

ASME A112.14.3-2000

# GREASE INTERCEPTORS

AN AMERICAN NATIONAL STANDARD



The American Society of  
Mechanical Engineers



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Mechanical Engineers

A N A M E R I C A N N A T I O N A L S T A N D A R D

# GREASE INTERCEPTORS

ASME A112.14.3-2000

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The next edition of this Standard is scheduled for publication in 2005. There will be no addenda or written interpretations of the requirements of this Standard issued to this edition.

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## FOREWORD

In 1994, the Plumbing and Drainage Institute agreed to work with the American Society of Mechanical Engineers for the development of this Standard. This Standard includes criteria for testing and rating of grease interceptors; general requirements for these appurtenances; and an appendix of valuable sizing, installation, and maintenance data.

The Plumbing and Drainage Institute has a membership of organizations that manufacture products for the plumbing industry. The basic aim of PDI is to contribute its combined talents and resources to the advancement of plumbing engineering and the plumbing industry. This Standard was developed with the assistance of the Plumbing and Drainage Institute.

For more than a century, grease interceptors have been used in plumbing wastewater systems to permit free flow of drainage from sinks and similar equipment and to prevent grease accumulations from clogging connecting piping and sewer lines. In 1883, one Nathaniel T. Whiting of California applied for a patent on a grease trap, which was issued in October 1884. Whiting's design principle does not differ greatly from present-day grease interceptors.

For the next 50 years, there was no coordinated effort to standardize ratings or to establish performance requirements for grease interceptors. Ratings were determined by each manufacturer for its interceptors, which were produced in a variety of sizes and types in an effort to meet engineers' specifications and satisfy code requirements.

In late 1940 and early 1941, prior to the United States' entry into World War II, grease interceptors were specified for Army posts to meet specifications of the Construction Division, Office of the Quartermaster General. These specifications called for interceptors, which proved inadequate; it immediately became apparent that a comprehensive engineering and testing program was needed to properly rate grease interceptors. Apart from prevention of sewage systems clogging, properly rated and sized grease interceptors were essential to the recovery of oils and grease so badly needed for the war effort. As a result, a series of conferences involving the Research Committee of the Plumbing and Drainage Manufacturer's Association (now Plumbing and Drainage Institute), representatives of the Quartermaster General, Surgeon General, Army Corps of Engineers, and others was held to develop a testing program to establish flow rates and grease holding capacity for uniform rating of grease interceptors manufactured at that time.

The program that emerged from these conferences included exhaustive laboratory testing of each grease interceptor at the Iowa Institute of Hydraulic Research at Iowa State University. This phase of the program was covered in a comprehensive report issued in August 1945. Using the guidelines established in Iowa, the Research Committee continued the testing program at the United States Testing Company, Inc., which culminated in the publication of Standard PDI-G101 in 1949 and the rating of applicable grease interceptors.

Since its initial publication, Standard PDI-G101 has been widely accepted and is referenced in most plumbing codes. It has been reprinted in its original format many times.

The Plumbing and Drainage Institute currently maintains a grease interceptor testing, rating, and certification facility.

The scope of this Standard is limited to units of 100 gallons per minute (gpm) or less in rated capacity. Units over the 100 gpm value shall be engineered for the demand rated flows of the jobsite requirements and specifications.

The Committee recognizes that a number of sewage treatment communities and other jurisdictions have established various maximum limits of fats, oils, and greases (FOG) in the waste stream. The most common of these is 100 mg/L or 100 ppm. The Committee decided that until a specific maximum limit is universally accepted, no number should be included in the Standard. The inclusion of a maximum limit will be reconsidered for adoption in a future edition of this Standard.

Suggestions for the improvement of this Standard are welcome. They should be sent to The American Society of Mechanical Engineers; Attn: Secretary, A112 Main Committee; Three Park Avenue; New York, NY 10016-5990.

This Standard was approved as an American National Standard on November 1, 2000.

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# GREASE INTERCEPTORS

## 1 GENERAL

### 1.1 Scope

This Standard covers general product requirements as well as the performance criteria for the testing and rating of grease interceptors, whose rated flows are 100 gpm (380 L/m) or less.

### 1.2 Units of Measurement

Values are stated in U.S. Customary units and in the International System of Units (SI). The U.S. Customary units shall be considered as the standard.

In this Standard, gallons (U.S. liquid) per minute is abbreviated gpm, and liters (metric liquid) per minute is abbreviated L/m.

### 1.3 Reference Standards

As a prerequisite for evaluation, a product that tested to the requirements of this Standard shall satisfy the requirements of the latest edition of the following standards, as applicable:

ASME B1.20.1, Pipe Threads

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990

ASTM A888, Hubless Cast Iron Sanitary Systems

Publisher: The American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428

### 1.4 Definitions

*directly connected:* a grease interceptor that is designed to be directly connected to the plumbing drainage system.

*flow control, unvented:* a device installed upstream from or within the interceptor, having an orifice that controls the rate of flow through the interceptor.

*flow control, vented:* a device installed upstream from the interceptor having an orifice that controls the rate of flow through the interceptor, and an air intake (vent)

downstream from the orifice, which allows air to be drawn into the flow stream.

*grease interceptor:* plumbing appurtenance(s) that is (are) installed in the sanitary drainage system in order to intercept oily and greasy wastes from wastewater discharges. Such equipment has the ability to intercept commonly available free-floating fats and oils.

*indirectly connected:* a grease interceptor that is designed to be installed through an air gap or air break indirectly to the sanitary system.

## 2 GENERAL REQUIREMENTS

### 2.1 Design

Grease interceptors shall comply with all the applicable requirements of ASME B1.20.1 and ASTM A 888.

### 2.2 Rating

The flow rate and grease retention capacity of each grease interceptor shall be rated consistent with the parameters of this Standard.

Grease interceptors shall be rated using one or more of the following methods:

Type	Figure	Installation Parameters
A	1	Units with an external flow control, with air intake (vent): directly connected
B	1	Units with an external flow control, without air intake (vent): directly connected
C	2	Units without an external flow control: directly connected
D	3	Units without an external flow control: indirectly connected

The manufacturer's installation instructions shall identify installation parameters consistent with the test parameters.

### 2.3 Inlet and Outlet Connections

The inlet and outlet connections of the grease interceptor shall be either female pipe thread or of a plain end diameter to allow hubless coupling connections.

Tapered threads shall comply with ASME B1.20.1. Hubless connections shall comply with the dimensional requirements of ASTM A 888.

## 2.4 Flow Controls and/or Vents

**2.4.1** The use and placement of flow controls and/or vents or air intakes for grease interceptors shall be the option of the manufacturer.

