GENERAL OVERVIEW OF THE REMEDIATOR® GREASE TREATMENT SYSTEM BY JAY R. SMITH MFG. CO.®

An Environmentally Safe Choice for Grease-free Waste Water

An Environmentally Safe Choice

Food service establishments and industrial processing facilities generate fat, oil, grease, sugar and other contaminants in waste water. Fat, oil and grease are major contributors to blockage and backups in interior drainage systems and city mains, often causing unpleasant odors, costly pumping of interceptors and, in extreme cases, excavation of drains, traps and mains. Enzymes, caustic compounds (lye), detergents, and hot water temporarily liquefy and transport the contaminants down-stream, but the additives become diluted and the water soon cools, allowing coagulation, resulting in blockage and backup. The goal is complete eradication of suspended fat, oil and grease (FOG) at the source.

The Remediator® Grease Treatment System is designed to accomplish this task through the use of environmentally safe live bacteria (we call Remediator® Culture) which have been specially selected and bred to have broad appetites to digest fat, oil, grease, sugar, and starch and other complex carbohydrates and proteins.

The Remediator® unique grease treatment process consists of the following:

1. separation and retention of over 99% of suspended fat, oil and grease;
2. uniform and regular application of multi-strain live bacteria (Remediator® Culture) to establish and maintain a biofilm of the greatest possible area and vitality;
3. disposal of FOG by metabolic processes of the organisms inhabiting the biofilm; and
4. removal of over 99% of the suspended solids over 2mm from the waste water stream with the custom designed solids interceptor.

Remediator® Culture includes nine different strains of natural bacteria which are non-toxic and non-pathogenic. They have been specifically selected and bred for the Remediator® Grease Treatment System to assist degradation of cellulose, and digest fat, oil, grease and sugar. Remediator® Culture consists of selected beneficial strains of Bacillus, Pseudomonas, Arthobacter, and Micrococcus bacteria.

The Remediator® Grease Treatment System is designed specifically to provide the greatest possible surface area incorporating an interactive media on which the biofilm is maintained. Through applied hydrodynamics, the media separates and retains material in the effluent and transfers it to the biofilm within the interactive media.

Complete Elimination Through Bioremediation:

The Remediator® Grease Treatment System incorporates the following three essential elements to complete elimination through bioremediation:

1. redirecting of effluent, allowing effective separation and retention of the fat, oil and grease, while ensuring contact with the biofilm, so the bacteria can consume it;
2. allowing controlled drainage without permitting flow-through of undigested solids; and
3. maintaining an enhanced environment so live, fully germinated bacteria can perform as designed.

This easy-to-install system is obviously the most reasonable solution to the problem of grease pollution.

FEATURES AND BENEFITS OF THE REMEDIATOR® GREASE TREATMENT SYSTEM

Features

Remediator® Grease Treatment System

The most advanced method of eliminating grease from waste discharge.

- The Remediator® system is designed to use a liquid mixture of nine species of non-pathogenic, environmentally safe, biofilm building bacteria referred to as Remediator® Culture which digests the fat, oil and grease (FOG), thereby eliminating an accumulation or potential blockage in the drainage system.
- Maintenance costs are virtually non-existent with no moving parts to service and no periodic clean out of fat, oil and grease.

- **No Dipping**
- **No Drawing-off**
- **No Hauling cost**
- **No Grease**

- The patented Remediator® vertical vortex media provides a large surface area to facilitate separation and retention of FOG to allow consumption by the Remediator® Culture.
- This system is regularly furnished with a stainless steel solids interceptor which separates out large food scraps and particles prior to entering the Remediator®.
- The Remediator® comes standard with two sampling ports, internal and external. Sampling of the effluent is encouraged to assure water quality requirements are being met and the system is functioning correctly.

What other grease interceptor system encourages you to measure performance?

