

# Removal of Silver Sulfide from Fixer, Bleach-Fix, Wash, or Stabilizer Racks/Rollers in Photographic Processors

**Kodak**

## CURRENT INFORMATION SUMMARY

December 2017 • CIS-167

When a fixer or bleach-fix replenisher oxidizes, the hypo (thiosulfate) breaks down, releasing sulfide and forming elemental sulfur. This is commonly known as sulfurization—a reaction that produces an off-white powdery precipitate with a rotten egg odor. When oxidation occurs in a seasoned tank solution, the sulfide quickly bonds with dissolved silver to form an insoluble silver sulfide. This dark-colored precipitate usually builds up on racks and rollers, and is deposited on the surface of the film or paper being processed. Depending on the severity, a golden-tan, brown, or black deposit is left on the surface of prints; in film processors, small black specks deposit on the film surface.

The breakdown of fixer or bleach-fix carry-over may also cause silver sulfide to form in wash, low-flow wash, or stabilizer tanks (in non-plumbed minilabs). Low wash water flow rates can exacerbate this situation. Silver sulfide is extremely insoluble and hard to remove. This publication describes a procedure that uses common liquid sodium hypochlorite laundry bleach (e.g., CLOROX or SUNNYSOL) to oxidize the silver sulfide into a soluble silver complex that can be removed with photographic fixer.

### **DANGER!**

DO NOT ALLOW SODIUM HYPOCHLORITE BLEACH TO COME IN CONTACT WITH PHOTOPROCESSING SOLUTIONS. THIS CAN RESULT IN THE FORMATION AND RELEASE OF TOXIC POISONOUS GASES INCLUDING CHLORAMINES, AND CYANIDE GAS (with the use of fixers that contain thiocyanate). CAREFULLY FOLLOW PRECAUTIONARY RECOMMENDATIONS TO THOROUGHLY RINSE AND FLUSH AFTER EACH STEP UNTIL ALL CHEMICALS HAVE BEEN FLUSHED WELL INTO YOUR SEWER SYSTEM, OR DISPOSED OF IN ACCORDANCE WITH YOUR LOCAL SEWER REGULATIONS.

### **SUPPLIES NEEDED**

- Two squeeze bottles
- Rubber gloves
- Eye protection
- Protective clothing
- Soft nylon scrubbing pad
- Liquid sodium hypochlorite laundry bleach (e.g., CLOROX or SUNNYSOL)
- KODAK Rapid Fixer, Solution A, or KODAK FLEXICOLOR Fixer and Replenisher for Process C-41

### **CLEANING RACKS AND ROLLERS**



#### **Caution**

Perform this procedure in a WELL-VENTILATED area with minimum (or no) potential exposure to photo-processing chemicals. RINSE the racks and rollers thoroughly with water to remove residual chemicals, and flush the drain completely before proceeding to the next step. Failure to adequately flush residual chemicals may result in the release of toxic fumes and gases. Be sure to wear personal protective clothing and equipment.

1. Fill one squeeze bottle with a mixture of 1 part hypochlorite laundry bleach (e.g., CLOROX or SUNNYSOL) to 4 parts water.
2. Fill the second squeeze bottle with a mixture of 1 part KODAK Rapid Fixer, Solution A, to 7 parts water, or working-strength KODAK FLEXICOLOR Fixer and Replenisher diluted 1:1 with water.
3. Remove the rack from the machine, and rinse it thoroughly with water to remove all traces of solution. Use enough water to completely wash residual chemicals down the drain.
4. Use the squeeze bottle filled with bleach solution to direct a stream of bleach onto the parts of the racks that require cleaning. Turn the rollers on the rack to ensure a thorough application of bleach solution. Allow the bleach solution to remain on the rack for 2 to 5 minutes.

5. Rinse the rack thoroughly with water to remove the bleach solution, and allow it to drain completely. Use enough water to completely wash residual bleach solution down the drain.
6. Use the squeeze bottle filled with fixer solution to direct a stream of fixer solution onto the parts of the racks that you treated with the bleach solution.
7. Scrub the rollers with a soft nylon pad.
8. Rinse the rack thoroughly with water to remove the fixer solution, and allow it to drain completely.

**Note:** If all the deposit is not removed, flush the residual fixer solution down the drain with water, and repeat steps 1 through 8, as necessary. (Severe buildup may require two or three treatments.)

9. Replace the rack in the machine and refill the tank.

To prevent silver sulfide from reoccurring in the working tank, dispose of any remaining bleach-fix or fixer replenisher that contains sulfur precipitates due to oxidation so that silver sulfide in the working tanks will not reoccur. If you do not see evidence of sulfurization in the bleach-fix or fixer replenisher tanks, continue using the solution.

### **DANGER!**

The addition of cleaning agents that contain strong acids or oxidizing agents (e.g., chlorine-containing bleaches) to thiocyanate-containing photoprocessing solutions (i.e., some fixers and bleach-fix solutions), 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 and racks have been completely drained and thoroughly rinsed with water.** Read the Material Safety Data Sheet for information on the potential hazards of the working tank solution.

TM/MC/MR: Flexicolor

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KODAK Publication No. CIS-167

Revised 12-17