Grease Control (beyond BMPs)

Dean Woehl
Industrial Pretreatment Technician
City of Bismarck

- 碗機都不應該接上水槽下 式的攔阻系統,因為熱水
- 會溶解攔阻到的油脂,而使油脂直接通過攔阻器。
- 除非油脂攔阻器是特別設計用於處理固體廢棄物。
- 不然,垃圾切碎處理機的 殘餘不應該進入油脂攔阻

VACUUM FAIL

Impact Statement

- After policies have been implemented, compliance inspections must be performed.
- It is imperative to have an understanding of the devices you are inspecting and knowledge of the certification process for those devices.
- Determination of components missing or present, knowledge of what is supposed to be present is needed.

Agenda

- Review of Grease Removal Devices
 - Interceptor (GGI)
 - Trap (Hydro mechanical)
- Discussion on PDI Certification
- Tools of The Trade
- Example of Traps With Deficiencies
- Test
- Real World Example (we open a trap)

Two basic types of Grease Removal Devices

Gravity Grease Interceptors

 grease interceptor must be large (usually installed outside underground) because it requires an extended time for grease separation (30 minutes or more). The separation is simply due to the specific gravity difference between FOG (fats, oils, and grease) and water.

Hydro Mechanical Grease Interceptors

 (covered by PDI G101) is normally installed inside a building. They are compact in size because grease separation occurs quickly (about one minute) due to several simultaneous actions; a hydraulic flow action, air entrainment and the difference in specific gravity between water and FOG (fats, oils and grease).

Law Regarding Grease Removal

Stokes' law

noun, Physics.

1. the law that the force that retards a sphere moving through a viscous fluid is directly proportional to the velocity of the sphere, the radius of the sphere, and the viscosity of the fluid.

Origin of Stokes' law: named after Sir G. Stokes

Coles-law [kohl-slaw] noun, Food

 a salad of finely sliced or chopped raw cabbage, usually moistened with a mayonnaise dressing.

Word Origin: from Dutch koolsla, from koolsalade, literally: cabbage salad

Grease Interceptors

- Concrete Vaults
- Green Turtle
- Trapzilla
- Great Basin
- ECH2O™ Grease Removal System



If grease removal devices were trucks















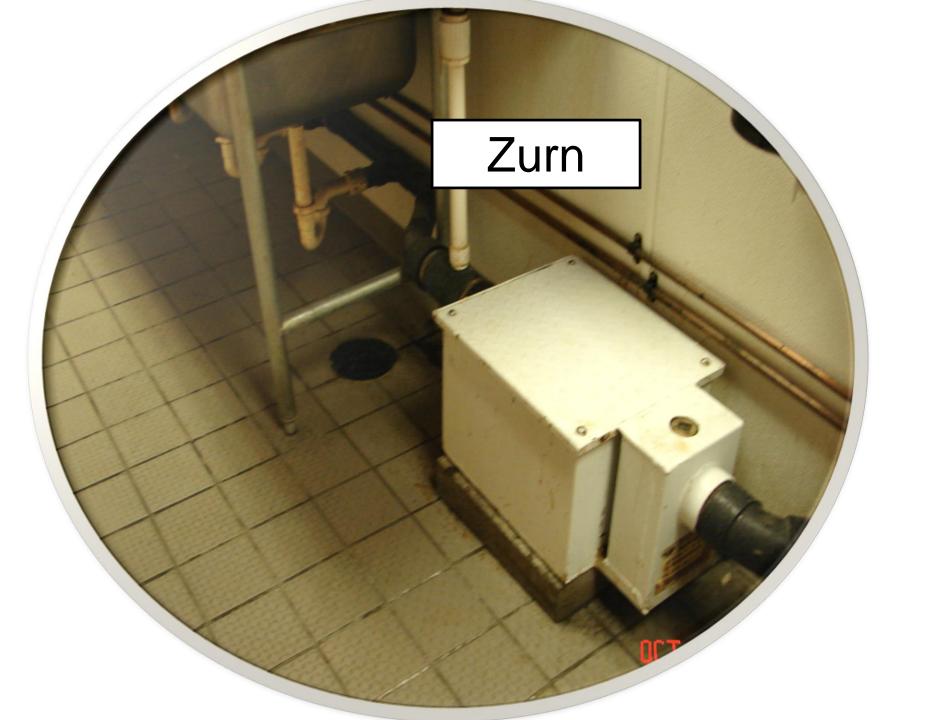


















How Does a Manufacture Obtain a PDI Rating?

- PDI is contacted by the manufacture, stating the requested rating. PDI sets up a "controlled environment" for the requested rating.
- As long as the grease trap passes the parameters, it is certified.





