4 MINILAB PROCESSORS

There are many different types of minilab processors, and they are used under a variety of conditions. KODAK Chemicals are designed to offer you choices to get the best results from your minilab regardless of its operation.

WHICH PROCESS CYCLE SHOULD YOU USE FOR YOUR PROCESSOR?

There are three basic processing cycles for processing Kodak color negative films in minilabs. You can use each of these cycles in minilabs that operate with or without wash water. The description of the three cycles will help you decide which matches your particular processor and processing conditions.

Do not process KODAK VERICOLOR III Professional Film, KODAK VERICOLOR Slide Film / SO-279/5072 or VERICOLOR Print Film / 4111 in washless minilab process cycles that use FLEXICOLOR Final Rinse and Replenisher, i.e., Process C-41B and Process C-41RA. Process these films in Process C-41 only using FLEXICOLOR Stabilizer III and Replenisher.

Note: If you are using a minilab that uses KODAK SM Chemicals, see KODAK Publication No. Z-101, *Using KODAK SM Chemicals in SM Minilabs*.

Process C-41RA

This film process cycle is the shortest of the Process C-41 cycles, and the one most commonly used in minilabs. You must use KODAK FLEXICOLOR RA Bleach Replenisher NR and KODAK FLEXICOLOR RA Fixer and Replenisher in this cycle.

Process C-41RA requires special equipment that accommodates the shorter solution times, and the processor must provide higher agitation in the bleach, fixer, and final rinse. Check with your minilab manufacturer to determine if your processor meets Process C-41RA specifications.

Although Process C-41RA is intended to be a washless cycle, you can use it with a processor that includes a final wash if it meets the time and agitation requirements.

Table 4-1 Process C-41RA Cycle

Solution/Step	Time* min:sec	Temperature °C (°F)
FLEXICOLOR Developer Replenisher LORR	3:15	37.8 ± 0.15 (100.0 ± 0.25)
FLEXICOLOR RA Bleach Replenisher NR†	1:00	38 ± 3 (100 ± 5)
FLEXICOLOR RA Fixer and Replenisher‡	1:30 to 2:00	38 ± 3 (100 ± 5)
FLEXICOLOR Final Rinse and Replenisher§	1:00	38 ± 3 (100 ± 5)
Dry	As needed	40 to 68 (104 to 155)

* Immersion time plus crossover time to the next tank. Bleach, fixer, and final rinse times are minimums; longer times are acceptable.

† Use only KODAK FLEXICOLOR RA Bleach Replenisher NR. Your equipment must provide the higher agitation required for this solution.

‡ Use only KODAK FLEXICOLOR RA Fixer and Replenisher. Use two countercurrent-flow fixer tanks with equal times in both tanks (0:45 to 1:00 in each tank). Your equipment must provide the higher agitation required for this solution.

§ Use three countercurrent-flow final rinse tanks with equal times in all tanks (0:20). Your equipment must provide the higher agitation required for this solution. Replenish the third final rinse tank at 40 mL/135-24 roll (36 mL/m). If your processor has two countercurrent-flow final rinse tanks followed by a single tank, replenish the second countercurrent tank at 40 mL/135-24 roll (36 mL/m) and the single tank at 20 mL/135-24 roll (18 mL/m). For minilabs with a final wash after the fixer, use a wash time of 1:40 and reduce the final rinse time to 40 seconds. Use a wash rate of 1250 mL/135-24 roll (330 mL/ft) for a two-stage countercurrent-flow wash. Double this rate for a single wash. Use a final rinse replenishment rate of 33 mL/135-24 roll.

Table 4-2 Starting-Point Replenishment Rates—Process C-41RA

Solution	Starting-Point Replenishment Rate	
	mL/135-24 Roll (mL/m)	mL/25-Exp ADVANTIX Film (mL/m)*
FLEXICOLOR Developer Replenisher LORR	20 (18)	11.1 (10.2)
FLEXICOLOR RA Bleach Replenisher NR	5 (4.5)	3.4 (3.1)
FLEXICOLOR RA Fixer and Replenisher	35 (32)	24 (22)
FLEXICOLOR Final Rinse and Replenisher	40 (36)	27 (25)

* These rates are averages based on an estimated film-speed mix in 25-exposure rolls of KODAK ADVANTIX Films.

Process C-41B

The primary feature of this cycle is that it is shorter than the standard Process C-41 cycle. It eliminates both washes and uses a shorter fixer time. Most minilabs that use Process C-41B use the washless version. However, if your minilab includes a final wash, see the fourth footnote below.