**2.4.2** When a flow control and/or vent is used during testing for rating a grease interceptor, the rating of the unit shall not exceed the maximum flow through the flow control. The manufacturer's literature shall reflect that the rating was achieved with the flow control and/or vent attached, and that the flow control and/or vent shall be installed with the unit.

## 3 TESTING

### 3.1 Construction of Test Equipment

**3.1.1 Test Sink.** The sink used in the tests shall have the following inside dimensions: 8 ft (2.44 m) in length; 2 ft (0.60 m) in width; 12½ in. (0.32 m) in depth. The sink shall be constructed of corrosion-resistant material and shall have two compartments, each 4 ft (1.22 m) in length. The sink shall be structurally reinforced and supported on legs. The legs shall be of proper length so that the rim of the sink will be 3 ft (0.91 m) above the floor. The sink legs shall be structurally braced.

Two sinks of the above description shall be used when tests are conducted for flow rates greater than 50 gpm (190 L/m) but not exceeding 100 gpm (380 L/m).

**3.1.1.1 Sink Waste Connections.** Each sink compartment shall be fitted with a 1½ in. (38 mm) standard sink waste connection with flange, crossbars, threaded or slip joint tailpiece, and locknut. The waste connections shall be located on opposite sides of the center partition in the corner formed by the side of the sink and the center partition.

**3.1.1.2 Water Level Gauges.** Each compartment shall be equipped with a gauge connection and a water level gauge with gauge glass. Each gauge connection shall be fitted into the bottom of a sink compartment and in close proximity to the waste outlet. Each gauge shall be mounted on the outside of the sink, adjacent to its respective gauge connection, and shall extend diagonally upward from the bottom center

to the top outside corners. These gauges shall be calibrated to read directly the number of inches of water in the sink compartments above the sink waste flange.

**3.1.1.3 Movable Sink Partitions.** Each compartment of the sink shall be fitted with a movable partition, making it possible to regulate the size of the compartment to any desired capacity.

**3.1.2 Skimming Tank.** The skimming tank shall be rectangular in shape; open at the top and equipped with a stationary baffle located approximately 3 ft (0.91 m) from the end of the tank receiving the discharge from the interceptor. This baffle shall extend the width of the tank and to within 4 in. (100 mm) of the bottom of the tank. The purpose of this baffle shall be to limit the heavy spread of grease to one end of the tank and to control to a degree the turbulent water currents created by the overflow from the interceptor. The dimensions of the tank shall be approximately 8 ft (2.44 m) in length, 28 in. (0.70 m) in width, and 32 in. (0.81 m) in depth. The tank shall be constructed of galvanized sheet or corrosion-resistant metal with structural reinforcement. The waste outlet from the tank shall be 4 in. (100 mm) in diameter, connected to the bottom of the tank at one end and trapped to retain approximately 26 in. (0.66 m) of water in the tank. The tank shall also be provided with a 4-in. (100 mm) valved bottom drain to permit draining and cleaning.

### 3.2 Installation of Testing Equipment

**3.2.1 Direct Connection Test Types A, B, and C.** See Figs. 1 and 2.

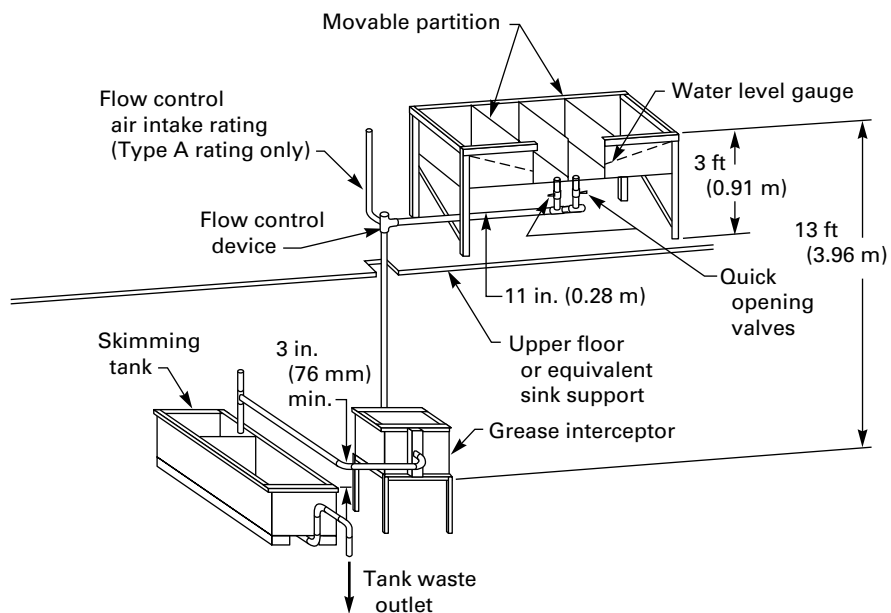
**3.2.1.1 Waste Piping.** The combined horizontal waste, vertical waste riser, interceptor inlet, and discharge piping shall be 2 in. (50 mm) for test flows of 50 gpm (190 L/m) or less and 3 in. (76 mm) for test flows over 50 gpm (190 L/m).

**3.2.1.2 Sink and Interceptor Locations.** The sink shall be located with the sink rim 13 ft (3.96 m) above the outside bottom of the grease interceptor being tested.

**3.2.1.3 Skimming Tank Location.** The skimming tank shall be located low enough, with respect to the interceptor, for the discharge piping from the interceptor to clear the tank rim by not less than 3 in. (76 mm).

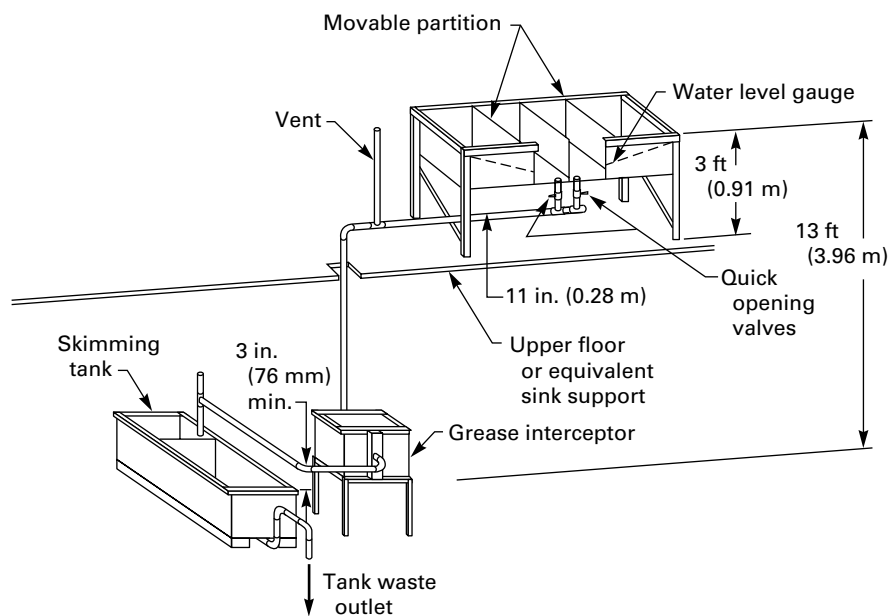
#### 3.2.1.4 Installation of Waste Piping

(a) *Sink Connections.* The sink outlet waste connection from each sink compartment shall be 1½ in.



