

NEWTEC

Hard-working bacteria that get results.

General Handbook

Plumbing, Grease Traps

Sewage Treatment Plants

Lift Stations

Pond Maintenance

Industrial Waste Treatment

Bioremediation of Petroleum Hydrocarbons

NEWTEC

The Newtec Difference

At Newtec we supply specialized bacteria for waste treatment. Customer satisfaction through product performance is our number one priority. Why? Because it has to be. Good microbial products can't be sold just to make a quick buck. If time and attention are not spent in their production and application, then they simply won't work. If you've tried a biological product in the past, you know that there are plenty of products out there that don't work and have nonexistent support. In fact, most Newtec customers have already tried countless products and spent thousands of dollars with no results to show for it. We at Newtec do things a little differently: we sell products that work consistently and well, and we help you implement them so that they continue doing the job for you over the long haul.

Countless factors limit bacterial growth. Knowledge of the material to be degraded and the environmental conditions present are a must. More importantly, knowledge of how bacteria and enzymes work to

degrade wastes is integral to their proper use (hint: it's not magic). Many distributors of bacterial cultures know more about penetrating oil, weed killer, and wasp spray than their bacterial/enzyme product. Newtec's pertinent knowledge and experience provides assurances that our bacterial products will work under a wide variety of conditions—not just in a “lab environment”. In addition, most competitive products are live cultures that can't survive even a slightly toxic situation. If adverse conditions are present when the bugs are applied (or even during shipping), then the bugs die, and *nothing happens*.

We spent 10 years observing the results of live culture applications. Occasionally, the results were quite promising. But performance was very inconsistent, owing to the fragility of the bacteria. Newtec's bacterial product, Microbe Plus, rewrote the rules for applying bacteria to waste. We've spent thousands of dollars on lab-controlled tests, proving the concentrated, specialized bacteria in Microbe Plus can degrade even harsh

chlorinated and aromatic hydrocarbons quickly when applied properly. For example, results from use in industrial pretreatment have proven Microbe Plus speeds the degradation of chlorinated hydrocarbons dramatically.

Since 1995, Newtec has provided bacterial solutions. We got our start with common grease degradation, and have moved into areas such as industrial hydrocarbon treatment, and municipal sewage treatment, among others.

No matter how tough your waste is, we're confident that we can bring in a solution that will save you time, effort, and money. Let our experience, coupled with the highest quality, most potent bacterial products available today, solve your waste treatment problems.

“We sell products that work consistently and well”

NEWTEC

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Quality Statement

Purity

Newtec microbes are grown aerobically by submerged fermentation under aseptic conditions to prevent the contamination with ineffective or pathogenic organisms which routinely occurs in non sterile semi-solid production of microbial cultures on bran.

In the Newtec process, stainless steel vessels containing the growth medium are sterilized with flowing steam under pressure. The organisms are transferred aseptically from pure stock cultures to the fermentation vessels.

Newtec technology assures that adventitious or pathogenic organisms are neither present nor grown in the production of Newtec bacteria.

Potency

Because Newtec fermentation takes place under rigidly controlled conditions, high-potency counts are obtained routinely from batch to batch. Our counts represent 100% effective organisms since other organisms do not enter the growth process by accident.

Origin of Microorganisms

The microorganisms in Newtec products are not foreign to the ordinary natural environment, as they were originally isolated from the soil. This means that the organisms (1) are not introducing into nature any genetically-engineered elements whose impact would be unknown and therefore potentially hazardous and (2) are viable in soil and water within the use specifications.

Environmental Impact

Newtec organisms are not toxic agents. They utilize the organic substances in the environment to produce carbon dioxide, water, and more bacteria.

Pathogenicity

Newtec bacteria are not a threat to human health. Newtec screens its products to assure that no adventitious pathogens are present. Newtec products are certified free of *Salmonella* and *E. coli*.

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Frequently Asked Questions

Why sell microbial products?

Microbial products are environmentally friendly, nonhazardous alternatives to disposal methods and chemical treatments that are becoming increasingly restricted or even banned by regulatory agencies. Biologicals:

- develop repeat business because they are effective
- are safe to blend and package
- are profitable
- may be formulated as products unique to the individual distributor

How do microbial products work?

In grease traps and other waste treatment situations, the microorganisms consume organic waste as a food source, multiplying as they do so. Microbial products also contain and produce as byproducts enzyme systems and surfactants that breakdown and mobilize waste.

Culture products aid plant production by providing hormonal stimulus and changing the microenvironment so that it favors plant root growth rather than fungal growth.

What is the difference between enzymes and bacteria?

Bacteria are living organisms that get nutrition by creating enzymes which they excrete into the environment. The enzymes break down complex compounds in the environment into simple compounds which the bacteria can then absorb and use for energy. Newtec bacteria products normally include some of the enzymes which the bacteria have produced while they were grown in the manufacturing plant. Newtec also produces the concentrated enzyme solution Enzyme Plus from which the bacteria cells have been removed.

How quickly do microbial products work?

The microorganisms are capable under ideal circumstances of doubling in population in as short a time as 20 minutes and continuing to increase logarithmically. The enzymes and surfactants in the products work immediately.

Why add large numbers of organisms if they start multiplying right away?

The environment to which the organisms are added is never ideal. Factors that limit growth potential include pH & temperature, oxygen & moisture content, poisons, competitor microorganisms & predator microorganisms, and depletion of the food source. The concentration of organisms in Newtec products is the ideal number to assure establishing a vigorous population of the bugs even when there is die off due to environmental conditions.

Why add microbes when other microorganisms are present naturally?

In grease traps, naturally-occurring organisms are regularly flushed out and occasionally poisoned by high concentrations of disinfectants. Added microbes help maintain adequate populations.

In sewage treatment, in addition to these problems related to the dynamics of flow, the organisms naturally present in the treatment plant produce compounds which tend to hold water next to the sludge. This water retention has two effects which greatly influence the sewage treatment process: it slows the settling of the powders and it increases the volume which they occupy. Newtec microbes split the compounds that cause water retention.

In the case of hydrocarbon contaminants, studies have shown that petroleum applied to normal soils at low levels is degraded very quickly (and with an apparent increase in soil fertility). Yet there is a problem with petroleum degradation in soil or there would not be the large amounts of petroleum-contaminated soil present in this country. Sometimes the problem is merely that of insufficient soil moisture to support growth. Sometimes, however, there are insufficient organisms present to initiate the degradation process. This occurs particularly when the soils in question are subsurface soils as those around underground storage tanks or when the soil has been killed as in production fields receiving highly saline production water for years.

