

# CHAPTER 10

## TRAPS AND INTERCEPTORS

### 1001.0 Traps Required.

**1001.1 Where Required.** Each plumbing fixture, shall be separately trapped by an approved type of liquid seal trap. This section shall not apply to fixtures with integral traps. Not more than one trap shall be permitted on a trap arm. Food waste disposal units installed with a set of restaurant, commercial, or industrial sinks shall be connected to a separate trap. Each domestic clothes washer and each laundry tub shall be connected to a separate and independent trap, except that a trap serving a laundry tub shall be permitted to also receive the waste from a clothes washer set adjacent thereto. The vertical distance between a fixture outlet and the trap weir shall be as short as practicable, but in no case shall the tailpiece from a fixture exceed 24 inches (610 mm) in length. One trap shall be permitted to serve a set of not more than three single compartment sinks or laundry tubs of the same depth or three lavatories immediately adjacent to each other and in the same room where the waste outlets are not more than 30 inches (762 mm) apart and the trap is centrally located where three compartments are installed.

### 1002.0 Traps Protected by Vent Pipes.

**1002.1 Vent Pipes.** Each plumbing fixture trap, except as otherwise provided in this code, shall be protected against siphonage, backpressure, and air circulation shall be assured throughout the drainage system by means of a vent pipe installed in accordance with the requirements of this code.

**1002.2 Fixture Traps.** Each fixture trap shall have a protecting vent so located that the developed length of the trap arm from the trap weir to the inner edge of the vent shall be within the distance given in Table 1002.2, but in no case less than two times the diameter of the trap arm.

**1002.3 Change of Direction.** A trap arm shall be permitted to change direction without the use of a cleanout where such change of direction does not exceed 90 degrees (1.57 rad). Horizontal changes in direction of trap arms shall be in accordance with Section 706.3.

**Exception:** For trap arms 3 inches (80 mm) in diameter and larger, the change of direction shall not exceed 135 degrees (2.36 rad) without the use of a cleanout.

**1002.4 Vent Pipe Opening.** The vent pipe opening from a soil or waste pipe, except for water closets and similar fixtures, shall not be below the weir of the trap.

### 1003.0 Traps — Described.

**1003.1 General Requirements.** Each trap, except for traps within an interceptor or similar device shall be self-cleaning. Traps for bathtubs, showers, lavatories, sinks, laundry tubs, floor drains, urinals, drinking fountains, dental units, and similar fixtures shall be of standard design, weight and shall be of ABS, cast-brass, cast-iron, lead, PP, PVC, or other approved material. An exposed and readily accessible drawn-brass tubing trap, not less than 17 B & S Gauge (0.045 inch) (0.114 mm), shall be permitted to be used on fixtures discharging domestic sewage.

**Exception:** Drawn-brass tubing traps shall not be used for urinals. Each trap shall have the manufacturer's name stamped legibly in the metal of the trap, and each tubing trap shall have the gauge of the tubing in addition to the manufacturer's name. A trap shall have a smooth and uniform interior waterway.

**1003.2 Slip Joint Fittings.** A maximum of one approved slip joint fitting shall be permitted to be used on the outlet side of a trap, and no tubing trap shall be installed without a listed tubing trap adapter. Listed plastic trap adapters shall be permitted to be used to connect listed metal tubing traps.

**TABLE 1002.2**  
**HORIZONTAL LENGTHS OF TRAP ARMS**  
**(EXCEPT FOR WATER CLOSETS AND SIMILAR FIXTURES)<sup>1, 2</sup>**

TRAP ARM PIPE DIAMETER (inches)	DISTANCE TRAP TO VENT MINIMUM (inches)	LENGTH MAXIMUM (inches)
1/4	2 1/2	30
1/2	3	42
2	4	60
3	6	72
4	8	120
Exceeding 4	2 x Diameter	120

For SI units: inch = 25.4 mm

**Notes:**

<sup>1</sup> Maximum length per foot slope (20.8 mm/m)

<sup>2</sup> The developed length between the trap of a water closet or similar fixture (measured from the top of the closet flange to the inner edge of the vent) and the vent shall not exceed 6 feet (1829 mm)

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**1003.3 Size.** The size (nominal diameter) of a trap for a given fixture shall be sufficient to drain the fixture rapidly, but in no case less than nor more than one pipe size larger than given in Table 702.1. The trap shall be the same size as the trap arm to which it is connected.