GENERAL NOTE: See para. 2.2.

**FIG. 1 GREASE INTERCEPTOR TEST CONFIGURATION FOR RATING TYPES A AND B**



GENERAL NOTE: See para. 2.2.

**FIG. 2 GREASE INTERCEPTOR TEST CONFIGURATION FOR RATING TYPE C**

(38 mm) in size and each connection shall be fitted with a quick-opening gate valve.

(b) *Combined Horizontal Waste Piping.* The combined horizontal waste piping into which the sink outlets connect shall be installed with the center line 11 in. (0.28 m) below the bottom of the sink and properly hung and braced from the sink reinforcement and supports. This waste pipe shall be fitted to the inlet of a vented (air intake) flow control and/or vent or equal device (if required for use with the interceptor).

(c) *Flow Control and/or Vent Device (Optional).* The flow control and/or vent device shall be adequate in size for the interceptor to be tested and shall be equipped with the proper size orifice and/or other details to provide the proposed flow rate of the subject interceptor, based on the simultaneous drainage of both sink compartments as detailed hereinafter. The waste piping on either side of the flow control and/or vent shall be fitted with unions to permit removal of the device.

(d) *Vertical Waste Riser.* The vertical waste riser shall be connected to the outlet of the flow control and/or vent device and shall extend downward to connect to the grease interceptor inlet by means of an elbow and a short horizontal nipple.

(e) *Interceptor Discharge.* The discharge pipe from the interceptor outlet to the skimming tank shall have a minimum pitch of  $\frac{1}{8}$  in. per ft (1 cm per m) and shall be provided with a 2-in. (50 mm) vent properly located to prevent siphoning of the interceptor.

(f) *Interceptor Connections.* If the inlet and/or outlet openings of the interceptor to be tested exceed 2 in. (50 mm) or 3 in. (76 mm) for test flows exceeding 50 gpm (190 L/m) in size, reducing couplings shall be used to permit connections of the 2 in. (50 mm) or 3 in. (76 mm) for test flows exceeding 50 gpm (190 L/m), inlet and discharge pipes.

**3.2.2 Indirect Connection Test Type D.** See Fig. 3.

**3.2.2.1 Sink and Interceptor Location.** The sink shall be located on a floor with the sink rim 3 ft (0.91 m) above the floor level and 13 ft (3.96 m) above the outside bottom of the grease interceptor being tested.

**3.2.2.2 Floor Sink and Location.** A 6 in. (152 mm) deep floor sink to receive the indirect waste discharge from the test sink shall be located in the floor supporting the test sink. The rim of the floor sink shall be located at floor level. The outlet of the

floor sink shall be sized to handle the test flow rate, and shall be not less than 3 in. (76 mm).

**3.2.2.3 Skimming Tank Location.** The skimming tank shall be located low enough, with respect to the interceptor, for the discharge piping from the interceptor to clear the tank rim by not less than 3 in. (76 mm).

### 3.2.2.4 Installation of Waste Piping

(a) *Sink Connections.* The sink outlet waste connection from each sink compartment shall be  $1\frac{1}{2}$  in. (38 mm) in size and each connection shall be fitted with a quick-opening gate valve.

(b) *Combined Horizontal Waste Piping.* The combined horizontal waste piping into which the sink outlets connect shall be 3 in. (76 mm) installed with the center line 11 in. (0.28 m) below the bottom of the sink and properly hung and braced from the sink reinforcement and supports. This waste pipe shall connect to a single 3-in. (76 mm) ball valve that shall serve to regulate the total discharge flow rate. The pipe connected to the ball valve outlet shall turn downward 90 deg and shall terminate 1 in. (25 mm) above the rim and at the center line of the floor sink.

(c) *Floor Sink to Interceptor Piping.* A trap fitting shall be connected to the outlet of the floor sink, of a size appropriate for the flow rate tested, but not less than 3 in. (76 mm). Horizontal piping of the same size and 3 ft (0.91 m) in length with a vent shall be connected between the floor sink elbow and the vertical waste riser, which shall extend downward to connect to the grease interceptor inlet by means of an elbow and a short horizontal nipple.

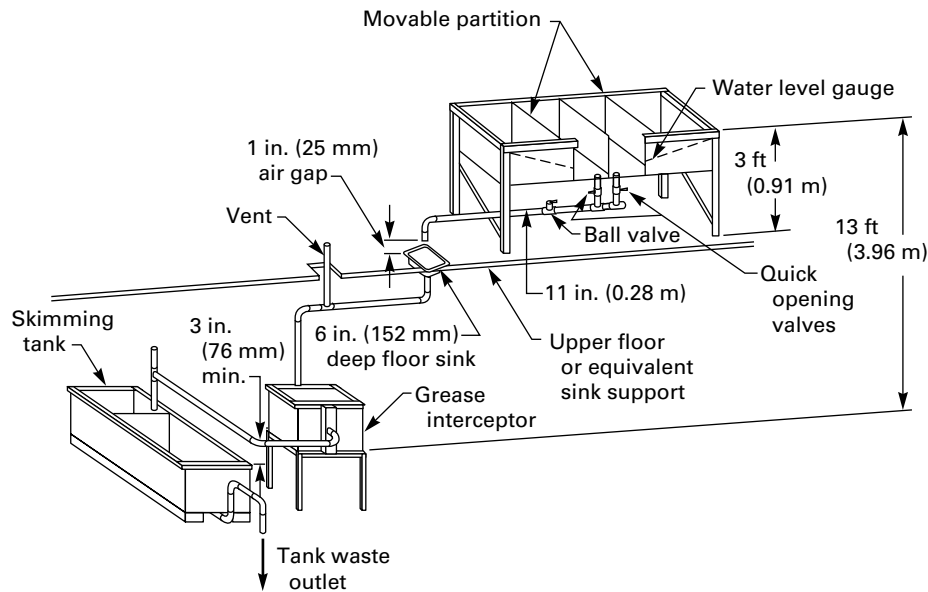
(d) *Interceptor Discharge.* The discharge pipe from the grease interceptor outlet to the skimming tank shall be the same size as the inlet pipe. It shall have a minimum pitch of  $\frac{1}{8}$  in. per ft (10 mm per m) and shall be provided with a 2-in. (50 mm) vent properly located to prevent siphoning of the interceptor.

