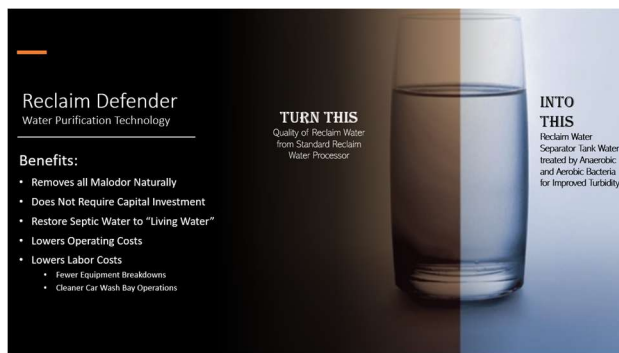


Reclaim Defender Series represents a breakthrough in technology for the car wash industry. Offering a sustainable and cost-effective approach to purifying reclaim water, a critical resource for car wash operators. Until recently, most reclaim water management systems primarily focused on removing suspended solids, offering little in terms of genuine water purification. This has led to widespread unhealthy working conditions in the industry. Which has recently been the focus of OSHA as workplace injuries rise.

Water Reclaim Processing systems commonly found in the industry use a system of ozone or chemical sterilizer for treatment of car wash recovered reclaim water. This anoxic or black water is then used for below the glass car wash processes. The use of sterilization practices (common in the Car Wash industry) results in the destruction of beneficial organisms that promote healthier water that aids in the cleaning and drying of the car wash process.



The use of sterilization processes is extremely limited in their ability for treatment of reclaim water processed and made ready for reuse, by the settling tank system, due to the amount of **Total Dissolved Solids (TDS)** in the water and the inherent half-life of ozone and chemistry solutions alike. As TDS levels increase, due to chemistry loads, organic material and other inorganic materials (Salts and Chloride) these compounds block the effectiveness of gases and chemical sterilization practices. In some cases, manufacturers of reclaim water treatment systems that use Ozone to sterilize recovered water, add large volumes of air (2.2 to 8 CFM) to improve the usability of ozone saturation in separator tanks or ready use supply lines. By adding high volumes of air into a confined space, foaming of reclaim water can be triggered. Foaming is caused by the separation processes being performed by the separator tanks and chemicals used to clean, dry and shine the vehicle throughout the wash.

Recovered wash water (Reclaim Water) stored in storage tanks will turn anoxic (septic) as oxygen levels and pH levels drop. **BOD** (*Biological Oxygen Demand*) and **COD** (*Chemistry Oxygen Demand*) provide key measurements of the health of the wash water. In environments where oxygen is scarce due to biological or chemical saturation, bacteria can move from oxygen to non-oxygen environments which trigger the emission of hydrogen sulfate (H_2S) gas which produces a rotten egg smell. This process then allows the bacteria to grow and produce increasing toxic levels of hydrogen Sulfide gas.

Arcadian's Reclaim Defender treatment process returns recovered water to "**Living Water**" by removing harmful bacteria, car wash chemistry and organic material. This process improves COD and BOD levels of the water, stopping the water from turning septic or what is commonly referred to as "**Dead Water**" or "**Black Water**".

Preparing Your Car Wash Reclaim System for Microbial Pre-Treatment

INOCULATION PROCESS

The cleaning and treatment of recovered wash water starts with the removal of all oxidizers such as Ozone, Chlorine or Hydrogen Peroxides. These products or treatments will disrupt the growth of the new healthy biology which is being introduced into your recovered water.

Following the removal of oxidizers, the Inoculation process may begin. As the water chemistry is being balanced and restored, you may observe foaming, water clarification changes and water odor changes. All of these issues are normal and will be reduced as the balance is restored allowing microbiology to expand and begin the digestion of all organic materials (sludge, chemistry, fat, oils and pollens) contained in the separator tanks.