### 1004.0 Traps.

**1004.1 Prohibited.** No form of trap that depends for its seal upon the action of movable parts shall be used. No trap that has concealed interior partitions, except those of plastic, glass, or similar corrosion-resisting material, shall be used. "S" traps, bell traps, and crown-vented traps shall be prohibited. No fixture shall be double trapped. Drum and bottle traps shall be installed for special conditions. No trap shall be installed without a vent, except as otherwise provided in this code.

**1004.2 Movable Parts.** Bladders, check valves or other type of devices with moveable parts shall be prohibited to serve as a trap.

### 1005.0 Trap Seals.

**1005.1 General.** Each fixture trap shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm), except where a deeper seal is found necessary by the Authority Having Jurisdiction. Traps shall be set true with respect to their liquid seals and, where necessary, they shall be protected from freezing.

### 1006.0 Floor Drain Traps.

**1006.1 General.** Floor drains shall connect into a trap so constructed that it can be readily cleaned and of a size to serve efficiently the purpose for which it is intended. The drain inlet shall be so located that it is in full view. Where subject to reverse flow of sewage or liquid waste, such drains shall be equipped with an approved backwater valve.

### 1007.0 Trap Seal Protection.

**1007.1 General.** Floor drain or similar traps directly connected to the drainage system and subject to infrequent use shall be protected with a trap seal primer, except where not deemed necessary for safety or sanitation by the Authority Having Jurisdiction. Trap seal primers shall be accessible for maintenance.

### 1008.0 Building Traps.

**1008.1 General.** Building traps shall not be installed except where required by the Authority Having Jurisdiction. Each building trap where installed shall be provided with a cleanout and with a relieving vent or fresh-air intake on the inlet side of the trap, which need not be larger than one-half the diameter of the drain to which it connects. Such relieving vent or fresh-air intake shall be carried above grade and terminate in a screened outlet located outside the building.

## 1009.0 Industrial Interceptors (Clarifiers) and Separators.

**1009.1 Where Required.** Interceptors (clarifiers) (including grease, oil, sand interceptors [clarifiers], etc.) shall be required by the Authority Having Jurisdiction where they are necessary for the proper handling of liquid wastes containing grease, flammable wastes, sand, solids, acid or alkaline substances, or other ingredients harmful to the building drainage system, the public or private sewer, or to public or private sewage disposal.

**1009.2 Approval.** The size, type, and location of each interceptor (clarifier) or separator shall be approved by the Authority Having Jurisdiction. Except where otherwise specifically permitted, no wastes other than those requiring treatment or separation shall be discharged into an interceptor (clarifier).

**1009.3 Design.** Interceptors (clarifiers) for sand and similar heavy solids shall be so designed and located as to be readily accessible for cleaning and shall have a water seal of not less than 6 inches (152 mm).

**1009.4 Relief Vent.** Interceptors (clarifiers) shall be so designed that they will not become air-bound where closed covers are used. Each interceptor (clarifier) shall be properly vented.

**1009.5 Location.** Each interceptor (clarifier) cover shall be readily accessible for servicing and maintaining the interceptor (clarifier) in working and operating condition. The use of ladders or the removal of bulky equipment in order to service interceptors (clarifiers) shall constitute a violation of accessibility. Location of interceptors (clarifiers) shall be shown on the approved building plan.

**1009.6 Maintenance of Interceptors.** Interceptors shall be maintained in efficient operating condition by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor.

**1009.7 Discharge.** The waste pipe from oil and sand interceptors shall discharge as approved by the Authority Having Jurisdiction.

## 1010.0 Slaughterhouses, Packing Establishments, etc.

**1010.1 General.** A fish, fowl, and animal slaughterhouse or establishment; a fish, fowl, and meat packing or curing establishment; a soap factory, tallow-rendering, fat-rendering, and a hide-curing establishment shall be connected to and shall drain or discharge into an approved grease interceptor (clarifier).

