ASME A112.14.6-2010
(Revision of ASME A112.14.6-2006)

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

AN AMERICAN NATIONAL STANDARD

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

AN AMERICAN NATIONAL STANDARD

ASME
SETTING THE STANDARD

Three Park Avenue • New York, NY • 10016 USA

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This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Periodically certain actions of the ASME A112 Committee may be published as Cases. Cases and interpretations are published on the ASME Web site under the Committee Pages at http://cstools.asme.org as they are issued.



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

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# FOREWORD

The American Society of Mechanical Engineers has prepared this Standard for 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 guidelines 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, 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 U.S. 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 rate grease interceptors properly. 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. This Standard applies to grease interceptors using the hydromechanical principles of PDI-G101, ASME A112.14.3, or the gravity interceptor principles of IAPMO/ANSI Z 1001.

This revision was approved as an American National Standard on June 14, 2010.

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# 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, Washington, DC 20001 (http://www.transportation.org)

ACI 318, Specification for Steel Reinforcement

Publisher: American Concrete Institute (ACI), 38800 Country Club Drive, Farmington Hills, MI 48331 (http://www.aci-int.org)

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 2900, Fairfield, NJ 07007-2900 (http://www.asme.org)

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
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: American Society for Testing and Materials (ASTM International), 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 (http://www.astm.org)

IAPMO/ANSI Z 1001, Grease Interceptors

Publisher: International Association of Plumbing and Mechanical Officials (IAPMO), 5001 East Philadelphia Street, NW, Ontario, CA 91761 (http://www.iapmo.org)

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, North Andover, MA 01845 (http://www.pdionline.org)

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, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062-2096 (http://www.ul.com)

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

Publisher: U.S. Environmental Protection Agency (EPA), Ariel Rios Building, 1200 Pennsylvania Avenue, NW, Washington, DC 20460 (http://www.epa.gov)

### 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, based on a hydromechanical grease interceptor principle, shall have a minimum separation/retention efficiency in accordance with ASME A112.14.3 or PDI-G101. FOG disposal systems, based on a gravity grease interceptor principle, shall be designed in accordance with IAPMO/ANSI Z 1001.

### 3.2 Application Documentation

Each FOG disposal system shall be provided with complete application instructions including, but not limited to, the following:
*(a) all* flow control and/or vent requirements
*(b)* any separate trapping requirements
*(c) all* elevation and accessibility requirements

*(d) all* safety and health-related instructions
*(e) all* wiring instructions to reference national or local codes
*(f) all* clean-out locations
*(g) all* 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 that 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. (510 mm) × 20 in. (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/ANSI Z 1001, which requires that all manholes have a leak-resistant closure that, when properly installed, cannot slide, rotate, or flip exposing the opening, and that does not require the use of mechanical fasteners.

## 4 TESTING

### 4.1 Water Test

**4.1.1 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.

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

**4.1.2.1** 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 (Hydromechanical Type Only)

**4.2.1 Test Procedure.** The hydraulic efficiency of the FOG internal disposal systems, based on hydromechanical grease interception, 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 (Hydromechanical Based).** 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 (21.11°C) and 76°F (24.44°C). Charge the system at the test flow rate, with FOG having a specific gravity of 0.875 ± 0.005, at 150°F (65.56°C) 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 Test Procedure (Gravity Based).** Test the FOG disposal system as follows:

*(a)* Calculate the total liquid volume of the system and divide by 30 min retention time to calculate the gpm rated flow of the interceptor.

*(b)* Calculate the test flow rate (in gpm) by dividing the 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 (21.11°C) and 76°F (24.44°C). Charge the system at the test flow rate, with FOG having a specific gravity of 0.875 ± 0.005, at 150°F (65.56°C) 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.