In agricultural applications, loss of advantageous microflora in the root zone can lead to decreased or lost plant production following environmental disruptions such as drought, flooding, and temperature extremes.

NEWTEC

Frequently Asked Questions

How often do microbial products need to be applied?

In waste treatment situations where pollutants are no longer being added, a single treatment may be sufficient. Bioremediation of petroleum contaminants in a contained area is an example of this type of situation. The only requirement is that pH, temperature, and oxygen and moisture content be maintained in the appropriate range for the three-month treatment period.

In organic waste treatment systems which manage a continuous stream of incoming pollutants, daily or weekly additions of highly-efficient organisms ensure continuous pollutant and odor reduction and optimization of the handling characteristics of the waste.

When treating surfaces such as carpeting for pet stains and spoiled food odors, the culture product is applied once and the surface is kept wet for 24 hours.

Root-zone microbes often need be applied only at planting or after an environmental disruption. In situations of constant stress, such as golf-course turf, monthly applications give best results.

What about anaerobic organisms?

Many competing products are formulated with up to one-half the plate count coming from anaerobic organisms. Newtec feels that these organisms do not enhance the results obtained from the use of microbial products in real-world situations. We will, however, formulate products with anaerobic organisms for distributors who require this for marketing purposes.

Can liquid products be diluted?

Yes, but effectiveness is reduced when it takes much longer for an adequate population of microbes to become established. IF PRODUCTS ARE DILUTED THE NEWTEC DILUTION PROTOCOL MUST BE FOLLOWED OR THE ORGANISMS WILL DIE WITHIN 8 HOURS.

NEWTEC

SOLUTIONS: Food Service

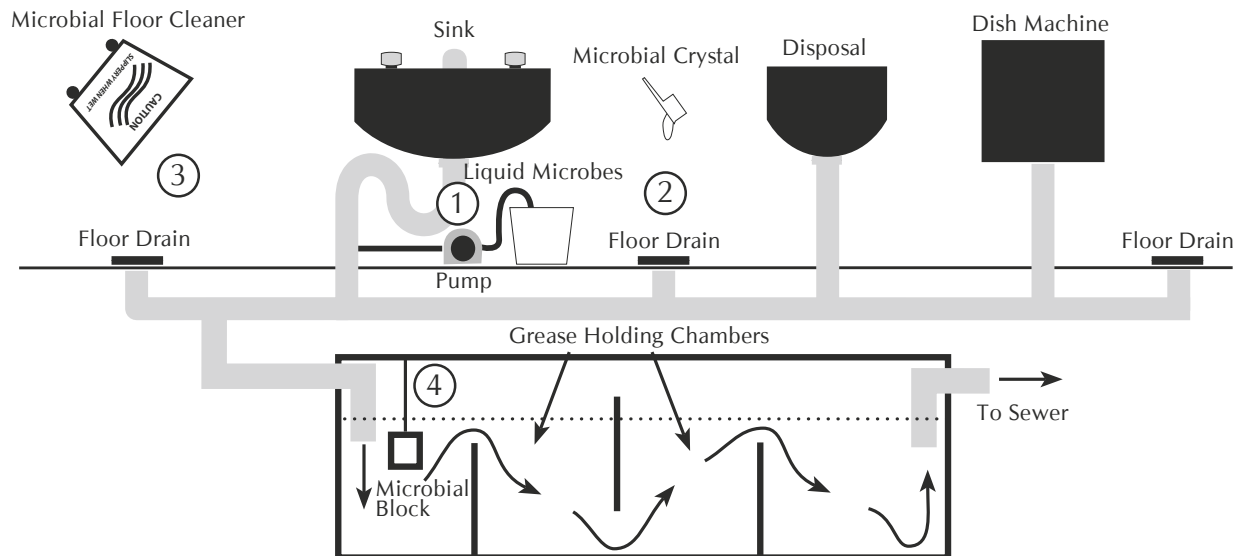
ENVIRONMENTAL CHALLENGE

[GREASE TRAP OPERATION]

Grease traps are devices for separation of fatty materials from the waste stream leaving a food service. Under ideal conditions, the grease would be collected and then periodically removed for land or other disposal outside the sewage system. However, in recent years, the cost of transportation and disposal of these wastes has raised the expense of handling grease to the point where food services are looking for alternatives. One way to reduce disposal costs is to treat grease traps with bacteria. This has been found to be both effective and environmentally sound.

MICROBIAL SOLUTION

[PREVENTATIVE MAINTENANCE WITH MICROBE PLUS]



Newtec has found that a certain organism in our collection is particularly useful in digesting grease and has formulated a preserved form of that organism into a number of Microbe Plus products.

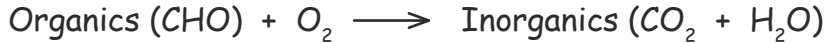
- 1. Microbe Plus Liquid**—Using a peristaltic feed pump and timer installed under a sink, a measured amount of Microbe Plus Liquid is automatically dispensed into the drain during low water-use periods.
- 2. Microbe Plus Crystal**—Microbe Plus Crystal may be dispensed into any drain by use of a measuring spoon
- 3. Floor Cleaner with Microbe Plus**—This method combines the task of floor cleaning with that of drain and grease trap maintenance. Newtec formulates for the distributor a free-rinsing, concentrated detergent with bacterial cultures that leaves a slip-free floor surface. When the floor cleaner containing Microbe Plus is washed into the floor drains, the microorganisms are activated to keep the drains free-running and to maintain the grease trap. In addition, Floor Cleaner with Microbe Plus keeps tile grout clean without degrading the grout and reduces worker injuries due to greasy floors.
- 4. Microbe Plus Block II**—This unique method of continuously dosing a grease trap for the elimination of excess grease slows the accumulation of grease in the trap so that the time between pumpings can be greatly extended. The use of continuously dosed product is extremely valuable because Newtec has found that a small amount of product that is continuously available can replace a significantly larger amount of product that is added intermittently.

