11 MAINTENANCE

GENERAL MAINTENANCE

Processing machines require regular maintenance to ensure optimum performance. We cannot overemphasize the importance of careful and frequent maintenance.

Checklists provide a convenient and efficient method of ensuring complete maintenance for Process E-6. A daily checklist should include all activities that are required on a daily basis, such as draining wash tanks and checking dryer temperature. The daily checklist should include all chemical and mechanical measurements. Other lists can include less frequent activities, such as filter changes.

Following a complete checklist will help ensure that the process is started up consistently, and that all the proper process variables are being monitored. Checklists are especially important if the process operates more than one shift per day, if the regular machine operator is away, or if the operator is new and unfamiliar with Process E-6. Customize checklists for each machine and each specific operation, and use checklists to record machine history.

The following table shows the ideal schedule of measurements and maintenance that you should observe for all processors.

Table 11-1
Process-Monitoring and Maintenance Frequency

Solution/Step	Time	Temperature	Agitation	Replenishment Rate	Specific Gravity	Filter Change	Drain and Replace
First Developer	D	D	D	D	D	EOW	
First Wash	M	D	D			EOW	D
Reversal Bath	M			D	D	*	EOM
Color Developer	M	D	D	D	D	EOW	
Pre-Bleach II	M			W	W	*	M
Bleach	M		D	W	W	EOW	
Fixer	M		D	W	W	EOW	
Final Wash	M		D			EOW	D
Final Rinse	M			W		*	W†
Dry		D					

* We do not recommend that you recirculate this solution. However, if your machine is equipped with a recirculation system for this solution, we recommend that you recirculate the solution for only the first 15 minutes of the day and change the filters every other week.
† Drain non-replenished final-rinse tanks daily; drain replenished final-rinse tanks weekly, or more frequently, to maintain solution cleanliness.

D = Daily
W = Weekly
M = Monthly
EOW = Every other week
EOM = Every other month

REPLENISHMENT SYSTEMS

Most replenishment systems incorporate three functions: chemical mixing, film sensing, and chemical delivery. All three must operate properly and consistently to maintain a good process.

Chemical mixing: In chemical mixing, consistency and accuracy are very important. Consistency is important in the mixing vessel you use, the order in which you mix the chemicals, the water supply, and the mixing time and method. Accuracy is important when you measure chemicals, concentrates, and water. **Do not** overmix or aerate replenisher solutions. Store mixed chemicals in tanks with floating lids (to minimize oxidation and evaporation) and dust covers (to prevent contamination). **Do not** store replenisher solutions at high temperatures.

Film sensing: Automatic sensing devices in processing machines vary by manufacturer, and include infrared scanner bars, mechanical rollers, and tabs on racks. Regardless of the type of measuring device, calibrate all mechanical and electrical parts frequently, preferably on a daily basis.

Note: When processing KODAK EKTACHROME Professional Infrared EIR Film / Process E-6, be sure to turn off all sources of infrared radiation that may be associated with your processing equipment to avoid fogging this film.

Chemical delivery: Your chemicals are probably delivered by a gravity-feed or metered-pump system. A gravity-feed system uses flowmeters or needle valves that allow chemicals to run continuously into the tanks as film is processed. Check flowmeters frequently to ensure consistent delivery (some meters exhibit pressure changes as the volume of replenisher in the storage tank decreases).

A metered-pump system is the most common system used with rack-and-tank and roller-transport processors. The pumps are run by a timer or a microswitch.

The replenishment system in an in-line dilution or blender system is a process within itself. Monitor and control it just as you do your tank solutions.

DAILY MAINTENANCE

- Drain the wash tanks at the end of every day or shift to help prevent buildup of biological growth (slime). If possible, leave the tanks empty overnight and then fill them with fresh water in the morning; see your processor manual for the procedure recommended for your equipment. Daily draining and refilling may not be enough to prevent slime buildup. If slime accumulates in your wash tanks, clean them by wiping the inside of each tank with a sponge and rinsing the tanks with warm water.
- Calibrate the replenisher pumps for the first developer, reversal bath, and color developer.
- Check the nitrogen supply (for your agitation system) at the beginning of each shift.

WEEKLY MAINTENANCE

- Calibrate the replenisher pumps for the pre-bleach, bleach, fixer, and final rinse, and record the calibration. The replenishment rates for these solutions are not as critical as those for the first developer, reversal bath, and color developer, but you should monitor them weekly to prevent problems.
- Measure the specific gravity of the pre-bleach, bleach, and fixer tank solutions.

BIWEEKLY MAINTENANCE (EVERY OTHER WEEK)

- Replace *all* filters, regardless of their appearance. This helps prevent slime in the filter housings. Use recirculation filters that are in the range of 15 to 20 microns.
- For best results, install pressure gauges before and after each filter so that you can easily detect plugged filters. If a 5-pound-per-square-inch difference in pressure occurs between the two gauges, replace the filter.

