



# **INTERCEPTOR** WHISPERER

## Hydromechanical **GREASE INTERCEPTOR**

### Sizing and Selection Guide (includes two-page worksheet)

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#### **ABSTRACT**

Hydromechanical grease interceptors certified to ASME A112.14.3, CSA B481 or PDI G101 are tested to determine efficiency, flow-rate and grease storage capacity. Sizing by flow-rate alone is not sufficient to ensure that the correct device has been selected. This two-step sizing and selection method provides guidance on sizing by flow-rate as a required first step. A second step is included that evaluates a facilities potential grease production, which can be used to select a grease interceptor that has sufficient capacity to meet a desired maintenance frequency.

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## Sizing and Selecting Hydromechanical Grease Interceptors (HGI)

The Interceptor Whisperer recommends the following two-step sizing methodology for passive hydromechanical grease interceptors regardless whether the unit will be installed indoors or outdoors:

### *Step 1: Size by Flow Rate*

The minimum flow rate for a passive HGI may be calculated by either using pipe diameter or fixture volume using either a one-minute or two-minute drainage period. Use a one-minute drainage period when the interceptor is installed within 20 feet of directly connected fixtures and/or has indirectly connected fixtures. When the interceptor will be installed exterior to the building beyond 20 feet of the connected fixtures use a two-minute drainage period.

#### Fixture Volume Sizing

Use the following formula for sizing fixtures by volume with a 75% fill factor:

$$\frac{L \times W \times H}{231} \times 0.75 = \text{Fixture Capacity Gallons}$$

Fixture Capacity Gallons x 1 = one-minute drainage period (GPM)

Fixture Capacity Gallons x 0.5 = two-minute drainage period (GPM)

Example: three-compartment sink with each compartment being 18 x 24 x 12 inches

18 x 24 x 12 = 5184 cubic inches (in<sup>3</sup>)

5184 / 231 = 22.44 fixture capacity gallons

22.44 x 3 = 67.3 total fixture capacity gallons (three bowls)

67.3 x 0.75 = 50.4 total fixture capacity after loading factor (75%)

50.4 x 1 = 50 GPM one-minute drainage period

50.4 x 0.5 = 25 GPM two-minute drainage period

To determine the minimum required flow rate for the HGI, calculate the capacity of each fixture that will be connected and add the volumes together and use the appropriate drainage period. An appropriate HGI must be certified to meet the minimum flow rate as calculated. Multiple HGIs may be used separately or combined to meet the flow rate requirement.

It is advisable to use a one-minute drainage period when the HGI will be installed in the kitchen area near the fixtures being serviced. It is essential to use a one-minute drainage period when an indirectly connected fixture is connected to the grease interceptor. A two-minute retention time assumes only directly connected fixtures are routed to the interceptor. A two-minute drainage period will negatively affect the total time for draining fixtures and is often a complaint of owners.

Pipe Diameter Sizing

When the final configuration of kitchen fixtures in an establishment is unknown or to allow for the addition of fixtures in the future, the minimum interceptor volume may be determined by the diameter of the drainage pipe leading from the establishment according to Table 1:

Table 1

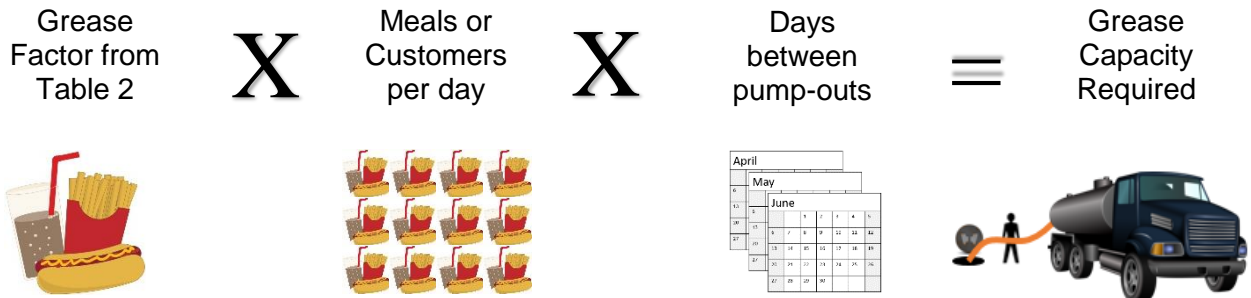
Pipe Size (inches)	Full-Pipe Flow (GPM) <sup>1</sup>	One-minute drainage period (GPM)	Two-minute drainage period (GPM)
2	20	20	10
3	60	75	35
4	125	125	75
5	230	250	125
6	375	400	200
8	426	500	250

