

# OPERATION AND MAINTENANCE FOR PRECAST CONCRETE GREASE INTERCEPTORS

National Precast Concrete Association



**NPCA**

Precast ... The Concrete Solution

## NOTES

1. This manual does not claim or imply that it addresses any safety-related issues associated with its use. Operation and maintenance of precast concrete grease interceptors may involve the use of or exposure to hazardous materials, operations and equipment. It is the user's responsibility to determine appropriate safety, health and environmental practices and applicable regulatory requirements associated with the use of this manual.
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# INTRODUCTION

With more than 900,000 restaurants and other food service establishments (FSEs) located in North America, the need for effective pretreatment for the wastewater they generate is vitally important. Ineffective grease removal from these waste streams results in the discharge of large quantities of grease into public sanitary sewer systems. Solidified grease can cause stoppages downstream in the piping networks and create costly and time-consuming problems at municipal wastewater treatment plants. Grease blockages can also cause considerable unnecessary health hazards when raw sewage backs up into residences or commercial establishments. By trapping fats, oils and greases (FOG) and solids normally found in FSEs, a grease interceptor is the last line of defense against potential problems downstream.

Some municipalities charge sewer line maintenance fees and, if they can trace the source of a blockage causing a sanitary sewer overflow to a particular FSE, the FSE may be liable for the cleanup cost and fines. Grease interceptors are a necessary component of pretreatment programs and are generally necessary in order to comply with U.S. Environment Protection Agency (EPA) requirements.

The greatest source of FOG loading comes from food service establishments that do not have a grease interceptor installed or from grease interceptors that are not properly maintained. This manual provides guidelines in the proper operation and maintenance of precast concrete grease interceptors, also known as gravity-type interceptors. These interceptors may have compartments and contain baffles to control the flow of wastewater and allow gravity separation of grease and solids from the wastewater stream.

# **GREASE INTERCEPTOR DESIGN CODE INFORMATION**

This manual is not intended to be a basis of design or sizing, yet these issues will have an effect on how well the interceptor performs during average daily use and should be of major consideration when considering the proper interceptor for the intended function of the FSE (new or existing). There are numerous codes and standards available that the design engineer or jurisdictional authority may elect to use for sizing an interceptor (such as ASTM C890, ASTM C1613, UPC, IPC, local, state and provincial plumbing codes). Knowledge of these codes will be of great assistance for design and sizing of interceptors to be used in your region(s) of service.

# GREASE INTERCEPTOR FUNCTION

In addition to proper maintenance and operation, there are three key characteristics that affect the functionality of gravity-type grease interceptors: retention time, flow and storage capacity.

## **Retention time**

Greases and oils have a lower specific gravity than water, so when a grease-laden mixture is left undisturbed, they will float to the surface while the sediment settles to the bottom. Grease interceptors use baffles and/or compartments to detain wastewater long enough for this process to occur. The Uniform Plumbing Code (UPC) in section 209.0 recognizes a retention time of 30 minutes.

## **Flow**

The grease interceptors must be sized and configured to allow for sufficient retention time, taking into account the flow rate of the influent. Furthermore, it must be configured such that it minimizes turbulence to allow the suspended FOG to separate. This is especially important in high-flow situations, such as in the draining of a large sink or the discharge of dishwasher water.

## **Storage capacity**

The interceptor must be large enough to allow for sufficient storage of accumulated FOG between cleaning operations without affecting the flow characteristics through the unit. Many jurisdictions use a 1.25 factor in sizing to allow for a 25 percent accumulation of FOG and solids before cleaning.

# KITCHEN PRACTICES AND OPERATION

There are no moving or mechanical parts in gravity-type grease interceptors that require operation or adjustment. Thus, the passive operation of the interceptor is affected by the way in which it is used and the substances that are allowed to enter it. Most regulatory agencies require FSEs to use Best Management Practices in their kitchens. The following kitchen practices will reduce interceptor maintenance costs:

