Z-129A
$2.00

KODAK EKTACHROME R-3 and R-3000 Chemicals

Kodak supplies EKTACHROME R-3 and R-3000 Chemicals to process KODAK EKTACHROME RADIANCE III Paper, KODAK EKTACHROME RADIANCE III Copy Paper, KODAK EKTACHROME RADIANCE HC III Copy Paper, KODAK EKTACHROME RADIANCE III Select Material, KODAK EKTACHROME RADIANCE III Overhead Material, KODAK EKTACHROME RADIANCE III Clear Display Material, and KODAK EKTACHROME RADIANCE III Translucent Display Material. This publication lists the EKTACHROME R-3 and R-3000 Chemicals* that are currently available, and describes how to mix and store them. It also describes some simple means of checking your chemicals and mixes, and how to dispose of them safely.

*KODAK EKTACHROME R-3 First Developer Replenisher LU is available in the European market area only. For more information about this chemical, refer to KODAK Publication No. Z-129H, *Using KODAK EKTACHROME R-3 LU Chemicals in Roller-Transport Processors.*

THESE ARE SOME TERMS RELATED TO PHOTOGRAPHIC CHEMICAL SOLUTIONS

To help you to understand the terms we've used for the chemicals and solutions in this manual, here are some definitions:

Chemicals, Concentrates, or Chemical Concentrates—Concentrated chemicals that are diluted to make processing solutions, or that are added to other solutions.

Fresh Solution—A freshly mixed solution made from chemical concentrate. Usually used to describe an unseasoned tank solution.

Replenisher—A solution used to replenish a tank solution.

Seasoned Solution—A tank solution that has reached an equilibrium after processing a certain amount of paper or material.

Starter—A concentrate added to a replenisher solution to prepare it for use as a tank solution so that it gives results similar to a seasoned tank solution.

Tank Solution—The solution used in the processor tank to process paper or material. Sometimes called a "working solution."

WHY USE *KODAK* CHEMICALS?

Kodak chemicals lead the way with quality, service, and cost-saving advantages. They are manufactured to consistent high-quality specifications. Kodak supports all of its products with technical assistance from well-trained field representatives and with a wide variety of technical publications and training programs. You can obtain KODAK EKTACHROME Chemicals quickly and easily through a wide network of dealers and regional marketing distribution centers. Here are some of the features and benefits of KODAK EKTACHROME R-3 and R-3000 Chemicals:

FEATURES	BENEFITS
► High process stability	► Consistent, repeatable results ► Easy startup after shutdown periods
► Highly stable bleach-fix	► Low susceptibility to oxidation; reduced possibility of sulfurization
► NR-type bleach-fix	► Low volume of bleach-fix effluent discharged ► No need for bleach-fix regeneration ► Can use electrolytic silver recovery
► All-liquid concentrates	► Ease of handling and mixing ► Clean, uniform mixes
► Low wash rates	► Energy and water savings

WHAT *KODAK EKTACHROME* R-3 AND R-3000 CHEMICALS ARE AVAILABLE?

Chemicals for Process R-3

These KODAK EKTACHROME R-3 Chemicals are available as packaged concentrated liquids for use in continuous processors.

KODAK EKTACHROME R-3 First Developer II Starter

Mix this starter with EKTACHROME R-3 First Developer II Replenisher to prepare a first-developer tank solution.

KODAK EKTACHROME R-3 Color Developer II Starter

Mix this starter with EKTACHROME R-3 Color Developer II Replenisher to prepare a color-developer tank solution.

KODAK EKTACHROME R-3 First Developer II Replenisher

Use this solution to replenish Process R-3 first developer. To make a first developer tank solution, add KODAK EKTACHROME R-3 First Developer II Starter according to the directions on the starter container.

*KODAK EKTACHROME R-3 First Developer Replenisher LU**

Use this solution to replenish Process R-3 first developer in roller-transport processors with utilization rates of 5 percent or less.

Do not use this developer replenisher to prepare a first developer tank solution; use only KODAK EKTACHROME R-3 First Developer II Replenisher. Using EKTACHROME R-3 First Developer Replenisher LU to prepare a tank solution will cause increased speed and lower maximum density.

Do not use KODAK EKTACHROME R-3 First Developer Replenisher LU in processors with utilization rates *higher* than 5 percent.

KODAK EKTACHROME R-3 Color Developer II Replenisher

Use this solution to replenish Process R-3 color developer. To make a color developer tank solution, add KODAK EKTACHROME R-3 Color Developer II Starter according to the directions on the starter container.

*May not be available outside the European market area.