## 1011.0 Minimum Requirements for Auto Wash Racks.

**1011.1 General.** A private or public wash rack, or floor or slab used for cleaning machinery or machine parts shall be adequately protected against storm or surface water and shall drain or discharge into an approved interceptor (clarifier).

**1012.0 Commercial and Industrial Laundries.**

**1012.1 General.** Laundry equipment in commercial and industrial buildings that does not have integral strainers shall discharge into an interceptor having a wire basket or similar device that is removable for cleaning and that will prevent passage into the drainage system of solids  $\frac{1}{2}$  of an inch (12.7 mm) or larger in maximum dimension, such as string, rags, buttons, or other solid materials detrimental to the public sewerage system.

**1013.0 Bottling Establishments.**

**1013.1 General.** Bottling plants shall discharge their process wastes into an interceptor that will provide for the separation of broken glass or other solids, before discharging liquid wastes into the drainage system.

**1014.0 Grease Interceptors.**

**1014.1 Where Required.** Where it is determined by the Authority Having Jurisdiction that waste pretreatment is required, an approved type of grease interceptor(s) in accordance with the provisions of this section shall be correctly sized and properly installed in grease waste line(s) leading from sinks and drains, such as floor drains, floor sinks, and other fixtures or equipment in serving establishments such as restaurants, cafes, lunch counters, cafeterias, bars and clubs, hotels, hospitals, sanitariums, factory or school kitchens, or other establishments where grease is introduced into the drainage or sewage system in quantities that can effect line stoppage or hinder sewage treatment or private sewage disposal. A combination of hydromechanical, gravity grease interceptors, and engineered systems shall be allowed in order to meet this code and other applicable requirements of the Authority Having Jurisdiction where space or existing physical constraints of existing buildings necessitate such installations. A grease interceptor shall not be required for individual dwelling units or for private living quarters. Water closets, urinals, and other plumbing fixtures conveying human waste shall not drain into or through the grease interceptor.

**1014.1.1 Trapped and Vented.** Each fixture discharging into a grease interceptor shall be individually trapped and vented in an approved manner.

**1014.1.2 Maintenance.** Grease interceptors shall be maintained in efficient operating condition by periodic removal of the accumulated grease and latent material. No such collected grease shall be introduced into drainage piping or a public or private sewer. Where the Authority Having Jurisdiction determines that a grease interceptor is not being properly cleaned or maintained, the Authority Having Jurisdiction shall have the authority to mandate the installation of additional equipment or devices and to mandate a maintenance program.

**1014.1.3 Food Waste Disposal Units and Dishwashers.** Unless specifically required or permitted by the Authority Having Jurisdiction, no food

waste disposal unit or dishwasher shall be connected to or discharge into a grease interceptor. Commercial food waste disposers shall be permitted to discharge directly into the building's drainage system.

**1014.2 Hydromechanical Grease Interceptors.**

Plumbing fixtures or equipment connected to a Type A and B hydromechanical grease interceptor shall discharge through an approved type of vented flow control installed in a readily accessible and visible location. Flow control devices shall be designed and installed so that the total flow through such device or devices shall at no time be greater than the rated flow of the connected grease interceptor. No flow control device having adjustable or removable parts shall be approved. The vented flow control device shall be located such that no system vent shall be between the flow control and the grease interceptor inlet. The vent or air inlet of the flow control device shall connect with the sanitary drainage vent system, as elsewhere required by this code, or shall terminate through the roof of the building, and shall not terminate to the free atmosphere inside the building.

**Exception:** Listed grease interceptors with integral flow controls or restricting devices shall be installed in an accessible location in accordance with the manufacturer's installation instructions.

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

For the purpose of this section, the term "fixture" shall mean and include each plumbing fixture, appliance, apparatus, or other equipment required to be connected to or discharged into a grease interceptor by a provision of this section.

**1014.2.2 Vent.** A vent shall be installed downstream of hydromechanical grease interceptors in accordance with the requirements of this code.

**1014.3 Gravity Grease Interceptors.** Required gravity grease interceptors shall comply with the provisions of Section 1014.3.1 through Section 1014.3.7.

