

**ASME A112.14.6-2006**

# **FOG (Fats, Oils, and Greases) Disposal Systems**

**AN AMERICAN NATIONAL STANDARD**



**The American Society of  
Mechanical Engineers**

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**Three Park Avenue • New York, NY 10016**

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# FOREWORD

The American Society of Mechanical Engineers has prepared this Standard for the purpose of establishing specifications regarding the construction and application of FOG (Fats, Oils, and Greases) disposal systems. It also is intended to serve as a guide for producers, distributors, architects, engineers, contractors, installers, inspectors, and users; to promote understanding regarding designs, materials, applications, and installation; and to provide for identifying FOG disposal systems that conform to this Standard.

In 1994, the Plumbing and Drainage Institute (PDI) agreed to work with the American Society of Mechanical Engineers for the development of a Grease Interceptor Standard. That Standard is known as ASME A112.14.3 and it serves as a derivative of that collaboration. PDI has a membership of organizations that manufactures 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 PDI.

For more than a century, grease interceptors have been used in plumbing wastewater systems to permit the 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 interceptor, 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 the 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 and serves as the definitive standard for determining separation and retention efficiency of grease interceptors.

Restrictions and regulations regarding proper disposal of retained FOG promulgated subsequent to PDI-G101 and ASME A112.14.3 resulted in the development of various devices that not only separate and retain FOG, but internally dispose of retained FOG by means of mass and volume reduction by processes including, but not limited to, thermal, chemical, electrical, and biological. It is devices having this disposal characteristic to which this Standard applies. Due to the differences between this technology and those described in PDI-G101 and ASME A112.14.3, such as internal disposal, the ASME A112 Standards Committee suggested the development of this Standard.

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

This Standard was approved as an American National Standard on May 19, 2006.

# ASME A112 COMMITTEE

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Secretary, A112 Standards Committee  
The American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016-5990

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The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the edition, the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation. When appropriate, proposals should be submitted using the A112 Project Initiation Request Form.

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The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

Subject:	Cite the applicable paragraph number(s) and the topic of the inquiry.
Edition:	Cite the applicable edition of the Standard for which the interpretation is being requested.
Question:	Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information.

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

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# FOG (FATS, OILS, AND GREASES) DISPOSAL SYSTEMS

## 1 GENERAL

### 1.1 Scope

This Standard establishes requirements for FOG (Fats, Oils, and Greases) disposal systems. FOG disposal systems shall be designed to

- (a) remove FOG from effluent
- (b) retain separated FOG
- (c) internally dispose retained FOG by means and methods of mass and volume reduction as required by para. 4.3.2

The use of alternate materials or methods are permitted, provided the proposed material and method complies with the performance requirements and intent of this Standard.

### 1.2 Units of Measurement

Where values are stated in U.S. Customary units and 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/min.

### 1.3 References

The following is a list of publications referenced in this Standard:

AASHTO H20-44, Standard Specifications for HS-20, Highway Loading

Publisher: American Association of State Highway and Transportation Officials (AASHTO), 444 North Capitol Street NW, Suite 249, Washington, DC 20001

ACI 318, Specification for Steel Reinforcement

Publisher: American Concrete Institute (ACI), 38800 Country Club Drive, Farmington Hills, MI 48331.

ASME A112.3.1, Stainless Steel Drainage Systems for Sanitary, Storm and Chemical Applications, Above and In-Ground

ASME A112.14.3, Grease Interceptors

ASME B1.20.1, Pipe Threads, General Purpose (Inch)

Publisher: The American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016-5990; Order Department: 22 Law Drive, P.O. Box 2300, Fairfield, NJ 07007-2300

ASTM A 888, Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm

Drain, Waste, and Vent Piping Applications

ASTM C 33-03, Standard Specification for Concrete Aggregates

ASTM C 94, Standard Specification for Ready-Mixed Concrete

ASTM C 150-04, Standard Specification for Portland Cement

ASTM C 260-01, Standard Specification for Air-Entraining Admixtures for Concrete

ASTM C 618-03, Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

Publisher: ASTM International (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959

IAPMO PS 1, Prefabricated Septic Tanks

Publisher: International Association of Plumbing and Mechanical Officials (IAPMO), 5001 East Philadelphia Street NW, Ontario, CA 91761

PDI-G101, Testing and Rating Procedure for Grease Interceptors With Appendix of Sizing and Installation Data

Publisher: Plumbing and Drainage Institute (PDI), 800 Turnpike Street, Suite 300, North Andover, MA 01845

UL 499, Electrical Standard for Heated Appliances

UL 917, Standard for Clock-Operated Switches

UL 1004, Standard for Electric Motors

UL 1585, Standard for Class 2 and Class 3 Transformers

Publisher: Underwriters Laboratories (UL), 333 Pfingsten Road, Northbrook, IL 60062-2096

USEPA Method 1664(A), FOG (Fats, Oils & Greases) Measurement

Publisher: Environmental Protection Agency (EPA), Ariel Rios Building, 1200 Pennsylvania Avenue NW, Washington, DC 20460

### 1.4 Definitions

*sample*: a representative portion of system discharge consisting of four discrete quantities of at least 1 L each.

