

3 Using KODAK EKTACOLOR PRIME Chemicals in Minilabs

This section lists the recommended steps, conditions, and replenishment rates for minilab processors using Process RA-4. The chemicals necessary for your minilab will depend on the type of processor and your production volume. Kodak supplies EKTACOLOR PRIME Chemicals which are adaptable for use in most minilabs, and are available in sizes specially designed for minilabs. For a listing of available sizes, see Section 1, *KODAK EKTACOLOR Chemicals*. Use these chemicals for processing Kodak Color Papers designed for Process RA-4, such as:

- KODAK EKTACOLOR EDGE Paper
- KODAK ROYAL Digital Paper
- KODAK ROYAL Luminous Digital Paper
- KODAK Photo Book Paper
- KODAK PROFESSIONAL SUPRA ENDURA VC Digital Paper
- KODAK PROFESSIONAL ULTRA ENDURA Paper
- KODAK PROFESSIONAL ULTRA ENDURA High Definition Paper
- KODAK PROFESSIONAL ENDURA Metallic VC Paper

Note: For information on using KODAK SM Chemicals, see KODAK Publication No. Z-101, *Using KODAK SM Chemicals in SM Minilabs*.

For information on using KODAK EKTACOLOR Processing Cartridge 111, for use in all models of Fuji Frontiers, and some models of Noritsu Digital Minilab equipment, using Processes CP-48S and CP-49E, see KODAK Publication No. CIS-229, *Using the KODAK EKTACOLOR Processing Cartridge 111 with Digital Minilabs using Processes CP-48S and CP-49E*.

For information on using the KODAK EKTACOLOR Processing Cartridge 92/110 in a KODAK PROFESSIONAL RP 30 or SRP 30 Laser Printer, see Publication CIS-239, *Using the KODAK EKTACOLOR Processing Cartridge 92/110, CAT No. 1440775, for Professional Color Papers in KODAK PROFESSIONAL RP 30 and SRP 30 Laser Printers*.

Table 3-1 Processing Steps and Conditions for Process RA-4—Minilab Processors with Medium to High Production Volume

Solution/Step	Time* min:sec	Temperature °C (°F)
EKTACOLOR PRIME SP Developer Replenisher LORR	0:45	37.8 ± 0.3 (100.0 ± 0.5)
EKTACOLOR Developer Replenisher RT	0:45	35 ± 0.3 (95 ± 0.5)
EKTACOLOR PRIME SP Bleach-Fix and Replenisher LORR or EKTACOLOR Bleach-Fix and Replenisher	0:45	30 to 36 (86 to 97)
EKTACOLOR PRIME Stabilizer and Replenisher LORR†	1:30	30 to 37 (86 to 99)
Dry	As needed	Not over 96 (205)

* Immersion time plus crossover time to the next tank. For best results, use the recommended times with crossover times of 6 seconds or less.

† Use four countercurrent-flow stabilizer tanks with equal times in all tanks (0:23 in each tank). With three countercurrent-flow tanks, use a replenishment rate of 390 mL/m² (36 mL/ft²); with two countercurrent-flow tanks, use 780 mL/m² (72 mL/ft²). If your minilab uses a countercurrent-flow wash instead of a stabilizer, use a wash-water temperature of 30 to 40°C (86 to 104°F). For wash times of 1:30 or longer, the wash-flow rate should be between 2160 and 10,800 mL/m² (200 and 1000 mL/ft²). The actual rate depends on the number of tanks and the wash time (see Section 2, *Wash Rates for Process RA-4*).

Note: For minilabs with process times shorter than 45 seconds in the developer and bleach-fix steps, it is acceptable to process KODAK EDGE, ROYAL Digital, ROYAL Luminous and Photo Book Paper at these shorter cycle times. For further information refer to www.kodak.com/go/photochemicals and click on *Technical Publications* tab.

Kodak does not recommend processing PROFESSIONAL Papers such as SUPRA ENDURA VC Digital, ULTRA ENDURA, ULTRA ENDURA HD or ENDURA Metallic VC Papers in developer cycle times shorter than 45 seconds due to potential decreases in the D-max areas of the image.