NEWTEC

SOLUTIONS: Sewage Treatment

The Process: Mineralization

The purpose of sewage treatment is to change the organic carbon and hydrogen in sewage into inorganic compounds: carbon dioxide and water. The process is called *mineralization* and requires the combination of organic carbon compounds with oxygen:



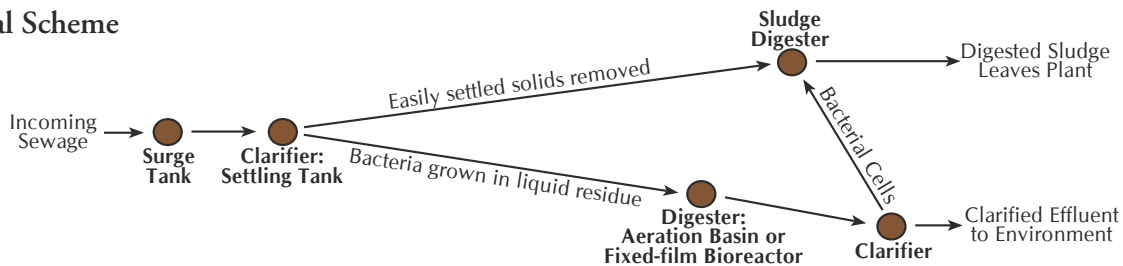
The Processors: Bacteria

In ecological terminology, bacteria are given the position of *mineralizers*. *Bacteria are ideally suited for the job they have to do in sewage*. Using enzymes they produce, bacteria carry out transformation of organics into inorganics. When the action of bacteria is shown, the general sewage treatment reaction looks like this:



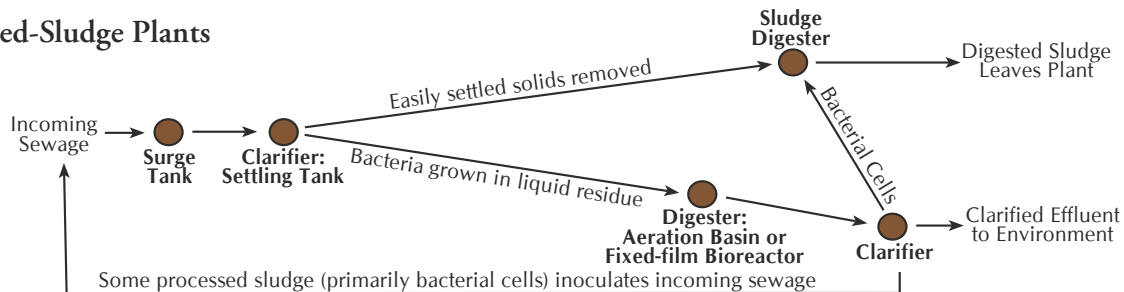
The Infrastructure: Sewage Treatment Plants

(A) General Scheme



Generally, sewage treatment plants are designed to aerobically decompose soluble organics into sludge, while at the same time continuing to degrade the settled solids. *The purpose of a sewage treatment plant is to create a contained environment for bacteria to do their mineralization work efficiently.*

(B) Activated-Sludge Plants



The activated-sludge process is most commonly used in U.S. sewage treatment plants today. These plants are designed to inoculate the incoming sewage with the settled biosolids (sludge) from processed sewage. The idea behind this inoculation is to put an actively metabolizing colony of organisms into the incoming sewage to initiate the breakdown process.

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SOLUTIONS: Sewage Treatment



ENVIRONMENTAL CHALLENGE

[POOR REMOVAL OF BOD/COD FROM SEWAGE]

In general, the activated sludge process works very well. However, since it is dynamic, (i.e., sewage is always flowing in, sludge is always settling, treated sewage is always flowing out) it is susceptible to small changes at one point making large changes at another.

One problem in aerated sewage treatment is producing sludge that easily settles. Many plants perform poorly in the removal of suspended solids and BOD. Theoretically, the organisms ordinarily present in sewage should be able to degrade all the organic compounds present in the sewage. However, it turns out that these microbes form polymers as they grow, and some of these polymers are detrimental to the activated sludge process. The polymers affect the process by increasing the water holding ability of the solids.

Water retention both increases sludge volume and decreases the settling rate, so that treatment plants often do not work efficiently at their design specifications. Instead of processing decomposing solids, the plants accumulate them.



MICROBIAL SOLUTION

[MICROBE PLUS INTRODUCES MORE EFFICIENT ORGANISMS]

1) Microbe Plus bacteria split recalcitrant polymers.

The Microbe Plus organisms produce a series of powerful enzymes which split detrimental polymers into inactive, short-chain sugars. Since the polymers are no longer causing the solids to hold water, the solids settle easily.

2) Microbe Plus bacteria degrade both suspended solids and settled sludge.

The Microbe Plus organisms aid the basic activated sludge process: decomposition of soluble organic compounds into sludge and degradation of settled sludge. Through production of powerful enzymes—amylase to degrade carbohydrates, protease to degrade proteins, and lipase to degrade fats—the Microbe Plus bugs do the basic mineralization work of sewage treatment. The continuous addition of highly efficient bugs is very helpful when plants are overloaded, when they have been hit with a slug of toxic waste, or when the native microbes are durable but inefficient.

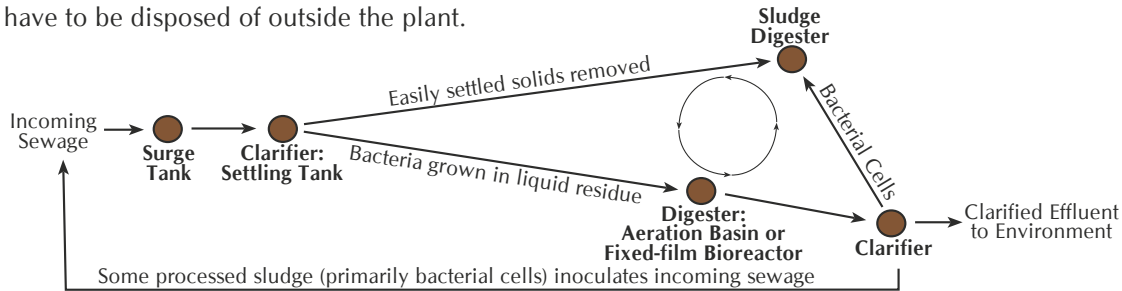
Bottom Line: Microbe Plus microbial products speed reduction of BOD/COD in suspended solids, increase the settling rate, and reduce final sludge volume.