- Establish Best Management Practice standards in the kitchen to minimize FOG discharge.
- Educate and train your staff on proper kitchen practices. Some regulatory agencies require proof that employees have been trained and comply with such practices.
- Keep records of maintenance on site. Most jurisdictional authorities require proof that the interceptor has regular maintenance. See Appendix A for a sample maintenance log.
- Post “No Grease” signs above sinks and other drainage fixtures.
- Dry-wipe pots, pans and dishware prior to washing.
- Use a 3-sink system with separate sinks for washing, rinsing and sanitizing.
- Use dishwashing and general cleaning detergents that promote rapid oil/water separation. These detergents are formulated to release oil quickly so that the oil can rise to the water surface instead of remaining emulsified.
- Use proper concentrations of cleaners and disinfectants. Excessive amounts of either can cause FOG to become emulsified and pass through the interceptor.
- Do not use water that is hotter than necessary to clean and sanitize wash items. Use temperature settings recommended by the dishwasher manufacture. (Several agencies require water temperatures be limited to 140 degrees.)
- Do not dispose of cooking oils, fats or grease into drains. Recycle waste cooking oils.
- Do not use additives such as enzymes, grease solvents or emulsifiers. Most regulatory agencies prohibit their use. Enzymes and solvents temporarily emulsify grease, allowing it to pass through the interceptor. The grease later coagulates on the inside walls of sewer pipes, restricting flow, which could result in sewage backups and blockages.
- Do not allow corrosive agents to drain into the grease interceptor.
- Do not use food grinders. Most regulatory agencies prohibit their use. Dispose of food waste into a solids waste container. Although the interceptor is designed to remove grease-laden food particles from the wastewater stream, it also increases the pump-out interval and could lead to potential odor and/or reactivity problems due to food particles breaking down biologically and releasing gases within the interceptor.

# OTHER OPERATIONAL CONSIDERATIONS

The service life of a precast concrete grease interceptor can be affected by improper use or irregular maintenance. In general, acids or acid-producing substances should not be allowed to enter grease interceptors in large quantities. A number of conditions can result in a corrosive environment for precast interceptors. Two examples are often cited:

- a low pH effluent could result from a high concentration of sugar, yeast or food particles found in the waste stream from the FSE if allowed to go septic in the interceptor, and
- the generation of corrosive products that result from a bacterial digestive process on the walls of the interceptor.

Either of these items can contribute to a corrosive effect on concrete and be a result of excessive sizing and infrequent or improper cleaning of the interceptor.

# ODOR PREVENTION

Odor issues with outdoor interceptors can be eliminated when a properly designed grease interceptor is incorporated into the building's plumbing/venting system. Most building codes require the interceptor to be vented back through the inlet plumbing and to a roof vent. In almost all cases odor problems are caused by improper venting of the building's plumbing system. This causes the gases to build up in the interceptor and allows them to escape, leading to odor problems. Proper building ventilation and interceptor design along with gastight manhole covers and seals will prevent odors from escaping the interceptor and allow them to properly escape through the roof vents. Additionally, when precast concrete gravity grease interceptors will be dormant for more than 30 days (schools, churches, etc.), the preferred practice is to pump and refill the interceptor with clean water before the long period of inactivity.



# CLEAN OUT & MAINTENANCE

All interceptors require maintenance to ensure an acceptable level of effluent FOG. This requires a regular schedule of pumping and inspection. When the grease interceptor is new, it is difficult for the jurisdictional authority to define the maintenance schedule, and so it is difficult to ensure compliance. For these reasons, it may be best to require the owner or establishment to obtain and maintain a maintenance contract with a qualified waste removal business.

For new installations, a monthly or bi-monthly cleaning may be required until the maintenance company can establish a predictable level of FOG accumulation for that particular facility. Thereafter, required cleanings may be extended until an optimum pumping frequency is determined. The jurisdictional authority may also require notification from either the owner or the maintenance company when a scheduled cleaning is performed (or missed) or when a contract is not renewed.

Automated monitoring systems are now available that monitor the levels of FOG in the tank. They provide an early warning to management that the grease interceptor is nearly full and needs pumping. In addition, the systems can minimize pumping cost by optimizing pump-out interval. Automated systems provide documentation for the jurisdictional authority and can even be monitored offsite.

## Inspection

- Service covers should be inspected for defects or missing bolts (if equipped). Check that the gasket (if equipped) is in place and not cracked or broken. Replace the gasket if needed.
- Before pump-out, notice the liquid level. An unexpectedly low level could indicate a leaky tank, while an unexpectedly high level (or signs of grease above the normal operation level) could indicate a plugged fitting, line or filter.
- Once the interceptor is pumped out, visually inspect all fittings, baffles and fixtures inside the interceptor to see that they are in good working condition and functioning properly.

## Pump-Out

Follow the manufacturers recommended pump-out levels for FOG and sedimentation within the interceptor. On new installations, determining the pump-out interval will be difficult until the service company has monitored the accumulation rate enough to predict it. The manufacturer may provide information that will help determine when the interceptor is full and needs pumping. If information is not available, pump out the interceptor when the combined FOG and solids accumulation is near – but not in excess of – 25 percent of the total liquid depth.

