

# Biocide for Photographic Solution Tanks and Wash Water

Kodak

## CURRENT INFORMATION SUMMARY

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### Some Facts about Bio-Slime

Slime is the result of biogrowth accumulation and is found in most photo processing wash waters at one time or another. It is a mixture of microbes such as bacteria and fungi that feed on chemicals in processing solutions such as dilute fixer. These microscopic contaminants come from incoming water, air, dirty tanks or lines, people, or anything that comes into contact with the wash water.

Some processes are more prone to biogrowth than others. As solutions become more "environmentally friendly" they become more prone to biogrowth, and deterring biogrowth becomes more of a concern.

The microbes are most evident when they create a foul odor and appear in the processor as dirt and slime. Other less obvious problems are accumulation in sumps, lines, and silver recovery systems. You can easily clean tanks with scrubbing and hot water (temperatures above 150°F can soften PVC). Lines and silver-recovery systems are not easily cleaned. If these systems become fouled, the result is plugged lines and less efficient silver recovery. Lines must often be replaced and chemical recovery cartridges must be frequently sent in with less than optimal quantities of silver. In ion-exchange silver-recovery columns, the resin can become fouled with bacteria causing high back pressures and reduced system efficiency.

The frequency of bio-fouling can depend on the quality of fresh water. Nonchlorinated well water usually causes the worst and most frequent problems. Well water often contains bacteria that contaminate an otherwise clean wash water system. Such a system requires more conscientious maintenance. Chlorinating the water reduces the microbial load entering the wash tanks. Once in the wash tanks, however, chlorine becomes inactivated as a biocide because dilute fixer neutralizes its effect. The system requires a biocide with residual strength to prevent biogrowth in the wash tanks, the effluent line, and the silver-recovery system.

### A Regular Clean-Out

Use the following procedure monthly or when bio-slime has contaminated replenishment systems, delivery systems, or internal plumbing. Wear protective gloves and splashproof goggles during this procedure.



### Warning

**DO NOT allow concentrated sodium hypochlorite bleach, e.g., CLOROX or SUNNY SOL, to come in contact with photoprocessing solution.**

1. Drain the system completely, including recirculating lines, and rinse twice with water.
2. Charge the system with a dilute concentration of sodium hypochlorite bleach. (e.g., a 0.5% hypochlorite solution, or a one part CLOROX bleach to 9 parts water solution. CLOROX contains 5% hypochlorite.) Observe precautionary information on the sodium hypochlorite bleach product label and its Material Safety Data Sheet.
3. Let the solution sit in the system for up to 1/2 hour. Higher concentrations of hypochlorite and/or longer dwell times may harm some construction materials.
4. Rinse the bleach from the system and dislodge easily removable biogrowth.
5. Scrub the biogrowth off accessible surfaces. Use a clean, stiff fiber brush or other tools recommended for cleaning the surface.
6. Flush the system thoroughly with water before returning it to normal use.

The addition of cleaning agents that contain strong acids or oxidizing agents (e.g. chlorine-containing bleaches) to thiocyanate-containing photoprocessing solutions (e.g. some fixers) may release poisonous and flammable hydrogen cyanide gas, as well as other irritating and toxic gases such as cyanogen chloride and sulfur dioxide. **Do not add cleaning agents to processing tanks unless the tanks, recirculating lines, and racks have been completely drained and thoroughly rinsed with water.** Refer to the Material Safety Data Sheet for each photoprocessing solution for more information.



### Warning

**DO NOT process sensitized products while sodium hypochlorite bleach remains in the system. Hypochlorite bleach can destroy images and reduce image stability.**

## Biocides

The severity of bio-fouling may vary significantly. To keep out of trouble, follow recommended maintenance procedures on a regular basis.\* However, you may also need to use a biocide.

It may become necessary to use biocides in rotation. Biogrowth may become resistant to a particular biocide after a period of months of exposure.

An example of a biocide that helps prevent biogrowth problems in wash tanks and silver recovery systems is Proxel GXL.†

This biocide is a liquid, water-soluble, and registered by the U.S. Environmental Protection Agency (EPA), administered with a metering pump (e.g., Gorman Rupp) to the wash tank that first receives the fresh water (see diagram). The biocide will then be carried with the countercurrent wash from tank to tank. Eventually, the biocide will exit in the machine overflow to a sump and be pumped through silver-recovery to the drain. Use

Proxel GXL for 30 to 60 minutes per day, one to five days per week, depending on the severity of the problem (see Table 1). Use of untreated well water may require more frequent biocide application than chlorinated water. Keep in mind that many photoprocessing laboratories may not need a biocide at all.