1. 1/4 inch per foot based on Manning's formula with friction factor N = 0.012

When using pipe diameter sizing and the interceptor is installed inside the kitchen near the fixtures being serviced, it is advisable to use a one-minute drainage period to ensure the drainage time is not a nuisance. When installed in the kitchen near the fixtures being serviced and there is an indirectly connected fixture it is essential to use a one-minute drainage period. When installed exterior to the building, where the developed length of piping can be quite long, a two-minute drainage period will provide a satisfactory result in drainage times.

**Step 2: Calculate Grease Capacity**

Once the minimum flow rate has been established in Step 1, calculate the minimum grease storage capacity for the HGI required for the desired pump-out frequency as follows:



To determine the correct grease factor, using Table 2, select the menu type (1 through 30), then the correct column (A through D) for whether there is a fryer and whether the establishment uses disposable or washable plates, glasses, knives, forks and spoons (flatware).

Table 2

Type	Menu	Grease Factor ->	without Fryer without flatware	without fryer with flatware	with fryer without flatware	with fryer with flatware
			A	B	C	D
1	Bakery		0.035	0.0455	0.035	0.0455
2	Bar and Grille		0.005	0.0065	0.025	0.0325
3	Barbeque		0.035	0.0455	0.035	0.0455
4	Breakfast Bar - Hotel		0.005	0.0065	0.025	0.0325
5	Buffet		0.035	0.0455	0.058	0.0754
6	Burger and fries, fast food		0.035	0.0455	0.035	0.0455
7	Cafeteria		0.025	0.0325	0.035	0.0455
8	Caterer		0.005	0.0065	0.025	0.0325
9	Chinese		0.035	0.0455	0.058	0.0754
10	coffee shop		0.025	0.0325	0.035	0.0455
11	Convenience Store		0.005	0.0065	0.025	0.0325
12	Deep fried Chicken / seafood		0.035	0.0455	0.058	0.0754
13	Deli		0.005	0.0065	0.025	0.0325
14	Family Restaurant		0.035	0.0455	0.035	0.0455
15	Frozen Yogurt		0.005	0.0065	0.025	0.0325
16	Greek		0.025	0.0325	0.035	0.0455
17	Grocery Bakery		0.025	0.0325	0.035	0.0455
18	Grocery Deli		0.025	0.0325	0.035	0.0455
19	Grocery Meat Department		0.025	0.0325	0.025	0.0325
20	Ice Cream		0.025	0.0325	0.035	0.0455
21	Indian		0.025	0.0325	0.035	0.0455
22	Italian		0.035	0.0455	0.035	0.0455
23	Mexican, fast food		0.035	0.0455	0.035	0.0455
24	Mexican, full fare		0.035	0.0455	0.058	0.0754
25	Pizza		0.025	0.0325	0.035	0.0455
26	Religious Institution		0.005	0.0065	0.025	0.0325
27	Sandwich shop		0.005	0.0065	0.025	0.0325
28	Snack Bar		0.005	0.0065	0.025	0.0325
29	Steak and seafood		0.035	0.0455	0.058	0.0754
30	Sushi		0.005	0.0065	0.025	0.0325

Example: Fast food burgers and fries, with fryer, with disposable flatware, serving 300 meals per day

Grease factor from Table 2: 6C = 0.035 pounds per meal

Meals per day = 300

Days between pump-outs\* =

$0.035 \times 300 \times 30 = 315$  pounds grease capacity required (HGI less than 100 gal liquid capacity)

$0.035 \times 300 \times 60 = 630$  pounds' grease capacity required (HGI 100 to 500 gal liquid capacity)

$0.035 \times 300 \times 90 = 945$  pounds' grease capacity required (HGI over 500 gal liquid capacity)

\*FSEs that are not open every day, may calculate the number of days actually open in a 30/60/90-day period and use that to calculate the total amount of grease capacity required.