Standard PDI-G 101 Revised January 2012

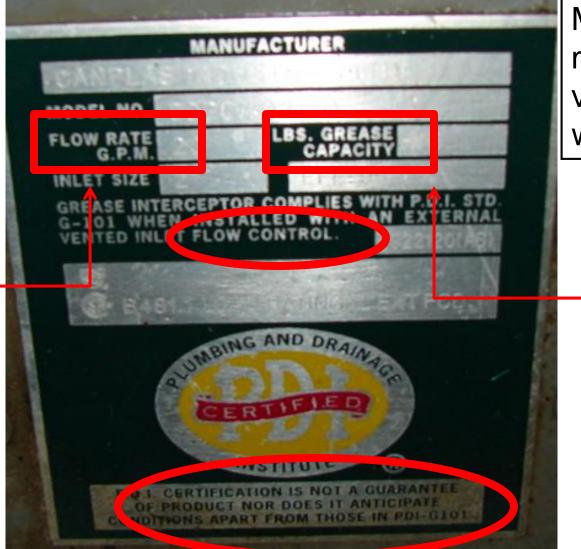
Testing and Rating Procedure
for
Hydro Mechanical
Grease Interceptors
with
Appendix of Installation
and
Maintenance

THE PLUMBING AND DRAINAGE INSTITUTE



Phone: (800) 589-8956 Web: <u>www.pdionline.org</u> E-mail: pdi@pdionline.org

What it does and does not say

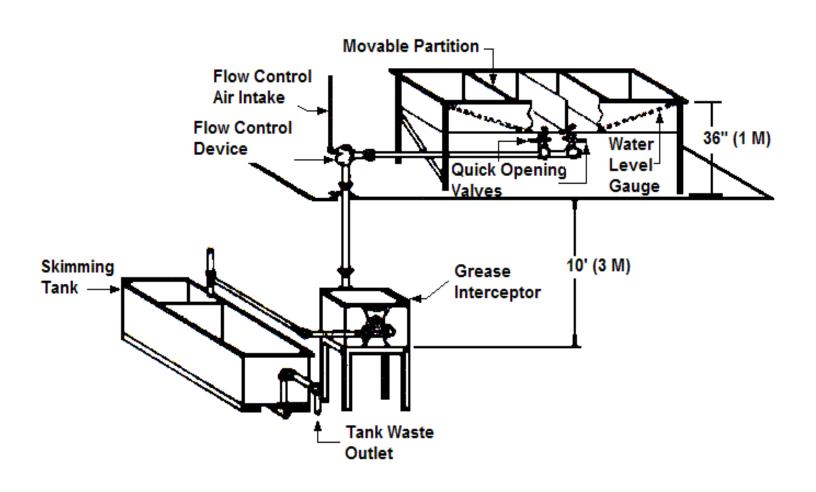


Makes no mention to the volume of water in trap

Maximum Limit

Minimum Limit

PDI Controlled Environment



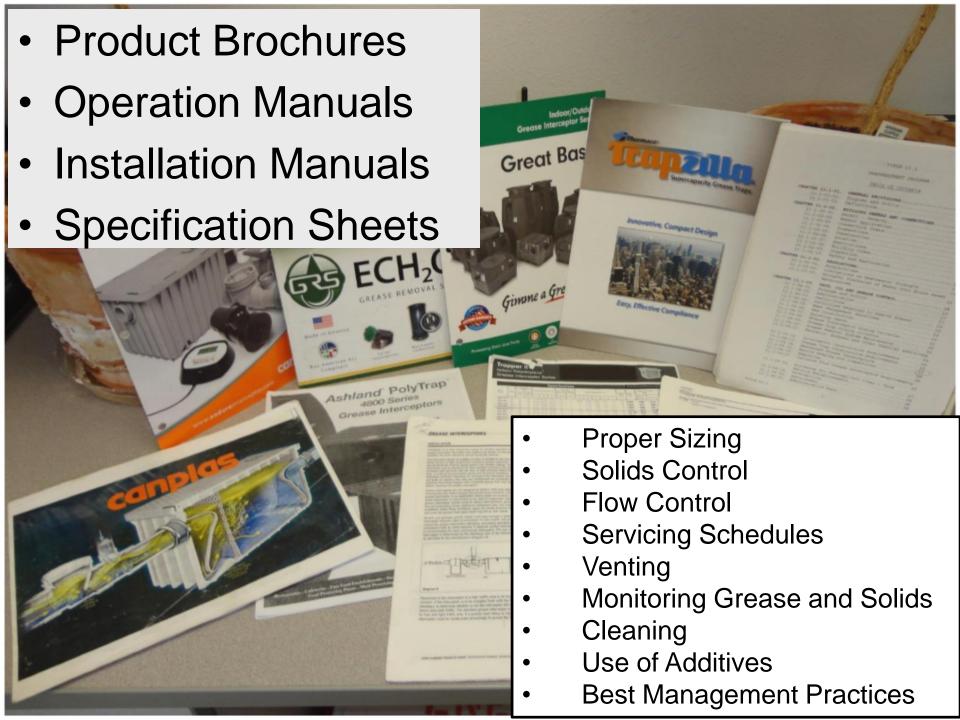
7.8 Requirements for Certification and Factor of Safety