Water temperature: Optimal temperatures for aerobic bacteria are between 10° C to 30° C (50°F to 86°F). Within this range, aerobic bacteria efficiently consume organic matter.

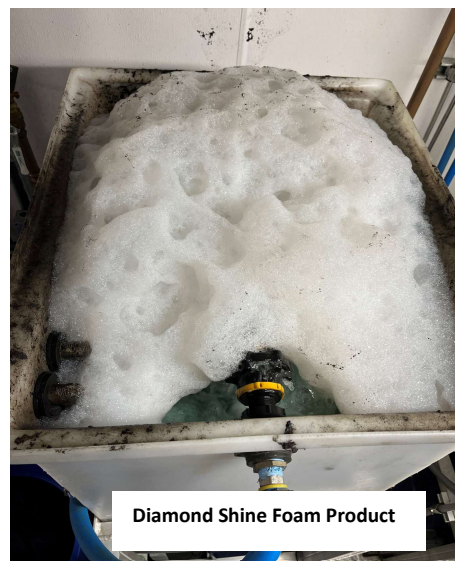
A critical factor in the biological treatment processes is the temperature of the "**Black Water**" being treated. Different bacteria have optimal temperature ranges where they are most active and efficient. As septic water cools or increases, it will affect the metabolic rates or growth, and the efficiency of the biochemical reactions they catalyze. Temperature also influences the solubility of oxygen in water (Active Oxygen). Colder water can hold more dissolved oxygen, which is beneficial for aerobic bacteria. In contrast, warmer temperatures decrease the solubility of oxygen, affecting aerobic processes while potentially favoring anaerobic conditions. Many of the reactions involved in breaking down contaminants are temperature-sensitive, with higher temperatures generally improving the catalytic reaction rates. This is particularly relevant for processes like hydrolysis and acidogenesis in the breakdown of organic matter.

Temperature can influence the survival and reproduction rates of pathogens in water. Certain harmful microorganisms may thrive at specific temperatures, and controlling the water temperature can be a strategy to limit their growth and reduce health risks. Maintaining a consistent temperature can help stabilize the biological ecosystem within the treatment system, ensuring that both anaerobic and aerobic bacteria can effectively coexist and perform their roles in water purification. By understanding and controlling water temperature, operators can optimize the efficiency of water purification systems, ensuring that they effectively remove contaminants and pathogens and produce clean, safe water.

Foaming & Biodegradable Surfactants: As the organic sludge is decomposed and drops to a minimal level (less than 4-inches), surface tension of the recovered water is dramatically reduced. This allows the remaining surfactants and car wash chemistry to develop white pillowy foam to rise in underground separator tanks and high-pressure storage tanks. ***This is a temporary issue*** that may need to be treated with a spray of alcohol or an Application of Reclaim Defender SulfurShield or Bio CitricClean if black sludge build up becomes an issue.

As the Reclaim Defender biologics grow and expand throughout your wash equipment, organic material found in these areas will be treated and cleared of organic waste.

PRO TIP: Don't have SulfurShield or CitricClean treat high pressure holding tank with Reclaim Defender Bio-Vorax. Add 1-cup to the tank at night after the wash is closed. Overnight microbiology will clarify the water in the tank, consuming organic material on the bottoms and sides of the holding tank. Foam build-ups observed in high pressure tanks will drop off as surfactant levels drop and oxygen levels climb.



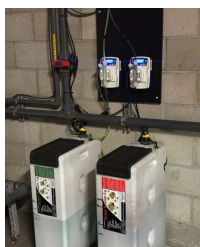
If the car wash uses chemistry manufactured with non-biodegradable surfactants or dyes, the biological treatments will fail to reduce dissolved solids and the use of a defoamer will be required to remove the foam load observed in the water tank.

For those wash operators that wish to reuse reclaim water in above the glass operations, such as hard water rinses, wrap lube, foam bars or presoak applications, it **is recommended that Turbidity and Nitrite levels drop below 50 NTU or 23.5 ppm of Nitrite before applying Reclaim Water to these functions.**

Inoculation Process

It's important that you follow the recommended inoculation process, following the completion of the initial water analysis report.