**1014.3.1 General.** The provisions of this section shall apply to the design, construction, installation, and testing of commercial kitchen gravity grease interceptors.

**1014.3.2 Waste Discharge Requirements.** Waste discharge in establishments from fixtures and equipment which contain grease, including but not limited to, scullery sinks, pot and pan sinks, dishwashers, soup kettles, and floor drains located in areas where grease-containing materials exist, shall be permitted to be drained into the sanitary waste through the interceptor where approved by the Authority Having Jurisdiction.

**1014.3.2.1 Toilets and Urinals.** Toilets, urinals, and other similar fixtures shall not drain through the interceptor.

**TABLE 1014.2.1  
HYDROMECHANICAL GREASE INTERCEPTOR SIZING USING GRAVITY FLOW RATES<sup>1</sup>**

DIAMETER OF GREASE WASTE PIPE (inches)	MAXIMUM FULL PIPE FLOW (gpm) <sup>2</sup>	SIZE OF GREASE INTERCEPTOR	
		ONE-MINUTE DRAINAGE PERIOD (gpm)	TWO-MINUTE DRAINAGE PERIOD (gpm)
2	20	20	10
3	60	75	35
4	125	150	75
5	230	250	125
6	375	500	250

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

**Notes:**

<sup>1</sup> For interceptor sizing by fixture capacity see the example below

<sup>2</sup> / inch slope per foot (20.8 mm/m) based on Manning's formula with friction factor  $N = 0.2$

**EXAMPLE 1014.2.1  
SIZING HYDROMECHANICAL GREASE INTERCEPTOR(S) USING FIXTURE CAPACITY**

**Step 1: Determine the flow rate from each fixture.**

$$[\text{Length}] \times [\text{Width}] \times [\text{Depth}] / [2.31] = \text{Gallons} \times [.75 \text{ fill factor}] / [\text{Drain Period (1 minute or 2 minutes)}]$$

**Step 2: Calculate the total load from fixtures that discharge into the interceptor.**

FIXTURES	COMPARTMENTS	LOAD (gallons)	SIZE OF GREASE INTERCEPTOR ONE-MINUTE DRAINAGE PERIOD (gpm)	TWO-MINUTE DRAINAGE PERIOD (gpm)
Compartment size				
24 inches x 24 inches x 12 inches	2	44.9		
Hydrant		3		
Rated Appliance		2		
		49.9	50	25

For SI units: inch = 25.4 mm, gallon per minute = 0.06 L/s, gallon = 3.785 L

**1014.3.2.2 Inlet Pipe.** Waste shall enter the interceptor through the inlet pipe.

**1014.3.3 Design.** Gravity interceptors shall be constructed in accordance with the applicable standard in Table 1401.1 or the design approved by the Authority Having Jurisdiction.

**1014.3.4 Location.** Each grease interceptor shall be so installed and connected that it shall be easily accessible for inspection, cleaning, and removal of the intercepted grease. A gravity grease interceptor in accordance with IAPMO Z1001, shall not be installed in a building where food is handled. Location of the grease interceptor shall meet the approval of the Authority Having Jurisdiction.

**1014.3.4.1 Interceptors.** Interceptors shall be placed as close as practical to the fixtures they serve.

**1014.3.4.2 Business Establishment.** Each business establishment for which a gravity grease interceptor is required shall have an interceptor which shall serve that establishment unless otherwise approved by the Authority Having Jurisdiction.

**1014.3.4.3 Access.** Each gravity grease interceptor shall be located so as to be readily accessible to the equipment required for maintenance.

**1014.3.5 Construction Requirements.** Gravity grease interceptors shall be designed to remove grease from effluent and shall be sized in accordance with this section. Gravity grease interceptors shall also be designed to retain grease until accumulations can be removed by pumping the interceptor. It is recommended that a sample box be located at the outlet end of gravity grease interceptors so that the Authority Having Jurisdiction can periodically sample effluent quality.

**1014.3.6 Sizing Criteria.** The volume of the interceptor shall be determined by using Table 1014.3.6. Where drainage fixture units (DFUs) are not known, the interceptor shall be sized based on the maximum DFUs allowed for the pipe size connected to the inlet of the interceptor. Refer to Table 703.2, Drainage Piping, Horizontal.