(e) *Interceptor Connections.* If the inlet and/or outlet connections of the interceptor are larger than the inlet pipe necessary to provide the required flow rate, reducing couplings shall be permitted to be used.

## 3.3 Preliminary Test Procedure

**3.3.1 Media Analysis.** before conducting rating tests on any grease interceptor, simple analysis of the test media shall be made to determine that it complies with the following characteristics:

(a) Water: hydrogen ion concentration (pH value from 6.0 to 8.0)



GENERAL NOTE: See para. 2.2.

**FIG. 3 GREASE INTERCEPTOR TEST CONFIGURATION FOR RATING TYPE D**

(b) Lard: specific gravity of  $0.875 \pm 0.005$ , at  $150^{\circ}\text{F}$  ( $66^{\circ}\text{C}$ ).

**3.3.2 Establishing Sink Compartment Capacity.** The size of each test compartment shall be established by means of the movable partitions so that the gross capacity of each compartment in gallons will be equal to 1.2 times the proposed flow rate in gallons per minute (gpm) of the interceptor to be tested. The gross sink capacity mentioned above shall be calculated on the basis of length x width x a depth of 12 in. (0.3 m) above the sink outlet flange.

**3.3.3 Establishing Volume of Incremental Discharge.** The volume of water to be discharged from each sink compartment during each test increment shall be based on 10 in. (0.25 m) of water above the sink outlet flange. On this basis, the incremental discharge in gallons per compartment shall be equal to the proposed gallons per minute (gpm) flow rate of the interceptor being tested.

**3.3.4 Computation of Flow Rate.** The flow rate from the sink shall be computed by timing the rate of drainage of the first  $9\frac{1}{2}$  in. (0.24 m) of water from the sink compartment, measured from the 10-in. (0.25 m) mark to the datum line  $\frac{1}{2}$  in. (13 mm) above the sink outlet flange.

**3.3.4.1 Check Flow Rate Tests.** After the sink compartment capacities have been established, the sink connected to the interceptor with the flow control and/or vent or equivalent device properly sized and installed, and the interceptor discharge pipe properly vented and extended to the skimming tank, a series of check flow rate tests shall be made. Three tests shall be made for each of the following four conditions (during test groups (a) and (b), the waste outlet from the adjacent compartment shall be closed off):

(a) Drain, gauge, and compute the flow rate from compartment No. 1 separately.

(b) Drain, gauge, and compute the flow rate from compartment No. 2 separately. Flow rates determined in (a) and (b) are only for purposes of checking against actual flow rates of test increments.

(c) Drain compartments No. 1 and No. 2 simultaneously and gauge and compute the flow rate on the basis of the time required to drain compartment No. 1.

(d) Drain compartments No. 1 and No. 2 simultaneously and gauge and compute the flow rate on the basis of the time required to drain compartment No. 2.

(e) For all test methods, the time for total discharge shall not exceed 126 sec.

**3.3.4.2 Calibrated Drainage Flow Rates.** The average of the three tests for each of groups (c) and (d) above shall be considered as the calibrated drainage

flow rate for that group provided no one of the tests varies by more than 5% from the other two in the same group. If such variation occurs, the test showing the discrepancy shall be discarded and additional check tests shall be made until three tests meeting the above condition are obtained. The average of the calibrated drainage flow rates for simultaneous discharge, as determined in this paragraph and in paras. 3.3.4.1(c) and (d), shall be equal to or exceed by not more than 5% the proposed flow rate of the interceptor being tested. If the average flow rate so determined is less than the proposed flow rate of the interceptor, the flow control and/or vent orifice shall be enlarged and the check flow rate tests rerun and the calibrated drainage flow rates again computed until flow rates within the required limits are obtained. If the average of the calibrated drainage flow rates exceeds the proposed flow rate of the interceptor by more than 5%, the flow control and/or vent orifice shall be reduced in size and the above tests shall be repeated until an average flow rate is obtained that falls within the 5% limit stipulated above.

### 3.4 Skimming Procedure

The skimming procedure shall be initiated approximately 5 min after the increment to be skimmed has discharged into the tank. A sheet metal hand baffle, slightly shorter than the width of the skimming tank and approximately 1 ft (0.30 m) in width, shall be employed to push all surfaced grease to one corner of the tank from which the layer of grease is readily skimmed by means of a rectangular pan. The mixture of water and grease thus removed shall be placed in a pail equipped with a drainage spigot. All grease shall be squeegeed from the baffle and pan. This process shall be continued until most of the visible grease has been removed from the surface of the water in the skim tank.

At this point, while the hand baffle previously used is allowed to cool, a second hand baffle shall be employed in the following manner:

The first 1 in. (25 mm) of the baffle plate shall be immersed at one end of the skimming tank and the baffle moved toward the opposite end, as before, to concentrate the now thin film of surfaced grease. The baffle shall be moved at a rate slow enough to prevent turbulence from drawing the accumulating grease below the baffle, and fast enough so that a minimum of grease will pass through the clearance space between the baffle and the tank walls. Upon reaching a point about 2 in. (50 mm) from the end of the tank, the baffle motion shall be slowed and, at the same time, the baffle shall

be lowered to bring the cooler surface in contact with the trapped grease. These motions shall be so regulated as to have the baffle submerged to within 1 in. (25 mm) of its top by the time it reaches the end of the last 2 in. (50 mm) of horizontal travel. The baffle shall then be removed from the water and moved, grease side up, to the pail where the adhering grease shall be squeegeed off and added to the previous contents. By now, the first baffle has cooled, and the above procedure is repeated using it. The baffles shall be used alternately until the amounts of grease collected in this manner are less than 1% by visual observation.

Upon completion of the above skimming procedures, the water shall be drained from the bottom of the pail by means of the spigot. The pail shall then be placed over a gas flame and its contents heated until the residual water is brought to boiling temperature; that is, until bubbles of steam rise through the molten grease. The mixture shall then be poured from the pail into a separatory funnel, the pail shall be squeegeed out and the mixture shall be allowed to stand in the funnel for approximately 5 min, at the end of which time the water is drawn off from the bottom of the funnel. The remaining liquid shall be permitted to separate for approximately 5 min more and the water shall again be removed from the bottom of the funnel. The remainder shall be drained from the separatory funnel into one or more preweighed cans.

The cans shall be cooled to solidify the grease. The cans may be placed in a freezer or refrigerator to expedite the cooling process. The solidified contents shall then be scraped and kneaded with a small putty knife, and the water thus worked from the mixture shall be poured off. If the quantity of water thus removed is greater than several drops, the heating and solidification process shall be repeated. When only a few drops of water are removed in this manner, the mixture shall be assumed to be completely dewatered and weights are taken for computation purposes.

