

# Silver Recovery Using KODAK Silver-Recovery Agent for Large Photofinishing Labs

KODAK Silver-Recovery Agent (KSRA) has been shown to efficiently precipitate silver from photoprocessing effluents. You can use KSRA to treat photoprocessing solution effluents containing silver, including low-flow washes.

KODAK Silver-Recovery Agent, used as specified by Kodak, should result in a consistent final silver concentration of less than 5 mg/l from the system. When an additional separation step is used, and the initial, pre-treated solution mixture meets specified conditions, many labs can achieve a consistent final silver concentration of less than 1 mg/l.

A KSRA silver-recovery system can replace any currently used secondary, terminal silver-recovery method. You can also use a KSRA silver-recovery system to enhance the performance of in-situ ion exchange silver recovery by diverting silver and hypo-rich effluent streams away from the ion exchange column and using the column only to treat final washes.

The KSRA system is especially suited for replacing Chemical Recovery Cartridges (CRCs). Silver recovery using KSRA results in consistently lower final silver concentrations than CRCs and does not increase the iron concentration in the effluent as CRCs do. KSRA produces a silver salt that is easier to refine than CRC sludge, resulting in refining cost savings. The KSRA-silver salt is also significantly more concentrated in silver than CRC sludge, resulting in shipping cost savings. The KSRA-silver salt does not require a Federal hazardous waste manifest for shipping; also, rinsing and drying steps are not required.

The active ingredient in KSRA is an odorless, crystalline solid which, when mixed with photoprocessing effluents containing silver, will precipitate an insoluble yellow-colored KSRA-silver salt. The KSRA-silver salt is also odorless, although the processing solutions being treated will retain their characteristic colors and odors. The treated solution is then allowed to settle by gravity, resulting in a two-phase system: a silver-rich sludge at the bottom of the vessel, and a relatively silver-free, liquid-top layer. The two phases are separated, and the KSRA-silver salt may be air dried or shipped wet to a refiner for silver credit.

Given the low concentrations of silver in final washes, we do not recommend KSRA for use with washes alone, or to replace in-situ ion exchange silver-recovery systems.

The KSRA silver-recovery system requires an initial capital investment for equipment. The typical KSRA system consists of two tanks, three pumps, a mixer and filtration equipment. The main tank is a conical bottom tank for the actual precipitation step; it will be sized based on the lab's expected effluent volume and expected frequency of batches. Currently, the minimum expected batch time is about eight hours. If the expected batch size exceeds about six hundred gallons, your lab may prefer to use two smaller precipitation tanks for flexibility and ease of use. The second tank you'll need to purchase is a smaller filtrate tank, typically about one-tenth the volume of the precipitation tank(s).

If you are interested in more information about silver recovery using KODAK Silver-Recovery Agent, please contact Kodak Environmental Services at 585-477-3194.