plumbing Code (UPC) & Oregon Plumbing Code

| Drainage Fixture Units | Interceptor Volume |
|---|---|
| 8 | 500 |
| 21 | 750 |
| 35 | 1000 |
| 90 | 1250 |
| 172 | 1500 |
| 216 | 2000 |

| Fixture | Fixture Units Private | Fixture Units Public |
|---|---|---|
| Floor drain, non-emergency | 2 | 2 |
| Special purpose sink w/1½" trap | 2 | 3 |
| Special purpose sink w/2" trap | 3 | 4 |
| Special purpose sink w/3" trap | -- | 6 |
| Commercial sink w/food waste w/1½" trap | -- | 3 |
| Bar sink | 1 | 2 |
| Mop sink | -- | 3 |
| Laundry sink | 2 | 2 |

**Example:**

- 3 comp sink = 3 DFU
- 2 x Special purpose sinks w/1-1/2" trap (1 hand wash, 1 prep) = 6 DFU
- 3 x floor drains = 6 DFU

**Total = 15 DFU or 750 gal**

# Hydromechanical Grease Interceptors

## Oregon Plumbing Code

**TABLE 1014.2.1**
**HYDROMECHANICAL GREASE INTERCEPTOR (HGI) SIZING CHART[1]**

| DRAINAGE FIXTURE UNITS (DFUs) | HGI FLOW (gpm) |
|---|---|
| 8 | 20 |
| 10 | 25 |
| 13 | 35 |
| 20 | 50 |
| 35 | 75 |
| 172 | 100 |
| 216 | 150 |
| 342 | 200 |
| 428 | 250 |
| 576 | 350 |
| 720 | 500 |

# Gravity Grease Interceptors
# International Plumbing Code (IPC)

## IPC - 1003.3.7: Peak Flow (GPM) x 30min Retention Time

**Peak Flow (GPM):**
25GPM
X
**Retention Time:**
30mins
=
Liquid Gallons Required
750 gal

**Peak Flow (GPM):**
55GPM
X
**Retention Time:**
30mins
=
Liquid Gallons Required
1650 gal

**Peak Flow (GPM):**
125GPM
X
**Retention Time:**
30mins
=
Liquid Gallons Required
3750 gal

# Hydromechanical Grease Interceptors
## UPC/IPC (ASME, PDI, ASPE)

3 Most Common Methods

01 **Pipe Size/Max Flow**

02 **Fixture Capacity**

03 **Grease Production Sizing**

The total capacity in gallons (gal) (L) of fixtures discharging into a hydromechanical grease interceptor shall not exceed two and one-half times the certified gallon per minute (gpm) (L/s) flow rate of the interceptor in accordance with Table 1014.2.1.

**TABLE 1014.2.1**

**HYDROMECHANICAL GREASE INTERCEPTOR SIZING USING GRAVITY FLOW RATES[1]**

| DIAMETER OF GREASE WASTE PIPE (inches) | MAXIMUM FULL PIPE FLOW (gpm)[2] | SIZE OF GREASE INTERCEPTOR | |
|---|---|---|---|
| | | ONE-MINUTE DRAINAGE PERIOD (gpm) | TWO-MINUTE DRAINAGE PERIOD (gpm) |
| 2 | 20 | 20 | 10 |
| 3 | 60 | 75 | 35 |
| 4 | 125 | 150 | 75 |
| 5 | 230 | 250 | 125 |
| 6 | 375 | 400 | 200 |

For SI units: 1 inch = 25 mm, 1 gallon per minute = 0.06 L/s

**Notes:**

[1] For interceptor sizing by the fixture capacity see the example below.

[2] $1/4$ inch slope per foot (20.8 mm/m) based on Manning's formula with friction factor N = 012.

# Pipe Size

## Sizing Hydromechanical Grease Interceptors

# Fixture Capacity

## Sizing Hydromechanical Grease Interceptors

| Table A - Procedure for Sizing Grease Interceptors | | |
|---|---|---|
| STEP | FORMULA | EXAMPLE |
| 1 | **Determine cubic content of fixture** by multiplying length x width x depth | A sink 24" long by 20" wide by 12" deep.<br>Cubic content: 24 x 20 x 12 = 5,760 cu in<br>(61.0 x 50.8 x 30.48 $cm^3$) |
| 2 | **Determine capacity in gallons.**<br>1 gallon = 231 cu in | **Contents in gallons:**<br>5,760 / 231 = 24.9 gallons<br>(94,451.42 / 1,000 = 94.45 litres) |
| 3 | **Determine actual drainage load.**<br><br>The fixture is normally filled to approximately 75% of capacity with water as the items being washed displace about 25% of the total fixture content.<br><br>Actual drainage load = 75% of fixture capacity | **Actual drainage load:**<br>.75 x 24.9 = 18.7 gallons<br>(0.75 x 94.45 = 70.84 litres) |
| 4 | **Determine flow rate and drainage period.**<br>In general, good practice dictates a one minute drainage period; however, where conditions permit, a two minute drainage period is acceptable. Drainage period is defined as the actual time required to completely drain the fixture.<br>Flow rate = Actual Drainage Load / Drainage Period | **Calculate flow rate for one minute drainage period:**<br>18.7 / 1 = 18.7 g.p.m. flow rate<br>(70.84 / 1 min. = 70.84 l.p.m.)<br>**Calculate flow rate for two minute drainage period:**<br>18.7 / 2 = 9.4 g.p.m. flow rate<br>(70.84 / 2 min. = 35.42 l.p.m.) |
| 5 | **Select Interceptor.**<br>From Table B select the interceptor with a flow rating at least equal to the calculated flow rate. When the calculated flow rate falls between two sizes, select the larger of the two interceptors. | **For a one minute drainage period:**<br>18.7 g.p.m. (70.84 l.p.m.) flow rate = 20 g.p.m. G.I.<br>**For a two minute drainage period:**<br>9.4 g.p.m. (35.42 l.p.m.) flow rate = 10 g.p.m. G.I. |

