Z-129C
$2.00

USING
KODAK EKTACHROME R-3000 or R-3 Chemicals in Batch-Type Processors

This publication gives the steps and conditions for using KODAK EKTACHROME R-3000 or R-3 Chemicals to process the following materials in batch-type processors:

- KODAK EKTACHROME RADIANCE III Paper
- KODAK EKTACHROME RADIANCE III Select Material

We do not recommend processing other color reversal papers or materials in batch-type processors. Batch processing includes rotary-tube and small-tube processors, and sink-line processing in trays.

With batch processing, you use the solutions and then discard them, rather than replenishing them. KODAK EKTACHROME R-3000 Chemicals are designed for this type of use. KODAK EKTACHROME R-3000 Chemicals are supplied in one-gallon sizes from the U.S. and in five-litre sizes from Europe and Australia. If you need larger amounts of solutions, you can use KODAK EKTACHROME R-3 Chemicals for batch processing. With EKTACHROME R-3 Chemicals, you will need to add starter to both the first and the color developers. Two separate developer starter solutions are needed to make fresh first- and color-developer working solutions. Use KODAK EKTACHROME R-3 First Developer II Starter with KODAK EKTACHROME R-3 First Developer II Replenisher to make a working solution. Use KODAK EKTACHROME R-3 Color Developer II Starter with KODAK EKTACHROME R-3 Color Developer II Replenisher to make a working solution. Also, with R-3 chemicals, light reexposure is needed; with R-3000 chemicals, reversal is accomplished chemically.

Take precautions to avoid contamination of the chemicals. With R-3000 chemicals, the risk of contamination of the first developer by the color developer is especially critical because of the chemical reversal agent in the color developer. Both developers are extremely sensitive to any contamination with bleach-fix. Avoid mixing chemicals in the printing and processing areas to prevent contaminating paper with airborne chemicals. Thoroughly rinse the processing equipment after each processing run. Mix each solution in a separate mixing tank. If you have only a single mixing tank, wash it *thoroughly* after each use. For more information on chemicals and chemical mixing, see the instructions packaged with the chemicals and KODAK Publication No. Z-129A, *KODAK EKTACHROME R-3 and R-3000 Chemicals.*

KODAK EKTACHROME RADIANCE III Paper and RADIANCE III Select Material are very sensitive to light. *Do not use a safelight;* handle the paper and material only in total darkness. Check for light leaks and stray light from timers, indicator lamps, enlargers, etc, in the printing and processing areas. Store and transport the paper and material in lighttight boxes.

Handle the paper and material carefully to avoid creases and fingerprints. Use only sheet materials for batch processing. If you must use roll material, cut and store it in a flat position to remove the curl before using it.

For information on mixing and storage of EKTACHROME R-3 Chemicals, see KODAK Publication No. Z-129A, *KODAK EKTACHROME R-3 and R-3000 Chemicals*. For information on troubleshooting your process, see KODAK Publication No. Z-129E, *Monitoring and Troubleshooting Processes Using KODAK EKTACHROME R-3 and R-3000 Chemicals*.

FOLLOW THESE RECOMMENDATIONS CAREFULLY

When you mix your chemicals properly, you take the first step in producing consistent, high-quality results. Also be sure to expose the paper or material correctly and to follow all the processing recommendations. The most critical conditions are time, temperature, and agitation. When you follow the conditions described in this publication, you'll have less waste, higher productivity, and the best quality.

WHAT EQUIPMENT DO I NEED?

The basic equipment that you'll need for this type of processing includes—

***Rotary-Tube Processor*—**A variety of these processors are made by several manufacturers.

***Thermometer*—**To check solution temperatures.

***Timer or Clock*—**Accurate in minutes and seconds to control the time of each step. The timers on many processors may not be accurate enough.

***Containers for Processing Solutions*—**Separate clean containers to hold pre-measured amounts of processing solutions. Be sure to label each container and use it for *only* one solution.