To receive certification in accordance with the Plumbing and Drainage Institute Standard Testing Procedure for Grease Interceptors, the interceptor shall conform with or exceed the following requirements:

- a) Have an average efficiency of ninety (90) percent or more (See Section 7.7) at the rated grease
 retention capacity to flow rate, as indicated in Table 1
 - b) Have an incremental efficiency of eighty (80) percent or more. (See Section 7.7)

the INSPECTOR must be familiar with the documents pertaining to each grease trap being inspected.

Without GRD manuals and an understanding of PDI, how do you know what is missing?



Canplas Installation Manual

Sizing Guideline

Sizing

For Grease Interceptor sizing, please reference the Sizing Guide or the Plumbing Drainage Institute Standard PDI-G 101. Without a properly sized flow control, the flow through the interceptor may exceed the rating of the unit, causing lower efficiencies and allowing grease to pass through the interceptor into the downstream piping. Be careful that you do not confuse liquid capacity and flow capacity. Liquid capacity is rated litres or gallons while flow capacity is rated in gpm (gallons per minute) or L/sec (litres per second).

If sizing indicates that a larger Grease interceptor is required, you maybe able to compromise to a smaller unit by adopting to a 2 minute drain down time in your sizing calculation. Although the smaller unit will be less expensive, the grease capacity of a smaller unit will dictate the cleaning frequency required.

Mop Sink Sizing Guide			Floor Drains & Floor Sinks
Size 2"	LPS 84	US/GPM 22	Take the volume of water produced by the number of
2 3″	142	37.5	hose bibs (ie 1.5-2.0 gpm per 3/4" faucet)
4"	170	45	Table A - Procedure for Sizing Grease Intercept

STEP	FORMULA	EXAMPLE
1	Determine cubic content of fixture by multiplying length x width x depth	A sink 24" long by 20" wide by 12" deep. Cubic content: 24 x 20 x 12 = 5,760 cubic inches (61.0 x 50.8 x 30.48 cm²)
2	Determine capacity in gallons. 1 gallon = 231 cubic inches	Contents in gallons: 5,760 / 231 = 24.9 gallons (94,451.42 / 1,000 = 94.45 litres
3	Determine actual drainage load. The fixture is normally filled to approximately 75% of capacity with water as the items being washed displace about 25% of the total fixture content. Actual drainage load = 75% of fixture capacity	Actual drainage load: .75 x 24.9 = 18.7 gallons (0.75 x 94.45 = 70.84 litres)
4	Determine flow rate and drainage period. In general, good practice dictates a one minute drainage period; however, where conditions permit, a two minute drainage period is acceptable. Drainage period is defined as the actual time required to completely drain the fixture. Flow rate = Actual Drainage Load Drainage Period	Calculate flow rate for one minute drainage period: 18.7 / 1 = 18.7 g.p.m. flow rate (70.84 / 1 min. = 70.84 l.p.m. Calculate flow rate for two minute drainage period: 18.7 / 2 = 9.4 g.p.m. flow rate (70.84 / 2 min. = 35.42 l.p.m.)
5	Select Interceptor. From Table B select the interceptor with a flow rating at least equal to the calculated flow rate. When the calculated flow rate falls between two sizes, select the larger of the two interceptors.	For a one minute drainage period: 18.7 g.p.m. (70.84 l.p.m.) flow rate = 20 g.p.m. G.l. For a two minute drainage period: 9.4 g.p.m. (35.42 l.p.m.) flow rate = 10 g.p.m. G.l.

Table B - Procedure for Sizing Grease Interceptor								
PDI Size Symbol	4	7	10	15	20	25	35	50
Flow Rate US Gallons per Minute (GPM)	4	7	10	15	20	25	35	50
Flow Rate Liters per Second (LPS)	.25	.44	.63	.95	1.26	1.58	2.20	3.16
Grease Capacity Pounds (Lbs)	8	14	20	30	40	50	70	100
Grease Capacity Kilograms (Kgs)	3.63	6.35	9.07	13.61	18.14	22.68	31.75	45.36

Sampling Access

Some municipalities require a sampling port to monitor effluent quality. If the unit is on the floor, or semi-recessed into the floor, a cleanout tee can be installed downstream of the Grease Interceptor. If the unit is installed in the floor, a backwater with its flapper removed, makes an effective collection port. Like the FCD the backwater valve can be extended to finish floor level using a sleeve kit.