The lard shall be weighed on a gram balance and weights shall be taken to the nearest  $\frac{1}{2}$  g. Tare weights of the preweighed cans shall then be subtracted from the total weight and the correct weight of lard removed shall be entered as data.

### 3.5 Rating Test Procedure

After all preliminary data and tests have been established as previously outlined, the rating tests shall be conducted as follows and all test data shall be recorded. The information shall be recorded on a form, which

contains the data as shown on the Grease Interceptor Rating Test Form (Appendix C).

**3.5.1 Test Media.** Certification tests shall be conducted with fresh, unused lard and water as defined in para. 3.3.1, both within a temperature range of from 150°F to 160°F (66°C to 71°C).

**3.5.2 Ratio of Lard to Water.** Both compartments of the test sink(s) shall be supplied with the required volume of water (paras. 3.3.2 and 3.3.3) at the temperature stipulated in para. 3.5.1. The test lard shall be introduced into one compartment, during each incremental discharge, in the ratio of 1 lb (0.45 kg) of lard for each 5 gal (19 L) of water in that compartment. Consequently, the proportion of lard to the total amount of water discharged from both sink compartments during each increment shall be 1 lb (0.45 kg) for each 10 gal (38 L), respectively. The required amount of test lard, within the above temperature range, shall be weighed out and poured into the test compartment of the sink.

### 3.5.3 Test Increments

**3.5.3.1** Each test increment shall consist of the simultaneous discharge of the water from both sink compartments and the lard from the test compartment.

**3.5.3.2** During the first test increment, the lard shall be poured into compartment No. 1 (that compartment having its discharge outlet closest to the interceptor, measured along the waste pipe) and compartment No. 2 shall discharge clear water. During the second test increment the lard shall be poured into compartment No. 2 while the water in compartment No. 1 remains clear. This procedure of introducing the lard into alternate sink compartments shall be continued throughout the test.

**3.5.4 Flow Rates.** The drainage period for each increment shall be gauged and timed on the basis of the flow from the compartment containing the clear water. The flow rate from the sink shall be computed and recorded for each increment.

**3.5.5 Efficiency Determinations.** The grease shall be removed from the skimming tank and the efficiency of the interceptor shall be computed at intervals of five increments or less until the average efficiency reaches 93% or less and/or the incremental efficiency reaches 85% or less. After this point has been reached, efficiency checks shall be made after each incremental discharge.

**3.5.6 Duration of the Test.** The above test procedure shall be continued until the average efficiency reaches 85% or less, and/or the incremental efficiency reaches 75% or less.

**3.5.7 Determination of Grease Retention Capacity.** Maximum grease retention capacity shall be established at the increment preceding two successive increments in which either the average efficiency is less than 90% or the incremental efficiency is less than 80%. The efficiencies used in determining the grease retention capacity shall be either "A," efficiencies determined on the basis of no unaccounted loss or gain, or "B," efficiencies adjusted for unaccounted loss or gain, whichever provides the lesser efficiency for the interceptor. The formulas for determining the above efficiencies shall be as follows:

$$\text{Efficiency "A"} = \frac{\text{Grease Added} - \text{Grease Skimmed}}{\text{Grease Added}}$$

$$\text{Efficiency "B"} = \frac{\text{Grease Added} \left\{ \begin{array}{l} 100\% + \% \text{ Gain} \\ - \% \text{ Loss} \end{array} \right\} - \text{Grease Skimmed}}{\text{Grease Added} \left\{ \begin{array}{l} 100\% + \% \text{ Gain} \\ - \% \text{ Loss} \end{array} \right\}}$$

If the grease retention capacity is reached at a higher efficiency, the formulas shall be used to determine the efficiency of the interceptor for the grease retention capacity.

### 3.5.8 Performance Requirements for Rating.

The interceptor shall conform with or exceed the following requirements at the breakdown point:

- (a) have an average efficiency of 90% or more (see para. 3.5.7);
- (b) have an incremental efficiency of 80% or more (see para. 3.5.7);
- (c) have retained not less than 2 lb (0.9 kg) of grease for each 1 gpm (0.6 L/s) average flow rate as determined during the test.

**3.5.9 Rated Capacities.** Standard rating flow rate and grease retention capacities for grease interceptors tested in accordance with the above procedure shall conform with Table 1.



**TABLE 1 STANDARD FLOW RATES AND GREASE RETENTION CAPACITY RATINGS FOR GREASE INTERCEPTORS**

	Flow Rate		Grease Retention Capacity Rating	
	gpm	L/s	lb	kg
<b>For Small Domestic Use</b>	4	0.25	8	3.6
	7	0.44	14	6.4
<b>For Large Domestic Commercial and Institutional Use</b>	10	0.63	20	9.1
	15	0.95	30	13.6
	20	1.26	40	18.2
	25	1.58	50	22.7
	35	2.20	70	31.8
	50	3.16	100	45.4
	75	4.73	150	68.0
	100	6.31	200	90.7

## 4 LABELING, INSTALLATION, AND MAINTENANCE

### 4.1 Labeling

Products shall be labeled with the following information:

- (a) manufacturer's name or trademark or other recognized identification
- (b) model number
- (c) rated flow(s) (see para. 2.2)
- (d) "Inlet" and "Outlet"
- (e) ASME A112.14.3
- (f) product type by rating
- (g) efficiency at the rated capacity

### 4.2 Installation Instructions

Grease interceptors shall be provided with complete installation instructions, including but not limited to the following:

- (a) flow control and/or vent requirements
- (b) separate trapping requirements
- (c) elevation and accessibility requirements
- (d) safety and health-related instructions
- (e) cleanout locations
- (f) instructions that show the clearances required for maintenance, cleaning, and hazard prevention
- (g) cautions against installation in any manner except as tested and rated.

### 4.3 Maintenance Instructions

Units shall be provided with complete maintenance instructions including but not limited to the following:

- (a) maintenance instructions
- (b) safety and health provisions

Each grease interceptor shall be provided with service instructions, which include a trouble-shooting guide as well as instructions for performing necessary servicing or for obtaining servicing.

## NONMANDATORY APPENDIX A SIZING, INSTALLATION, AND MAINTENANCE OF GREASE INTERCEPTORS

### A1 GENERAL

Realizing the need for uniform sizing, installation, and maintenance data for grease interceptors conforming to the testing and rating procedures outlined in ASME A112.14.3-2000, the following information has been provided in this Appendix. The recommendations for sizing, installation, and maintenance of grease interceptors contained in this Appendix are based on input from the Plumbing and Drainage Institute (PDI).