Agitation

The recirculation rates for the developer and bleach-fix should be 0.50 to 0.75 tank volumes/minute. The recirculation rate for the stabilizer should be 0.67 to 1.0 tank volumes/minute. With multiple tanks, the recirculation rate should be the same in each tank. Low-volume and slow-transport speed processors may require higher agitation to maintain process activity.

Good agitation is important during the first few seconds of the developer and bleach-fix steps. If initial agitation is poor in the developer, development may be uneven. Poor initial agitation in the bleach-fix may not stop development uniformly, which can cause magenta streaks and non-uniformity. Excessive developer carryover into the bleach-fix will aggravate this problem.

Filtration

Processing solutions and wash water may contain some insoluble materials. If you don't filter out these materials, they can stick to the paper, tank walls, rollers, and lines, and possibly damage the paper. Use the filters designed for your processor or those recommended by the manufacturer. Usually, filters with a porosity of 10 to 30 microns are effective for solutions and wash water. For incoming water supplies, use a filter with a porosity of 15 microns.

CHEMICAL OPTIONS FOR YOUR MINILAB

KODAK EKTACOLOR PRIME LORR Chemicals are supplied as a single-part concentrates for easy mixing, and recommended for minilabs with medium to high production volumes. The lower replenishment rates of PRIME Chemicals mean that waste-solution volume, packaging waste, and the need for solution mixing are all minimized. Most minilab equipment using Process RA-4 can use KODAK EKTACOLOR PRIME LORR Chemicals but the chemicals you will need and use will depend on the type of processor and your production volume. Minilabs operating in low utilization conditions may require other chemical choices.

Using Production Volume to Determine Chemical Choice

Choosing which chemicals are correct to use in your minilab is a simple exercise. You will need only two pieces of information:

1. Volume of the developer tank
2. Number of prints processed in an average day

If the developer tank volume is relatively large and the number of prints per average day is relatively low, your processor is operating for a significant amount of time without sufficient replenishment of fresh chemicals. This can lead to oxidation of the solutions and considerable evaporation from the tank. Both conditions can adversely affect print quality.

To manage this impact, see *Periodic Low-Volume Situations* later in this section.

The table shows which developer and bleach-fix to choose based on the developer-tank volume and the number of 4 x 6-inch (10.2 x 15.2-cm) prints typically processed in a day.

Note: If your lab prints 3.5 x 5-inch (8.9 x 12.7-cm) prints, multiply the number of prints you make each day times 0.73 to convert them into 4 x 6-inch (10.2 x 15.2-cm) sized equivalent. Use that number to determine your developer.

Minilabs with Medium- to High-Production Volume

KODAK EKTACOLOR PRIME SP Developer Replenisher LORR

KODAK EKTACOLOR PRIME SP Bleach-Fix Replenisher LORR

KODAK EKTACOLOR PRIME Stabilizer Replenisher LORR

Minilabs with Very Low-Production Volume (or equipment with a roller-transport design)

KODAK EKTACOLOR RA Developer Replenisher RT (or EKTACOLOR PRIME Developer Replenisher LU in certain regions)

KODAK EKTACOLOR RA Bleach-Fix Replenisher

KODAK EKTACOLOR PRIME Stabilizer and Replenisher LORR

Table 3-2 Developer Options for Process RA-4

Number of 4 x 6-Inch (10.2 x 15.2 cm) Prints Per Day

Tank Volume—Litres	125	250	375	500	750	1000	1250	1875	2500
5									
10									
15									
20									
25									
30									
40									
50									

 Use EKTACOLOR PRIME SP Developer Replenisher LORR
 Use EKTACOLOR RA Developer Replenisher RT

Replenishment Rates

The specified replenishment rates are starting-point recommendations. The actual rates depend on the type of processor, amount of paper processed, and other variables of the processing system. The rates are given in millilitres per square metre and in millilitres per square foot. To convert the rate to millilitres per minute, multiply the rate in mL/m² by the processor speed in m²/min (or mL/ft² by the processor speed in ft²/min).