***Tempering Bath*—**If your processor does not have built-in solution tempering, a separate tempering bath will be required.

WHAT ARE THE STEPS AND CONDITIONS FOR USING PROCESS R-3000 OR R-3 IN A ROTARY-TUBE PROCESSOR?

Before you load the exposed paper, make sure the inside of the processor is perfectly dry. Also, check the temperature of the processor and the processing solutions. After you've made these checks, turn off the lights and load the paper or material into the processor. To avoid fogging the paper be sure that no processor indicator lights are on. Follow the manufacturer's recommendation for loading the processor. Turn the room lights on after you've closed the processor cover.

Table 1

Processing Steps and Conditions—Rotary-Tube Processors—Process R-3000 or R-3

Processing Step	Time* min:sec	Temperature °C (°F)	Comments
Prewet	3:00	35±3 (95.5±5)	
First Developer	1:45†	34±0.5 (93±1)	The first developer time, temperature, and agitation are critical for good photographic results.
First Wash	1:45	32 to 38 (90 to 100)	Renew the wash water by draining and refilling the tube completely every 20 seconds.
Reexposure			*For Process R-3 chemicals only*—You can open the processor cover for the last 40 seconds of the wash following the first-developer step; expose the paper to a 100-watt bulb at a distance of 2 feet. In Process R-3000, reversal is done chemically.
Color Developer	5:30	34±1 (93±2)	A shorter color-developer processing step may result in green shadows and D-Max, due to lack of chemical reexposure.
Second Wash	0:45	32 to 38 (90 to 100)	Renew the wash water by draining and refilling the tube completely every 20 seconds.
Bleach-Fix	2:30	34±1 (93±2)	
Final Wash	2:30	32 to 38 (90 to 100)	Renew the wash water by draining and refilling the tube completely every 20 seconds.
Dry	As needed	Not over 71 (160)	Do not ferrotype KODAK EKTACHROME Papers and Materials.

* Includes a 10-second drain time at the end of each step to minimize carryover of solution to the next step.

†Use the solution volumes and processing techniques recommended by the equipment manufacturer. If necessary, you can adjust the first developer time slightly to improve results. First development is affected by processor configuration, tube rotation speed, and solution volumes. You may use KODAK RADIANCE III Control Strips, Process R-3 (CAT No. 508 2953) to establish and maintain process control.

Turn on the water for the prewet, and start the timer. Ten seconds before the end of the prewet, shut off the water flow, drain the tube, and check that the developer temperature is correct. Add the first developer.

Ten seconds before the end of the step, drain the first developer. Open the tap on the processor for the first wash. Drain and replace the water in the tube completely every 20 seconds. Follow the steps and conditions given in Table 1 to complete the processing sequence.

After completing each processing sequence, rinse the processor, processing tube, and the print holder thoroughly with warm water and dry them with a clean cloth or paper towel (or allow them to air dry if the processor will not be used immediately).

Temperature

The processing temperature depends on the processor. See Table 1 and your processor manual. Avoid wash-water temperatures below 32°C (90°F); temperatures that are too low will lower the temperature of the next solution in the process. Adjust the temperature of the solution-tempering bath to 34°C (93°F). Maintain the first-developer temperature to ±0.5°C (±1.0°F); the color-developer and bleach-fix temperatures at ±1°C (±2°F).

Solution Volume

Two factors that determine the sensitometric and physical quality of processed prints are processor solution volume and the rotation speed of the tube. At least one-seventh of the rotating tube circumference should be immersed in the solution. Check the equipment manufacturer's recommendations for the solution volume recommended for your processor. Be sure the tube is level to assure even distribution of solutions during processing.

Tube Rotation Speed

The tube should rotate at 30 to 40 revolutions per minute. At speeds under 30 revolutions per minute, processing streaks may appear because paper or material will be exposed to air for too long a time. Imperfections may also appear at speeds above 45 revolutions per minute because of excessive solution agitation. If your processor rotates at a speed higher than 45 revolutions per minute, double the solution volume to provide more even development.