Table 1 shows recommended levels of biocide for photoprocessing wash waters. The Proxel GXL must be diluted with fresh water for closer volume approximation. To dilute it, add three parts Proxel GXL to two parts clean water to obtain a 60% solution. Use the table for approximating how much Proxel GXL or diluted Proxel GXL to use in the fresh wash water. As an example, a processor using wash water at 3 gallons per minute requires 6 mL of biocide per minute. So, for every 3 gallons of fresh water, you would use 6 mL dilute Proxel GXL. At this rate, you should use 180 mL of biocide in 30 minutes or 360 mL in 1 hour.

\* Consult your Kodak processing (Z) manual for more details.

† Proxel GXL, EPA Reg. No. 10182-30, is available from Avecia Inc., Biocide Business, 1405 Foulk Rd. P.O. Box 15457, Wilmington, Delaware 19850-5457; Tel. No. (800) 523-7391.

Table 1 Biocide Use in Photoprocessing Wash Water

Amount	Proxel GXL	Proxel GXI dilute 40%
mL/L	0.3	0.5
mL/gal	1.2	2.0
mL/1.5 gal	1.8	3.0
mL/3 gal	3.6	6.0
mL/10 gal	12.0	20.0
mL/100 gal	120.0	200.0
oz/gal	0.041	0.068
oz/1.5 gal	0.060	0.10
oz/3 gal	0.120	0.20
oz/10 gal	0.41	0.68
oz/100 gal	4.1	6.8

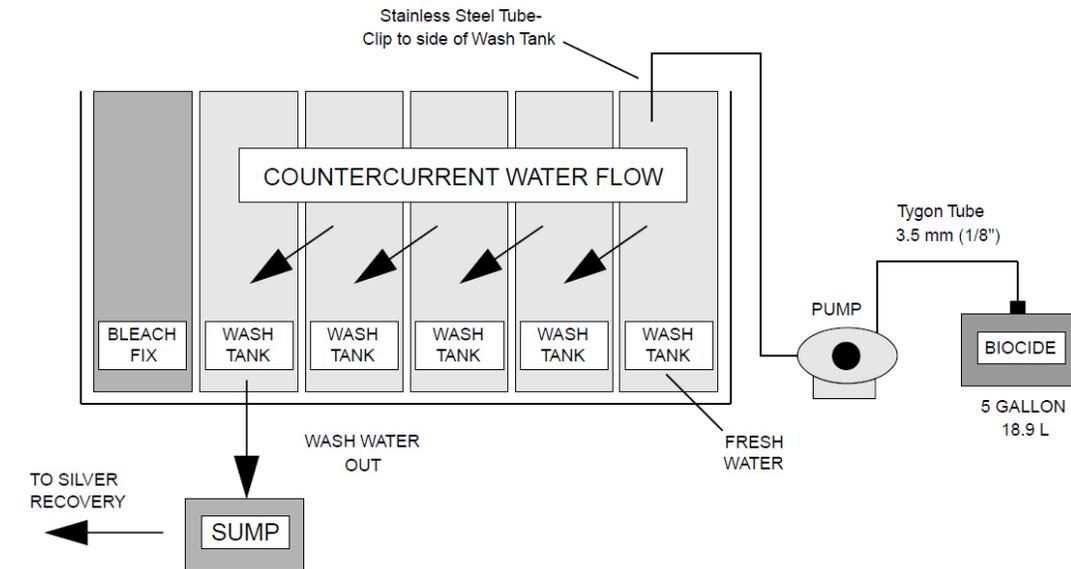
Use powerful biocides sparingly and with caution. Many biocides are strong skin and eye irritants, and may cause an allergic skin reaction in sensitive individuals. Before using, read the Material Safety Data Sheets (MSDSs) for these products. Follow safe handling practices and procedures outlined in the MSDSs. Wear protective clothing, splashproof goggles, and impervious overshoes. Keep spills out of municipal sanitary sewers, storm sewers and surface or ground water. Soak up spills with inert material such as dry earth, sand or material commonly used in cat litter boxes. Disposal must be in accordance with local, state, and federal regulations. Any use of this biocide inconsistent with the labeling is a violation of federal or state regulations.

Tests at Kodak indicate that Proxel GXL used at the recommended concentration in wash water is not photoactive (does not have significant image stability or sensitometric effects) on KODAK sensitized goods and is not corrosive to common construction materials. Studies have also found no adverse effects on silver-recovery systems that employ KODAK Chemical Recovery Cartridges, ion-exchange resin, or electrolytic units. However, do not use biocides in any processing solution other than the final wash water. If biocide is put into a processing solution, such as developer, you must dispose of the processing solution. Disposal must be in accordance with local, state and federal regulations.

This may not be the only biocide that works well in photoprocessing wash water, but this is the one most extensively studied for the purpose. Also, at this time, this is the only biocide we know of that is registered with the EPA for this application. You can visit the Internet for other manufacturers who sell biocides.

**Routine maintenance is necessary. Any biocide addition to wash tanks will reduce the frequency of cleaning, but does not eliminate the need for routine maintenance.**

## Biocide Application to Photoprocessing Wash Water



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