Table 1

KODAK EKTACHROME R-3 and R-3000 Chemicals—Availability by Region of Manufacture

KODAK Chemical	Europe		United States		Australia	
	To Make	CAT No.	To Make	CAT No.	To Make	CAT No.
R-3 First Developer II Starter	1–100 L	524 0007	1–12.5 Gal	869 9795	1–12.5 Gal	869 9795
R-3 First Developer II Replenisher	2–25 L 1–100 L 6–300 L	524 0585 524 0015 524 0593	1–12.5 Gal — —	877 8433 — —	2–20 L — —	401 9840 — —
R-3 First Developer Replenisher LU	2–20 L	502 6950	—	—	—	—
R-3000 First Developer	1–5 L*	505 4085	1–1 Gal	106 5291	1–5 L*	445 0581
R-3 Color Developer II Starter	1–100 L	523 6021	1–12.5 Gal	878 3557	1–12.5 Gal	878 3557
R-3 Color Developer II Replenisher	2–25 L 1–80 L 2–500 L	522 8390 523 1279 523 6039	2–12.5 Gal — —	840 3222 — —	2–20 L — —	401 9832 — —
R-3000 Color Developer	1–5 L*	505 4085	1–1 Gal	106 5275	1–5 L*	445 0581
R-3 Bleach-Fix II and Replenisher R-3 Bleach-Fix II and Replenisher, Part A R-3 Bleach-Fix II and Replenisher, Part B	1–25 L 3–400 L 1–100 L 1–100 L	523 9595 523 9603 523 9579 523 9587	1–12.5 Gal L — — —	884 7972 — — —	2–30 L — — —	401 9873 — — —
R-3000 Bleach-Fix	1–5 L*	505 4085	1–1 Gal	106 5259	1–5 L*	445 0581

*All chemicals are provided in one package.

Chemicals for Process R-3000

Use EKTACHROME R-3000 Chemicals to process KODAK EKTACHROME Papers and Materials in rotary-tube and drum processors. These chemicals are liquid concentrates designed to be mixed for one-time use. Dispose of them properly after use.

- KODAK EKTACHROME R-3000 First Developer
- KODAK EKTACHROME R-3000 Color Developer
- KODAK EKTACHROME R-3000 Bleach-Fix

USE SAFE-HANDLING PRACTICES WITH ALL CHEMICALS

Handle all chemicals with care. The following guidelines will help you to do this. For more information about health hazards and safe handling of specific Kodak chemicals, write to or call the address or phone number below and ask for Material Safety Data Sheets (MSDS) for the particular chemicals you are interested in.

Eastman Kodak Company
343 State Street
Rochester, New York 14652-6267
1 (800) 242-2424 (U.S. only)

Outside of the United States, contact Kodak in your country for assistance.

Follow Instructions Carefully

Kodak chemical packages carry precautionary notices on the labels when necessary. Always follow the label instructions. Read the Material Safety Data Sheets for detailed handling information.

Store Chemicals and Processing Solutions Safely

Keep chemicals and processing solutions out of the reach of children and pets. *Do not* store chemicals and processing solutions in areas used to store food (refrigerators, etc).

Label All Chemicals Properly

Label all chemical storage tanks with the correct name of the tank contents. In the U.S., the Occupational Safety Health Act (OSHA) requires employers to inform their employees about hazardous chemicals in the workplace. Part of this requirement is the labeling of all containers of hazardous chemicals and chemical mixtures, including processor tanks. Labels for Kodak chemicals are available from your dealer. These are 4 x 5-inch self-adhesive labels that you can attach to your storage and processor tanks. The labels state the chemical hazard, handling instructions, and the action that you should take in case of accidental contact. Use these labels *only* for Kodak chemicals; use with other chemicals is a misrepresentation under the OSHA standard. In other countries, consult local safety regulations.

Keep the Darkroom and Mixing Area Clean

Clean up spilled chemicals as soon as possible; powdered chemicals or the residue from dried solutions may become airborne and can be inhaled, or they may contaminate processing equipment, photographic paper or film, and other processing solutions.

Wear Protective Clothing

Wear a waterproof apron and protective gloves designed for handling chemicals. These may be made of rubber or neoprene. Always wear safety glasses, goggles, or a face shield, particularly when handling acids or alkalies, or where splashing may occur. Clean protective gloves after each use to remove chemical residues and prevent contamination.

Handle Chemicals Carefully

Avoid skin contact with chemicals. Some chemicals in photographic solutions can cause allergic skin reactions. Most of these chemicals are in the developers, but some in other solutions may also cause an allergic reaction. Wear rubber gloves, goggles, and protective clothing when mixing and pouring chemicals. Before removing the rubber gloves, wash the outsides thoroughly with water.

Provide an emergency shower, as well as a face-and-eye water spray, such as a short hose attached to a cold- or tempered-water tap in the chemical mixing area for washing chemicals from the skin and eyes. Be sure everyone working in the mixing area is familiar with the location of this hose, other eye-wash facilities, showers, and fire extinguishers.

Provide a nonalkaline hand cleaner in the mix area for cleansing the skin in case of contact with any processing solution or chemicals, especially developers.

In case of accidental contact, immediately remove chemicals from the skin by washing with tap water and a nonalkaline hand cleaner. If chemicals are splashed into your eyes, wash at once with running water for at least 15 minutes; immediately afterwards, get medical attention.

Properly Ventilate Mixing and Processing Areas

Some Kodak photographic processing solutions, such as those that contain acetic acid, give off vapors; other solutions can give off gases such as ammonia, or sulfur dioxide. These vapors and gases can produce unpleasant odors and irritate the eyes or respiratory tract.

Install an exhaust system in the mixing room and vent it directly to the outside of the building. To prevent recirculation of contaminated air, make sure that the exhaust outlets to the outside of the building are not near any fresh-air intake ducts. This system should exhaust 30 cubic metres of air per square metre of tank surface per minute (100 cubic feet of air per square foot of tank surface per minute), and should have an air velocity of about 24 metres (75 feet) per minute, measured at the tank surface.