*stabilize*: when the functions of separation, retention and disposal are fully operational in accordance with the manufacturer's requirements.

## 2 GENERAL REQUIREMENTS

### 2.1 Construction

FOG disposal systems shall be manufactured from materials such as, but not limited to, concrete, steel,

stainless steel, fiberglass, reinforced polyester, polyethylene, and polypropylene. Such materials shall be rated and suitable for the intended application.

**2.1.1 Design Performance.** FOG disposal system designs and methods shall produce an effluent quality not to exceed 100 mg/L FOG as stated in para. 4.3.2.

**2.1.2 Flow Rate.** FOG disposal systems shall be described by total gpm influent.

**2.1.3 Inlet and Outlet Connections.** The inlet and outlet connections of the FOG disposal system shall be either a female pipe thread or a plain end diameter to allow hubless coupling connections. Tapered threads shall comply with ASME B1.20.1. Hubless connections shall comply with the outside dimension for the given pipe size in accordance with ASTM A 888 or ASME A112.3.1.

## 2.2 Electrical

All electrical components used in the FOG disposal system shall conform to the appropriate sections of UL Standards 499, 917, 1004, and 1585 as listed in para. 1.3.

## 2.3 Manufacture

**2.3.1** FOG disposal systems shall be free of manufacture and/or material defects that affect performance, or serviceability.

**2.3.2** FOG disposal systems shall be designed to withstand anticipated installation and use associated FOG loading.

**2.3.3** Each FOG disposal system and cover designated for buried application shall be structurally designed to withstand earth or other loads pertinent to its location.

**2.3.4** FOG disposal systems and covers for buried applications in nonvehicular traffic areas shall be designed for an earth load of not less than 500 psf (24 kPa) when the maximum coverage does not exceed 3 ft (0.9 m).

**2.3.5** FOG disposal systems and covers for installation in traffic areas shall be designed to withstand an AASHTO H20-44 wheel load, an additional 3 ft (0.9 m) earth load with an assumed soil weight of 100 psf (4.8 kPa), and 30 psf (1.4 kPa) fluid equivalent sidewall pressure.

**2.3.6** Internal construction shall be designed to withstand the maximum expected conditions that include, but are not limited to, chemical, thermal, electrostatic and hydrostatic pressure.

## 3 SPECIAL REQUIREMENTS

### 3.1 Separation/Retention Efficiency

FOG disposal systems shall have a minimum separation/retention efficiency in accordance with ASME A112.14.3 or PDI-G101.

### 3.2 Application Documentation

Each FOG disposal system shall be provided with complete application instructions including, but not limited to, the following:

- (a) flow control and/or vent requirements
- (b) any separate trapping requirements
- (c) elevation and accessibility requirements
- (d) safety and health-related instructions
- (e) wiring instructions to reference national or local codes
- (f) clean-out locations
- (g) instructions that show the clearances required for maintenance, cleaning, and prevention of hazards

### 3.3 Maintenance and Operation Documentation

Each FOG disposal system shall be provided with maintenance and operation documentation, which include a troubleshooting guide as well as instructions for performing necessary servicing or obtaining outside servicing. Units shall be provided with complete maintenance and operating instructions.

### 3.4 Installation

**3.4.1** Installation shall be in accordance with the manufacturer's recommendations and the applicable plumbing codes.

**3.4.2** Each unit shall be packaged with illustrated directions detailing correct installation procedures.

**3.4.3** In buried applications of FOG disposal systems, access to each system shall be provided. There shall be access for each 10 ft (3.03 m) of length for FOG disposal systems over 20 ft (6.1 m) long. Each access opening shall have a leak-resistant closure (i.e., lid) that cannot slide, rotate, or flip exposing the opening, and which does not require the use of mechanical fasteners and be of a vandal-resistant type.