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SOLUTIONS: Sewage Treatment

(C) Extended-Aeration Plants

The extended-aeration plant is a form of the activated-sludge system. In the extended-aeration system, the sludge from the sludge digester is recycled through the aeration basin repeatedly. The idea is that eventually, all the sludge will degrade and none will have to be disposed of outside the plant.



ENVIRONMENTAL CHALLENGE

[POOR REMOVAL OF BOD/COD FROM SEWAGE]

In practice, all sewage treatment results in a sludge residue of very resistant material such as bacterial cell walls and lignins which will build up and need to be disposed of into the environment—as landfill or soil amendment.



MICROBIAL SOLUTION

[MICROBE PLUS INTRODUCES MORE EFFICIENT ORGANISMS]

Microbe Plus products are uniquely suited to upgrade the operation of extended-aeration plants because they improve aerobic digestion in two ways:

- Microbe Plus provides optimal organisms for biodegradation of sewage solids
- Microbe Plus introduces soluble hydrolytic enzyme systems that are immediately active

Microbe Plus products substantially reduce the aerobic digestion time needed to reach an optimum amount of settling. Control tests to produce minimum sludge volume and maximum settling show that Microbe Plus results were obtained in less than one-tenth the time required for the untreated control.

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SOLUTIONS: Sewage Treatment

(D) The Collection System

The sewage system operates by gravity to carry sewage to a collection point called a lift station. At the lift station the sewage accumulates in a well. When this wet well has filled to a given level, pumps are activated to raise the sewage so that it may flow a further distance by gravity. In transit to the treatment plant, periodic stations lift the sewage from the level to which it has flowed back up to the surface. Eventually a force main may be required to keep the sewage moving, depending on grade, volume, and distance.

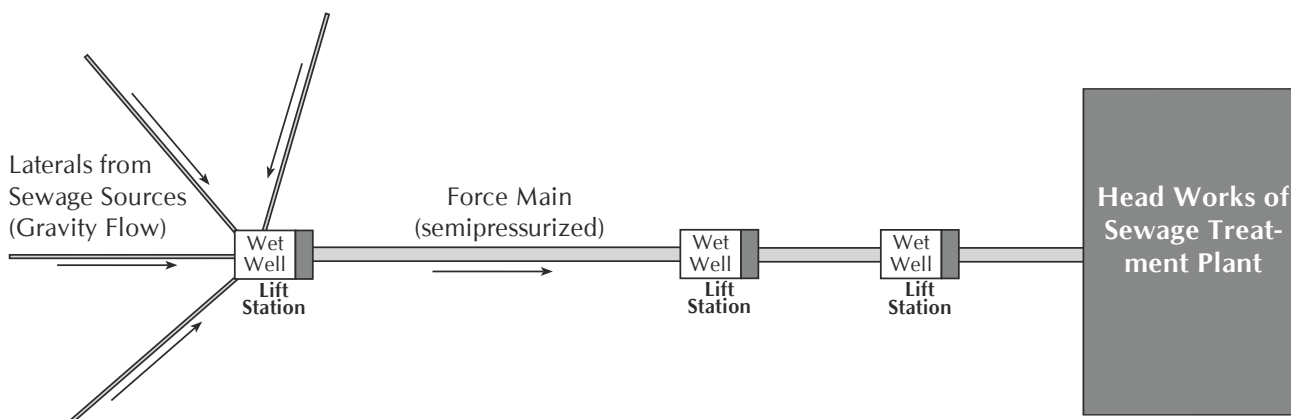


ENVIRONMENTAL CHALLENGE

[LIFT STATION AND WET WELL TREATMENT]

As sewage moves through the collection system, chemical changes are continuous and mostly undesirable. When grade changes are minimal and average annual ground temperatures high, slow movement means sewage becomes septic: dissolved oxygen decreases or disappears. Facultative anaerobic microorganisms start splitting nutrients in the waste, giving rise to odor compounds such as hydrogen sulfide, mercaptans, and complex amines. "Grease" tends to accumulate. This grease is really a combination of microbial biofilm and the insoluble accretions from the sewage as its velocity slows down. The grease clogs the lines, reducing hydraulic capacity.

In a lift station wet well, the grease can form a thick layer, eventually covering the surface of the wet well. When pieces break off, they can damage pumps, and the mass of material prevents the diffusion of oxygen, thus allowing a very large mass of material to become severely anaerobic.



MICROBIAL SOLUTION

[MICROBE PLUS BLOCK SUSPENDED IN A LIFT STATION]

Microbe Plus Block reduces hydrogen sulfide and grease, breaks down odor compounds, automates treatment, and releases its dose of bacteria gradually over time.

The microbes in Microbe Plus Block produce enzymes which will dissolve the biofilm which holds the "grease" together. This allows the other accretions to move with the stream of sewage, as was the intention of the engineers who built the system. When the layer of film is thinner, it does not tend to slough, and there are no masses of solid grease to damage the pumps. Further, there is no massive amount of material on the walls to inhibit oxygen diffusion. The environmental area suitable for the growth of SRBs (sulfate reducing bacteria) is, therefore, much reduced and little or no hydrogen sulfide (H_2S) is produced. Since H_2S is both toxic and corrosive, it is very important for each sewage manager to control its production. As H_2S is also a nuisance for the citizen, it is politically important for public officials to be observed "doing something about it." Microbe Plus Block also contains nutrients needed for bacterial growth, but which are known to be missing in grease. The addition of these nutrients greatly increases the efficiency of bacterial metabolism of the grease, making the observed result truly phenomenal.

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SOLUTIONS: Pond Maintenance



ENVIRONMENTAL CHALLENGE

[EXCESS NUTRIENTS START NEGATIVE CYCLE]

In natural waters, nutrients for the growth of algae—specifically, nitrogen and phosphorous—are normally limiting. Under certain conditions, however, either nitrogen or phosphorous may be enriched. Algae are autotrophic (see definition on left) and the other nutrients necessary for algae growth are normally in excess. So, when nitrogen and/or phosphorous become available (non-limiting) in natural waters, then all the conditions are present for algae to multiply extremely rapidly. This sort of multiplication is called algal bloom.

As the algae multiply, they consume available nutrients, causing the nitrogen and phosphorous supply to again return to limiting conditions. Then, with the excess nutrients eliminated, the large population of algae begins to die. As the algae die off, the growth of decay microbes removes oxygen from the water, and noxious odors develop.

