Preparing Smaller-Than-Package-Size Amounts of KODAK Processing Chemicals

Kodak

CURRENT INFORMATION SUMMARY

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SPLITTING PACKAGED CHEMICAL AMOUNTS—*YOUR DECISION*

You will get the best, most consistent results from Kodak chemicals by mixing them to produce the full volume marked on the package. Kodak supplies photographic chemicals in a variety of sizes to make it easy to choose the volume you need. However, you may want to mix chemicals in amounts that are more suitable for your conditions. Although we do not recommend mixing smaller volumes, we provide this information to simplify calculations. If you measure the chemicals and follow the mixing directions carefully, you should obtain the same results produced by a mix made with the entire package. The information provided here applies to splitting liquid chemicals only.

DIVIDING PACKAGED CHEMICALS

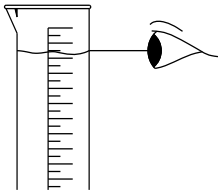
Use one of the following methods. When you select a method, consider the one that offers sufficient protection against oxidation for your needs. These methods are listed in order of preference.

1. Draw off the chemicals from flexible plastic containers stored in an inverted position. Flexible containers stored in this manner keep air and other vapors from coming into contact with the concentrate.
2. Divide the concentrate into smaller amounts and store them in full stoppered bottles for use as needed.
3. Take the portions from the original bottle as needed. *This method has the greatest potential for oxidation.*

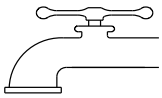
If you use method 2 or 3, be sure to use the entire amount within two weeks. This is particularly important with developers or other solutions that are very susceptible to oxidation.

MIXING CHEMICALS

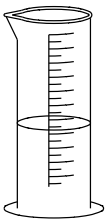
Some basic techniques are important when you mix any photographic chemicals.



Accurate Measurement is essential. Always read the liquid level at the bottom of the meniscus.



Rinse each container or graduate with a small amount of water and add the rinse water to the mix.



Protect Against Oxidation by storing the unused concentrate properly.

Discard excess concentrate that you draw off accidentally. **Do not** return it to the original container; it can be a source of contamination.

Always add concentrate to the water—never add water to the concentrate.

Use metric measurements whenever possible. The most accurate and widely available measuring devices are calibrated in metric measurements.

Do not split packages of dry chemicals. The components of dry chemicals may not be uniform within the batch.

HOW TO USE THE TABLES

For each chemical, the number of mililitres per litre (mL/L) are given. For larger volumes, use the following conversion factors:

3785 mL	= 1 gal (U.S.)
3.785 L	= 1 gal (U.S.)
1000 mL	= 1 L
29.57 mL	= 1 fl oz
128 fl oz	= 1 gal (U.S.)

Example:

Suppose you have a package of KODAK FLEXICOLOR Developer Replenisher to make 25 U.S. gallons, but you need only 8 gallons. This is how you would determine the amount of each part to use:

1. Find the table for mixing FLEXICOLOR Developer Replenisher from replenisher concentrate (Table 1).
2. Read across the row for 25, 75 gallons of FLEXICOLOR Developer Replenisher. It indicates to start with 700 mL of water at 21 to 38°C (70 to 100°F) for each litre of developer replenisher you prepare.
3. To the water, add 80.0 mL/L of Part A, 9.37 mL/L of Part B, and 10.0 mL/L of Part C. Using these numbers as the basis for calculating the amount of concentrate needed for 8 gallons, multiply each number by

   3.785 L x 8 gal. = 30.28 L

   The starting volume of water is
   700 x 30.28 = 21196 mL or 21.196 L.
   Round this to 21.2 L

   Part A: 80.0 x 30.28 = 2422.4 mL or 2.4224 L
   Round this to 2.42 L

   Part B: 9.37 x 30.28 = 283.72 mL, rounded to 283.7 mL

   Part C: 10.0 x 30.28 = 302.8 mL (No rounding needed.)

Therefore, to make an 8-gallon mix, begin with 21.2 L of water and add 2.42 L of Part A, 283.7 mL of Part B, and 302.8 mL of Part C. Complete the mix by adding water to bring the final volume to 8 gallons. Check the instructions packed with the chemicals for mixing times and other information.