Venting

Grease Interceptors must have a vented waste, sized in accordance with local code requirements for venting interceptors to retain a water seal and prevent siphoning. Most codes dictate that two vents be installed, one upstream and one downstream of the grease interceptor. The upstream vent must not be placed between the air intake and the grease interceptor.

ENDURA® GREASE INTERCEPTOR

OPERATION MANUAL

Train your employees so they can contribute to your goal of responsible waste management and reduced maintenance cost. Provide training in:

- proper function, operation and maintenance of grease interceptors
- proper storage, handling and disposal of wastes
- proper separation and storage of materials
- proper use and handling of cleaning aids
- proper housekeeping

!!!Caution!!!

jurisdiction and/or flooding as a

result of the system backing up.

the benefits of following the code and the Best Management Practices for food sector facilities.

Monitoring Grease and Solids Collected

Using a piece of clear 3/4" (20 mm) diameter tubing, insert the tubing into the trap until it bottoms out. Place your thumb over the top opening, creating a vacuum that enables you to extract a cross section of the total liquid depth. Definite levels of solids, water and grease will be visible.

Cleaning & Maintenance

All grease interceptors must be cleaned regularly to maintain efficient operation. The frequency of grease removal is dependent upon a variety of factors; the type of food served, the capacity of the grease interceptor and the quantity of grease in the water. Increasing the frequency of cleaning will reduce odour problems associated with grease traps and improve retention efficiency. The maximum depth of solids permitted to accumulate Failure to maintain the Grease at the bottom of the trap should not exceed 1" (25 mm). Interceptor can result in heavy fines The maximum depth of grease allowed to accumulate from the local authority having prior to servicing shall not represent more than 25% of the

> liquid volume of the grease interceptor or 2 1/2"(63 mm) deep on the 15/20/25 GPM (.94/1.26/1.60 Liters per Second - LPS) and 3" (76 mm) deep on 35/50 GPM (2.2/3.2 LPS).

Grease weighs about 7 pounds(3.17 kg.)

per gallon. If it is determined that a 20 GPM (1.26 LPS) 40 lbs (18 kg.) interceptor accumulates about 5 gallons (19 liters) of grease every four days it would be easily and correctly assumed that the interceptor must be cleaned no less than once a week. Once an optimal grease removal interval has been established for a specific installation, regular cleaning at this interval is necessary to maintain the rated efficiency of the trap. After the accumulated grease and waste material has been removed, the interceptor should be thoroughly checked to determine that the inlet, outlet and air relief bypass port are clear of obstructions.

!!!Caution!!!

If there is an obstruction in the line, make sure the plugs are installed in the sinks or the ball valve is closed before accessing the waste piping.

The interior cavity of the grease interceptor and baffles can be cleaned using standard soaps and detergents.

Some municipalities require cleaning logs be maintained and kept for a minimum of 2 years. A sample of a form has been enclosed.

!!!WARNING!!! The use of certain cleaning agents such as chlorine, strong caustics, bleaches etc. in a concentrated solution can attack surfaces and void the unit's warranty.





Schier Products Specification Sheet Showing Internal Flow Control

SPECIFICATIONS (PATG-1820)

- 2" inlet and outlet connections. (No-Hub couplings included)
- Max flow rate: 20 GPM
- Liquid capacity: 17 Gallons
- Max grease capacity: 70 Pounds Unit weight w/std. covers: 37 Pounds
- Maximum operating temperature 190°F.

- Unit is manufactured in accordance to ASME grease interceptor standard #A112.14.3
- Factory installed Built-In flow control.
- For gravity drainage applications only.
- Do not use for pressure applications. 3/8" thick high density polyethylene walls.
- Custom extension heights available. Three outlet options for easy rough in.
- Unit is shipped with outlet diffuser in
- Engineered inlet and outlet diffusers are removable to inspect/clean piping. For on-the-floor or buried applications.
- Locate interceptor as close as possible to grease producing fixtures.
- 10. Kitchen-duty polyethylene cover with 5/16" stainless steel bolts. (Load Capacity 500 lbs.)
- 11. Integral Air Relief / Anti-siphon.

ENGINEERED INLET AND OUTLET DIFFUSERS

The inlet diffuser distributes incoming effluent into two paths that utilize the entire liquid volume of the tank for efficient grease separation. The calibrated openings greatly reduce effluent turbulence. The effluent enters the tank without disturbing the grease or sediment layers.