Reversal Exposure

The Process R-3000 color developer provides chemical reversal; light reversal is not needed. However, light reversal is required if you use EKTACHROME R-3 Color Developer II. During the last 40 seconds of the first wash, open the processor and expose the paper or material to the light from a 100-watt bulb held 50 cm (2 ft) from the paper for at least 5 seconds.

Drying

Squeegee the excess water and place the print in a clean, dust-free place to dry at room temperature. For faster drying, use forced warm air (not above 66°C [150°F]) from an air-impingement dryer or a handheld hair dryer. During drying, the paper surface temperature must not exceed 71°C (160°F). *Do not* ferrotype KODAK EKTACHROME RADIANCE III Paper or RADIANCE III Select Material. Surface sheen and paper curl depend on drying conditions. A lower drying temperature normally produces less sheen and curl. *Do not* place the wet emulsion surface on blotting paper or cloth; it will leave marks on the paper.

WHAT EQUIPMENT DO I NEED?

The basic equipment that you will need for this type of processing includes—

Small-Tube Processor—Available from photo dealers for home darkroom use.

Thermometer—To check solution temperatures.

Timer or Clock—Accurate in minutes and seconds to control the time of each step. The timers on many processors are not accurate enough.

Containers for Processing Solutions—Separate clean containers to hold pre-measured amounts of processing solutions. Be sure to label each container and use it for *only* one solution.

Tempering Bath—To control the temperature of the solutions.

WHAT ARE THE STEPS AND CONDITIONS FOR USING PROCESS R-3000 IN A SMALL-TUBE PROCESSOR?

There are two methods recommended for processing EKTACHROME RADIANCE lll Paper in a small-tube processor. The design of your tube determines which one you should use. Method A is based on using a tempering bath to maintain a constant temperature throughout the entire processing sequence. Use this method if the solution inlets on your tube are closed or are positioned so that tempering water cannot enter.

With Method B, the tube remains outside the water bath. The room temperature gradually reduces solution temperatures to produce an *average* processing temperature. Use this method if your processing tube is non-immersible.

Method A

Use a water bath to keep your processing solutions at a constant temperature. Although you can process at any of the temperatures given in Table 2, you will get the best results at the recommended temperature of 38°C (100°F). With a water bath, you must be sure that water cannot enter the tube during processing. For uniform processing, keep the tube level during processing so that each solution is distributed evenly.

Each step begins immediately after you pour in the solution; the times include the 10-second drain time between steps. Drain the tube ten seconds before the end of each step.

Table 2

Processing Steps and Conditions—Small-Tube Processors—Process R-3000

Process Temperature °C (°F)	Solution Time (min:sec)										Total Time
	Prewet (Water)*	First Developer	Wash No. 1*	Wash No. 2*	Wash No. 3*	Color Developer	Wash No. 4*	Wash No. 5*	Bleach-Fix	Wash No. 6*	
30 (86)	0:30	2:45	0:20	0:20	0:20	8:30	0:20	0:20	4:00	2:15	21:40
31 (88)	0:30	2:30	0:20	0:20	0:20	7:55	0:20	0:20	3:45	2:15	18:35
32 (90)	0:30	2:15	0:20	0:20	0:20	6:55	0:20	0:20	3:30	2:15	17:05
33 (91)	0:30	2:00	0:20	0:20	0:20	5:55	0:20	0:20	3:15	2:15	15:35
34 (93)	0:30	1:45	0:20	0:20	0:20	5:35	0:20	0:20	3:00	2:15	14:45
35 (95)	0:30	1:45	0:20	0:20	0:20	5:25	0:20	0:20	2:45	2:15	14:10
36 (97)	0:30	1:30	0:20	0:20	0:20	4:55	0:20	0:20	2:30	2:15	13:20
37 (99)	0:30	1:30	0:20	0:20	0:20	4:40	0:20	0:20	2:15	2:15	12:50
38 (100)	**0:30**	**1:15**	**0:20**	**0:20**	**0:20**	**4:00**	**0:20**	**0:20**	**2:00**	**2:15**	**11:40**

* Use fresh water.
Figures in boldface are the recommended temperature and times.