To supplement the exhaust systems, the general ventilation of the mixing room and processing area should have at least 10 to 20 filtered fresh-air changes per hour. This will minimize the buildup of irritating vapors in other parts of the building.

HOW DO I MIX THE CHEMICALS?

Read and follow the instructions packed with the chemicals. Like all chemicals, handle photographic chemicals with care. Be sure to follow the safety precautions on the label and in any instructions packaged with the chemicals.

Developers are highly sensitive to contamination by each other and by the bleach-fix. If possible, use a separate tank for mixing the first and color developers. If you do mix the first- and color-developer solutions in the same tank, rinse the tank thoroughly after you complete each mix. The first developer is highly sensitive to contamination by the reversal agent in the EKTACHROME R-3000 Color Developer; take extra care in cleaning and rinsing tanks when you mix these developers in the same tank. Use separate mixing tanks for developers and bleach-fixes to minimize the possibility of contamination. *Do not* interchange tanks; thoroughly rinse each solution from the tank before mixing the next solution.

A variety of chemical-mixing equipment is commercially available. *Do not* mix developer-replenisher or bleach-fix replenisher solutions in plastic storage tanks; their flexibility can affect the volume and result in incorrect concentration. For more information about chemical mixing, see KODAK Publication No. J-4, *Safe Handling of Photographic Chemicals.* Photographic Chemicals are sensitive to oxidation. Keep mixing time to the minimum necessary for completely mixed and uniform solutions.

Avoid mixing chemicals in a printing or processing area; airborne chemicals can cause spots on prints. If you split chemical package sizes to make volumes smaller than those for which the chemicals are packaged, be sure to measure the amounts carefully.

Table 2 summarizes the current mixing instructions for KODAK EKTACHROME R-3 Chemicals.

Table 2

Mixing KODAK EKTACHROME R-3 and R-3000 Chemicals

Solution	Comments
R-3 First Developer II Replenisher and R-3000 First Developer	Start with water at 20 to 30°C (68° to 86°F).* Add the chemical concentrate while stirring. Rinse the container with a small amount of water and add the rinse water to the mix to be sure all the concentrate is added. After all the concentrate has been added, bring the mix to volume with water at 20 to 30°C (68 to 86°F). Mix until uniform.
R-3 First Developer II Tank Solution	It is important that you use the correct starter with the appropriate replenisher when making either first or color developer working tank solutions. Mix 995 mL of First Developer Replenisher II and 5 mL of First Developer II Starter for each litre of solution required. If you know the precise total solution volume of the processing tank (with racks in place) and plumbing, you can mix the first developer directly in the processing tank. Use the recirculation system to mix the solution thoroughly.
R-3 Color Developer II Replenisher and R-3000 Color Developer	Start with water at 30 to 38°C (86 to 100°F).* Add Part A. Rinse the bottle with water and add the rinse water to the tank. Stir gently for 2 minutes While stirring, add Part B and Part C in that order. Rinse each container and add the rinse water to the mix. Bring the mix to its final volume with water at 25 to 30°C (77 to 86°F). Stir gently for 5 minutes or until thoroughly mixed.
R-3 Color Developer II Tank Solution	It is important that you use the correct starter with the appropriate replenisher when making either first or color developer working tank solutions. For each litre of tank solution, mix 800 mL of Color Developer II Replenisher and 7.5 mL of Color Developer Starter with 192.5 mL of water to make one litre. Stir until the solution is thoroughly mixed. If you know the precise total solution volume of the processing tank (with racks in place) and plumbing, you can mix the color developer directly in the processing tank. Use the recirculation system to mix the solution thoroughly.
R-3 Bleach-Fix II and Replenisher, Bleach-Fix Tank Solution, and R-3000 Bleach Fix	Use a separate tank from that used for the developers; developers are highly susceptible to contamination by bleach-fixes. Start with water at 20 to 30°C (68 to 86°F).* Add the parts in consecutive order while stirring. Rinse the containers and add the rinse water to the mix. Add water at 20 to 30°C (68 to 86°F) to bring the mix to its final volume. Stir until thoroughly mixed.

* See Tables 3 and 4 for correct amounts of water.

NOTE: When using the same tank to mix R-3000 First Developer and Color Developer solutions, be especially careful to thoroughly clean and rinse the tank between mixes. The first developer is highly sensitive to contamination by the reversal agent in the color developer.

Preparing Smaller-Than-Package-Size Amounts of KODAK EKTACHROME R-3 Chemicals

You will get the best and most consistent results by mixing KODAK EKTACHROME R-3 Chemicals to produce the full volume marked on the package. However, some users may want to mix chemicals in amounts they feel are more suitable for their conditions. Although we *do not* recommend mixing smaller volumes, we provide this information to simplify calculations. You must measure the chemicals carefully and follow all mixing directions to obtain the same results produced by a mix made with the entire package.

***To Divide Your Packaged Chemicals*—**Use one of the following methods. When you choose a method, consider the one that offers you sufficient protection against oxidation for your needs.

The methods are listed in order of preference:

1. Store the chemicals in flexible plastic containers and draw off amounts as needed. By using these containers and storing them in an inverted position, the amount of air and other vapors that come into contact with the chemicals is minimized.
2. Divide the concentrate into smaller amounts and store them in full stoppered bottles for use as needed.