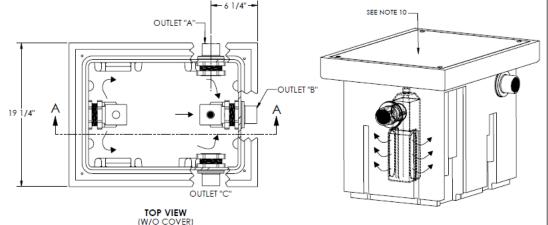
The outlet diffuser allows only effluent which is free of grease to exit the tank. It can easily be attached to any of the three outlets provided to ease jobsite piping layouts.

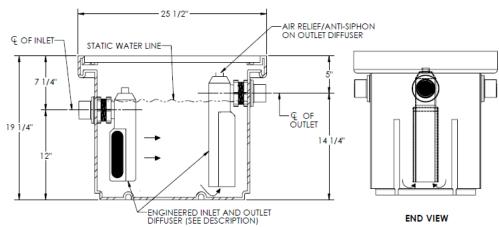
ENGINEER SPECIFICATION GUIDE

Grease Interceptor shall be Schier interceptor as manufactured by Schier Products, New Berlin, WI Interceptor shall be lifetime guaranteed and Made in USA of seamless, rotationally-molded High Density Polyethylene with minimum 3/8" uniform wall thickness. Interceptor shall be furnished for above or below grade installation. Interceptor shall be built in accordance to ASME A112.14.3 (type C), with internal flow control, built-in test caps, and three outlet options. Interceptor grease capacity shall be at least three times its rated flow. Cover shall be gasketed and constructed of High Density Polyethylene with minimum 500 lb load capacity.

- EXT Custom Extension to finished grade
- PS3 3" Inlet and Outlet connections
- MPT Male pipe thread connections
- 1/4" Steel treadplate cover







SECTION A-A

SPECIFICATION SHEET





SEPARATORS





WASTE TANKS







DESCRIPTION:

20 GPM, 70 POUNDS GREASE STORAGE 17 GALLONS LIQUID HOLDING CAPACITY POLYETHYLENE GREASE INTERCEPTOR

PART NUMBER: PATG-1820 DWG BY: TEU **DATE:** 11/21/06 REV: 3 - 8/14/08

MATL: HDPE

Schier Products 2500 South 170th Street New Berlin, Wisconsin 53151 Tel: 800-827-7119 Fax: 800-827-9664 www.schierproducts.com

INTERCEPTORS PROPRIETARY AND CONFIDENTIAL

Made in the U.S.A

Zurn Speciation Sheet

Showing Inlet and Outlet



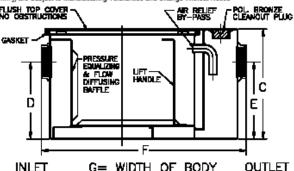
Z-1170 GREASE INTERCEPTOR

SPECIFICATION SHEET

TAG

Dimensional Data (Inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice





	Inlet/	Flow Rate	Capacity		Approx.	Dimensions in Inches				
Size	Outlet Size**	G.P.M. [L]	Water Gal. [L]	Grease Lbs. [kg]	Wt. Lbs. [kg]	С	D/E	F	G	
100		4 [15]	3 [11]	8 [4]	42 [19]	10 [254]	7 1/4 [184]	19 [483]	9 7/8 [251]	
200	2 [50]	7 [26]	5 [19]	14 [6]	53 [24]	11 1/4 [286]	8 1/8 [206]	20 3/8 [518]	11 7/8 [302]	
300]	10 [38]	6 [23]	20 [9]	66 [30]	11 3/4 [298]	8 1/4 [210]	22 5/8 [575]	14 [356]	
400		15 [57]	10 [38]	30 [14]	83 [38]	13 3/8 [340]	9 3/8 [238]	24 5/8 [625]	16 3/4 [425]	
500]	20 [76]	16 [60]	40 [18]	99 [45]	15 [381]	11 3/4 [298]	27 1/2 [698]	17 1/4 [438]	
600	3 [75]	25 [94]	21 [79]	50 [23]	124 [56]	17 [432]	12 1/2 [318]	29 7/8 [759]	19 7/8 [505]	
700]	35 [132]	30 [113]	70 [32]	151 [68]	18 3/4 [476]	14 1/4 [362]	31 3/4 [806]	22 1/2 [572]	
800]	50 [189]	40 [151]	100 [45]	180 [82]	21 1/2 [546]	16 [406]	33 5/8 [854]	24 1/2 [622]	

ENGINEERING SPECIFICATION: ZURN Z-1170 Acid Resistant Coated Interior and exterior fabricated steel grease Interceptor, PDI, rated at GPM and _____ Lbs. grease capacity, with Internal air relief by-pass, bronze cleanout plug and visible double wall trap seal with removable combination pressure equalizing/flow diffusing baffle and sediment tray. Gasketed non-skid secured cover, complete with Z-1108 flow control fitting. Regularly furnished inlet and outlet in high position. Note: Location of outlet from bottom for interceptor cannot be changed.

