




ASPE CONVENTION 2008
"Our mission is to protect Public Health and the Environment"

DESIGN AND SIZING OF THE GREASE INTERCEPTORS

Prepared & Presented By:
Olga Krel - Civil Engineering Associate,
City of Los Angeles,
Department of Public Works,
Bureau of Sanitation,
Industrial Waste Management Division.






10/28/2008 1

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Introduction

- As part of the Clean Water Act, the National Pretreatment Regulation (40CFR 403) was established to protect POTWs and the waterways in which they discharge.
- Discharged Fats, Oil, and Grease (FOG) to the sanitary sewer system build up in sewer lines over time, restricting the capacity of the pipes. To keep the sewer collection system flowing is a very costly and time consuming effort. Eventually, the pipes can become blocked completely, leading to overflows of raw sewage.






10/28/2008 2

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Introduction (cont.)

- Food Service Establishments were identified as significant sources of the FOG that caused major problem for the City of Los Angeles sewers and for the Bays and Ocean that surround Los Angeles.
- Food Service Establishments (ESE's) are facilities engaged in preparing food for consumption by the public.
- The City Ordinance requires all new or rebuilt facilities to install a Grease Interceptors (GI) to prevent grease from entering a sewer.

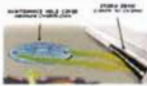
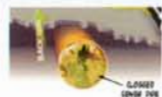


10/28/2008 3

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Introduction (cont.)

- Capacity of GI may be determined using the Uniform Plumbing Code (UPC), Edition 2003, Appendix H or Edition 2006 Tables 7-3; 7-5; 10-3 and Appendix A.
- The minimum size of GI is 750 gallons.
- GI is required for all FSE's undergoing:
 - New construction.
 - Remodeling of \$100,000 or more to accommodate expansion or operational modifications.
 - Conversion of an existing non-FSE facility to an FSE (change-of-use).
 - As deemed necessary by the Director of the Bureau of Sanitation.

10/28/2008 4

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City of Los Angeles Sanitation Facilities.

- City's boundaries are 600 square miles of land area.
- More than 6700 miles of city sewers connect residences and businesses to the City's wastewater treatment plants with over 550 million gallons per day flows through this system.
- 4 wastewater treatment plants serve needs of 4 million customers and 27 contracting agencies.
- Over 10,000 permitted FSEs.



10/28/2008 5

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Designing Grease Interceptor - GI

- Gravity Grease Interceptor** is a large-capacity underground vault with at least two chambers placed in-line between the source of the grease and the wastewater sewer lines and are installed outside the building as near as possible to the source of FOG in a location that is readily accessible for periodic cleaning, inspection, and/or sampling. The interior baffle acts as a barrier to trap grease and oil in the first compartment to be removed later.
- Only GI approved by IAPMO and UPC allowed to be used in the City of Los Angeles.
- If special GI is required or approved GI needs modification, approval of the City of Los Angeles, Bureau of Building and Safety, Material Testing Lab approval is required.




10/28/2008 6

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Designing Grease Interceptor - GI

- The use of garbage grinder to discharge food wastes from commercial kitchens, markets, or food plants to the POTW is prohibited.
- No person shall discharge industrial wastewater to the POTW without permission as provided in an Industrial Wastewater Permit.
- A separate permit shall be required for each point of discharge to the POTW.



10/28/2008 7

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Designing Grease Interceptor - GI

- An Industrial Wastewater Permit shall not be transferable, by operation of law or otherwise, either from one location to another, or from one person to another.
- All FSEs must implement and demonstrate compliance with Best Management Practices (BMP) requirements as specified in the Board's Rules and Regulations.



10/28/2008 8

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Designing Grease Interceptor (cont.)

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10/28/2008 9

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Designing Grease Interceptors (cont.)

Grease Interceptor

A Flow directly from plumbing fixtures enters the grease interceptor. The UPC requires that all flow entering the interceptor must enter through the inlet pipe.

B An approved flow control or restricting device is installed to restrict the flow to the grease interceptor to the rated capacity of the interceptor.

C An air intake valve allows air into the open space of the grease interceptor to prevent siphonage and backpressure.

10/28/2008 10

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Designing Grease Interceptors (cont.)

D Oil and grease floats on the water surface and accumulates behind the grease retaining fittings and the wall separating the compartments. The oil and grease will be removed during routine grease interceptor cleaning.

E Solids in the wastewater that do not float will be deposited on the bottom of the grease interceptor and will need to be removed during routine grease interceptor cleaning.

F Grease retaining fittings extend down into the water to within 12 inches of the bottom of the interceptor. Because grease floats, it generally does not enter the fitting and is not carried into the next compartment. The fittings also extend above the water surface to provide air relief.

G Interceptors require to have a sample box so that inspectors or employees of the establishment can periodically take effluent samples. Having a sample box is recommended by the UPC and required by the City of Los Angeles.