**3.4.4** Manholes, if applicable, shall extend to grade; have a minimum diameter size of 20 in. (510 mm) diameter or 20 in. × 20 in. (510 mm × 510 mm); and shall be provided with a fitted, water-tight cover. Manholes shall be capable of withstanding all anticipated loads and comply with IAPMO PS-1, para. 4.7.1, which requires that all manholes have a leak-resistant closure that, when properly installed, cannot slide, rotate, or flip exposing the opening, and which does not require the use of mechanical fasteners.

## 4 TESTING

### 4.1 Water Test

**4.1.2 Test Procedure.** A sampling from each manufacturer's production run shall be water-tested. One sample shall be tested for each size FOG disposal system manufactured.

Sample FOG disposal systems shall be assembled in accordance with the manufacturer's instructions, set level, and water raised to the flow line of the outlet fitting.

**4.1.3 Acceptance Criteria.** FOG disposal systems shall show no leakage from section seams, pinholes, or other imperfections. Any leakage is cause for rejection.

**4.1.3.1** When leakage occurs, additional water testing shall be made from new samples after corrective measures in production or installation have been completed. Test reports shall show the total number of FOG disposal systems tested, number passing, number failing, location, and cause of leakage. When leakage occurs, corrective measures taken shall be reported.

### 4.2 Efficiency Test

**4.2.1 Test Procedure.** The hydraulic efficiency of the FOG internal disposal systems shall be determined in accordance with ASME A112.14.3 or PDI-G101. For flows exceeding PDI-G101 capacities, the efficiency shall be calculated as prescribed in para. 7.7 of PDI-G101. Hydraulic efficiency, as used here, is the FOG separation and retention efficiency of the FOG disposal system with the disposal function inactive. The separation and retention efficiency of the FOG disposal system shall comply with the requirements of para. 7.8 of PDI-G101.

**4.2.2 Acceptance Criteria.** The minimum hydraulic efficiency shall be 90% or greater.

### 4.3 Performance Testing

**4.3.1 Test Procedure.** Test the FOG disposal system as follows:

(a) Measure the total liquid volume of the system at the point of discharge.

(b) Calculate the test flow rate (in gpm) by dividing the nameplate flow rate (in gpm) by 4.

(c) Install the system in accordance with the manufacturer's instructions.

(d) Connect the inlet of the system to a potable water supply capable of providing the test flow rate at a temperature between 70°F and 76°F. Charge the system at the test flow rate, with FOG having a specific gravity of  $0.875 \pm 0.005$ , at 150°F being injected into the influent at the rate of 300 mg/L. Activate the disposal function and allow it to stabilize in accordance with the manufacturer's instructions.

**4.3.2 Acceptance Criteria.** Once the system is stabilized (when the functions of separation, retention, and disposal are fully operational in accordance with the manufacturer's requirements), sample (a representative portion of system discharge consisting of four discrete quantities of a least 1 L each) the final effluent and determine the quantity of FOG in accordance with USEPA Method 1664. The final effluent from FOG internal disposal systems shall contain no more than 100 mg/L FOG as measured by USEPA Method 1664.

## 5 MARKING

### 5.1 Marking and Identification

FOG disposal systems shall be permanently and legibly marked with the following:

- (a) manufacturer's name and/or trademark
- (b) model number
- (c) rated flow (in gpm) and metric equivalent
- (d) "inlet" and "outlet"
- (e) third party certification marking as required
- (f) ASME A112.14.6

## A112 ASME STANDARDS RELATED TO PLUMBING

Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water-Connected Receptors).....	A112.1.2-2004
Air Gap Fittings for Use With Plumbing Fixtures, Appliances, and Appurtenances .....	A112.1.3-2000 (R2005)
Performance Standard and Installation Procedures for Stainless Steel Drainage Systems for Sanitary, Storm, and Chemical Applications, Above and Below Ground .....	A112.3.1-1993
Macerating Toilet Systems and Related Components .....	A112.3.4-2000 (R2004)
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Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals .....	A112.19.2-2003
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Hydraulic Performance Requirements for Water Closets and Urinals .....	A112.19.6-1995
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Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Appliances .....	A112.19.8M-1987 (R1996)
Non-Vitreous Ceramic Plumbing Fixtures .....	A112.19.9M-1991 (R2002)
Dual Flush Devices for Water Closets .....	A112.19.10-2003
Wall Mounted and Pedestal Mounted, Adjustable and Pivoting Lavatory and Sink Carrier Systems .....	A112.19.12-2000 (R2004)
Electrohydraulic Water Closets .....	A112.19.13-2001
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