Chemical Treatments Present Their Own Problems

After algal bloom has matured, it is nearly impossible to change the situation immediately. Therefore, most efforts in the management of algal blooms are devoted to prevention of the problem.

One method of prevention is the use of algaecides applied at the beginning of the bloom. There are, however, at least two problems with the use of algaecides in this manner: nearly all commercially available algaecides contain copper as the active ingredient, and copper 1) is suspect by the EPA for long-term use in natural waters, and 2) may cause a massive release of toxins from blue-green algae. Although algal toxins are not known to have caused human deaths in the U.S., they are known to have caused death in fish and domestic animals.

Another method of prevention is to stop the process of the bloom chemically by reducing the concentration of phosphate in the body of water. The chemicals used to do this are readily available, but the quantities necessary and the equipment required for even mixing and distribution make this solution problematic.



MICROBIAL SOLUTION

[GROW BACTERIA INSTEAD OF ALGAE]

The natural solution to pond maintenance is the use of heterotrophic soil organisms. These microbes, which—unlike algae—require carbon compounds other than carbon dioxide for growth, use up the phosphorous in the water as they multiply. This mechanism for preventing algal blooms is just beginning to be established as a recognized form of treatment. The heterotrophic organisms are naturally occurring and have a limited lifetime in the water. Since they require organic carbon compounds, they are not self-sufficient in natural waters and will not multiply and produce a bloom.

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SOLUTIONS: Petroleum Bioremediation

ENVIRONMENTAL CHALLENGE

[PETROLEUM CONTAMINATION OF SOIL AND WATER]

Chemically, crude oil and petroleum distillates are made up primarily of carbon and hydrogen. They do contain nutrient value, but as a result of their narrow chemical composition, they are low in many nutrients necessary for proper breakdown by natural soil-borne bacteria. In addition, petroleum and its by-products are originally biological in nature, but have been chemically metamorphosed by geological forces and by the refining process. Because of these factors, it is very difficult for the natural bacteria to obtain the nutrient value locked in the oil, and it is not easily degraded. Indeed, owing to this difficulty, naturally-occurring bacteria do not exist in high enough numbers to degrade the waste to any acceptable degree. Of course, in an industrial setting, the bacteria in question would not be present at all.

Evaluation

A petroleum waste situation should be evaluated before creating a treatment plan. The following are laboratory tests which quantify and qualify the nature of the contamination:

Total Petroleum Hydrocarbon

BETX

This test measures benzene, ethylbenzene, toluene, and xylene. These aromatic hydrocarbons are attacked by Newtec bacteria but are toxic in high concentrations.

BOD

Microbes use oxygen to break down waste. To determine Biological Oxygen Demand in the laboratory, waste is put in a stoppered bottle with bacteria. After 5 days the amount of oxygen consumed is measured as an indicator of the concentration of food that can be degraded biologically. That is, BOD is a measure of the strength of the waste.

COD

Chemical oxidation can also break down waste. To test for Chemical Oxygen Demand, a chemical oxidizing agent is combined with the waste for 3 hours and the amount of the agent that reacts is measured as an indicator of the concentration of chemically-reduced materials. Some of these could have been degraded biologically instead. It is another way of measuring the strength of the waste.

Heavy Metals

Heavy metals are both contaminants and toxic to microorganisms in high concentration.

Total Suspended Solids

This measure represents the amount of solids suspended in the liquid phase of the waste.

pH

Most biological degradation occurs between pH 6 and pH 8.5.

Dissolved Oxygen

Oxygen is required to biologically degrade waste efficiently without generating bad odors.

TOC

The amount of Total Organic Carbon in the sludge indicates how much of it can be degraded.

Total Dissolved Solids

This measure represents the total amount of common ions plus dissolved organic material.

Common Cations & Anions

Ca²⁺, Mg²⁺, Na⁺, Cl⁻, SO₄

Total Nitrogen & Total Phosphorus

NEWTEC

SOLUTIONS: Petroleum Bioremediation



MICROBIAL SOLUTION

[BREAK DOWN PETROLEUM WASTE WITH MICROBE PLUS]

Microbe Plus bacteria are able to break down petroleum and its distillates, first into fatty acids, with the final products being carbon dioxide and water. The breakdown into fatty acids occurs over a short time, so that the land can be reused and/or the industrial area can be washed down. Keep in mind that the fatty acids which are the intermediate by-product of bacterial action are environmentally benign and are broken down naturally by the bacteria in the soil very rapidly. Following are some ways to maximize the effectiveness of Microbe Plus on petroleum wastes.

Water

Contaminated soil must be moist during the entire treatment period to sustain microbial growth.

Toxicity

If the COD of the waste is excessively high compared to the BOD, this indicates that biological growth is being inhibited. If nitrogen and phosphorus levels are sufficient, toxic levels of ions, heavy metals, or other antibacterial agents may be present. If the concentration of these toxins is not too high, simple dilution may overcome toxicity. Additives may also render certain metals nontoxic. However, if heavy metal concentration is quite high, then biodegradation alone cannot solve this waste disposal problem.

Emulsifiers

Emulsifiers enhance the rate of biological breakdown by increasing surface area and solubility of interactants. Some of the bioactivity of Newtec's bacteria appears to be due to their emulsifying action, however the addition of nontoxic chemical emulsifiers may further enhance the process.

Nutrients

If the waste is deficient in nitrogen, phosphorus, or both, supplementation is necessary.

Concentration

Microbes will break down only 90% of hydrocarbon waste. Prior dilution of the waste with soil or fresh water may reduce contamination enough that biodegradation can bring it below the limit for nonhazardous waste disposal. Dilution can also contribute to better diffusion of oxygen.

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SOLUTIONS: Drain Lines



ENVIRONMENTAL CHALLENGE

[SEWER PIPE BLOCKAGES]

Pipe carrying sewage will accumulate a coating on the walls over time. As this coating builds up, it slows the flow of material. Pipe fittings such as 90's, reducers, and T's are more likely to catch solids when the flow is slow. Eventually, the sewage solids no longer flow past the pipe fittings and a blockage occurs.

An operation known as rodding is normally required to remove the blockage. Many times the blockage requires rodding at inconvenient times. At other times, the plugging of the lines causes damage by the time the rodding is done. The rodding itself may damage the pipe, leading to the eventual necessity of expensive repairs.