### A2 SIZING

#### A2.1 Sizing Considerations

**A2.1.1** A grease interceptor conforming to ASME A112.14.3-2000 is designed to operate efficiently at its rated capacity. The larger the interceptor, the higher the flow rate it will handle efficiently, with a greater quantity of grease retained before cleaning is required. While a small interceptor, undersized, can accommodate a flow of waste water well in excess of its rated capacity, it will not intercept grease efficiently under such overload conditions.

**A2.1.2** The fixture drainage period in combination with the service required and the quantity of wastewater involved, establishes the rate of flow through the grease interceptor. Flow rate is therefor the primary gauge; and the flow rate establishes interceptor size or capacity.

**A2.1.3** In general, the link between flow rate and installation to produce satisfactory grease interceptor operation is a flow control and/or vent fitting. A correctly sized grease interceptor will not regulate the flow of water discharged from the fixture it is serving. Therefore, to ensure that the flow rate does not exceed the grease interceptor's rated capacity, a flow control and/or vent fitting is required for some product designs. The flow control and/or vent fitting is essential in some designs for protection against overloading the grease interceptor which could otherwise occur from sudden surges from the fixture. The flow control and/or vent fitting will

**TABLE A1    SIZING AND RATING**

Size Symbol	Flow Rate		Grease Capacity	
	gpm	L/s	lb	kg
4	4	0.25	8	3.6
7	7	0.44	14	6.4
10	10	0.63	20	9.1
15	15	0.95	30	13.6
20	20	1.26	40	18.2
25	25	1.58	50	22.7
35	35	2.20	70	31.8
50	50	3.16	100	45.4
75	75	4.73	150	68.0
100	100	6.31	200	90.7

control the flow of waste water at all times, enabling the interceptor to operate at its rated capacity.

#### A2.2 Size Symbols

It has been determined through the testing and rating procedure that ten (10) different sized interceptors are required for normal domestic, commercial, and institutional installations. These sizes are based on standard flow rates and grease retention capacity ratings for grease interceptors. (See Table 1, ASME A112.14.3-2000). Table A1 lists the size symbol for each of the standard rated grease interceptors.

#### A2.3 Sizing Procedure

Table A2 shows the standard formula in steps for sizing grease interceptors to suit requirements of specific fixtures. An example of this sizing formula application is included to illustrate the steps.

#### A2.4 Selection

Table A3 is included as a selection chart for standard grease interceptors, rated at 50 gpm or less, applicable to various size fixtures commonly used in domestic,

**TABLE A2 PROCEDURE FOR SIZING GREASE INTERCEPTORS**

Step	Formula	Example
1	Determine cubic content of fixture by multiplying length by width by depth.	A sink 48 in. long x 24 in. wide x 12 in. deep. Cubic content $48 \times 24 \times 12 = 13.824 \text{ in.}^3$
2	Determine capacity in gallons. $1 \text{ gal} = 231 \text{ in.}^3$	Contents in gallons: $13.824/231 = 59.8 \text{ gal}$
3	Determine actual drainage load. The fixture is normally filled to 75% of capacity with water. The items being washed displace about 25% of the fixture content; thus, actual drainage load = 75% of fixture capacity.	Actual drainage load: $0.75 \times 59.8 = 44.9 \text{ gal}$
4	Determine flow rate and drainage period. In general, good practice dictates a one-minute drainage period; however, when conditions permit, a two-minute drainage period is acceptable. Drainage period is the actual time period to completely drain the fixture.  $\text{Flow Rate} = \frac{\text{Actual Drainage Load}}{\text{Drainage Period}}$	Calculate flow rate for one-minute period.  $44.9/1 = 44.9 \text{ gpm Flow Rate}$  $44.9/2 = 22.5 \text{ gpm Flow Rate}$
5	Select Interceptor. From Table A1 select intercepting equipment that corresponds to the flow rate calculated.  Note: Select next larger size when flow rate falls between two sizes listed.	For one-minute period: 4.9 gpm requires size "50"  For two-minute period: 22.5 gpm requires size "25"

**TABLE A3 SELECTION CHART**

Fixture Compartment Size, in.	Number of Compartments	Drainage Load, gal	Recommended Size, Grease Interceptor	
			One-Minute Drainage Period	Two-Minute Drainage Period
18 x 12 x 6	1	4.2	7	4
16 x 14 x 8	1	5.8	7	4
20 x 18 x 8	1	9.4	10	7
18 x 16 x 8	2	15.0	15	10
20 x 18 x 8	2	18.7	20	10
30 x 20 x 8	1	15.5	20	10
24 x 20 x 12	1	18.7	20	10
22 x 20 x 8	2	23.0	25	15
22 x 20 x 12	2	34.0	35	20
24 x 24 x 12	2	44.9	50	25

commercial, and institutional installations. The selections listed are based on the sizing formula covered in Table A2.

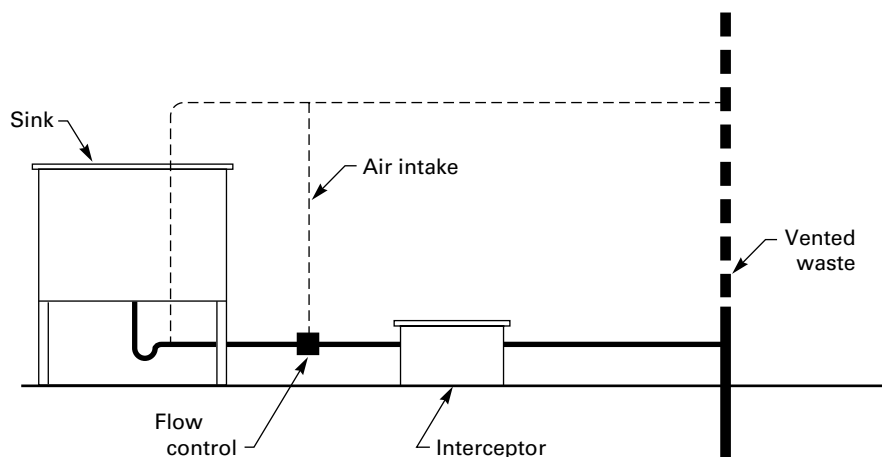
### A2.5 Dishwashers

A separate grease interceptor is recommended for each commercial dishwasher. The size of the interceptor is determined by the discharge rate gpm (L/m) of the

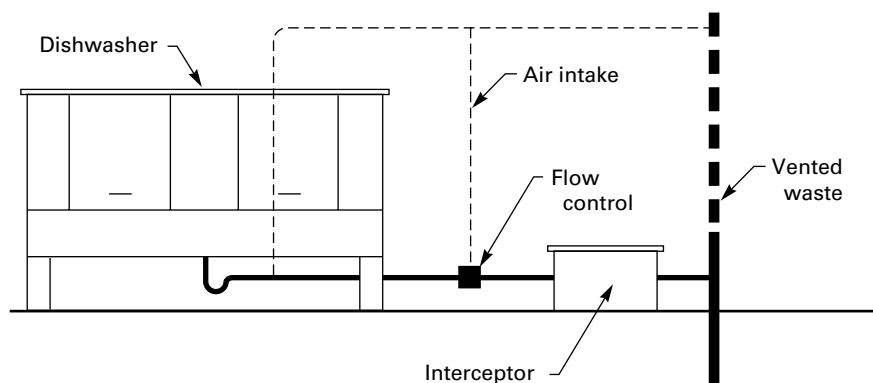
dishwasher as specified by the manufacturer. Select the proper interceptor of equivalent or next higher rate from Table A1.