| Table B -Metric conversions based on PDI sizes | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| PDI Size | 4 | 7 | 10 | 15 | 20 | 25 | 35 | 50 | 75 | 100 |
| Flow Rate US Gallons per Minute (gpm) | 4 | 7 | 10 | 15 | 20 | 25 | 35 | 50 | 75 | 100 |
| Flow Rate Liters per Second (L/Sec) | .25 | .44 | .63 | .95 | 1.26 | 1.58 | 2.20 | 3.16 | 4.74 | 6.3 |
| Grease Capacity Min. (lb) | 8 | 14 | 20 | 30 | 40 | 50 | 70 | 100 | 150 | 200 |
| Grease Capacity Min. (kg) | 3.63 | 6.35 | 9.07 | 13.61 | 18.14 | 22.68 | 31.75 | 45.36 | 68 | 91 |

# Grease Production

## Sizing Hydromechanical Grease Interceptors

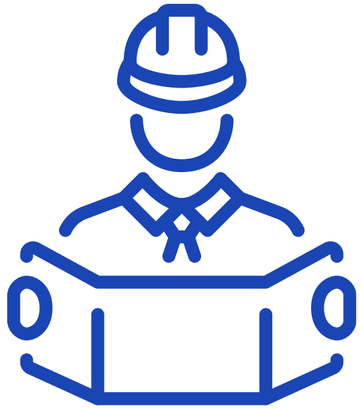


# Would we size these 2 restaurants the same way?

# Grease Production Sizing

## ASPE PEDH Vol. 4 Ch. 8

**Brown Grease Study - Kennedy/Jenks Study 2011**



**Adopted by ASPE in 2016**

# Grease Production Sizing

## ASPE PEDH Volume 4 Ch.8 Table 8-3

| 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) | |

# Grease Production Sizing

## Sub Shop Example

| Table 8-3 Example Grease Production Values for Restaurants | | |
|---|---|---|
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Meals Per Day:
150
X
Grease (lbs) Per Meal:
0.005lbs
X
Pump Out Frequency:
90 Days
=
Grease Capacity Required:
67.5 lbs

Value comes from the restaurant

Value comes from local code

# Grease Production Sizing

## Sub Shop Example

### GREASE INTERCEPTOR CAPACITY DATA

| Model No. | Flow Rate (GPM) | Liquid Cap (Gal) | Grease Design Cap. (Lbs) | Solids Cap. (Gal) |
|---|---|---|---|---|
| **LIL-7** | 7 | 5.8 | 37 | 2.0 |
| **LIL-10** | 10 | 8.5 | 42 | 2.0 |
| **LIL-15** | 15 | 13 | 50 | 3.1 |
| **LIL-20** | 20 | 16 | 73 | 3.9 |
| **LIL-25** | 25 | 23 | 79 | 5.6 |
| **LIL-35** | 35 | 39 | 86 | 10.6 |
| **LIL-50** | 50 | 44 | 109 | 11.9 |
| **LIL-25-LP** | 25 | 19 | 74 | 11.9 |
| **BIG-500** | 50 | 55 | 250 | 28 |
| **BIG-750** | 75 | 140 | 501 | 42 |
| **BIG-1150** | 100 | 300 | 1556 | 115 |
| **SUPER-500** | 100 | 539 | 3492 | 53 |
| **SUPER-750** | 100 | 772 | 5002 | 77 |
| **SUPER-1000** | 100 | 1015 | 6577 | 102 |
| **SUPER-1250** | 100 | 1262 | 8177 | 126 |
| **SUPER-1300** | 100 | 1312 | 8501 | 131 |
| **SUPER-1500** | 100 | 1522 | 9862 | 152 |
| **SUPER-2000** | 100 | 2022 | 13102 | 202 |

# Grease Production Sizing

## Mexican Restaurant Example

| Table 8-3 Example Grease Production Values for Restaurants | | |
|---|---|---|
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| | 0.075 lbs (34.019 g)/meal (with flatware) | |

Meals Per Day:
150
X
Grease (lbs) Per Meal:
0.075lbs
X
Pump Out Frequency:
90 Days
=
Grease Capacity Required:
1,012.5 lbs

Value comes from the restaurant

Value comes from local code

# Grease Production Sizing

## Mexican Restaurant Example

### GREASE INTERCEPTOR CAPACITY DATA

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| **LIL-20** | 20 | 16 | 73 | 3.9 |
| **LIL-25** | 25 | 23 | 79 | 5.6 |
| **LIL-35** | 35 | 39 | 86 | 10.6 |
| **LIL-50** | 50 | 44 | 109 | 11.9 |
| **LIL-25-LP** | 25 | 19 | 74 | 11.9 |
| **BIG-500** | 50 | 55 | 250 | 28 |
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CHIPOTLE
MEXICAN GRILL
CHIPOTLE


SUBWAY

# Interceptor Already Installed
## New Tenant - Greek Restaurant

| Table 8-3 Example Grease Production Values for Restaurants | | |
|---|---|---|
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| | 0.075 lbs (34.019 g)/meal (with flatware) | |

Max Grease Capacity:
501 lbs

÷

Meals Per Day:
250
X
Grease (lbs( Per Meal:
0.0325

=

Pump Out Frequency:
61.6 Days

Comes from label/mfr

Do this first (8.125)

# www.SizeMyInterceptor.com


**Fixtures**
Need to know each fixture that will drain to interceptor.

**Restaurant**
Need to know type, number of meals, and days between pumpout.

# Thank You

**Tony Cole**
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