Rounding (reducing the decimal places to a reasonable number) before the final step in the calculation and using inaccurate factors are potential sources of error when you split larger sizes to make smaller mixes. Use only the conversion factors given in the following pages to make your calculations.

Table 1: Preparing Replenisher Solutions from Replenisher Concentrates, Process E-6

KODAK Chemical	Package Size	Mixing Temperature C° (F°)	Starting Water (mL)	Part A (mL)	Part B (mL)	Part C (mL)	Additive (mL)	Add Water to Make
First Developer Replenisher	10 L 5 gal, 25 gal AR	20–40 (68–104)	700 750	200.0 200.0	—	—	—	1 L
Reversal Bath and Replenisher	10 L 5, 25, and 100 gal AR	20–40 (68–104)	750	50.0	—	—	—	1 L
Color Developer Replenisher	10 L 5 gal 25 gal AR	20–40 (68–104)	500 500	200.0 200.0 200.0	71.0 50.0 200.0	— —	— —	1 L 1 L
Color Developer Replenisher LORR	25 gal AR	20–40 (68–104)	500	200.0	200.0	—	—	1 L
Pre-Bleach and Replenisher	10 L 5, 50 gal AR	20–40 (68–104)	750	100.0	—	—	—	1 L
Bleach Replenisher	10 L, 5 gal AR	20–40 (68–104)	—	1000.0*	—	—	—	1 L
Fixer and Replenisher (4 min)	10 L, 5, 25 gal, and 50 gal AR	20–40 (68–104)	750	100.0	—	—	—	1 L
Fixer and Replenisher (2 or 3 min)	10 L, 5, 25 gal, 50 gal AR	20–40 (68–104)	750	125.0	—	—	—	1 L
Final Rinse and Replenisher	10 L, 5, 25 gal 500 gal AR	20–40 (68–104)	800	10.0	—	—	—	1 L

* Use full strength (1000 mL), or dilute 667 mL bleach replenisher with 333 mL water for 6-minute bleach. (See KODAK Publication No. Z-119.)

Table 2: Preparing Replenisher Solutions from Replenisher Concentrates, FLEXICOLOR (Process C-41)

KODAK Chemical	Package Size	Mixing Temperature C° (F°)	Starting Water (mL)	Part A (mL)	Part B (mL)	Part C (mL)	Additive (mL)	Add Water to Make
Developer Replenisher	5 gal 25 gal	27–32 (80–90)	700 700	75.0 80.0	12.5 9.37	11.73 10.0	— —	1 L 1 L
Developer LU Replenisher LORR	5 L, 10 L	21-37.8 (70-100)	800	80.0	22.4	11.2	—	1 L
Developer Replenisher LORR	5, 10 L, 25 gal (two 12.5 gal)	21–37.8 (70–100)	800	80.0	11.2	11.2	—	1 L
Bleach III Replenisher	12.5 gal	37.8–43 (100–110)	330	200.0	400.0	—	—	1 L
RA Bleach Replenisher NR	5 L	Ready-to-use solution						
Bleach III Regenerator	5, 25 (two 12.5-gal mixes) gal		1000 bleach overflow	60.0	—	—	—	—
Fixer and Replenisher	25 gal	27–32 (80–90)	700	200.0	—	—	—	1 L
ELECTROSILVER Fixer and Replenisher LORR	75 gal	21–27 (70–80)	500	400.0	—	—	—	1 L
RA Fixer and Replenisher	5, 10 L	21–37.8 (70–100)	500	500.0	—	—	—	1 L
Final Rinse	5, 10 L 75 gal	21–37.8 (70–100)	800	9.0	—	—	—	1 L

Table 3: Preparing Replenisher Solutions from Replenisher Concentrates, EKTACOLOR (Process RA-4)