H Flow exits the interceptor through the outlet pipe and continues through the sampling box on to the sanitary sewer system.


10/28/2008 11

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Designing Grease Interceptors (cont.)



- Uniform Plumbing Code (UPC) 2003 uses **Maximum Occupancy Load** to calculate size of the Grease Interceptor (GI).
- During design it is very important to have information on occupancy load per Fire Marshall approval, is there dishwasher or not, to know if the kitchen is commercial or single service, hours of FSE operations and use Appendix H for calculations.

10/28/2008 12

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Designing Grease Interceptors (cont.)

- Uniform Plumbing Code (UPC) 2006 uses DFUs – Drainage Fixture Units of the Plumbing Fixture to calculate size of the GI.
- It is very important to provide complete schedule of the grease producing kitchen plumbing fixture and equipment approved by the Department of Health to determine their individual DFU to properly size GI utilizing Tables 7-3, 7-5, 10-3 and Appendix A.
- A Grease Interceptor **MUST BE SIZED TO ACCEPT THE MAXIMUM FLOW POSSIBLE** from the connected fixtures. Not the average flow. When a maximum flow event occurs in an interceptor sized for average flow, the contents are scoured from the interceptor and the purpose of the interceptor is defeated.

10/28/2008 13

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Designing Grease Interceptors (cont.)

- Vast number of Food Service Establishments "FSEs under the same roof", such as Shopping Centers, Strip Malls, Mixed Use Buildings, Sport Complexes, any building with multiple FSE's in the City of Los Angeles are going through major remodeling, construction, reconstruction, change of use, or remodeling during change of the ownership.
- These alterations elicit involvement of the FOG Control Program of the Industrial Waste Management Division, Bureau of Sanitation since overall cost of these processes well exceeds \$100,000.00.



10/28/2008 14

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Designing Grease Interceptors (cont.)

- To minimize impact and misunderstanding, FOG Control Program Engineering Staff works closely with Facilities Management Companies of such Complexes. By educating Facilities Management Companies in potential effects of SSO on the Environmental and Public Health.
- The City's FOG Control Program was able to reach an agreement with Management Companies on the issue such as Community Grease Interceptors, which brings enormous benefit to the Facilities not only economically, but also minimizes land use and maintenance efforts.




10/28/2008 15

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Designing Grease Interceptors (cont.)

- When the benchmark amount of the \$100,000.00 is met during remodeling process, IWMD requires installation of the GI, for each FSE in Complex during tenant improvement phase.
- Division may end up requesting, in many cases, ten (10) or even more 750 gallons or above GI, independent of the large restaurants or even supermarkets that are often a part of those facilities.
- GI has to be install outside FSE, which brings an other issue.



10/28/2008 16

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Designing Grease Interceptors (cont.)

- Under the Lease Agreement FSE is allowed to do modifications only within the walls of the leased unit. Any modification outside the leased unit has to have Management Company / Owner approval in form of official letter made to IWMD.
- To avoid problem with space available for GI installation if each FSE will have to install separate GI, IWMD believe that Centrally Located, Properly Sized Community GI would be the best and the most economical solution for most large Complexes with the multiple FSEs.




10/28/2008 17

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Designing Grease Interceptors (cont.)

- Installation of the separate Grease Waste (GW) Line with **Plumbing Point of Connections** and severance from the Sanitary Sewer Line (SS) is required. No wastewater containing human waste allowed to go through GI. Wastewater from all the plumbing fixture including dishwasher within the kitchen and dinning area of the FSE required to go to GW line.
- During construction phase all the FSE's within Complex are very accessible, and installation of GI with related GW line is particularly feasible from economical and construction point of view without interruption of the regular Mall operations.



10/28/2008 18

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Designing Grease Interceptors (cont.)

- **One excellent example of such Complex:** **Westside Pavilion**, Existing Shopping Center that had change of ownership in a few FSEs in a Food Court. Even so the cost of remodeling performed by the each new owner of some FSE's independently was close but did not exceed \$100,000.00, the add-up cost of the multiple FSEs remodeling exceeded benchmark amount.
- Each FSE, during TI phase presented their projects at the different time within couple of weeks and IWMD required GI from each FSE. Soon it became evident to IWMD that Division along with the Mall Management Company has to find a better solution then sixteen (16) 750 gallons GIs.



10/28/2008 19

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Designing Grease Interceptors (cont.)

- IWMD met with the Mall Management and discussed that issue. Explained FOG Ordinances and Board Rules and Regulations for the "Facilities Under One Roof". Perspective of going through the GI installation process every time Complex will go through the Change of Use or Remodeling over \$100,000.00 caused Management to agree to installation of the one adequately sized Community GI that will serve all the existing FSEs and even possible future expansions.