The bleach-fix replenishment rates assume minimum developer carryover. If carryover is greater than normal, increase the bleach-fix replenishment rate to maintain the bleach-fix chemical balance and pH level. Otherwise problems such as retained silver may occur. Retained silver will be evident on KODAK Control Strips, Process RA-4, as a yellow patch that appears significantly brown. See your equipment manual for specifications and adjustments for squeegees or squeegee rollers.

Table 3-3 Replenishment for Minilabs

	Replenishment for EDGE, ROYAL, ROYAL Luminous, Photo Book Papers mL/M ² (mL/ft ²)*	Replenishment for SUPRA VC, ULTRA, ULTRA HD, MetallicVC mL/M ² (mL/ft ²)*
Products for Mid to High Utilization		
PRIME SP Developer Replenisher LORR	80 (7.5)	83 (7.7)
PRIME SP Bleach-Fix Replenisher LORR	54 (5)	54 (5)
PRIME SP Stabilizer and Replenisher LORR (4 tanks)	195 (18)	195 (18)
Products for Low Utilization		
EKTACOLOR Developer Replenisher RT	170 (15.8)	174 (16.2)
EKTACOLOR Bleach-Fix and Replenisher	215 (20)	215 (20)
PRIME Stabilizer and Replenisher LORR (4 tanks)	195 (18)†	195 (18)†

* Starting point rates only, exact rate dependant upon utilization and image content

† For three countercurrent-flow tanks, use a replenishment rate of 390 mL/m² (36 mL/ft²); with two countercurrent-flow tanks, use 780 mL/m² (72 mL/ft²).

Drying

The maximum drying temperature for KODAK EKTACOLOR EDGE and KODAK PROFESSIONAL SUPRA ENDURA Papers is 96°C (205°F).

Periodic Low-Volume Situations

From time to time, a minilab will experience low-volume periods. EKTACOLOR PRIME LORR Chemicals are tolerant of low-volume periods that last for four to eight weeks.

However, low-volume operation for longer periods may lead to unacceptable performance. We recommend using EKTACOLOR RA Developer Replenisher RT and EKTACOLOR Bleach-Fix Replenisher, which have higher replenishment rates, until production returns to normal.

To control the effects of low-volume processing, you can also take the steps described below.

When the number of prints processed is very low, you can observe two changes in process quality:

1. D-min, especially the yellow D-min, increases by as much as 6 density points.
2. The LD (Speed) or Black Patch (D-max) process-control parameter will fall below aim by as much as 10 density points.

Note: These conditions can also result from a processor malfunction—for example, if an air leak develops in the recirculation line or the replenishment rate is too low.

You can take a number of steps to minimize these conditions. Be sure to return to normal operation when production volume returns to normal.

- The yellow D-min increase described above is most commonly caused by the stabilizer solution. Replacing the stabilizer tank solution will reduce the yellow D-min. In many cases, changing only the first tank or the first two tanks will be sufficient. Routine dumping of the stabilizer every two to four weeks will minimize yellow D-min problems.
- If high yellow D-min persists, increase the replenishment rate for the EKTACOLOR PRIME Stabilizer LORR to reduce the problem. Increase the rate from 18 mL/ft² (195 mL/m²) to 23 mL/ft² (248 mL/m²) until production increases.
- When production volume is low, the LD speed parameter typically moves below aim. Small printer adjustments to maintain print density can accommodate minor shifts. However, if the low LD speed falls outside the lower action limit, you should increase the developer replenishment. Typically an increase from the nominal 7.5 mL/ft² (80 mL/m²) to 8.5 mL/ft² (91 mL/m²) will bring the process back into control. Also increase the bleach-fix rate to 6 mL/ft² (64 mL/m²).

Note: Before increasing the rates, verify that the processor meets specifications for replenisher delivery, solution time and solution temperature. Also check to be sure that the developer recirculation is working properly. For more information on operating a minilab at low utilization, see Publication CIS-246, *Operating Minilabs at Low Levels of Utilization: Process C-41 and Process RA-4*.