KODAK Chemical	Package Size	Mixing Temperature C° (F°)	Starting Water (mL)	Part A (mL)	Part B (mL)	Part C (mL)	Additive (mL)	Add Water to Make
PRIME SP Developer Replenisher LORR	10 L, 10 gal	21–37.8 (70–100)	700	130	—	—	—	1 L
Note: With PRIME SP Developer Replenisher LORR, rinse the measuring graduate (or concentrate bottle on last mix) with water to ensure all of the concentrate is used.								
Developer Replenisher	25 gal 75 gal	21–37.8 (70–100)	700 700	50.0 50.0	42.28 33.0	50.0 50.0	— —	1 L 1 L
Developer Replenisher RT	10 L 25, 75 gal	27–32 (80–90)	800 800	50.0 50.0	22.2 30.0	50.0 50.0	— —	1 L 1 L
Developer Replenisher RT with Additive	10 L 25, 75 gal	27–32 (80–90)	800 800	40.0 40.0	17.8 24.0	40.0 40.0	24.0* 24.0*	1 L 1 L
Developer Replenisher RT with Additive	10 L 25, 75 gal	27–37.8 (70–100)	219 mL 2190 mL	1000 mL mixed replenisher 10 L mixed replenisher			31* 310*	Makes 1.250 L Makes 12.5 L
Digital Developer Replenisher RT	50 gal	21-37.8 (70-100)	700	100	100	—	—	1 L
RA Developer Replenisher, 12	150 gal	21–37.8 (70–100)	700	26.7	26.7	66.7	—	1 L
RA Developer Regenerator, 12/55	150 gal 55 gal drums	21–37.8 (70–100)	550 developer overflow	26.7	16.7	26.7	—	1 L†
PRIME SP Bleach-Fix Replenisher LORR	5, 10 L	21–37.8 (70–100)	500	500	—	—	—	1 L
Bleach-Fix and Replenisher	10 L 25 gal	21–37.8 (70–100)	658 500	142.0 142.0	200.0 200.0	— —	— —	— 1 L
Bleach-Fix and Replenisher with Additive	10 L, 25 gal	21–37.8 (70–100)	500	142.0	200.0	—	15.0‡	1 L
RA Bleach-Fix and Replenisher NR	20 gal 208 gal	21–37.8 (70–100)	400 400	250.0 250.0	181.0 128.0	23.44 23.44	— —	1 L 1 L
Bleach-Fix Regenerator II	100 gal	21–37.8 (70–100)	910 desilvered bleach-fix overflow	51.2	32	—	—	—§
PRIME Stabilizer and Replenisher LORR	10 L 12.5, 100 gal	21–37.8 (70–100)	988 991	12.0 9.0	—	—	—	1 L 1 L

* RA Developer Replenisher Addditive, CAT No. 122 4930.

† Adjust pH of regenerated replenisher to 10.75–10.85.

‡ RA Bleach-Fix Additive, CAT No. 803 6832.

§ Adjust pH of regenerated replenisher to 7.0 ±0.5.

Table 4: Preparing Tank Solutions from Replenisher Solutions

Chemical	Start with This Amount of Replenisher (mL)	Add This Amount of Water (mL)	Add This Amount of Starter (mL)	To Prepare This Amount of Tank Solution
Process E-6				
First Developer	950	50	6.0*	1 L
Reversal Bath	800	200	—	1 L
Color Developer	850	150	5.0†	1 L
Color Developer Replenisher LORR	750	250	9.0†	1 L
Pre-Bleach	Use mixed replenisher as tank or replenisher solution.			
Bleach 4 min	600	380	20.0‡	1 L
6 min	500	480	20.0‡	1 L
Fixer	Use mixed replenisher as tank or replenisher solution.			
Final Rinse	Use mixed replenisher as tank or replenisher solution. Do not use with Process C-41.			
FLEXICOLOR (Process C-41)				
Developer	860	126	14.0§	1 L
AR Developer	860	126	14.0§	1 L
Developer LORR & Developer LU LORR	763	207	30.0¶	1 L
Bleach III Replenisher	870	80	50**	1 L
RA Bleach Replenisher NR	880	—	120**	1 L
Fixer and Replenisher	862	138	—	1 L
RA Fixer and Replenisher	Use mixed replenisher as tank or replenisher solution.			
ELECTROSILVER Fixer and Replenisher LORR	750	250	—	1 L
Final Rinse	Use mixed replenisher as tank or replenisher solution.			—
EKTACOLOR RA (Process RA-4)				
Developer Replenisher	700	275	25.0††	1 L
Developer Replenisher RT	800	175	25.0††	1 L
Digital Developer Replenisher RT	700	275	25.0††	1 L
Developer Replenisher, 12	600	370	30.0††	1 L
PRIME SP Developer Replenisher LORR	500	455	45.0††	1 L
PRIME Bleach-Fix Replenisher LORR	950	—	50‡‡	1 L
Bleach-Fix	Use mixed replenisher as tank or replenisher solution.			
Bleach-Fix Replenisher NR	500	500	—	1 L
PRIME Stabilizer and Replenisher LORR	Use mixed replenisher as tank or replenisher solution.			