The correctly sized and selected grease interceptor will have the minimum flow rate determined in Step 1 and the grease storage capacity calculated in Step 2. Multiple grease interceptors may be installed to satisfy the minimum flow rate requirement, the minimum grease storage capacity, or both.

Grease interceptors certified to meet the minimum requirements of ASME A112.14.3, CSA B481, and/or PDI G101, shall have the flow rates and minimum grease storage capacities as listed in Table 3:

Table 3

HGI Flow Rate	Minimum Grease Storage Capacity <sup>2</sup> (lbs)
20	40
25	50
35	70
50	100
75	150
100	200
2. Minimum grease capacity as required by ASME A112.14.3, PDI G101 and CSA B481	

Grease interceptors claiming grease capacities exceeding the minimum requirements in Table 3, shall be reviewed and approved by the Utility when the manufacturer can demonstrate by third-party test reports, including the incremental test data, that the interceptor(s) has the capacity claimed. Upon approval from the Utility, a high-capacity HGIs' proven grease storage capacity may be used in selecting the sizes and required number of units to satisfy the requirements of this two-step sizing method.

The Interceptor Whisperer has reviewed certain high-capacity HGIs and listed the manufacturer, model number, flow rate, proven grease capacity, and the flow control requirement for each device in Table 4. These units offer superior performance and extended pump-out frequencies over traditional designs that conform with the minimum requirements of applicable standards.

Table 4

Manufacturer	Model	Flow Rate (GPM)	Efficiency (%)	Substantiated Grease Capacity (lbs)	Flow Control Required
Endura Separation Tech	Endura 3907A Type A	7	95.5	31	External Vented
Endura Separation Tech	Endura 3910A Type A	10	92.5	33	External Vented
Endura Separation Tech	Endura 3915A Type A	15	92	34	External Vented
Endura Separation Tech	Endura 3920A Type A	20	90.9	76	External Vented
Endura Separation Tech	Endura 3925A Type A	25	97	73	External Vented
Endura Separation Tech	Endura 3925ALO Type A	25	96	62	External Vented
Endura Separation Tech	Endura 3935A Type A	35	95	126	External Vented
Endura Separation Tech	Endura 3950A Type A	50	93.9	122	External Vented
Endura Separation Tech	Endura XL 75 Type A	75	98	559	External Vented
Endura Separation Tech	Endura XL 100 Type A	100	99	1,058	External Vented
Endura Separation Tech	Endura XL 100(2) Type A	100	99	2,382	External Vented
Endura Separation Tech	Endura XL 100(2) Type A	100	99.0*	1,486	External Vented
Schier Products	Great Basin GB-1 Type C	20	97.3	70	Built-in
Schier Products	Great Basin GB-1 Type C	25	92.8	64	Built-in
Schier Products	Great Basin GB-2 Type C	35	93.3	130	Built-in
Schier Products	Great Basin GB-2 Type C	50	91.2	127	Built-in
Schier Products	Great Basin GB-3 Type C	50	90.9	272	Built-in
Schier Products	Great Basin GB-3 Type C	75	90.1	175	Built-in
Schier Products	Great Basin GB-50 Type C	50	92.2	249	Built-in
Schier Products	Great Basin GB-75 Type C	75	90.8	653	Built-in
Schier Products	Great Basin GB-75(2) Type C	75	96.6	1,522	Built-in
Schier Products	Great Basin GB-75(2) Type C	75	99.0*	861	Built-in
Schier Products	Great Basin GB-250 Type C	100	95.1	1,751	Built-in
Schier Products	Great Basin GB-250 Type C	200	93.5	1,196	Built-in
Schier Products	Great Basin GB-250(2) Type C	100	97.6	3,612	Built-in
Schier Products	Great Basin GB-250(2) Type C	100	99.0*	2,593	Built-in
Schier Products	Great Basin GB-1000 Type C	100	98.9	6,547	Built-in
Schier Products	Great Basin GB-1000 Type C	100	99.0*	6,237	Built-in
Thermaco	Trapzilla TZ-160 Type A	35	95.8	167	External Vented
Thermaco	Trapzilla TZ-400 Type A	75	90.1	405	External Vented
Thermaco	Trapzilla TZ-600 Type A	75	96.3	635	External Vented
Thermaco	Trapzilla TZ-1826 Type A	100	99.3*	1,826	External Vented