Table 4-3 Process C-41B Cycle

Solution/Step	Time* min:sec	Temperature °C (°F)
FLEXICOLOR Developer Replenisher LORR	3:15	37.8 ± 0.15 (100.0 ± 0.25)
FLEXICOLOR Bleach III NR Replenisher	3:00 to 4:20	38 ± 3 (100 ± 5)
FLEXICOLOR Fixer and Replenisher†	4:00 to 4:20	38 ± 3 (100 ± 5)
FLEXICOLOR Final Rinse and Replenisher‡,§	2:20	38 ± 3 (100 ± 5)
Dry	As needed	40 to 68 (104 to 155)

* Immersion time plus crossover time to the next tank. Bleach, fixer, and final rinse times are minimums; longer times are acceptable.
† Use two countercurrent-flow fixer tanks with equal times in both tanks (2:00 to 2:10 in each tank).
‡ Use three countercurrent-flow final rinse tanks with equal times in all tanks (0:47 in each tank).
§ If your minilab uses a final wash, also install a wash between the fixer and final rinse with a wash time of 1:40. Reduce the final rinse time to 40 seconds, and use a replenishment rate of 35 mL/135-24 roll (32 mL/m). Use a wash-flow rate of 1250 mL/135-25 roll (1080 mL/m) for a two-stage countercurrent wash or 2500 mL/135-24 roll (2160 mL/m) for a single-stage wash.

Table 4-4 Starting-Point Replenishment Rates—Process C-41B

Solution	Starting-Point Replenishment Rate	
	mL/135-24 Roll (mL/m)	mL/25-Exp ADVANTIX Film (mL/m)*
FLEXICOLOR Developer Replenisher LORR	20 (18)	11.1 (10.2)
FLEXICOLOR Bleach III NR Replenisher	5 (4.5)	3.4 (3.1)
FLEXICOLOR Fixer and Replenisher	35 (32)	24 (22)
FLEXICOLOR Final Rinse and Replenisher	40 (36)	27 (25)

* These rates are averages based on an estimated film-speed mix in 25-exposure rolls of KODAK ADVANTIX Films.

Process C-41

This process cycle is sometimes used in older minilabs. It most commonly includes water washes. To use the washless version of this cycle, follow the recommendations in the second footnote under the table.

Table 4-5 Process C-41 Cycle

Solution/Step	Time* min:sec	Temperature °C (°F)
FLEXICOLOR Developer Replenisher LORR	3:15	37.8 ± 0.15 (100.0 ± 0.25)
FLEXICOLOR Bleach III NR Replenisher	4:20 to 6:30	38 ± 3 (100 ± 5)
Wash†	1:00 to 3:15	24 to 41 (75 to 105)
FLEXICOLOR Fixer and Replenisher‡	4:20 to 6:30	38 ± 3 (100 ± 5)
Wash†	2:10 to 3:15	24 to 41 (75 to 105)
FLEXICOLOR Final Rinse and Replenisher	1:05	24 to 41 (75 to 105)
Dry	As needed	40 to 68 (104 to 155)

* Immersion time plus crossover time to the next tank. Bleach, fixer, and final rinse times are minimums; longer times are acceptable.
† Use a two-stage countercurrent-flow wash. For a single-stage wash, double the replenishment rate. If your minilab uses a final rinse step *instead of* a final wash, eliminate both washes. Use three countercurrent-flow final rinse tanks with a minimum final rinse time of 2:20 (0:47 in each tank). Use a final rinse temperature of 38 ± 3°C (100 ± 5°F) and a replenishment rate of 40 mL/135-24 roll (36 mL/m).
‡ Use two countercurrent-flow fixer tanks with equal times in both tanks (2:10 to 3:15).

Table 4-6 Starting-Point Replenishment Rates—Process C-41

Solution/Step	Starting-Point Replenishment Rate	
	mL/135-24 Roll (mL/m)	mL/25-Exp ADVANTIX Film (mL/m)*
FLEXICOLOR Developer Replenisher LORR	20 (18)	11.1 (10.2)
FLEXICOLOR Bleach III NR Replenisher	5 (4.5)	3.4 (3.1)
Wash	1250 (1080)†	850 (734)†
FLEXICOLOR Fixer and Replenisher	35 (32)	24 (22)
Wash	1250 (1080)†	850 (734)†
FLEXICOLOR Final Rinse and Replenisher	35 (32)‡	27 (25)‡

* These rates are averages based on an estimated film-speed mix in 25-exposure rolls of KODAK ADVANTIX Films.
† For a two-stage countercurrent-flow wash. Double this rate for a single-stage wash.
‡ If your minilab uses a final rinse *instead of washes,* use a replenishment rate of 40 mL/135-24 roll (36 mL/m) or 27 mL/25-exposure roll (25 mL/m) of ADVANTIX Film.