MICROBIAL SOLUTION

[ENZYME ACTION OF MICROBE PLUS MICROBES]

The coating that builds up on the inside of sewer pipe is composed of grease and biofilm. If this accumulation can be broken down or prevented, the sewage will flow faster. Microbe Plus is a concentrated mixture of spores and enzymes ideally suited to attacking grease and biofilm. When added to sewage, the spores become active microbes in approximately twenty minutes. As the microbes grow and multiply, they continually produce more enzymes. These enzymes work to break down grease and prevent accumulation of biofilm on the inside surfaces of the pipe. The result is a maximum flow rate. This rapid flow enables the drain system to function as designed, carrying ordinary solids past the pipe fittings without blockages.

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SOLUTIONS: Laundry, Carpets, Drains



ENVIRONMENTAL CHALLENGE

[LAUNDRY, CARPETS, AND DRAINS NEED TO BE CLEANER]

It may be the case that laundry, carpets, and drains are not getting as clean as possible. This is especially true if they are soiled with organic compounds such as blood, sewage, petroleum, grass, or grease. In these cases, a cleaner with the power of enzymes is needed.



MICROBIAL SOLUTION

[EMPLOY ENZYMES TO CLEAN THOROUGHLY]

Enzyme Plus is an enzyme mixture from a fermentation which has been optimized for the production of lipase. Other enzymes extracted from the fermentation include protease, amylase, and urease. The Enzyme Plus mixture possesses characteristics which make it unique and valuable in the formulation of cleaning preparations.

CARPET DEODORIZERS AND STAIN REMOVERS

Enzyme Plus destroys odor-causing compounds and removes a wide range of organic stains such as urine, food, and red wine (not ink or certain synthetic dyes), making it ideal for inclusion in carpet deodorizers and stain removers. Newtec will assist customers in formulating such carpet cleaners or can supply a complete product for private label if blending capabilities are not available.

ENZYME DRAIN OPENERS AND MAINTAINERS

The lipase and protease in Enzyme Plus make this enzyme mixture unique for the formulation of enzyme drain line openers and maintainers. A superior product would combine the enzyme action of Enzyme Plus with the extended activity of the spores in Newtec's microbial cleaner, Microbe Plus.

DETERGENT ADDITIVE

Used in formulations, Enzyme Plus boosts the cleaning power of hard-surface cleaners and moderate pH laundry detergents. Enzyme Plus can also be formulated into presoak preparations which are extremely advantageous for urine and fecal contaminated nursing home laundry. In this application, Enzyme Plus can eliminate the use of bleach as a presoak for the laundry, thus increasing linen life and reducing costs.

NEWTEC

RESULTS: Microbe Plus Multicell 21

SS = Suspended Solids
 COD = Chemical Oxygen Demand

Industrial Waste Water Treatment Plant 12M to 15M GPD influent including chlorinated hydrocarbons