Benefits over other types of grease interceptors

Other Units	Benefits of the Remediator®
Typical, indoor or in-ground, steel G.I.s —If the user must comply with a code which limits grease to 100 parts per million, cleaning would be recommended every 2 to 3 days.	**The Remediator® literally eradicates FOG from the effluent by the use of Remediator® Culture with a discharge tested to below 100 parts per million.** The unit, depending on use, only requires removal of non-grease material once or twice a year.
Timer controlled Grease Recovery Device (GRD) —Typically utilize a disk or belt which passes through the FOG layer and a squeegee device to wipe the accumulated FOG from the disk or belt into a drain trough and into a FOG receptacle.	**The Remediator® has no moving parts** and the Remediator® Culture digests the FOG thereby eliminating an accumulation or potential blockage in the drainage system.
Sensor controlled Grease Recovery Device (GRD) —These devices have the ability to sense the presence of FOG. By detecting FOG and initiating the removal process only when necessary, GRD eliminate the daily routine of GI cleaning. However, these devices do require periodic maintenance to remove trapped solid debris and removal of scum and there is the continuing problem of recovered grease disposal. These devices also require electrical connections and components.	**The Remediator® system is regularly furnished with a solids interceptor** which separates out large food scraps and particles. The solids interceptor basket is the only ongoing maintenance required. It should be emptied once a day, or more frequently if needed. The Remediator® Culture digests the FOG, thereby eliminating an accumulation or potential blockage in the drainage system. **The only electrical connection for the Remediator® is the standard 110 volt Culture Metering Device.**
Large capacity in-ground, concrete G.I.s —These units are usually installed in the parking lot, outside, requiring additional cost for extra piping, access parts and periodic pumping. Their location outside goes against the recommended practice to locate the interceptor as near as possible to the source of the FOG laden water. This is important because every foot of piping between the source of FOG laden waste water and the interceptor is unprotected and is a potential maintenance problem.	**The Remediator® is installed inside** as close as possible to the last source of the FOG laden water.

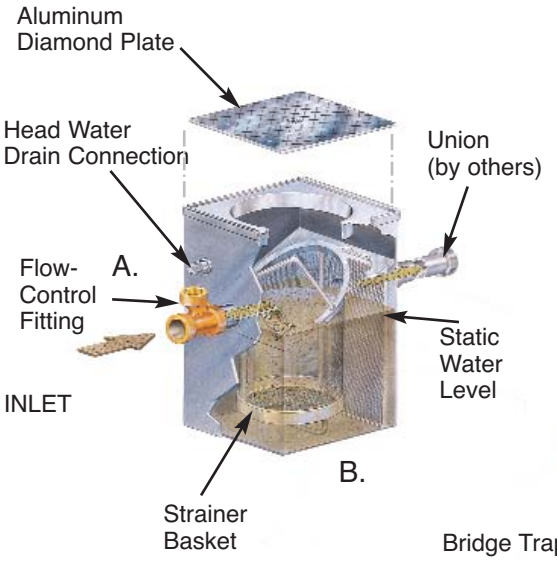
ELIMINATE FAT, OIL AND GREASE, AND MOST OF THE ASSOCIATED PROBLEMS—REMEDIATOR® GREASE TREATMENT SYSTEM ISOMETRIC OVERVIEW

How the Remediator® Grease Treatment System Works

The influent first enters the solids interceptor via a flow control fitting (A) that assures a proper rate of flow as well as oxygen introduction. The solids interceptor (B) retains food scraps and particles. The flow exits the solids interceptor and enters the Remediator's primary chamber where it is evenly metered to the media chamber (C) where separation is effected by conventional gravity method and vortex-induced coalescence. The flow passes through the media which is engineered to create vortices which cause less dense materials (FOG) to rise along the vertical surfaces of the media structure where they come in contact with the micro-organisms inhabiting the biofilm.

As the grease collects on the biofilm, the bacteria secrete lipases, which break the bonds between the fatty acids and glycerols. The bacteria are then able to digest FOG, giving off residual byproducts of carbon dioxide and water. The drainage continues through the media chamber to the clarifier (D) and is channeled to the outlet (E) where it can be piped to the sanitary sewer system.