### A2.6 Multiple Fixtures

Where multiple fixtures are served by a single interceptor, calculate the total capacity of all fixtures, establish the number of fixtures that may be drained simulta-



**FIG. A1 GREASE INTERCEPTOR SERVING TRAPPED AND VENTED SINK —  
FLOW CONTROL AIR INTAKE INTERSECTS VENT**



**FIG. A2 GREASE INTERCEPTOR SERVING DISHWASHER —  
FLOW CONTROL AIR INTAKE INTERSECTS VENT**

neously, and apply this factor to the total capacity to determine the maximum simultaneous capacity. Then proceed with sizing and selection of the grease interceptor using the sizing formula in Table A2.

### A3 INSTALLATION

All installation recommendations are subject to approval of the code authority.

#### A3.1 Installation Considerations

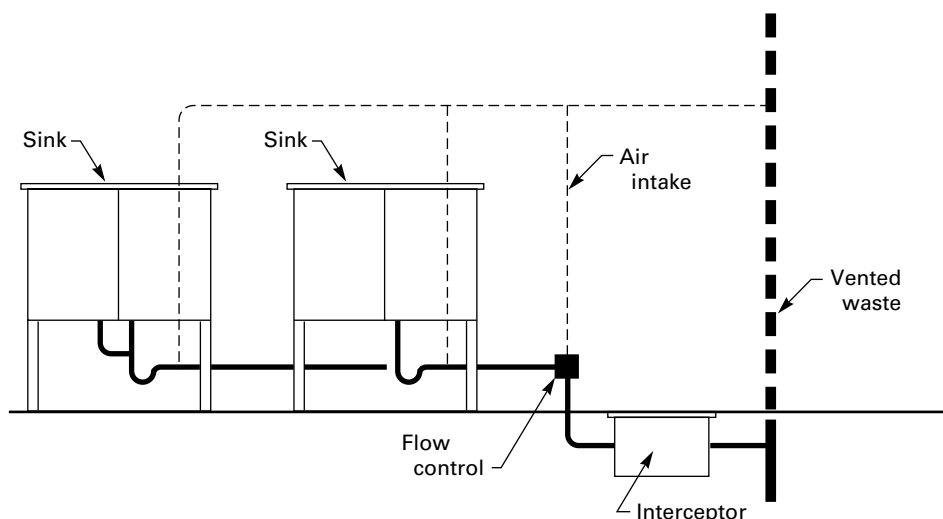
**A3.1.1** Install interceptor as close as practical to fixture or fixtures being served, see Figs. A1 through A4. The interceptor may be set on the floor, partially

recessed in the floor, or fully recessed below the floor to suit piping and structural conditions.

**A3.1.2** Anticipate sufficient clearance for removal of the interceptor cover for cleaning.

**A3.1.3** Avoid installation in which long runs of pipe (exceeding 25 ft) are necessary to reach the interceptor. This precaution will preclude the possibility of pipeline becoming clogged with congealed grease that will collect before reaching the interceptor.

**A3.1.4** Do not install piping from other sanitary fixtures such as water closets, urinals, and lavatories into the inlet piping to an interceptor. The inlet piping



**FIG. A3 GREASE INTERCEPTOR SERVING TWO INDIVIDUALLY TRAPPED AND VENTED SINKS — FLOW CONTROL AIR INTAKE INTERSECTS VENT**

to the interceptor should only be from fixtures and appliances which discharge grease or oil-laden wastes.

### A3.2 Flow Control and/or Vent

**A3.2.1** The flow control and/or vent fitting, when furnished with interceptors, shall be installed ahead of the interceptor in the waste line beyond the last connection from the fixture and as close as possible to the underside of the lowest fixture. When waste of two or more sinks or fixtures is combined to be served by one interceptor, a single flow control and/or vent fitting may be used. Except in the case of indirect waste installations, each fixture connected to a grease interceptor shall be trapped in accordance with the plumbing code. If the grease interceptor water seal is less than 2 in. (51 mm), the grease interceptor should not be used in place of a fixture trap.

**A3.2.2** If a single fixture is served by a grease interceptor, and that grease interceptor is installed with a vented flow control device, the air intake on the flow control device may serve as the fixture vent provided the air intake is connected to the building vent stack and the fixture is trapped. In no instance should a fixture vent be located between the vented flow control device and the grease interceptor.

### A3.3 Waste Line Venting

The waste line downstream from a grease interceptor shall be vented in accordance with plumbing code requirements.

### A3.4 Multiple Fixtures

One interceptor may serve multiple fixtures provided the total flow rate from the fixtures does not exceed the rated flow of the interceptor.

### A3.5 Installation Diagrams

Figures A1 through A4 illustrate various grease interceptor installations normally encountered in domestic, commercial, and institutional systems. These figures will serve as a guide to practical application of grease interceptors.