Table 3

Replenisher—Preparing Smaller-Than-Package-Size Amounts from KODAK EKTACHROME R-3 and R-3000 Concentrates

KODAK Chemical	CAT No.	To Prepare 1 Litre Replenisher					Mixing Temperature
		Start with Water (mL)	Add Part A (mL)	Add Part B (mL)	Add Part C (mL)	Add Water to Make	
First Developer Replenisher							
Europe							
R-3 First Developer II Replenisher	524 0585	750	200	—	—	1 L	
	524 0015	750	200	—	—	1 L	
	524 0593	750	200	—	—	1 L	
R-3 First Developer Replenisher LU	502 6950	700	244	—	—	1 L	
R-3000 First Developer	505 4085	750	200	—	—	1 L	
United States							20 to 30°C (68 to 86°F)
R-3 First Developer II Replenisher	877 8433	630	320	—	—	1 L	
R-3000 First Developer	106 5291	750	200	—	—	1 L	
Australia							
R-3 First Developer II Replenisher	401 9840	750	200	—	—	1 L	
R-3000 First Developer	445 0581	750	200	—	—	1 L	
Color Developer Replenisher							
Europe							
R-3 Color Developer II Replenisher	522 8390	800	40	40	69	1 L	
	523 1279	800	37.6	50	63	1 L	
R-3 Color Developer II Replenisher	523 6039	800	37.6	50	60	1 L	
R-3000 Color Developer	505 4085	800	40	40	60	1 L	
United States							30 to 35°C (86 to 95°F)
R-3 Color Developer II Replenisher	840 3222	800	40	40	80	1 L	
R-3000 Color Developer	106 5275	800	40	60	60	1 L	
Australia							
R-3 Color Developer II Replenisher	401 9832	800	40	40	69	1 L	
R-3000 Color Developer	445 0581	800	40	40	60	1 L	
R-3 Bleach-Fix and Replenisher							
Europe							
R-3 Bleach-Fix II and Replenisher	523 9603	700	150	115	—	1 L	
R-3 Bleach-Fix II and Replenisher, Part A	523 9579	700	154	115	—	1 L	
R-3 Bleach-Fix II and Replenisher, Part B	523 9587	700	154	115	—	1 L	
R-3 Bleach-Fix II and Replenisher	523 9595	650	190	115	—	1 L	
R-3000 Bleach-Fix	505 4085	650	200	115	—	1 L	
United States							20 to 30°C (68 to 86°F)
R-3 Bleach-Fix II and Replenisher	884 7972	700	154	115	—	1 L	
R-3000 Bleach-Fix	106 5259	650	188	125	—	1 L	
Australia							
R-3 Bleach-Fix II and Replenisher	401 9873	700	154	115	—	1 L	
R-3000 Bleach-Fix	445 0581	650	200	115	—	1 L	

3. Take the portions from the original bottle as needed. *This method has the greatest potential for oxidation of the remaining unused chemicals.*

If you use method 2 or 3, be sure to use the entire amount of concentrate within two weeks. This is particularly important with developers because they are very susceptible to oxidation.

***To Mix Your Chemicals*—**Follow this basic procedure:

- MEASURE all volumes accurately. Use a graduated cylinder of the appropriate size and always read the liquid level at the bottom of the meniscus.
- RINSE each container or graduated cylinder with a small amount of water and add the rinse water to the mix. This assures that you have added *all* of the concentrate.
- STORE the unused concentrate properly to protect against oxidation. Keep flexible plastic containers inverted to minimize oxidation.
- DISCARD EXCESS concentrate that you draw off accidentally. *Do not* return it to the original container; it can be a source of contamination.
- ADD THE CONCENTRATE TO THE WATER—never add the water to the concentrate.
- USE METRIC MEASUREMENTS whenever possible; the most accurate and widely available measuring devices are calibrated in metric measurements.

Table 3 and 4 give amounts in millilitres. For greatest accuracy, use this metric measurement whenever you mix smaller-than-package-size amounts. Conversion tables for amounts for various metric and U.S. measurements are on pages 10 and 11.

Preparing First Developer and Color Developer Tank Solutions—To prepare working tank solutions of first developer or color developer, add KODAK EKTACHROME R-3 First Developer II Starter or KODAK EKTACHROME R-3 Color Developer II Starter to the appropriate amounts of replenisher and water (see Table 1 for available sizes).

NOTE: It is important that you use the correct starter with the appropriate replenisher when making either first or color developer working tank solutions. R-3 First Developer Replenisher LU is a replenisher only and should not be used with Starter to make a tank solution. R-3000 First Developer II and R-3000 Color Developer II do not need starter.

Preparing Bleach-Fix Tank Solutions—To make bleach-fix tank solutions, use R-3 Bleach-Fix II and Replenisher directly—they *do not* require starter or additional water. R-3000 First Developer, R-3000 Color Developer and R-3000 Bleach-Fix also *do not* require starter or additional water to make working solutions.