The Jay R. Smith Mfg. Co.® Fig. 8970 Remediator® Grease Treatment System Isometric

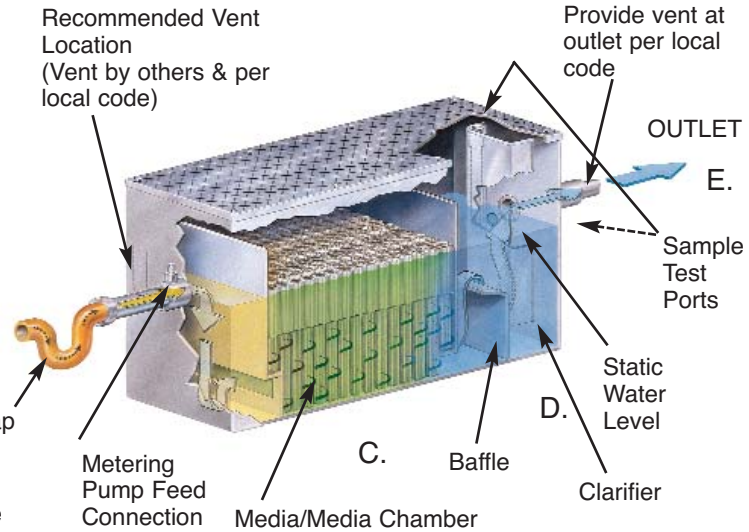


Solids Interceptor

NOTE: Solids interceptor(s) to be installed as close as possible to contributing fixture for easy access.

Refer to Solids Interception Importance, Page 9.

Microprocessor Controlled Metering Pump/Shelf



Remediator®

Patent 6,916,421

THE REMEDIATOR® SYSTEM: ENGINEERED COMPONENTS WORKING TOGETHER TO ERADICATE FOG

What the Remediator® Grease Treatment System does to FOG.

Fats are widely distributed in nature and are used for fuel, lubricants, and as the starting products for other compounds. The chemical structures of fats are quite complex due to the many combinations possible as fatty acid groups attached to glycerol "backbones." Plant seed fats present up to 1,000 different fatty acid-glycerol combinations while animal fats may produce over 60,000. This helps explain why animal fats often are more difficult to degrade than vegetable fats.

Fats and oils assimilated within the biofilm are hydrolyzed by enzymes (biological catalysts) called lipases. Certain bacteria are capable of producing various lipases and are key to the bio-degradation processes. Once the fatty acids and glycerols have been separated, a host of other bacteria are ready to continue the catabolic process which leads to the oxidation of lipids into carbon dioxide and water.

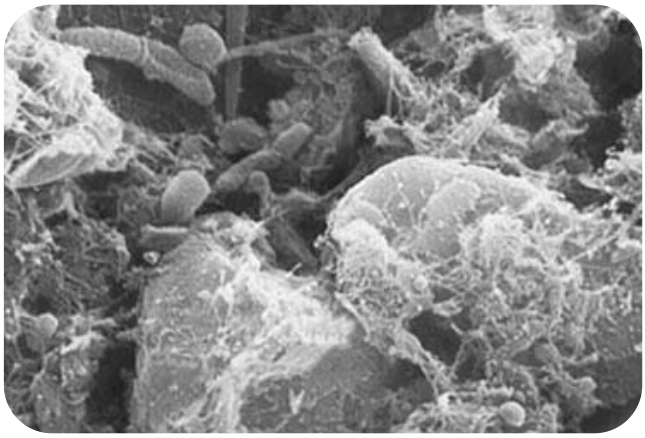
The Remediator® Culture

The bacteria used in the Remediator®, we call Remediator® Culture, are naturally occurring bacteria species. The bacteria adhere to the large surface area of the media both above and below the static water level of the Remediator® Grease Treatment System. These micro-organisms form a controllable biological ecosystem called a biofilm. As the effluent surges into the Remediator®, the fat, oil, and grease and other nutrients are brought into contact with the biofilm where the bacteria digests the waste, releasing carbon dioxide and water.

The Remediator® Culture is totally non-pathogenic (does not cause infections) and is safe to humans. The bacteria that comprise Remediator® Culture can be found in our digestive tracts, some are present in any tap-water source, one is present in the gut of a termite and some are found in soil.