MAINTAINING EQUIPMENT USED WITH ADVANCED PHOTO SYSTEM™ FILMS

The Advanced Photo System (APS) offers several features that are not available in 35 mm or other film systems, including the ability to record information on a transparent magnetic layer on the film base. The information recorded by APS cameras includes some or all of the following:

- print format (C/H/P)
- exposed date and time
- roll title and frame number
- number of prints to be made from each exposure
- scene information

To deliver all the Advanced Photo System features consistently and reliably, the photofinishing equipment must read this information correctly. This requires special attention during film handling, as well as routine and thorough maintenance of the processing and printing equipment to keep it clean and working reliably. The following guidelines will help ensure that your equipment can read the magnetic information properly.

Maintaining the Film Processor

To ensure that the film is free from residue that can interfere with the operation of printing equipment, proper maintenance of the processor is very important.

Clean the processor squeegees or squeegee rollers daily. Contaminated or deteriorated squeegee rollers that are not able to remove excess final rinse can lead to the formation of residue (scum) on the surface of the film. This residue may adhere to the magnetic head in the printer and affect its ability to read information on the film. Follow the daily start-up and shutdown procedures recommended by your processor manufacturer for maintaining the squeegee rack.

Debris can also collect on squeegee rollers if the processor is idle for a long time. Solution remaining on the squeegee rollers may be crystallized, or the solution soaked into the rollers may be concentrated due to evaporation. When starting the processor after a shutdown, wash the squeegee rollers according the manufacturer's recommendations.

Regularly maintain the solution levels in the processing tanks. Top off the solutions with water at start-up and shutdown. Overconcentrated final rinse can leave residue on the film surfaces, which can transfer to the magnetic head in the printer and interfere with its operation. Follow the processor manufacturer's instructions for minimizing evaporation and oxidation.

Use a clean water supply to mix the chemicals. Impurities (such as dirt or calcium particles) in the final rinse may dry on the film as it goes through the dryer. These impurities may become loose and stick to the magnetic head in the printer. If your water contains high levels of impurities, we recommend that you use an alternate water supply or use deionized or distilled water.

Use proper solution replenishment. Confirm that the replenishment rates are correct for the rolls of APS films in your product mix.

Replace the final rinse periodically. Dirt, skiving, biological growth, and other foreign materials can accumulate in the final rinse over time. To avoid biological growth in the tank and dirt problems on film, we recommend that you dump and replace the final rinse at least once a month. Clean the tank and rollers thoroughly before replacing the solution. Some labs may require more frequent dumping if the final rinse tends to form precipitates.

Maintaining Printing Equipment

The magnetic head inside the printer film deck must be able to read the magnetic information recorded on APS films. Dirt or debris can cause magnetic-data reading errors.

Keep the magnetic heads clean. Residue on the film after processing can cause too large a separation between the reading head and the film surface. This can lead to errors in reading the low-level magnetic signal on the film. Residue and debris can also become loose and stick to the magnetic head in the printer.

Follow the maintenance and cleaning procedures recommended by the manufacturer of your printer. *Manufacturers generally recommend cleaning the magnetic heads at the beginning of each shift to prevent magnetic-data reading errors.*

Note: Residue on film can affect the print quality of all films. However, in the case of APS film, the effect on magnetic reading will generally occur before any visible effect on print quality.

Clean the reattacher magnetic heads. After processing, APS films are reattached to the original cassette before the negatives are exposed in the minilab printer.

Noritsu makes several models of reattach fixtures. One model, the FARA-300, can clean some processing debris off the film surface within 3 mm of the film edge. This cleaning greatly facilitates the magnetic data exchange between the processed film and the printer that occurs during the next operation.

You can reach the subassembly that reattaches and cleans the film by unlatching the top cover and swinging it up. Two metallic-colored pads are located directly behind the drive rollers in the base of the unit, and two metallic spring-loaded pads are in the top cover opposite the pads in the base of the unit. Clean all four pads with a cotton swab soaked in alcohol. Clean the four pads after every shift, or after every 1000 APS rolls that are reattached, whichever occurs sooner.