\*Meets Miami's 99.0% average efficiency requirement for sizing and selection purposes

Grease Interceptor Sizing and Selection Worksheet (pg. 1 of 2)

Table 5

Qty	Fixture Type	Actual			Fixture <sup>3</sup> Capacity (gallons)	Flow <sup>4</sup> Rate GPM	Total <sup>5</sup> GPM
		L	W	H			
	Multi-Compartment Four Bowls						
	Multi-Compartment Three Bowls						
	Multi-Compartment Two Bowls						
	Prep Sink Two Bowls						
	Prep Sink One Bowl						
	Pre-Rinse Sink One Bowl						
	Dump Sink One Bowl						
	Bar Sink One Bowl						
	Soup Kettle Large				100	100	
	Soup Kettle Medium				50	50	
	Soup Kettle Small				20	20	
	Clothes Washer					2	
	Dipper Well (circulating water)					3	
	Dishwasher - Conveyer type					5	
	Dishwasher - Rack type					2	
	Hand Sink					3	
	Ice Machine (with drain)					1	
	Mop Basin					10	
	Warming Table (with drain)					1	
	Wok Range					12	
	Floor Drain						
	Floor Drain Emergency						
	Floor Sink						
	Food Waste Disposal						
					<b>Grand Total<sup>6</sup>:</b>		

<sup>3</sup> $((L * W * H) / 231) * (\text{number of bowls}) * 0.75 = \text{Total Fixture Capacity (gallons)}$

<sup>4</sup> $\text{Total Fixture Capacity} * 1.0 = \text{Flow Rate (GPM)}$

<sup>5</sup> $\text{Flow Rate} * \text{Qty} = \text{Total GPM}$

<sup>6</sup> $\text{Grand Total GPM} * 1.0 = \text{One-minute Drainage Period}$

<sup>6</sup> $\text{Grand Total GPM} * 0.50 = \text{Two-minute Drainage Period}$

## Grease Interceptor Sizing and Selection Worksheet (pg. 2 of 2)

### HGI Required Information:

1.  Interior Installation       Exterior Installation
2. Are there indirectly connected fixtures routed to the HGI?       Yes    No
3. Will the HGI be installed within 20 feet of the fixtures?       Yes    No

Note: for interior installations, if the answer to either question 2 or 3 is YES, use a one-minute drainage period, otherwise use a two-minute drainage period. For exterior installations use a two-minute drainage period.

### Step 1: Calculated Flow Rate

1. Total Fixture Volume (Table 5): \_\_\_\_\_ Flow Rate GPM (one or two-minute): \_\_\_\_\_
2. OR, Pipe Diameter (Table 1): \_\_\_\_\_ Flow Rate GPM (one or two-minute): \_\_\_\_\_

### Step 2: Calculated Grease Capacity

Grease Factor (Table 2): \_\_\_\_\_ Meals or customers served per day: \_\_\_\_\_  
 Days open 30-day period<sup>7</sup>: \_\_\_\_\_ Grease produced 30-day period (lbs)<sup>8</sup>: \_\_\_\_\_  
 Days open 60-day period<sup>7</sup>: \_\_\_\_\_ Grease produced 60-day period (lbs)<sup>8</sup>: \_\_\_\_\_  
 Days open 90-day period<sup>7</sup>: \_\_\_\_\_ Grease produced 90-day period (lbs)<sup>8</sup>: \_\_\_\_\_

<sup>7</sup>HGIs with liquid capacity of less than 100 gallons – use 30 days  
 HGIs with liquid capacity between 100 and 500 gallons – use 60 days  
 HGIs with liquid capacity over 500 gallons – use 90 days

<sup>8</sup>Calculation: Grease factor\*Meals or customers per day\*Days open in 30/60/90-day period

**Note: The correctly sized and selected HGI(s) will have the minimum required flow rate determined in Step 1 and the minimum substantiated grease capacity determined in Step 2.**

What is the make and model of the HGI selected: \_\_\_\_\_

Flow rate (GPM): \_\_\_\_\_ Liquid capacity (gal): \_\_\_\_\_ Proven grease capacity (lbs): \_\_\_\_\_

Please submit the completed Grease Interceptor Sizing and Selection Worksheet to the Utility for approval along with any other required documents.

Utility Approval: \_\_\_\_\_ Date: \_\_\_\_\_