Method B

This is a "drift-by" method. You begin with a specific *solution* temperature chosen according to the *room* temperature; during processing, the solution temperature drifts downward. This *moving* processing temperature yields the equivalent of the constant recommended processing temperature. For example, if the room temperature is 24°C (75°F), the temperature of your first developer at the start of processing should be 44.5±0.5°C (112±1°F) and the other solutions should be at 44.5±1°C (112±2°F). The temperature will fall during processing to give an average processing temperature of 38°C (100°F). Use Table 3 to determine the starting temperature for your solutions.

Table 3

Starting Solution Temperatures—Small-Tube Processors—Process R-3000

For a Room Temperature of °C (°F)	Use a Starting Temperature of °C (°F)
18.0 (64.4)	46.7 (116.0)
21.0 (69.8)	45.5 (114.0)
24.0 (75.2)	44.5 (112.0)
26.7 (80.0)	43.5 (110.3)
29.4 (85.0)	42.2 (108.0)
32.2 (90.0)	41.0 (105.8)

Keep the tube level so that the solutions are evenly distributed. Since processing occurs outside a constant-temperature bath, heat will be transferred from the processor to the surrounding surfaces and air.

WHAT EQUIPMENT DO I NEED?

***Trays*—**At least five; one for each solution and two wash trays.

Sink or Larger Tray—To use as a tempering bath.

Thermometer—To check solution temperatures.

Timer or Clock—Accurate in minutes and seconds to control the time of each step.

Containers for Processing Solutions—To hold a pre-measured amount of solution for each process. Use containers that can be used in a constant-temperature bath to maintain the solutions at the correct temperature.

WHAT ARE THE STEPS AND CONDITIONS FOR USING PROCESS R-3000 IN TRAYS?

In tray processing with R-3000 Chemicals you can handle your processing solutions in two ways. As described on the following page, you can use a small amount of solution and discard it after use (Method A), or you can use the entire amount of solution in the trays (Method B).

It's important to control the processing temperature and times. You can use any of the temperature and time combinations shown in Table 4. For best results, the recommended temperature is 38°C (100°F).

Be sure to monitor the actual temperature of the processing solution in the trays. It may be lower than the temperature of the solutions in the tempering bath.

Do all processing up to the color-developer step in total darkness. With either method, follow these guidelines:

Place the print in the tray emulsion side up. Start the timer immediately after putting the print into the solution. The times indicated in Table 4 include a drain time of about 10 seconds.

A high water flow rate is required for the washes. The wash-water temperature should be within 2°C (4°F) of the process temperature. For good water circulation and efficient washing, tilt the tray slightly.

Carefully wash the trays after each process to avoid contamination. Also take care when emptying solution from the trays into storage containers. Allow the print to dry *completely* before you evaluate it for color and density.

Method A

With this method, discard the solutions after each use. The solution volume will depend on the size and shape of the tray (especially on the size of the ribs at the bottom of some trays) and the size of the print being processed. A typical amount would be 100 mL for one 50 x 60 cm print in a 60 x 70 cm tray, or one 20 x 30-inch print in a 30 x 40-inch tray.