Date	Surge		Clarifier		A Digester			B Digester			Final	
	pH	COD	pH	COD	pH	COD	SS	pH	COD	SS	pH	COD
4/4	7.6	3325	7.3	3063	7.0	1053	8040	6.9	816	7820	6.8	735
4/4	8	2190	6.5	2680	7.0	1071	8180	7.1	1020	7960	6.9	876
4/5	6.8	2165	6.5	2630	7.1	1018	7720	7.2	937	7940	7.1	877
4/6	7.6	2105	6.5	2515	7.1	1035	8240	7.3	1017	8040	7.4	978
4/7	7.5	2790	6.6	2450	7.3	991	8420	7.3	1040	8140	7.3	974
4/8	6.8	2410	6.4	2440	7.1	900	7580	7.2	1004	7800	7.1	950
4/10	7.5	1905	6.5	2145	7.3	755	7660	7.3	856	7440	7.3	885
4/11	7.7	1135	6.8	2035	7.5	768	8060	7.6	826	7700	7.7	822
4/12	11.4	2030	6.8	1855	7.2	742	7980	7.4	777	7980	7.3	779
4/13	7.5	1640	6.8	1880	7.4	700	8440	7.6	750	7960	7.6	731
4/14	7.3	1435	6.9	1755	7.3	708	8560	7.5	728	8380	7.5	723
Begin treatment with ENSPOR full strength: 5 GPD												
4/15	7.3	1885	6.8	1985	7.3	675	7750	7.5	739	7760	7.5	695
4/17	7.8	1060	6.7	1590	7.3	658	7960	7.5	685	7900	7.5	643
4/19	7.9	1245	7.1	1240	7.6	651	7580	7.7	610	7300	7.9	605
4/20	7.6	900	7.1	1060	7.6	634	7360	7.7	638	7440	7.8	595
4/21	8	2135	6.9	1085	7.4	614	7180	7.5	627	7220	7.5	599
4/22	7.9	1495	7.9	1480	7.5	580	6920	7.6	569	6800	7.7	567
4/24	7.9	485	7.4	1025	7.5	579	6800	7.7	567	6860	7.7	589
4/25	7.9	6195	7.4	555	7.6	487	6400	7.6	539	6520	7.8	493
Begin 2.25 GPD												
4/26	7.5	6120	7.5	3270	7.6	714	6580	7.7	469	6460	7.7	448
4/27	7.4	4205	7.5	4045	7.5	1022	6320	7.5	413	6260	7.6	406
4/28	7.5	2905	7.3	3605	7.3	1053	6500	7.3	365	6460	7.3	349
4/29	7.9	825	7.6	2280	7.5	1012	6380	7.4	328	6360	7.5	329
5/1	7.9	1101	7.6	1490	7.3	554	6640	7.2	353	6620	7.4	371
5/3	8.1	2120	8.7	1665	7.5	379	6020	7.4	310	5980	7.4	316
Begin 4.25 GPD												
5/4	4.4	4290	8.5	1640	7.5	372	6480	7.5	286	6460	7.4	297
5/5	7.5	4835	8.2	1965	7.5	362	6460	7.6	312	6280	7.6	293
5/6	8	3780	7.0	3790	7.8	474	6600	7.6	326	6380	7.7	301
5/8	8.4	2340	7.6	3025	8.0	564	7320	7.7	353	6700	7.7	327
5/9	8.1	1415	7.7	2080	8.0	550	7260	7.9	362	7080	8.0	355
5/10	8.0	1245	7.7	1760	7.8	502	7060	7.9	383	6780	7.9	364
5/11	7.6	714	7.7	1274	7.8	453	7140	8.0	394	7120	8.0	362
Begin 4 GPD												
5/12	8.0	634	7.7	958	7.8	371	6940	8.0	340	6740	8.0	360
5/13	9.1	1418	7.2	972	7.9	354	6620	8.0	364	6660	8.1	337
5/15	8.2	702	7.9	946	7.7	297	6520	7.8	320	6500	7.7	327
5/16	8.2	640	8.1	774	7.8	287	6580	8.0	320	6480	7.9	315
5/17	8.3	734	8.1	702	7.9	268	6300	7.9	302	6400	8.0	297
5/18	8.3	954	8.1	757	7.8	282	6540	8.0	298	6500	7.9	287
5/19	7.9	1013	8.0	883	7.8	306	6000	8.0	288	5980	7.8	296
5/20	7.6	1088	7.8	886	7.7	299	6500	7.9	262	6400	7.9	295
5/22	8.1	844	7.7	752	7.7	300	7120	7.8	301	7040	7.8	278
5/24	7.4	1150	7.6	1038	7.6	279	7260	7.9	276	7160	7.8	269
5/25	9.3	2264	7.7	1252	7.5	288	7020	7.7	284	6820	7.7	287
5/26	7.5	1640	7.6	1752	7.5	292	7180	7.7	270	6960	7.6	247
5/27	8.0	1334	7.5	1642	7.4	368	7200	7.6	261	7040	7.6	263
5/30	8.3	976	7.6	1150	7.4	460	7760	7.6	416	7500	7.5	377
5/31	8.3	589	7.6	904	7.4	453	7700	7.5	439	7800	7.5	398
6/1	7.2	637	7.7	706	7.4	432	7320	7.5	479	7300	7.5	430
6/2	8.0	953	7.6	664	7.4	414	7640	7.5	412	7600	7.4	408
6/3	7.5	1604	7.5	1114	7.4	405	7220	7.5	425	7020	7.5	398
6/5	No treatment 2 days: begin 1/2 GPD 6/5											
6/6	7.1	5255	6.8	2190	7.3	395	7600	7.5	398	7380	7.4	384
6/7	6.2	5290	6.8	2970	7.2	375	8120	7.5	387	7800	7.4	358
6/8	7.4	3895	6.8	3830	7.2	410	8040	7.4	399	7860	7.3	348
6/9	6.9	3345	6.8	3545	7.3	507	8300	7.5	358	8200	7.5	354
6/10	7.3	2670	6.9	2930	7.2	563	7840	7.5	323	7940	7.6	335
6/13	7.4	2020	6.7	2475	7.3	444	7920	7.5	331	8100	7.6	295
6/14	7.0	1540	6.0	2234	7.3	438	7840	7.4	299	7860	7.5	276
6/15	8.0	866	6.5	2240	7.5	499	7780	7.6	301	7960	7.4	258
6/17	7.3	1156	7.2	1216	7.4	263	7920	7.4	249	7920	7.4	247
6/19	8.2	784	7.4	1034	7.7	155	7140	7.6	168	7420	7.6	189
6/20	7.7	576	7.5	1028	7.8	138	7320	7.6	149	7580	7.6	153
6/21	8.0	358	7.5	768	7.7	96	6960	7.8	109	7120	7.8	100
6/22	8.2	836	7.4	769	7.7	74	7180	7.8	89	7060	7.7	81
6/23	7.8	922	7.7	846	7.8	104	7160	8.0	101	6980	8.0	80

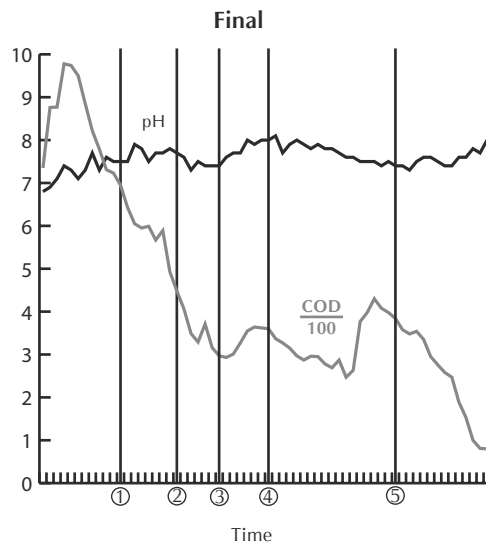
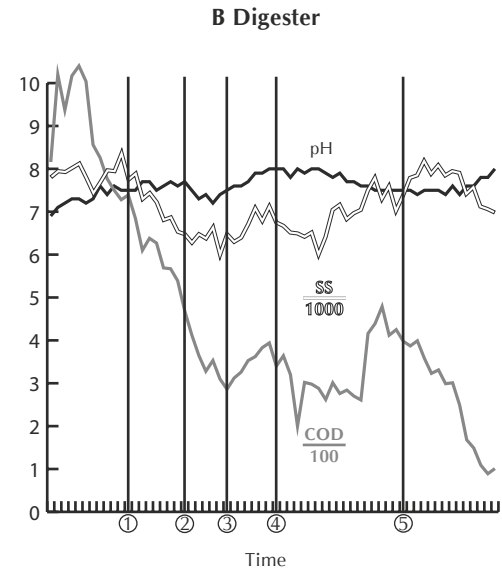
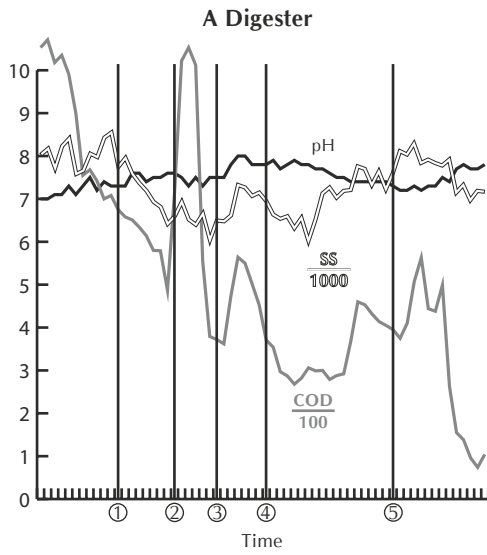
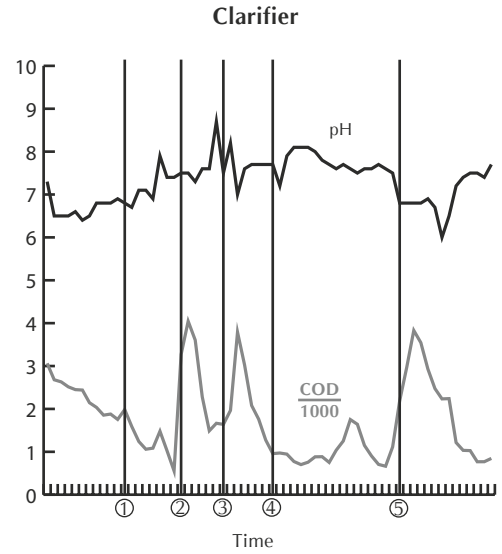
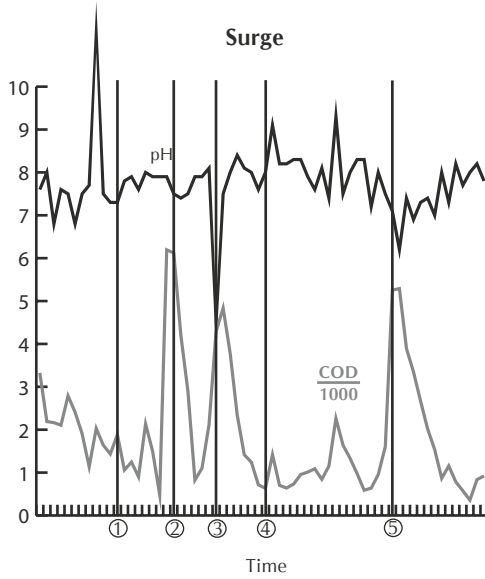
See next
page for
graphs...
→