Reclaim Defender Products may be added to your **Recovered Wash Water** by simply pouring in the products into separator Tank 2a or with microbial delivery systems, systems are available through:



Brilliant Wash Solutions Gladiator 100

- Flow Rate Calibration
- Flow Sensor Input
- 4-20 mA control
- Pump Output Display
- Relay Output
- Underload/Overload alarms
- 20-Gal, Radar Tank Level Sensor
- Set and Forget Technology



Fluid Dynamics Guardian 1000

- 500 mL/min Pumps
- 3-Point Peristaltic Pumps
- 24/7 Customer Support
- HMI Interface
- Sonic 10-Gal Storage tanks
- Set and forget technology
- SMS Messaging

These microbial delivery systems have been proven effective at insuring proper dosing of Reclaim Defender Products, which are being administered regularly and in accordance with the inoculation prescription. Following the Inoculation procedure, the delivery systems will be used to ensure sustainability of your reclaimed wash water is maintained.

pH of the Water: *Recommended to be between 6.8 to 8.5.*

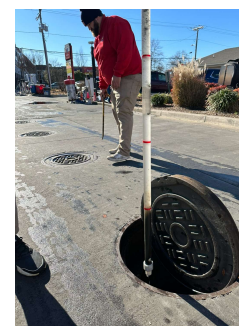
Throughout the water purification process the pH of the water is likely to change. As the sludge becomes less compact, and water clarity moves from black to a cloudy grayish and then to a light brown. This process known as **Hydrolysis** is triggered by the decomposition and consumption of the sludge. Forming simple aerobic compounds which form fatty acids (VFAs), alcohols, hydrogen, and carbon dioxide. These elements combine reduce the pH of the recovered wash water.



If the water's pH drops below 6.8, the enzymatic process slows and may stop. When this occurs, the reclaim water may turn light-brown and residual black sludge will become suspended processed water. Stopping the further transformation of complex organics into simpler substances.

KEY MEASUREMENTS to SUCCESS!

Sludge Judge Measurements — The Sludge Judge is designed to take accurate readings of settleable solids. This device is ideal for examining the sludge blanket and mixed suspended solids on each of the separator tanks and city return tank. Record readings.



Recommended Purchase:

<https://www.weberscientific.com/sludge-judge-nasco> model: 3065-12

Nitrite Titration Kit — Nitrite levels will range greatly. It's important to record the level at the beginning of the process and several times during the inoculation process. Reading will Range from 110 to 600 NaNO₂. Please follow instructions on Nitrite Test Kit. Our goal is to obtain readings below 100 NO⁻². For expanded water use NO⁻² ppm should be below 50 ppm.



Recommended Purchase:

<https://catalog.aquaphoenixsci.com/product/nitrite-test%C2%A0kit-0>

RECLAIM DEFENDER PRODUCTS



Odor Control and Foam Reduction- Bio-SulfurShield / ALLN1 – Product metabolically blocks anaerobic bacteria from emitting hydrogen sulfide gas “Rotten Egg Smell”, balances pH levels and reduces oxidizers in water and reduce foam levels. This is a powder product for ease of use, maybe added to separator tanks, high-pressure storage tanks and conveyor.



Water Clarity and Purification – Reclaim Defender / 1G and 1F – Product are packed with multiple strains of gram-negative bacteria. This product will consume all biological and pathogens found in oxygen enriched water environments. Locking them into a voracious consumption of organic material (Pollen, oil, Chemistry and biologicals) suspended in recovered wash water.



Sludge Removal – Reclaim Defender / 2G & 2F – This is the workhorse of the Defender Series of biological treatments. Multi homogenous strains of gram-positive bacteria will devour and decompose the black sludge that builds in the reclaim separator tanks preventing the generation of malodors and hydrogen sulfide gas.