Table 4

Processing Steps and Conditions—Tray Processing—Process R-3000

Process Temperature °C (°F)	Solution Time (min:sec)							Total Time
	Prewet (Water)	First Developer	Wash No. 1*	Color Developer	Wash No. 2*	Bleach-Fix	Wash No. 3*	
30 (86)	0:30	2:45	1:00	8:30	0:45	4:00	2:15	19:45
31 (88)	0:30	2:30	1:00	7:55	0:45	3:45	2:15	18:40
32 (90)	0:30	2:15	1:00	6:55	0:45	3:30	2:15	17:05
33 (91)	0:30	2:00	1:00	5:55	0:45	3:15	2:15	15:35
34 (93)	0:30	1:45	1:00	5:35	0:45	3:00	2:15	14:50
35 (95)	0:30	1:45	1:00	5:25	0:45	2:45	2:15	14:15
36 (97)	0:30	1:30	1:00	4:55	0:45	2:30	2:15	13:25
37 (99)	0:30	1:30	1:00	4:40	0:45	2:15	2:15	12:55
38 (100)	**0:30**	**1:15**	**1:00**	**4:00**	**0:45**	**2:00**	**2:15**	**11:45**

* Use fresh water.
Figures in boldface are the recommended temperature and times.

Method B

With this method, use the entire solution volume for each process. Adjustments in exposure or processing times as you process more paper are not needed. A 5-litre kit can process the equivalent of 150—A4 or 180—8 x 10-inch prints. A 1-gallon kit can process the equivalent of 140—8 x 10-inch prints. Processing higher quantities with either kit size will adversely affect print quality.

You can store partially used working solutions at normal room temperature for up to one week in full bottles that are light- and air-tight. You can store fresh working solutions for up to four weeks under the same conditions.

HOW CAN I DISPOSE OF MY USED PROCESSING SOLUTIONS?

You can discharge the effluent from these processes to a municipal secondary treatment plant without harm to the treatment plant. Typical effluent from Process R-3000 or R-3 chemicals is within a pH range of 7 to 9, has a temperature of less than 30°C (90°F), contains less than 60 mg/L of suspended solids, and contains no oils, greases, detergents, or flammable or explosive materials. The silver contained in the effluent is in the form of silver thiosulfate complex, which is not harmful to organisms. A secondary treatment plant converts this silver complex to insoluble silver sulfide, which is removed as a solid by the treatment plant.

Septic tanks can efficiently treat photographic waste if it is mixed with sanitary waste in the ratio of 1 to 3. For example, for each 150 gallons of sanitary, cooking, and washing effluent, a correctly designed septic tank and leach field could treat 50 gallons of photographic effluent (including wash water) each day. Avoid sudden releases of large amounts of photographic effluent, which can harm the microorganisms of the septic system. Another alternative for disposing of photographic wastes is to collect them in a holding tank and have them hauled away by a commercial waste hauler.

Note that federal, state, and local effluent regulations take precedence; review them before discharging any chemicals. For more information on disposing of small volumes of photographic wastes, see KODAK Publication No. J-52, *Disposal of Small Volumes of Photographic Processing Solutions.*

SILVER RECOVERY

Consider silver recovery from the bleach-fix only if you can justify it economically, or if your local sewer codes require it. Recovery of silver from these small-volume processes requires special handling and may require processor modifications. To recover silver, collect the used bleach-fix and pass it through a KODAK Chemical Recovery Cartridge, Junior Model II. Cartridges work best when a relatively continuous flow of bleach-fix passes through them. The filler material will oxidize if the cartridge is used only intermittently. This will reduce the efficiency of the cartridge and shorten its life.

Recovery of silver from the bleach-fix wash water is *not* practical for small-volume operations. Although electrolytic silver recovery is possible, the expense of the equipment is difficult to justify for small-volume operations.

MORE INFORMATION

Kodak has many publications to assist you with information on Kodak products, equipment, and materials.

Complete information on KODAK EKTACHROME RADIANCE III Paper and Select Material is available on the Kodak website **www.kodak.com/go/professional** and through Kodak in your country.

The publications listed below are available from dealers who sell Kodak products, or you can contact Kodak in your country for more information.

J-2A *Health, Safety, and Environmental Emergency Card*

Y-55 *KODAK Process Record Form*

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