The Remediator® Culture multiply by cell division. Each ounce of Remediator® Culture contains approximately 5.5 billion colony-forming units that develop and maintain a healthy biofilm in the media chamber. The bacteria multiply approximately 50,000 times in 24 hours, enabling rapid elimination of fat, oil, grease, sugar and starch. Individual cell life is approximately 20 minutes in free or planktonic state. However, cell life is extended somewhat in the protection of a biofilm, or in conditions of lower temperature or reduced food availability.

Remediator® Culture is essential to maintaining population stability and diversity in the biofilm.



The photo above shows a naturally occurring biofilm from a septic system, similar to the biofilm found in the Remediator®.

The benefits of bacteria and its use with the Remediator®

Beneficial use of microorganisms such as yeast and bacteria touches virtually every aspect of our day to day lives. Perhaps the most common uses of bacteria are in the production of antibiotics, amino acids, citric acid and vitamins. These items are used by nearly everyone daily in one form or another as medicines, dietary supplements, flavorings and preservatives. These products and the products they enhance would not be possible without the use of beneficial organisms. Active use of micro-organisms is essential to brewing, dairy, baking, fruit and vegetable processing, sugar and starch production as well.

The most fundamental and most critical function of bacteria in our lives is at the very basis of life on the planet earth. The availability of the building blocks of life: carbon, nitrogen and oxygen is the direct result of bacterial action. Free atmospheric oxygen is the by-product of mineral eating stramatolytes; the nitrogen cycle which provides the majority of our atmosphere requires the activity of nitrifying and nitrogen

BENEFITS OF REMEDIATOR® MEDIA, METERING DEVICE, AND SOLIDS INTERCEPTOR

releasing bacteria; carbon, the substance of all life on earth is recycled only by bacteria or fire.

People rarely know or appreciate the dependence of their very existence on the lowly bacteria.

The photo below shows a portion of the 2,128 cells in the patented media on which the Remediator® Culture bacteria affix themselves to form the biofilm. The configuration of cells is designed to create small vortices in the wastewater flow, causing the grease to rise to the surface. All separated and retained grease is digested from the waste stream.

The Patented Remediator® Media

The Remediator® Media which is at the center of the treatment process provides a large surface area that is essential in the separation and retention of FOG by the Remediator®. The surface area in the honeycomb of cells comprising the media would cover the first five yards of a football field—it is where the Remediator® Culture does its job. Without the media, the bacteria would be washed downstream rendering the unit's treatment function ineffective.

The Remediator® Culture Metering Device.

To maintain the biofilm, the bacteria require some time to attach to the media surfaces so the replenishment of the Remediator® Culture takes place during a period of relative inactivity rather than at times of maximum use. The bacteria, being live, fully vegetative organisms, require no further incubation period to become productive. One ounce of the Remediator® Culture is prescheduled for injection into the Remediator® every 24 hours, during a period of low kitchen activity.

The benefits of the Remediator® solids Interceptor

The Remediator® is designed to separate, retain and dispose of FOG; a liquid pollutant which is not efficiently separated, retained or easily disposed of by gravity interceptors. Solid material is not a liquid pollutant and is easily disposed of. The system features which make the Remediator® extremely efficient at separating and retaining liquid pollutants make it extremely efficient at separating and retaining solids, a pollutant the Remediator® is not designed to digest. Solids require much longer to break down in a biofilm and will accumulate over time eventually causing odor and partial or complete blockage of the unit, which is why a solids interceptor is included.

The solids interceptor is an inline separator with an easily removable basket-style strainer designed to remove all suspended solids over 2mm. It is fitted with a permanent safety screen to ensure no solids bypass during emptying of or inattention to the basket. Company testing verifies the strainer is capable of handling all designated flows with capacity for normal solids accumulation at an efficiency in excess of 99%. A benefit, in addition to dependable operation of the Remediator®, is over 99% reduction in TSS (Total Suspended Solids) and concurrent reduction in BOD (Biological Oxygen Demand) loading from kitchen waste to the POTW (Publicly Owned Treatment Works) or septic system.