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- Z- Acid Resistant Coated Fabricated Steel*
- ZS- All Type 304 Fabricated Stainless Steel

SUFFIXE

- -D1 Dual High/Low Inlet.
- -E Acid Resistant Coated Interior and exterior fabricated steel extension section. (Specify 'C' Dim. required) for recessed installation.
 - -EP Enzyme Port in Cover.
 - -HD Heavy Duty Cover
- -K Anchor flange 1 3/4 [44] down from top and 2 [51] wide. A 3 [76] minimum extension height is required when anchor flange (-K) option is specified. (Specify 'C' Dim. height required.)
- -KC Anchor flange 1 3/4 [44] down from top and 2 [51] wide with clamp collar. A 3 [76] minimum extension height is required when anchor flange (-K) option is specified.
- -L Angle type (Z-1108-L) flow control device.
- Recessing receiver for recessed installation is equipped with adjustable support brackets and gasketed non-skild cover with covered recessed lift handle.
- _______-RE Recessing receiver enclosed type for recessed installation. Furnished with adjustable support brackets and gasketed non-skild secured cover with covered recessed lift handle.
- T Cover recessed for tile/terrazzo. A 3 [76] minimum extension height is required. (Specify 'C' Dim. and required recess depth 1/8 [3], 3/4 [19], or 1 1/4 [32]).
 - Inlet and outlet sizes shown indicate standard operating sizes and flow control setting. Size #300 will have 3[75] connections reduced to 2[50] and sizes #500 thru #300 will have 4[100] connections reduced to 3[75] as standard. If changed, flow control must be adjusted accordingly.

*REGULARLY FURNISHED UNLESS OTHERWISE SPECIFIED

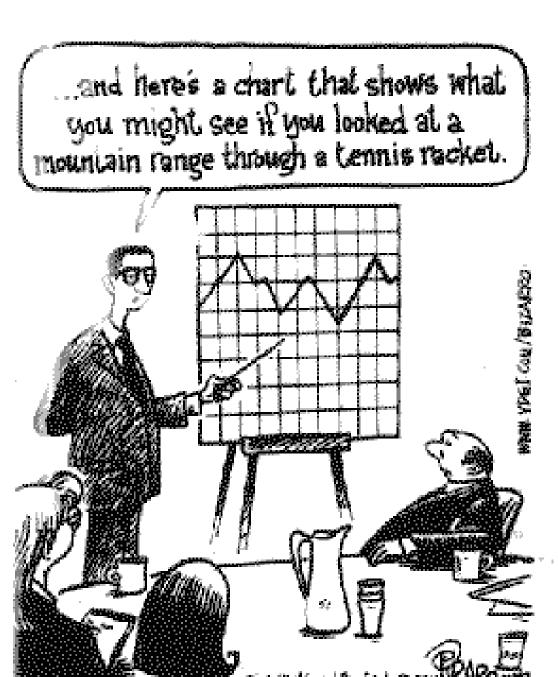
REV. C DATE: 10/11/96

C.N. NO. 76171

DWG. NO. 58905 PRODUCT NO. Z-1170

ZURN INDUSTRIES, INC. • HYDROMECHANICS DIV., • 1801 Pittsburgh Ave. • Erie, PA 16514 • Phone: 814/455-0921 Fax: 814/454-7929 In Canada: ZURN INDUSTRIES LIMITED • 6540 Gottardo Court • Mississauga, Ontario LST 2A2 • Phone: 905/795-8844 Fax: 905/795-8850

BIZARRO By Dan Piraro



World's Most Accurate Pie Chart





Grease Traps with deficiencies

Identify the problem (s)



Flow Control Device Installation

The flow control device furnished with the Endura Grease Interceptor is essential to the proper operation of this unit. The flow control limits the unit to its rated capacity allowing enough time for grease separation to take place inside the interceptor.

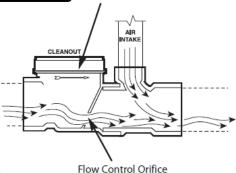
Flow Direction Identifier



The flow control fitting is molded in PVC and must be solvent welded using PVC solvent cement, **upstream** of the interceptor. It is to be located in the drain line beyond the last connection from the fixture and as close as possible to the underside of the lowest fixture. When the discharge from two or more sinks or fixtures are combined and served by one interceptor, a single flow control fitting should be used.