NEWTEC

RESULTS: Microbe Plus Multicell 21

The graphs on this page represent the numbers on the previous page. Please note that the COD and SS ratings have been divided by 1000 or 100 in order that all the points might fit on the same graph.

- (1) Begin treatment with ENSPOR full strength: 5 gal./day
- (2) Begin 2.25 gal./day
- (3) Begin 4.25 gal./day
- (4) Begin 4 gal./day
- (5) No treatment 2 days: begin ½ gal./day



NEWTEC

SPECS: Microbe Plus Block II

Description

Microbe Plus Block II is a concentrated, commercially pure culture of bacilli dispersed in a block of organic base. It will dissolve gradually in lift stations and grease traps. Storage in high-moisture environments will not affect the viability of the organisms or enable growth of contaminants.

Typical Properties

Color	Light blue
Plate count	At least 1.2 billion CFU/g (545 billion/lb.)
Shelf life	At least one year in unopened container
pH of a 1% solution	~ 7.5
Storage temperature	5°—45°C (41°—115°F) Do not allow to freeze.
Effective pH range	5.5—8.0
Effective temperature	12°—45°C (54°—113°F)
Flash point	None
Bulk density	1.3g/cm ³ (81 lb./cu. ft.)
Odor	Wintergreen

Standard Packaging

- 8-lb. blocks, 4 per case
- 5-lb. blocks, 4 per case
- 2-lb. blocks, 6 per case

Precaution on Materials

Wash hands after each use. All situations in which Microbe Plus Block II is recommended it is safe to use with all equipment.

NEWTEC

SPECS: Floor Cleaner w/ Microbe Plus

Description

Floor Cleaner w/ Microbe Plus is a concentrated detergent especially formulated for cleaning floors. It is free rinsing and produces a slip-free surface. The enzymes in Floor Cleaner w/ Microbe Plus aid in the removal of surface soils, then the bacterial cultures are activated by dilution water to keep drains free running and maintain the grease trap.

Typical Properties

Color	Blue
Clarity	Clear
Plate count	300 million CFU/mL (1.1 trillion/gal.)
Shelf life	At least one year in unopened container
pH	9.2
Flash point	> 212°F
Specific gravity	1.03
Odor	Lemon-lime

Standard Packaging

55- & 30-gal. drums
5-gal. pails

Precaution on Materials

Floor Cleaner w/ Microbe Plus in use dilution can be used on any material approved for water contact. Wash all food surfaces that come in contact with Floor Cleaner w/ Microbe Plus with a separate detergent and a potable water rinse.

NEWTEC

SPECS: Microbe Plus Multicell 21

Description

Microbe Plus Multicell 21 is a culture of five different species of bacteria grown aseptically by submerged fermentation and preserved in order to provide a stable blending compound or powerful primary bioculture for use in waste treatment and bioremediation.

Typical Properties

Color	Brown
Clarity	Turbid
Plate count	1 billion CFU/mL (3.8 trillion/gal.)
Shelf life	At least one year in unopened container
pH	8.3
Storage temperature	> 0°C— < 70°C (> 32°F— < 160°F)
Effective pH range	4.5—11.5
Effective temperature	5°—55°C (41°—131°F)
Flash point	None
Specific gravity	1.024
Odor	Mild, slightly pungent

Standard Packaging

330-gal. bulk tote
55- & 30-gal. drums

Precaution on Materials

Wash hands after each use. In all situations in which Microbe Plus Multicell 21 is recommended it is safe to use with all equipment. Wash food-handling equipment thoroughly after use with Microbe Plus Multicell 21.

NEWTEC

SPECS: Enzyme Plus

Description

Enzyme Plus is an enzyme mixture from a fermentation which has been optimized for the production of lipase. None of the other enzymes has been removed during the extraction process. The Enzyme Plus mixture possesses characteristics which make it unique and valuable in the formulation of cleaning preparations.

Typical Properties

Color	Brown
Clarity	Clear
Enzymes	Protease standardized to 1700 Azocoll units Amylase Lipase Urease
Shelf life	At least one year in unopened container
pH	8.3
Storage temperature	> 0°C—40°C (> 32°F—104°F)
Effective pH range	6.5—10.5
Effective temperature	20°—50°C (68°—122°F)
Flash point	> 140°F
Specific gravity	1.088
Odor	Mild, slightly pungent

Standard Packaging

450- & 275-lb. drums
45-lb. pails

NEWTEC

Hard-working bacteria that get results.

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