Table 4

Tank Solutions—Preparing Smaller-Than-Package-Size Amounts with KODAK EKTACHROME R-3 First Developer II Starter and KODAK EKTACHROME R-3 Color Developer II Starter

KODAK Chemical	To Prepare 1 Litre Tank Solution			Mixing Temperature
	Start with Replenisher (mL)	Add Starter (mL)	Add Water (mL)	
First Developer Replenisher/Starter				
Europe R-3 First Developer II Replenisher plus R-3 First Developer II Starter	995	5	—	20 to 30°C (68 to 86°F)
United States R-3 First Developer II Replenisher plus R-3 First Developer II Starter	995	5	—	
Australia R-3 First Developer II Replenisher plus R-3 First Developer II Starter	995	5	—	
Color Developer Replenisher/Starter				
Europe R-3 Color Developer II Replenisher plus R-3 Color Developer II Starter	800	7.5	192.5	20 to 30°C (68 to 86°F)
United States R-3 Color Developer II Replenisher plus R-3 Color Developer II Starter	800	7.5	192.5	
Australia R-3 Color Developer II Replenisher plus R-3 Color Developer II Starter	800	7.5	192.5	

CONTAMINATION CAN RUIN A PROCESS

The cleanliness of the mixing, storage, and processing equipment can affect the life and photographic quality of the processing solutions. Avoid contaminating one solution with another. Contamination is most often caused by

- solution splashed or dripped into another solution
- using mixing equipment that has not been thoroughly cleaned
- dry chemicals that become airborne during mixing
- pipes and tanks made of materials that react with the photographic chemicals

To reduce the possibility of contamination, avoid dripping solution into other tanks when you remove racks for cleaning, and avoid splashing by not agitating too vigorously. Also check that processing and mixing equipment and plumbing are made of suitable materials. If possible, use a separate set of mixing equipment to mix each type of solution, and wash all equipment *thoroughly* before reusing it.

Good housekeeping (e.g., keeping the mixing area clean, neat, and well ventilated; storing chemicals properly, etc) will reduce the possibility of contamination and provide safe working conditions.

Ideally, the R-3 Process requires three separate mix tanks. However, separate mix tanks may not always be practical or possible. The diagram at the right shows mixing arrangements for one to four mix tanks. Use it as a guide for using your mixing tanks to reduce the possibility of contamination.

- If you mix only chemicals for REVERSAL processes, you can use two mix tanks: one for the first and color developers and one for all other solutions. Three mix tanks are preferable: one for the developers, one for the bleach and fixer, and one for all other solutions.
- If you mix chemicals for both NEGATIVE and REVERSAL processes, use four mix tanks: one for the negative developer and the reversal first developer, one for color developer, one for bleach and bleach-fix, and one for all other solutions.

If you have one tank:

1

Do following before mixing different batches of chemicals—
- Thoroughly rinse tank and mixing equipment with room-temperature water
- Flush tubing and lines
- Thoroughly clean transfer pumps

If you have two tanks:

1

Use this tank for—
- black-and-white developers
- first developers for Processes E-6, R-3, and EA-5
- color developers for Processes E-6, C-41, and R-3, and developer for Process RA-4

2

Use the second tank for—
- color developer for Process EA-5
- all stop baths and stabilizers
- reversal bath, pre-bleach, and final rinse for Process E-6
- all bleaches, fixers, and bleach-fixes

If you have three tanks:

1

Use this tank for—
- black-and-white developers
- first developers for Processes E-6, R-3, and EA-5
- color developers for Processes E-6 and C-41, and developer for Process RA-4

2

Use the second tank for—
- color developers for Processes EA-5 and R-3
- all stop baths and stabilizers
- reversal bath, pre-bleach, and final rinse for Process E-6

3

Use the third tank for—
- all bleaches, fixers, and bleach-fixes

If you have four tanks:

1

Use this tank for—
- black-and-white developers
- first developers for Processes E-6, R-3, and EA-5

2

Use the second tank for—
- color developers for Processes E-6, C-41, and R-3, and developer for Process RA-4

3

Use the third tank for—
- stop baths and stabilizers
- reversal bath, pre-bleach, and final rinse for Process E-6

4

Use the fourth tank for—
- all bleaches, fixers, and bleach-fixes

Materials for Processing Equipment

Use Type 316 stainless steel for equipment used for developers. Some plastic materials, such as polyethylene, are also acceptable. Bleach-fix rapidly corrodes brass and copper. Avoid all contact of these metals with the bleach-fix.

Type 316 stainless steel is recommended for the bleach-fix and the wash tanks following the bleach-fix. Several plastic materials, such as polyethylene, are also acceptable. When you discharge bleach-fix to the drain, dilute it with a large volume of running water to avoid corrosion of metal pipes. For more information, contact your local Kodak representative and request KODAK Publication No. CIS-104, *Materials Suitable for Use in Photographic Processing Systems.*

Cleaning Processor Tanks and Racks

Biological growth can occur in the bleach-fix and wash tanks. This is a potential source of dirt. To remove biological growth, dump the solution or wash water. Be sure that you desilver the bleach-fix before you dump it. Scrub the tanks and racks with a brush and rinse thoroughly with hot water. After scrubbing, fill the tanks with a hypochlorite solution made by adding 2 mL Clorox bleach (5.25% NaOCl) or 1 mL Sunny Sol bleach (12.5% NaOCl) per litre of water. Allow the hypochlorite solution to remain in the tanks for at least 30 minutes. Soaking the tanks overnight is even better if they contain no plastic or rubber materials; hypochlorite will damage them with prolonged soaking. If you soak the tanks overnight, remove the racks from the tanks. After this treatment, discharge the hypochlorite solution directly to the sewer, and then rinse the tanks two or three times with plenty of water.