The installation of a ball valve upstream of the flow control is recommended.

A ball valve provides a means of drain line isolation and will prevent flooding if the maintenance person forgets to install the sink plugs to alleviate head pressure.



Some local plumbing codes require that grease interceptors have an internal flow control to ensure drain lines do not bypass the grease interceptor. However, if the flow control device is located immediately upstream of an interceptor, this is often considered as forming part of the interceptor. Therefore, officials having jurisdiction may accept such design as meeting the intent of the requirement. If local codes dictate the flow control must be installed directly preceding the grease interceptor inlet, and the fixtures being served are in excess of 8 ft (2.4 m) from the interceptor, we recommend a second flow control being installed as close to the last fixture as possible. Please contact your local representative if you require further clarification.

Note: Some local jurisdictions require that the interceptor service the floor drains. The floor drain must bypass the flow control to ensure the restriction does not flood the drain. Therefore, the flow control should be installed as close to the fixture as possible or directly preceding the floor drain connection.

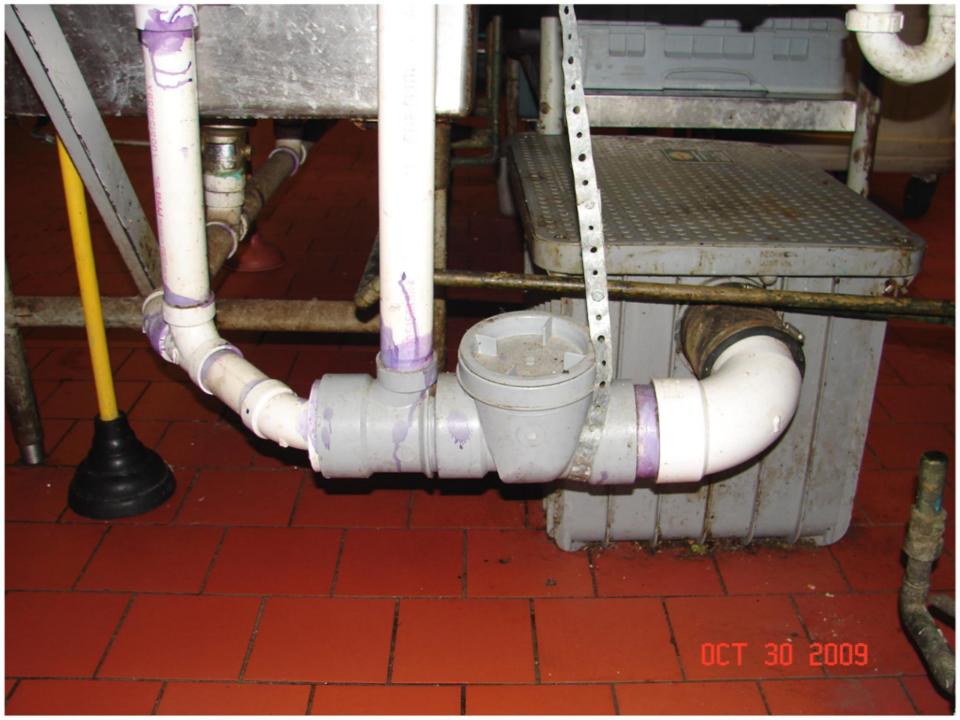






















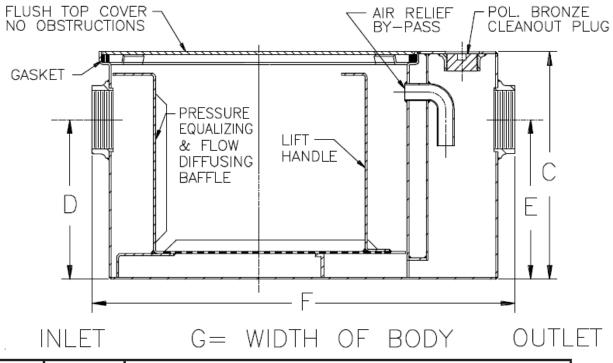


Z-1170 GREASE INTERCEPTOR

TAG

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice





Inlet/ Flow Rate Capacity Approx. Dimensions in Inches























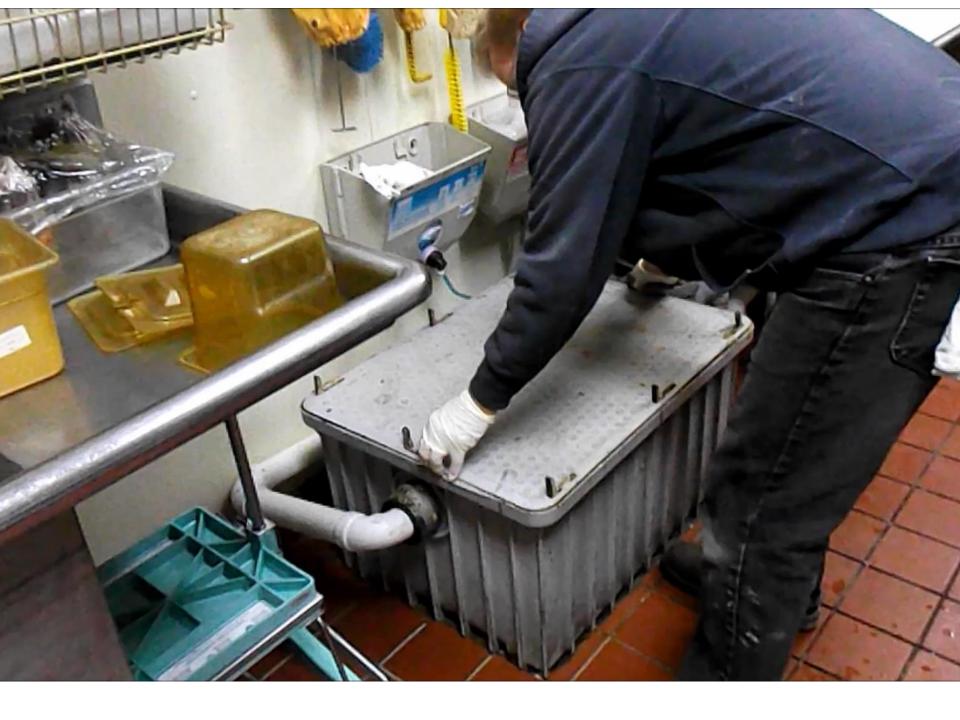












HOW A GREASE INTERCEPTOR WORKS