Green and Clean - Bio-CitricClean – is a versatile reclaim water conditioner and equipment cleaner, freshener and defoamer. May be used throughout the car wash to treat stubborn areas where odor or biomass build-up is an issue. When applied to open air water tanks, the product forms a surfactant cap preventing odors from being emitted into the air while organic detergents and microbiology team up to clean tanks, floats, filters and spray nozzles, leaving the wash clean with a vibrant citric fragrance. May be added to separator tanks, high-pressure storage tanks and conveyor.



Icon –
Microbe Bio-SulfurShield

Product -
Reclaim Defender ALLN1



MICROB Bio-SulfurShield: Is the superhero of odor abatement and foam control. Biologically inhibiting the release of Hydrogen Sulfate Gas (H_2S) from harming humans and car wash equipment, while increasing the water's surface tension to prevent white pillowy foam from forming.

Reclaim Defender ALLN1 is a microbiological inhibitor used to block emission of hydrogen sulfide Gasses (H_2S) from being emitted from anaerobic bacteria. This product is highly effective at foam reduction and odor abatement. **May be used in systems that use hydrogen peroxide, chlorine tablets or bleach** for sterilization of reclaim water..

Retail Pricing:

Reclaim Defender ALLN1 – \$120.70 5-Pound Bucket.

Reclaim Defender ALLN1 - \$386.25 25-Pound Bucket.

RECOMMENDED APPLICATION:

Non-Biological Treatment: Use with current oxidizer to prevent odor production. Apply 4-scoops of ALLN1 to open water areas in the car wash (conveyor, holding tanks and separator tanks, to combat odors and control pH balance of water. Will aid in controlling foam.

Inoculation Phase: The treatment process (Please See ACS Setup Process) will require up to 2 - Gallons of product to obtain results. Following initial inoculation Reclaim Defender Alnn1 should be dissolved directly into the high-pressure water holding tanks or conveyor trench.

Sustainability Phase: To support a healthy wash water environment consistent use of the product is recommended as needed to knock out organic blooms caused by high use days or weather conditions that may trigger a bio-plume. It is recommended that up to 4 pounds of Reclaim Defender Alnn1 be dissolved into conveyer to block the release of Hydrogen Sulfide Gases (rotten egg smell odor), from being generated by anerobic bacteria.



Icon –
Bio-Vorax
Product -
Reclaim Defender 1G & 1F



Microbe Bio-Vorax: Is known for its voracious appetite and broad destructive capabilities against bacteria, pathogens, and car wash chemicals.

Water in car wash facilities encounters a myriad of contaminants, ranging from organic materials to chemicals used to clean, shine and dry vehicles. In addition, pollutants and dangerous pathogens like Legionella and E. Coli find their way into reclaim water when it is allowed to go septic. Effective water purification methods are vital to mitigate these risks, ensuring environmental integrity and public safety. **Arcadian Solutions - Reclaim Defender 1G and 1F** products are scientifically balanced bacteria designed to eliminate harmful bacteria's and pathogens aiding in the water purification process required of reclaim systems used in the car wash industry. **Reclaim Defender 1G and 1F** will neutralize these biological threats without resorting to chemical additives like chlorine tablets, hydrogen peroxide, or other treatments.

Retail Pricing:

Reclaim Defender 4-Pack 1G Containers - \$267.04 per case.

Reclaim Defender 1F - \$327.95 per 5-gallon pail.

RECOMMENDED APPLICATION:

Inoculation Phase: The treatment process (***See ACS Setup Process***) will require up to 8-Gallons of product to obtain results. Requiring between 10-15-Days for inoculation to be achieved, depending on age and condition of separation tanks installed at site.

Sustainability Phase: Process is designed to support “**Living Water**” reclaim water environment. Recommended that between 250 to 400 ml of Reclaim Defender 1F be dosed into the reclaim return line daily. Approximately 2 cups per day.