HOW CAN I CHECK MY CHEMICALS AND MIXES?

Fresh EKTACHROME R-3 and R-3000 Chemical concentrates have a characteristic appearance and odor. Checking the appearance and odor may indicate whether the concentrate has been stored improperly. Table 5 summarizes the characteristics of EKTACHROME R-3 and R-3000 Chemicals.

You Can Check Your Mixes with Specific-Gravity Measurements

Specific gravity is the ratio of the mass of a liquid to the mass of an equal volume of water at a specific temperature. It provides a convenient way to measure the total dissolved material in a solution and check the concentration of solutions. The primary use of specific-gravity measurements for Process R-3 is to check for mixing errors and to monitor the tank solutions to detect problems that can affect the concentration of the solutions (evaporation, under- or over-replenishment, squeegee efficiency, leaks, etc).

Table 5

Characteristics of KODAK EKTACHROME R-3 and R-3000 Chemical Concentrates

Concentrate	Part	Normal Appearance	Comments*
First Developer and First Developer II Replenisher	—	Clear, light yellow to light brown	Darkens with age. Do not use if the concentrate turns opaque or dark brown or contains a precipitate. Below 5°C (41°F), a heavy precipitate may form. The precipitate will **not** redissolve at room temperature.
Color Developer and Color Developer II Replenisher	A	Clear, colorless to yellowish	Stable. Cloudy at –20°C (–4°F); turns transparent at room temperature.
	B	Clear, yellowish	Darkens with age. Becomes a solid at –20°C (–4°F); redissolves at room temperature.
	C	Clear, colorless	Stable. Liquid at –20°C (–4°F).
First Developer II Starter	—	Clear, Colorless	Liquid at –20°C (–4°F).
Color Developer II Starter	—	Clear, colorless	Liquid at –20°C (–4°F).
Bleach-Fix and Bleach-Fix II Replenisher	A	Clear, light yellow	Stable. Becomes a solid at –20°C (–4°F).
	B	Clear, dark red	Stable. Becomes a solid at –20°C (–4°F).

* See page 9 for recommended storage conditions.

***Measuring Specific Gravity*—**To make specific-gravity measurements of your Process R-3 solutions, use any hydrometer that meets the standard ASTM E100-81. To measure the specific gravity of the color developer, use a hydrometer graded from 1.000 to 1.050. For the first developer and bleach-fix, use a hydrometer graded from 1.050 to 1.100. Although most hydrometers are calibrated at 16°C (60°F), you can use them at other temperatures. To measure specific gravity:

1. Place a 250 mL graduated cylinder or similar-sized container on a level surface. Fill it with enough solution so that it will overflow the container when you insert the hydrometer Never place the hydrometer directly into the processing tank to make measurements; a broken hydrometer can contaminate the processor.
2. Specific gravity varies considerably with temperature. Adjust the solution temperature to 25±1°C (77±2°F), or 38±1°C (100.4±2°F).
3. Carefully *clean and dry* the hydrometer and slowly lower it into the container. The hydrometer must not rest on the bottom of the container.
4. Read the specific-gravity value at the top or the bottom of the meniscus as recommended by the hydrometer manufacturer.

Acceptable Specific-Gravity Measurements for Process R-3 Solutions

Table 6 lists typical specific gravities for fresh mixes of KODAK EKTACHROME R-3 Chemicals. The acceptable range for the specific gravity of a fresh tank or a replenisher tank solution is ±0.003. The figures for a seasoned tank are guides only and can vary slightly from one processor to another.

HOW SHOULD I STORE MY CHEMICAL CONCENTRATES AND SOLUTION MIXES?

Proper storage of your concentrates and solutions directly affects the quality of your finished prints. Store your unmixed concentrates at 5 to 30°C (41 to 86°F) in a dry location. Below 5°C (41°F), a heavy precipitate will form in the First Developer Replenisher. This precipitate will **not** redissolve at room temperature. To check if your chemicals may have been affected by poor storage, see Table 5.

Store mixed solutions in polyethylene storage tanks at temperatures between 5 and 30°C (41 and 85°F). If you store your replenisher solutions at temperatures lower than 16°C (60°F), be sure to warm them before use or they may affect the processing temperature. Storing them at too high a storage temperature will accelerate oxidation and evaporation. Below 5°C (41°F), crystals may form in the tanks. Equip the storage tanks with floating lids and dust covers to prevent dust and dirt from getting into the solutions. *Do not* use solutions stored for longer than the times given in Table 7.

The tank-solution storage recommendations apply to processors in which the transport and chemical recirculation systems are shut off during periods of inactivity. Operating roller, belt, or chain drives and recirculation pumps increases aerial oxidation, and significantly reduces solution storage life. To extend solution life, turn off the transport and recirculation systems when paper is not being processed.