10/28/2008 20

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Designing Grease Interceptors (cont.)

- Westside Pavilion Food Court has 16 FSE's @ 750 gallons capacity each, brings us to 12,000 gallons GI and independent from Food Court large Italian Restaurant that itself requires 3000 gallons capacity GI.
- Since Westside Pavilion is an existing Facility, to prevent interruption of the Mall operation and secure safety of the visitors and staff, IWMD allowed an extension of GI installation process. Mall will be able to continue normal operations and GI installation process will be done after hours.




10/28/2008 21

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Designing Grease Interceptors (cont.)

- Another Example of such Complex: The Westfield Topanga Mall that recently underwent a \$330 million renovation and expansion, adding over 100 retail outlets, including but not limited to a large two-story Target; a Neiman Marcus Department Store; several new restaurants, new cafe-style dining terrace and more.
- Manager of Mall Operations provided IWMD with proposed General Plan with the information on the future Tenants, including Food Court and Restaurants locations. During the meeting IWMD work out with the Mall Construction Manager, Project Manager and Designers the number of the adequately sized GIs required per information provided.
- All the parties involved have a chance to put in the picture the magnitude of the project, locations of the FSEs and spaces available for GI installation.
- To derive the necessary size of GI or GIs IWMD along with Mall Management and Designers set the following procedure:


10/28/2008  22

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Designing Grease Interceptors (cont.)

- Food Court consist of a large number of primarily Fast Food Restaurants, and each restaurant requires 750 gallons GI. Restaurants have the same hours of operation. So, the size of the community GI was determine to be equal to the number of the restaurants (N) times capacity of one GI which is 750 gallons:



$$N \times 750 = 750N$$
- In case of multiple restaurants, other then Fast Food, the capacities of the GI's that each restaurant required were summarized (UPC 2003, Appendix H, H 104.3 or UPC 2006, Chapter 10, 1014.3.4.3) based on occupancy load of each restaurant, if known, or square footage of the floor area, as if they operate separately but during same hours to derive the size of the Community GI.
- Only when it is impossible to install community interceptors for some restaurants due to their location within the Mall, individual GIs were provided.

10/28/2008  23

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Designing Grease Interceptors (cont.)

- The size of GI is also largely depends upon the maintenance schedule. If a GI is not maintained regularly it will not provide the necessary grease removal and will create unpleasant odor. The FSE should work out with Rendering Company a specific cleaning schedule that is right for the FSE. FOG must be removed and hauled off site for proper disposal any time the volume of grease and solids fractions exceeds 25% of the interceptor functional volume.

Rendering Company - Baker Commodities, Inc.

10/28/2008 24

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Sizing Grease Interceptors per 2003UPC.

- Number of meals per peak hour:
 - City of Los Angeles uses FSE's Occupancy Load allowed by the Fire Marshall.
 - When seating capacity is not available, for example newly constructed Strip Mall, City of Los Angeles uses FSE's Floor Square Footage with 30% reduction for the future kitchen and restrooms, divided by 15 sq ft/person per Fire Department Regulations to determine Occupancy Load.

* Larger interceptors typically handle waste are easily installed below ground. All types of devices are to be easily accessible for cleaning and service.



10/28/2008 25

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Designing Grease Interceptors (cont.)

1	With Dishwasher	6 gallon flow
2	Without Dishwasher	5 gallon flow
3	Single Service kitchen	2 gallon flow
4	Food waste disposer	1 gallon flow

1	Commercial kitchen waste with/without dishwasher	2.5 hours
2	Single service kitchen/single serving	1.5 hours

1	Fully equipped commercial kitchen	8 hr operation	1
2	Fully equipped commercial kitchen	16 hr operation	2
3	Fully equipped commercial kitchen	24 hr operation	3
4	Single Service Kitchen		1.5

10/28/2008 26

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Sizing Grease Interceptors (cont.)

- Starting January 1, 2008 City of Los Angeles, Department of Public Works, Bureau of Sanitation, Industrial Waste Management Division (IWMD) implemented UPC 2006 in Division's day to day Plan Check Operations.
- To facilitate this transition IWMD requires that mandatory information would be incorporated into plumbing drawings submitted for plan check:

Table that provides information for calculation of the Grease Interceptor (GI) containing **Plumbing Fixture** approved by Department of Public Health with the name, quantity of each plumbing fixture, trap size-1½", 2" or 3", drainage fixture units (DFU) for each plumbing fixture and total DFU per fixture and per facility.

It is absolutely essential to provide **Cut Sheet of Dishwasher Specifications containing Make, Model and Pump Capacity** as a part of Plumbing Drawings for GI Size Determination.

10/28/2008 27

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Department of Public Works
Bureau of Sanitation
Industrial Waste Management Division
FOG Control Program
(323) 342-6118
(323) 342-6124

10/28/2008 40