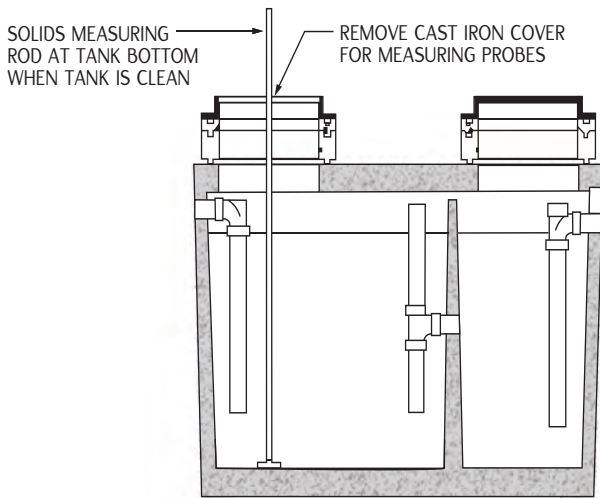
With compartmentalized grease interceptors, be

sure that each compartment is checked, cleaned and inspected at the time of pump-out.

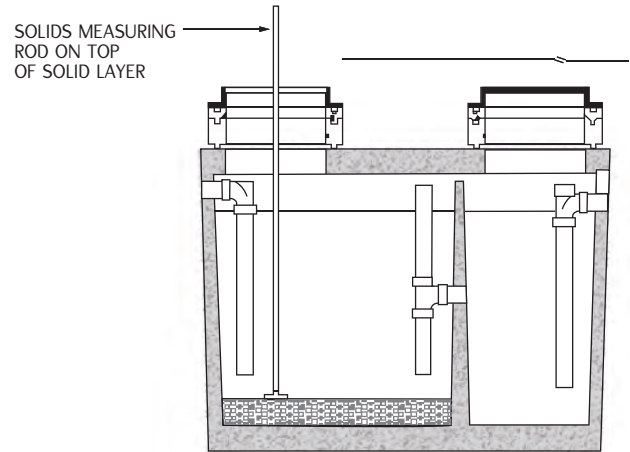
It is important to scrape clean the side walls and baffles during pump-out to help maximize removal of greases from the interceptor during each cleaning. The settled materials should also be thoroughly vacuumed to prevent biological breakdown and the unwanted release of gases. If the interceptor is equipped with an effluent filter, make sure it is properly cleaned and maintained according to manufacturer's instructions. **WARNING: Do not enter the interceptor to perform maintenance.**

Once the pump-out has been completed, be sure that the area has been cleaned up, the effluent filter (if applicable) has been reinstalled and that the access covers have been placed and secured (if provided with bolts or other device).

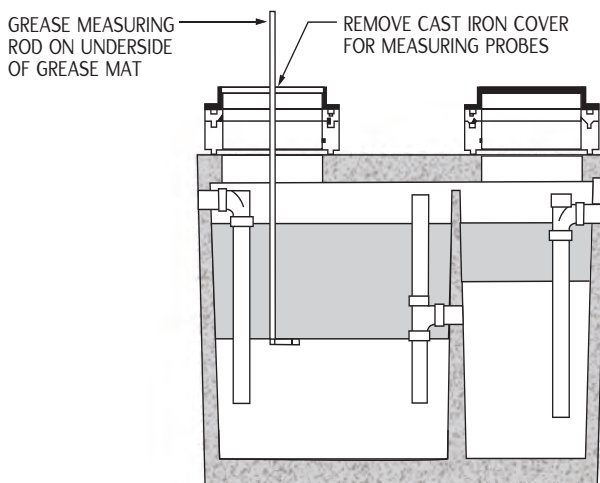
## INTERCEPTOR INSPECTION EXAMPLES:



- 1.) Obtain the FOG and/or solid levels using a "Sludge Judge" or a simple rod with a flat bottom piece to feel the mass levels within the recognized areas of separation, floatation and settling.



- 3.) Measure the height of the solids. If the height of the solids and grease are greater than 25 percent of the liquid depth then the interceptor needs pumping.



- 2.) Measure the depth of the grease.

NOTE: The grease interceptor model shown is for illustrative purposes only. It is not the only option for gravity-type grease interceptors. Contact one or more manufacturers to obtain additional information on the available options and models.

# SUMMARY

Precast concrete grease interceptors offer a simple, efficient solution to a critical problem. Their performance and the degree of protection they provide for the sewer components located downstream are determined by the way in which they are used. As such, it is vitally important that grease interceptors be properly operated and maintained at all times.

Contact your local jurisdictional authority with questions regarding permits, record-keeping requirements or any other maintenance issues that they may require to avoid costly sewer maintenance charges from improper grease discharges. The manufacturer of your interceptor should also be able to provide you with answers regarding the construction and operation of your grease interceptor and may be able to help you locate a licensed, qualified cleaning contractor who can offer a contract cost to maintain your interceptor and documentation required to assure compliance.