Table 7

Solution Storage Times

Solution	Tank Solution in Processor with No Operation	Replenisher in Covered Storage Tank with Floating Lid
First Developer	2 weeks	6 weeks
Color Developer	2 weeks	4 weeks
Bleach-Fix	3 weeks	6 weeks

Table 6

Acceptable Specific-Gravity Measurements for Process R-3 Solutions

				R-3 Bleach-Fix II, Tank 1		R-3 Bleach-Fix II, Tank 2	
Solution	**R-3 First Developer II**	**R-3 First Developer LU***	**R-3 Color Developer II**	**(Chalon–100L & 3x400L)**	**(USA & Australia Chalon–2x25L)**	**(Chalon–100L & 3x400L)**	**(USA & Australia Chalon–2x25L)**
Measurement at 25±1°C (77±2°F)							
Fresh Tank	1.061	NA†	1.032	1.092	1.098	1.092	1.098
Seasoned Tank**	1.065	1.075	1.036	1.087	1.090	1.094	1.099
Replenisher‡	1.061	1.071	1.040	1.092	1.098	1.092	1.098
Measurement at 38±1°C (100.4±2°F)							
Fresh Tank	1.058	NA†	1.029	1.089	1.095	1.089	1.095
Seasoned Tank**	1.062	1.072	1.033	1.084	1.087	1.091	1.096
Replenisher‡	1.058	1.068	1.037	1.089	1.095	1.089	1.095

* R-3 LU Chemicals may not be available outside of the European market area.
† *Do not* use R-3 Developer Replenisher LU to make a fresh tank solution.
**These figures can vary slightly from one processor to another depending on the amount of evaporation and the efficiency of the squeegees.

HOW CAN I DISPOSE OF *EKTACHROME* R-3 CHEMICALS AND PROCESSING EFFLUENT?

Effluent from Process R-3 consists of normal amounts of developer, desilvered bleach-fix and wash water. This effluent is compatible with and effectively treated by a municipal secondary wastewater treatment plant. Photographic effluent is considered an industrial waste discharge. Most municipalities require a permit to discharge such waste to a municipal sewer system. Batch discharges directly to a septic system generally are not recommended. Federal, state, and local effluent regulations take precedence. Contact the appropriate authorities to determine the requirements in your area for the discharge, treatment, or disposal of solutions. Effluent from Process R-3 has these characteristics:

pH	**6.5 to 9**
Temperature	Less than 30°C (86°F)
Suspended solids	Less than 50 mg/L
Oils, greases, detergents	None
Flammable, explosive, or toxic materials	None

Keep the discharge of photographic chemicals as low as possible by using squeegees where they are recommended, and by using the correct replenishment rates. Avoid making batch discharges, such as tank dumps, unless absolutely necessary. If you must discharge a large amount of chemicals at one time, adjust the pH and discharge them slowly along with your normal processing effluent.

Silver is present in the effluent in the very stable form of silver thiosulfate complex, which has a very low order of toxicity for both biological treatment systems and aquatic organisms. Secondary biological treatment plants convert the silver thiosulfate complex to insoluble silver sulfide, which is removed by the solids-removal operation of the treatment plant.

Consider silver recovery as a part of your normal processing. The primary silver-recovery recommendation for Process R-3 chemicals is to use an electrolytic recovery cell, and tail it with a chemical recovery cartridge. If your municipality's sewer code limits silver to 1 mg/L or less, you may need to consider using an ion-exchange silver-recovery method. For more information on recovering silver from Process R-3, see KODAK Publication No. Z-129G, *Recovering Silver from Processes Using KODAK EKTACHROME R-3 Chemicals.* For information on choosing a silver-recovery method see KODAK Publication No. J-21, *CHOICES—Choosing the Right Silver Recovery Method for Your Needs.*

If you have questions about discharging KODAK EKTACHROME R-3 Chemicals or other environmental concerns about Kodak chemicals, contact Kodak in your area for assistance.

SIMPLIFIED METRIC CONVERSION TABLES

Because most laboratory measuring devices are calibrated in metric units, this summary includes tables for converting U.S. units of volume, length, and weight to metric units. *Do not* use these tables to convert from metric to U.S. values. Accuracy is within one percent. This degree of accuracy is adequate for most measurements in a photoprocessing laboratory (e.g., replenishment rates, safelight distances, equipment location, etc). To use the first four tables, find the amount you are converting at the top of the table for amounts from 1 to 9. For amounts greater than 9, find the amount you are converting by using a combination of the amount at the left side of the table and the amount at the top.

U.S. Gallons to Litres

gal.	0	1	2	3	4	5	6	7	8	9
0	—	3.8	7.6	11.4	15.1	18.9	22.7	26.5	30.3	34.1
10	37.8	41.6	45.4	49.2	53	56.8	60.6	64.4	68.1	71.9
20	75.7	79.5	83.3	87.1	90.8	94.6	98.4	102.2	106	107.8
30	113.6	117.3	121.1	124.9	128.7	132.5	136.3	140.1	143.8	147.6
40	151.4	155.2	159	162.8	166.6	170.3	174.1	177.9	181.7	185.5

U.S. Fluidounces to Millilitres

fl. oz.	0	1	2	3	4	5	6	7	8	9
0	—	29.5	59	89	118	148	177	207	237	265
10	295	325	355	385	415	445	475	500	530	560
20	590	620	650	680	710	740	770	800	830	860
30	890	920	950	980	1006	1035	1065	1094	1124	1153