Icon –
Bio-SludgeBane

Product -
Reclaim Defender 2G & 2F



Microbe Bio-SludgeBane: Is known for its incredible ability to break down complex organic material in low-oxygen environments, while releasing an army of enzymes to complete the job.

Arcadian Services - Reclaim Defender 2G & 2F are supercharged with gram-Positive bacteria which thrive in low-oxygen environments. Designed to break down complex organic compounds, pollutants, and sulfates. Microbe Bio-SludgeBane will digest organic solids in commonly referred to as “black sludge” and continue to keep sludge levels below 4”. Resulting in improved separation of solids, reduced odor and cleaner recovered wash water. Leaving recovered wash water odor free, cleaner and chemistry free.

Retail Pricing:

Reclaim Defender 4-Pack, 1G containers - \$287.33 per case.

Reclaim Defender 1F - \$352.34 per 5-gallon pail.

RECOMMENDED APPLICATION:

Inoculation Phase: The treatment process (*See ACS Setup Process*) will require up to 8-Gallons of product to obtain results. Requiring between 10-15-Days for inoculation to be achieved, depending on age and condition of separation tanks installed at site.

Sustainability Phase: Process is designed to support “**Living Water**” reclaim water environment. Recommended that between 350 to 600 ml of Reclaim Defender 2G or 2F be dosed into the reclaim return line daily. Approximately 3 cups per day.



Icon –
Microbe Bio-CitricClean

Product -
Reclaim Defender Bio-CitricClean



MICROB Bio-CitricClean – is a versatile reclaim water conditioner and equipment cleaner, freshener and defoamer. May be used throughout the car wash to treat stubborn areas where odor or biomass build-up is an issue.

When applied to open air water tanks, the product forms a surfactant cap preventing odors from being emitted into the air while organic detergents and microbiology team up to clean tanks, floats, filters and spray nozzles, leaving the wash clean with a vibrant citric fragrance.

Maybe added to separator tanks, high-pressure storage tanks and conveyor. Will not cause clogging of nozzles or filters

Retail Pricing:

Reclaim Defender CitricClean – \$233.00, 4-Pack, 1G containers

Reclaim Defender CitricClean - \$286.30, 5G container

RECOMMENDED APPLICATION:

Inoculation Phase: Reclaim Defender Bio Citric-Clean is a water conditioner at odor treatment product used periodically throughout the inoculation process. The product is best used in areas of the wash where consistent odors linger.

The treatment process will require up to 2 -Gallons of the product to obtain results. Following initial inoculation Reclaim Defender Bio Citric Clean should be poured directly into the high-pressure water holding tanks to help with filter and tank clean outs. Recommend adding 8 ounces to water holding tanks daily to support microbiology and cleaning out of persistent bio mass.

Sustainability Phase: To support a healthy wash water environment consistent use of the product as needed to remove occasional bio-Blume odors or biomass build up in water tanks, nozzles and filters. It is recommended that up to 4 ounces of Reclaim Defender Bio Citric Clean daily during periods of changing weather or high car wash count days to support microbiology colonies to help block the release of Hydrogen Sulfide Gases (rotten egg smell odor), from being generated by anerobic bacteria.

KEY Tools for SUCCESSFUL RECLAIM WATER TREATMENT

Sludge Judge Measurements – The Sludge Judge is designed to take accurate readings of settleable solids. This device is ideal for examining the sludge blanket and mixed suspended solids on each of the separator tanks and city return tank. Record readings.

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model: 3065-12



Nitrite Measurement – Nitrite levels will range greatly. It's important to record the level at the beginning of the process and several times during the inoculation process. Reading will Range from 110 to 600 NaNo₂. Please follow instructions on Nitrite Test Kit. Our goal is to obtain readings below 100 NO². For expanded water use NO² ppm should be below 50 ppm.



Recommended Purchase:

<https://catalog.aquaphoenixsci.com/product/nitrite-test%C2%A0kit-0>