A grease interceptor is a passive control device that is designed to help reduce fats, oils, greases, and solids from entering the sanitary sewer collection and treatment system. Grease interceptors hold the fats, oils, greases, and solids until they can be removed and disposed of by recycling, rendering, or land application.

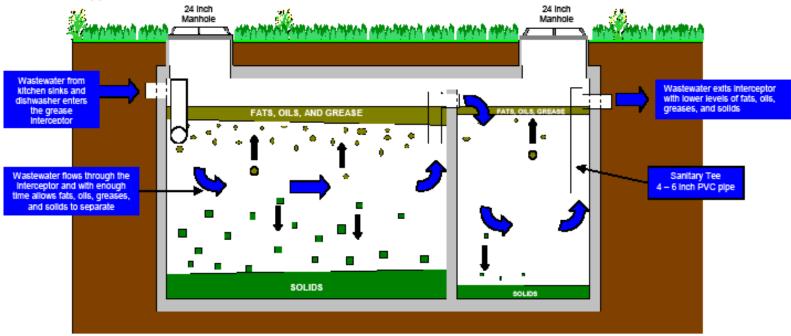


Illustration by: Donald Smith Town of Cary

- · Grease interceptors allow wastewater flows to slow down
- With sufficient time fats, oils, greases, and solids separate from wastewater
- Fats, oils, and greases are less dense than water and float
- Solids are denser than water and sink
- Grease interceptors are designed in a variety of sizes, shapes, and constructed of various materials



















Links

- http://www.pdionline.org/
- http://www.pdionline.org/storage/publications/PDI-G101.pdf
- http://www.pdionline.org/storage/publications/Standard-PDI-G102.pdf
- http://www.ashlandpolytraps.com/
- http://www.canplasplumbing.com/
- www.greaseremovalsystems.com
- http://www.greenturtletech.com/
- http://www.jrsmith.com/
- http://www.schierproducts.com/
- http://www.thermaco.com/
- http://www.wadedrains.com/front/f_cat_srch.php
- http://www.zurn.com/



Comments During Inspections

- Grease interceptor?
 - Do we have one?

- We have a low fat diet menu, so we have no grease.
 - FSE was baking chicken thighs in oven... NO GREASE?
 - Grease trap was over half full of grease

Comments During Inspections

- Our facility does not have a grease problem
 - Upon inspection of the grease interceptor, it contained over 500 gallons of Olive Oil!!!
 - FSE had been in business for 4 months
 - What does a gallon of Olive Oil cost?

- We clean out GT only once per year
 - All the greasy kitchen wares are washed in the sink not connected to the GT

A box in the corner or a hole in the floor does not a grease removal device make

Dean Woehl
Industrial Pretreatment Technician
www.bismarcknd.gov