**4.3.3 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 the final effluent and determine the quantity of FOG in accordance with USEPA Method 1664. The sample shall be a representative portion of system discharge consisting of four discrete quantities of at least 1 L each. 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

# ASME STANDARDS RELATED TO PLUMBING

A112.1.2-2004, Air Gaps in Plumbing Systems (for Plumbing Fixtures and Water-Connected Receptors)
A112.1.3-2000 (R2010), Air Gap Fittings for Use With Plumbing Fixtures, Appliances, and Appurtenances
A112.3.1-2007, Stainless Steel Drainage Systems for Sanitary, DWV, Storm, and Vacuum Applications, Above- and Below-Ground
A112.3.4-2000 (R2004), Macerating Toilet Systems and Related Components
A112.4.1-2009, Water Heater Relief Valve Drain Tubes
A112.4.2-2009, Water Closet Personal Hygiene Devices
A112.4.3-1999 (R2010), Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System
A112.4.7-2002 (R2008), Point of Use and Branch Water Submetering Systems
A112.4.14-2004 (R2010), Manually Operated, Quarter-Turn Shutoff Valves for Use in Plumbing Systems
A112.6.1M-1997 (R2008), Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use
A112.6.2-2000 (R2010), Framing-Affixed Supports for Off-the-Floor Water Closets With Concealed Tanks
A112.6.3-2001 (R2007), Floor and Trench Drains
A112.6.4-2003 (R2008), Roof, Deck, and Balcony Drains
A112.6.7-2001 (R2007), Enameled and Epoxy Coated Cast Iron and PVC Plastic Sanitary Floor Sinks
A112.6.9-2005 (R2010), Siphonic Roof Drains
A112.14.1-2003 (R2008), Backwater Valves
A112.14.3-2000 (R2004), Grease Interceptors
A112.14.4-2001 (R2007), Grease Removal Devices
A112.14.6-2010, FOG (Fats, Oils, and Greases) Disposal Systems
A112.18.1-2005/CSA B125.1-05, Plumbing Fixture Fittings
A112.18.2-2005/CSA B125.2-05, Plumbing Fixture Waste Fittings
A112.18.3-2002 (R2008), Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings
A112.18.6-2009/CSA B125.6-09, Flexible Water Connectors
A112.18.7-1999 (R2004), Deck Mounted Bath/Shower Transfer Valves With Integral Backflow Protection
A112.18.8-2009, In-Line Sanitary Waste Valves for Plumbing Drainage Systems
A112.19.1-2008/CSA B45.2-08, Enameled Cast Iron and Enameled Steel Plumbing Fixtures
A112.19.2-2008/CSA B45.1-08, Ceramic Plumbing Fixtures
A112.19.3-2008/CSA B45.4-08, Stainless Steel Plumbing Fixtures (Designed for Residential Use)
A112.19.4M-1994 (R2004), Porcelain Enameled Formed Steel Plumbing Fixtures
A112.19.5-2005, Trim for Water-Closet Bowls, Tanks, and Urinals
A112.19.6-1995, Hydraulic Performance Requirements for Water Closets and Urinals
A112.19.7-2006, Hydromassage Bathtub Appliances
A112.19.8-2007, Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs
A112.19.9M-1991 (R2008), Non-Vitreous Ceramic Plumbing Fixtures
A112.19.10-2003 (R2008), Dual Flush Devices for Water Closets
A112.19.12-2006, Wall-Mounted, Pedestal-Mounted, Adjustable, Elevating, Tilting, and Pivoting Lavatory, Sink, and Shampoo Bowl Carrier Systems and Drain Waste Sysetms
A112.19.13-2001 (R2007), Electrohydraulic Water Closets
A112.19.14-2006, Six-Liter Water Closets Equipped With a Dual Flushing Device
A112.19.15-2005 (R2010), Bathtubs/Whirlpool Bathtubs With Pressure Sealed Doors
A112.19.16-2006, Terrazzo Plumbing Fixtures
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A112.19.19-2006, Vitreous China Nonwater Urinals
A112.20.1-2004, Qualification of Installers of High Purity Piping Systems
A112.20.2-2004, Qualification of Installers of Firestop Systems and Devices for Piping Systems
A112.21.3M-1985 (R2007), Hydrants for Utility and Maintenance Use
A112.36.2M-1991 (R2002), Cleanouts

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