**1014.3.7 Abandoned Gravity Grease Interceptors.** Abandoned grease interceptors shall be pumped and filled as required for abandoned sewers and sewage disposal facilities in Section 722.0.

**1015.0 FOG (Fats, Oils, and Greases) Disposal System.**

**1015.1 Purpose.** The purpose of this section is to provide the necessary criteria for the sizing, application, and instal-

**TABLE 1014.3.6  
GRAVITY GREASE INTERCEPTOR SIZING**

DRAINAGE FIXTURE UNITS <sup>1, 3</sup> (DFUs)	INTERCEPTOR VOLUME <sup>2</sup> (gallons)
8	500
21	750
35	1000
90	1250
172	1500
216	2000
307	2500
342	3000
428	4000
576	5000
720	7500
2112	10 000
2640	15 000

For SI units: gallon = 3.785 L

**Notes:**

<sup>1</sup> The maximum allowable DFUs permitted to the kitchen drain lines that will be connected to the grease interceptor

<sup>2</sup> These sizes based on: DFUs, the pipe size from this code; Table 703.2; Useful Tables for Flow in Pipe Pipes (ref: *Mohinder Nayyar Piping Handbook*, 3rd Edition, 1992) Based on 30-minute retention time (ref: George Tchobanoglous and Metcalf & Eddy *Wastewater Engineering Treatment, Disposal and Reuse*, 3rd Edition 1991 & Ronald Crites and George Tchobanoglous *Small and Decentralized Wastewater Management Systems*, 1998) Rounded up to nominal interceptor volume

<sup>3</sup> Where the flow rate of directly connected fixture(s) or appliance(s) have no assigned DFU values, the addition grease interceptor volume shall be based on the known flow rate (gpm) (L/s) multiplied by 30 minutes

lation of FOG disposal systems designated as a pretreatment or discharge water quality compliance strategy.

**1015.2 Scope.** FOG disposal systems shall be considered engineered systems and shall be in accordance with the requirements of Section 301.4 of this code.

**1015.3 Components, Materials, and Equipment.** FOG disposal systems, including components, materials, and equipment necessary for the proper function of the system, shall be in accordance with Section 301.1.2 or Section 301.2 of this code.

**1015.4 Sizing Application and Installation.** FOG disposal systems shall be engineered, sized, and installed in accordance with the manufacturer's installation instructions and as specified in ASME A112.14.6, as listed in Table 1401.1 of this code.

**1015.5 Performance.** FOG disposal systems shall be tested and certified as listed in Table 1401.1 of this code, and other national consensus standards applicable to FOG disposal systems as discharging a maximum of 5.84 grains per gallon (gr/gal) (100 mg/L) FOG.

**EXAMPLE 1014.3.6**

**GRAVITY GREASE INTERCEPTOR SIZING EXAMPLE**

Given: A restaurant with the following fixtures and equipment.

One food preparation sink; three floor drains - one in the food prep area, one in the grill area, and one receiving the indirect waste from the ice machine and a mop sink.

Kitchen Drain Line DFU Count (from Table 702.1):

3 floor drains at 2 DFUs each =	6 DFUs
Mop sink at 3 DFUs each =	3 DFUs
Food prep sink at 3 DFUs each =	3 DFUs
Total =	12 DFUs

Using Table 1014.3.6, the grease interceptor will be sized at 750 gallons (2389 L).

**1016.0 Sand Interceptors.**

**1016.1 Discharge.** Where the discharge of a fixture or drain contain solids or semi-solids heavier than water that would be harmful to a drainage system or cause a stoppage within the system, the discharge shall be through a sand interceptor. Multiple floor drains shall be permitted to discharge into one sand interceptor.

**1016.2 Authority Having Jurisdiction.** Sand interceptors are required where the Authority Having Jurisdiction deems it advisable to have a sand interceptor to protect the drainage system.