MONTHLY MAINTENANCE

- Measure the time of all solutions that you do not measure daily. Use a stopwatch to measure the time that the film is in a solution from the time the film enters the solution to the time it enters the next solution (or wash).
- Drain your pre-bleach tank, flush it with hot water, and replace the solution. You must do this regularly because the solution is not recirculated or agitated. Process by-products may precipitate and collect at the bottom of the tank. If these precipitates build up, they can transfer dirt to the film.
- Check all recirculation systems.

BIMONTHLY MAINTENANCE (EVERY OTHER MONTH)

Drain your reversal-bath tank, flush it with hot water, and replace the solution. You must do this regularly because the solution is not recirculated or agitated. Process by-products may precipitate and collect at the bottom of the tank. If these precipitates build up, they can transfer dirt to the film.

RACK-AND-TANK PROCESSORS

Use floating lids on all solution tanks. Rinse the floating lids after you remove them at daily start-up. (This will prevent dried chemicals from entering the tanks when you reinstall the lids. Dried or crystallized chemicals can plug filters.)

Follow these other maintenance steps as well as the procedures in your processor manual:

- Clean pickup cups or lifts every day. Remove chemical residue to prevent corrosion.
- Clean the rack slides by wiping them with a damp sponge; then use a clean, lintless cloth sprayed with silicone. **Do not** transfer any silicone to the tank solutions.
- Rinse the racks, hangers, weights, and clips between each use to prevent solution contamination.
- Thoroughly clean the machine once a week. Wash the tank dividers or crossover plates. (Check that the rim of each tank is free of dried chemicals. If you have to remove dried chemicals, **do not** let them fall into the tanks.)

CONTINUOUS PROCESSORS

If your processor is equipped with wiper blades or squeegees, check and clean them every day. Replace blades or squeegees that are worn or have a buildup. Check the pressure on the blades or squeegees daily.

Rinse all rollers above the solution level with warm water every day. (This will help prevent chemical buildup that can scratch film.)

ROLLER-TRANSPORT PROCESSORS

Roller-transport processors are sensitive to dirt; they require a more involved maintenance routine.

- Rinse the top (or crossover) rollers with warm water every day. (This will help prevent chemical buildup that can scratch film.)
- When the tank solutions are up to operating temperature, run KODAK Roller Transport Cleanup Film 4955 through the processor daily at start-up. Make sure that the film comes into contact with the entire width of the rollers. **Do not** reuse the cleanup film.

Note: KODAK Roller Transport Cleanup Film 4955 is available in 8 x 10-inch (CAT No. 114 1530), 11 x 16-inch (CAT No. 114 1555), or 35 x 43 cm (CAT No. 166 4368) sheets, and 40-inch x 30-foot (CAT No. 154 7306) or 50-inch x 30-foot rolls (CAT No. 154 4368). You can cut the roll sizes to the appropriate size for wide-track processors.

- Clean the racks in the first-developer tank every week. Clean all other racks once a month. (Do this by cleaning a few racks each week.) See your owner's manual for instructions on cleaning the racks.

Note: You can use ultrasonic cleaning to loosen dirt on racks. However, if you use ultrasonic cleaning to clean racks that have hollow rollers, the cleaning solution may fill the rollers and contaminate tank solutions.

If you cannot remove silver buildup by following your manufacturer's cleaning instructions, you can use KODAK Developer System Cleaner and Neutralizer (CAT No. 843 4615). Prepare the cleaner and neutralizer according to the instructions packaged with the chemicals.

1. Remove the racks from the machine, and rinse them thoroughly with water to remove all traces of solution.
2. Use a squeeze bottle filled with working-strength cleaner to direct a stream of cleaner onto the parts of the racks that require cleaning. If necessary, use a sponge or a brush to keep the parts wet with cleaner. For heavy deposits, reapply the cleaner as needed.
3. Rinse the racks thoroughly with water to remove the cleaner, and allow them to drain completely.
4. Use a squeeze bottle filled with neutralizer to direct a stream of neutralizer onto the parts of the racks that you treated with cleaner.
5. Rinse the racks thoroughly with water to remove the neutralizer, and allow them to drain completely.
6. Replace the racks in the machine and refill the tank(s).

ALL MACHINES

Follow the maintenance recommendations listed in your processor manual.

- Occasionally check that the air flow from the darkroom is positive. If it is not, air from the dryer will flow back through the machine and cause an increase in solution temperature and/or excessive evaporation during processing. Check for positive air flow by holding a candle near the feed tray. The smoke from the candle should move toward the machine, not back toward the darkroom.
- Check all hose fittings once a year. (Hoses tend to shrink with age, so check that the clamps are tight enough to prevent leaks. Check all hoses for cracks.)
- We recommend that you drain every tank at least once a year and clean and inspect it. Place your solutions in holding tanks while you clean the processor tanks.
- Check for rust and/or loose metal parts in tanks.