Inches to Centimetres

in.	0	1	2	3	4	5	6	7	8	9
0	—	2.5	5.1	7.6	10.2	12.7	15.2	17.8	20.3	22.9
10	25.5	28	30.5	33	35.5	38	40.5	43	45.5	48.5
20	51	53	56	58	61	64	66	69	71	74
30	76	79	81	84	86	89	91	94	97	99

Ounces to Grams

oz.	0	1	2	3	4	5	6	7	8	9
0	—	28.5	57	85	113	142	170	198	227	255
10	285	310	340	370	395	425	455	480	510	540
20	570	600	620	650	680	710	740	770	790	820
30	850	880	910	940	960	990	1021	1049	1077	1106

Temperature Conversion Table

For temperatures not shown in this table, use the following calculation:

1. To convert to degrees Celsius, add 40 to the Fahrenheit temperature, multiply by 5⁄9 and then subtract 40 from that result.
2. To convert to degrees Fahrenheit, add 40 to the Celsius temperature, multiply by 9⁄5 and then subtract 40 from that result.

to °C	°F or °C	to °F	to °C	°F or °C	to °F
37.78	100	212.0	1.67	35	95.0
37.22	99	210.2	1.11	34	93.2
36.67	98	208.4	0.56	33	91.4
36.11	97	206.6	0.00	32	89.6
35.56	96	204.8	–0.56	31	87.8
35.00	95	203.0	–1.11	30	86.0
34.44	94	201.2	–1.67	29	84.2
33.89	93	199.4	–2.22	28	82.4
33.33	92	197.6	–2.78	27	80.6
32.78	91	195.8	–3.33	26	78.8
32.22	90	194.0	–3.89	25	77.0
31.67	89	192.2	–4.44	24	75.2
31.11	88	190.4	–5.00	23	73.4
30.56	87	188.6	–5.56	22	71.6
30.00	86	186.8	–6.11	21	69.8
29.44	85	185.0	–6.67	20	68.0
28.89	84	183.2	–7.22	19	66.2
28.33	83	181.4	–7.78	18	64.4
27.78	82	179.6	–8.33	17	62.6
27.22	81	177.8	–8.89	16	60.8
26.67	80	176.0	–9.44	15	59.0
26.11	79	174.2	–10.00	14	57.2
25.56	78	172.4	–10.56	13	55.4
25.00	77	170.6	–11.11	12	53.6
24.44	76	168.8	–11.67	11	51.8
23.89	75	167.0	–12.22	10	50.0
23.33	74	165.2	–12.78	9	48.2
22.78	73	163.4	–13.33	8	46.4
22.22	72	161.6	–13.89	7	44.6
21.67	71	159.8	–14.44	6	42.8
21.11	70	158.0	–15.00	5	41.0
20.56	69	156.2	–15.56	4	39.2
20.00	68	154.4	–16.11	3	37.4
19.44	67	152.6	–16.67	2	35.6
18.89	66	150.8	–17.22	1	33.8
18.33	65	149.0	–17.78	0	32.0
17.78	64	147.2	–18.33	–1	30.2
17.22	63	145.4	–18.89	–2	28.4
16.67	62	143.6	–19.44	–3	26.6
16.11	61	141.8	–20.00	–4	24.8
15.56	60	140.0	–20.56	–5	23.0
15.00	59	138.2	–21.11	–6	21.2
14.44	58	136.4	–21.67	–7	19.4
13.89	57	134.6	–22.22	–8	17.6
13.33	56	132.8	–22.78	–9	15.8
12.78	55	131.0	–23.33	–10	14.0
12.22	54	129.2	–23.89	–11	12.2
11.67	53	127.4	–24.44	–12	10.4
11.11	52	125.6	–25.00	–13	8.6
10.56	51	123.8	–25.56	–14	6.8
10.00	50	122.0	–26.11	–15	5.0
9.44	49	120.2	–26.67	–16	3.2
8.89	48	118.4	–27.22	–17	1.4
8.33	47	116.6	–27.78	–18	–0.4
7.78	46	114.8	–28.33	–19	–2.2
7.22	45	113.0	–28.89	–20	–4.0
6.67	44	111.2	–29.44	–21	–5.8
6.11	43	109.4	–30.00	–22	–7.6
5.56	42	107.6	–30.56	–23	–9.4
5.00	41	105.8	–31.11	–24	–11.2
4.44	40	104.0	–31.67	–25	–13.0
3.89	39	102.2	–32.22	–26	–14.8
3.33	38	100.4	–32.78	–27	–16.6
2.78	37	98.6	–33.33	–28	–18.4
2.22	36	96.8	–33.89	–29	–20.2

KODAK CHEMICALS OFFER YOU MORE

When you use Kodak chemicals according to the instructions and the information given in this publication, your processing solutions will give you the highest quality with your equipment. Remember that good quality begins with the right chemicals, but proper mixing, good housekeeping, and safe handling are necessary to get the most out of your chemicals. If you have questions about KODAK EKTACHROME R-3 or R-3000 Chemicals that are not covered in this publication, please contact your Kodak representative.

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*

Consumer Imaging
EASTMAN KODAK COMPANY • ROCHESTER, NY 14650

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