**1016.3 Construction and Size.** Sand interceptors shall be built of brick or concrete, prefabricated coated steel, or other watertight material. The interceptor shall have an interior baffle for full separation of the interceptor into two sections. The outlet pipe shall be the same size as the inlet pipe of the sand interceptor, the minimum being 3 inches (80 mm), and the baffle shall have two openings of the same diameter as the outlet pipe and at the same invert as the outlet pipe. These openings shall be staggered so that there cannot be a straight line flow between the inlet pipe and the outlet pipe. The invert of the inlet pipe shall be no lower than the invert of the outlet pipe.

The sand interceptor shall have a minimum dimension of 2 square feet (0.2 m<sup>2</sup>) for the net free opening of the inlet section and a minimum depth under the invert of the outlet pipe of 2 feet (610 mm).

For each 5 gpm (0.3 L/s) flow or fraction thereof over 20 gpm (1.26 L/s), the area of the sand interceptor inlet section is to be increased by 1 square foot (0.09 m<sup>2</sup>). The outlet section shall at all times have a minimum area of 50 percent of the inlet section.

The outlet section shall be covered by a solid removable cover, set flush with the finished floor, and the inlet section shall have an open grating, set flush with the finished floor and suitable for the traffic in the area in which it is located.

**1016.4 Separate Use.** Sand and similar interceptors for every solid shall be so designed and located as to be readily

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accessible for cleaning, shall have a water seal of not less than 6 inches (152 mm), and shall be vented.

### 1017.0 Oil and Flammable Liquid Interceptors.

**1017.1 Interceptors Required.** Repair garages and gasoline stations with grease racks or grease pits, and factories that have oily, flammable, or both types of wastes as a result of manufacturing, storage, maintenance, repair, or testing processes, shall be provided with an oil or flammable liquid interceptor that shall be connected to necessary floor drains. The separation or vapor compartment shall be independently vented to the outer air. Where two or more separation or vapor compartments are used, each shall be vented to the outer air or shall be permitted to connect to a header that is installed at a minimum of 6 inches (152 mm) above the spill line of the lowest floor drain and vented independently to the outer air. The minimum size of a flammable vapor vent shall be not less than 2 inches (51 mm), and, where vented through a sidewall, the vent shall be not less than 10 feet (3048 mm) above the adjacent level at an approved location. The interceptor shall be vented on the sewer side and shall not connect to a flammable vapor vent. Oil and flammable interceptors shall be provided with gastight cleanout covers that shall be readily accessible. The waste line shall be not less than 3 inches (80 mm) in diameter with a full-size cleanout to grade. Where an interceptor is provided with an overflow, it shall be provided with an overflow line [not less than 2 inches (50 mm) in diameter] to an approved waste oil tank having a minimum capacity of 550 gallons (2082 L) and meeting the requirements of the Authority Having Jurisdiction. The waste oil from the separator shall flow by gravity or shall be pumped to a higher elevation by an automatic pump. Pumps shall be adequately sized and accessible. Waste oil tanks shall have a 2 inch (50 mm) minimum pump-out connection at grade and a 1½ inch (38 mm) minimum vent to atmosphere at an approved location not less than 10 feet (3048 mm) above grade.

**1017.2 Design of Interceptors.** Each manufactured interceptor that is rated shall be stamped or labeled by the manufacturer with an indication of its full discharge rate in gpm (L/s). The full discharge rate to such an interceptor shall be determined at full flow. Each interceptor shall be rated equal to or greater than the incoming flow and shall be provided with an overflow line to an underground tank.

Interceptors not rated by the manufacturer shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening shall have not less than an 18 inch (457 mm) water seal and shall have a minimum capacity as follows: Where not more than three motor vehicles are serviced, stored, or both, interceptors shall have a minimum capacity of 6 cubic feet (0.2 m<sup>3</sup>), and 1 cubic foot (0.03 m<sup>3</sup>) of capacity shall be added for each vehicle up to 10 vehicles. Above 10 vehicles, the Authority Having Jurisdiction shall determine the size of the interceptor required. Where vehicles are serviced and not stored, interceptor capacity shall be based on a net capacity of 1

cubic foot (0.03 m<sup>3</sup>) for each 100 square feet (9.29 m<sup>2</sup>) of surface to be drained into the interceptor, with a minimum of 6 cubic feet (0.2 m<sup>3</sup>).