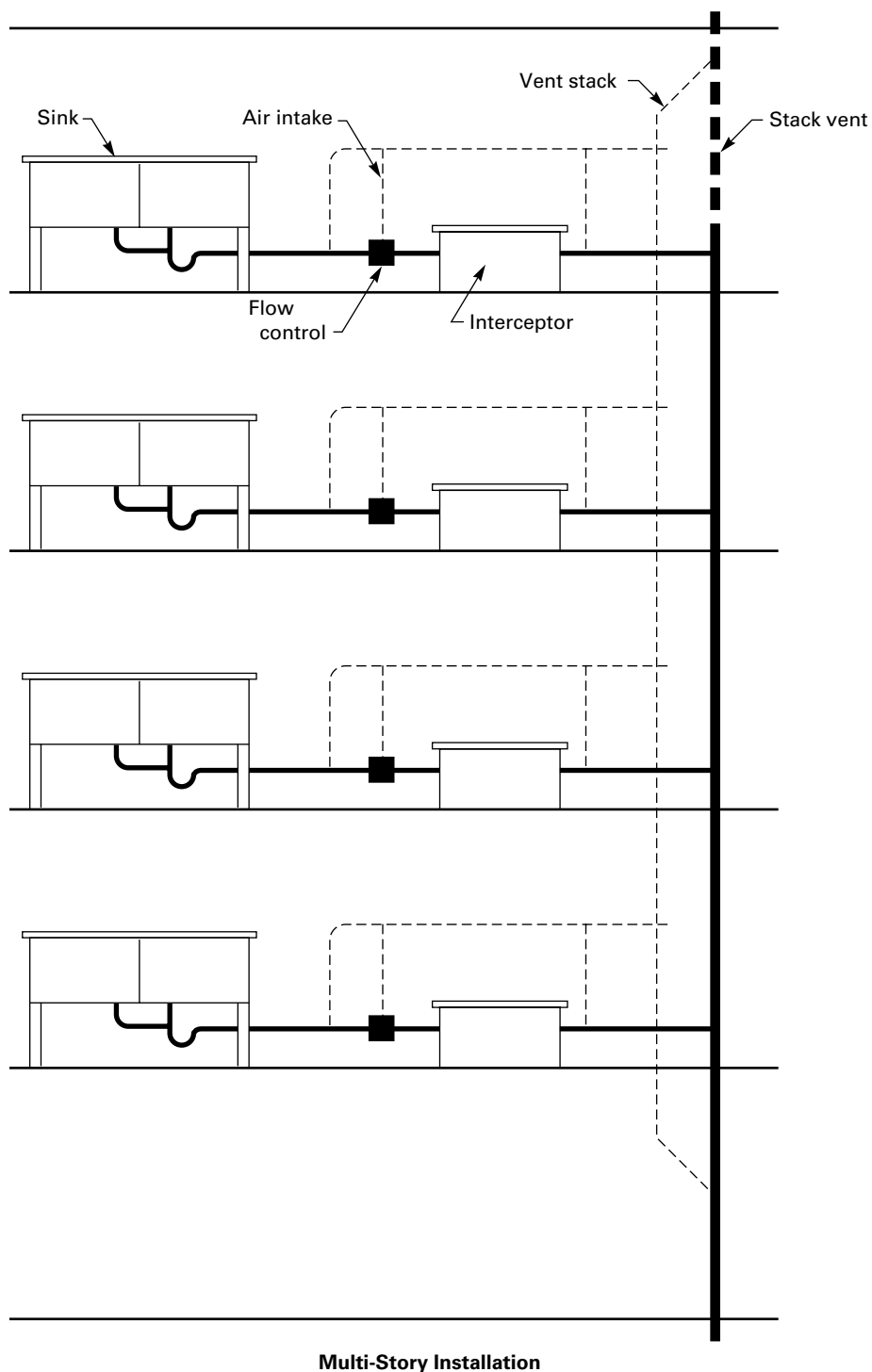
### A3.6 Alternate Installations

Grease interceptors that are tested and rated without the use of vented flow control devices should be installed in the same manner as tested and rated.

## A4 MAINTENANCE

### A4.1 General Considerations

To obtain optimum operating efficiency of a properly sized and installed grease interceptor, a regular schedule of maintenance shall be adhered to. All grease interceptors are furnished with manufacturer's operating and maintenance instructions, which shall be followed to ensure efficient satisfactory operation.



**FIG. A4 GREASE INTERCEPTORS SERVING TRAPPED AND VENTED SINKS —  
FLOW CONTROL AIR INTAKE INTERSECTS VENT**

#### **A4.2 Cleaning**

All grease interceptors shall be cleaned regularly. The frequency of grease removal is dependent upon the capacity of the interceptor and the quantity of grease in the wastewater. Grease removal intervals may therefore vary from once a week to once in several weeks. When the grease removal interval has been determined for a specific installation, regular cleaning at that interval is necessary to maintain the rated efficiency of the interceptor. After the accumulated grease and waste material has been removed, the inter-

ceptor should be thoroughly checked to make certain that inlet, outlet, and air relief ports are clear of obstructions.

#### **A4.3 Disposition of Intercepted Materials**

Grease and other waste matter that has been removed from the interceptor should not be introduced into any drain, sewer, or natural body of water. This waste matter should be placed in proper containers for disposal. Where recovery of grease is desired, it can be handled in a manner suitable to the authorities.

## **NONMANDATORY APPENDIX B RECOMMENDED FIXTURE CAPACITY LIMITATIONS**

The following recommendation is applicable to the proper sizing of grease interceptors:

“It is recommended that the total capacity in gallons of fixtures being served by an interceptor conforming to the above standard ratings, shall not exceed  $2\frac{1}{2}$  times the gallons per minute (gpm) flow rating of the subject interceptor.”



## **NONMANDATORY APPENDIX C GREASE INTERCEPTOR RATING TEST REPORTING FORM**

A rating test reporting form similar to the form shown in Table C1 shall be used by the authorized testing laboratory to record the test results for each interceptor.

TABLE C1 GREASE INTERCEPTOR RATING TEST REPORTING FORM

Interceptor ID:		Standard PDI-G101 Grease Interceptor Rating Test Form #1						Report No.:			
Capacity No. 1		Test Vehicle:	Flow Control Data			Observers:		Date:			
Capacity No. 2		Spec. Gravity:	Location:								
Separate No. 1		Viscosity:	Position:								
Separate No. 2		Test Temperature 150°F to 160°F	Flow Direction:	Grease Poured into Sink:			Notes: Drainage gauged on clear compartment.				
Simultaneous 1		Water:	Orifice Size:	Sink Test Compartment:			Tabulated "amounts retained" and "efficiency" "assumes" "no loss."				
Simultaneous 2		Test Temperature 150°F to 160°F	Air Intake:				Tabulated "skim amounts"				
		INCREMENTAL			ACCUMULATED			includes pro-rata addition for skim reclaimed from skim tank after chilling. "Actual retained" established by weight after completion of test. All weights taken after dewatering by separatory funnel and chilling.			
No.	Test	Clear	Min/Sec	Rate: gpm	lb Added	lb Skimmed	lb Retained Eff. A		lb Added	lb Skimmed	lb Retained Eff. A
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
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30											
Average											
or Total											
<b>Summary and Adjusted Results</b> 1. Total Skimmed: lb 2. Actual Retained: lb 3. Total Accounted: lb 4. Total Added: lb 5. Loss: lb 6. % Loss: lb  Avg. = line 4-line 1 / line 4 "A" = % Eff. B = line 2 / line 3 "B" = %  Breakdown Increment No.:  Amount Retained: lb  Incr. Eff. A % B Avg. Eff. A % B  Certificate Rating: gpm: lb Cap. lb											

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