* First Developer Starter, Process E-6, CAT No. 167 1577.

† Color Developer Starter, Process E-6, CAT No. 156 4012.

‡ Bleach Starter, Process E-6, CAT No. 177 9792.

§ FLEXICOLOR Developer Starter, CAT No. 195 3009.

¶ FLEXICOLOR Developer Starter LORR, CAT No. 848 5153.

** FLEXICOLOR Bleach Starter, 1-gal concentrate, CAT No. 856 6796.

†† EKTACOLOR RA Developer Starter, CAT No. 102 6681.

‡‡ EKTACOLOR PRIME SP Bleach-Fix Starter, CAT No. 834 1133.

Preparing Smaller-Than-Package-Size Amounts of KODAK Processing Chemicals

STORING AND HANDLING *KODAK* PHOTOGRAPHIC CHEMICALS

Unopened Chemicals—Processing chemicals in the original unopened containers are the easiest to handle and store. Follow the recommendations on the package. Avoid storing dry chemicals on floors that are damp or susceptible to water overflows from sinks, clogged drains, etc. Store unopened chemicals on a wooden platform about four inches high.

Storage Temperature—Store chemicals at 7.2 to 30°C (45 to 86°F). Below that temperature range, ingredients in liquid concentrates may come out of solution or crystallize. Higher temperatures accelerate chemical reactions and cause deterioration. As a general rule, every increase of 5.5°C (10°F) over 30°C (86°F) will double reaction rates.

Store chemicals in a cool, dry place. In warm climates, storage temperatures of 60°C (140°F) can make chemicals unusable in just a few days. This applies to almost all processing chemicals, with the possible exception of stop bath, which is not as affected by heat.

Working Solutions and Oxidation—Once the original container is opened, the chemicals are exposed to oxidation. Reaction of chemicals, especially developers, with oxygen in the air will gradually cause them to deteriorate. Oxidation continues to some extent even if the container is immediately resealed. You can reduce oxidation by storing working solutions in amounts that can be used all at one time. For example, if you open a 10-gallon-size package, mix the entire amount, and then store the solution in 1-gallon containers. Then, each time you open a container you can use the entire amount, and the remaining mix is not exposed to air.

Chemical Containers—When you use plastic bottles to store working solutions, fill the bottle to the top and cap it tightly to exclude air completely. The best way to do this is to squeeze the bottle gently before you cap it to raise the chemical level to the top of the neck.

When you fill glass bottles, leave a small amount of air at the top of the neck before capping. This is necessary because chemical expansion due to temperature or pressure changes can cause a completely filled glass bottle to burst. Glass, however, is preferable to plastic for storing photographic chemicals for long periods because air can slowly penetrate plastic.

Flexible plastic containers stored in a cardboard box can minimize oxidation. The plastic container collapses as chemicals are removed, thereby minimizing the amount of air in the container. With rigid bottles and drums, air remains inside, causing oxidation. With drums, you must consider the method of dispensing the chemicals. A drum stored on its side will expose a greater liquid surface area to the air than a drum stored upright. No container can completely stop aerial oxidation; it can only minimize it.

Liquid and Dry Chemicals—Dry chemicals have a longer shelf life than liquid concentrates, and both unopened dry chemicals and liquid concentrates keep considerably longer than working solutions. For that reason, mix the smallest amount of working solution that you will need for your processing conditions.

Liquid chemical concentrates are uniform throughout. You can use small portions as needed to mix any amount of working solution. However, with dry chemicals, mix the entire contents at one time because the chemicals are not uniform throughout. Shipping and handling will cause the ingredients to settle in different ways. As a result, working solutions made from portions of dry packaged chemicals may be nonuniform and inconsistent. Once dry chemicals are converted to liquid working solutions, you can then subdivide them for use and storage.

Read the Mixing Instructions—The most up-to-date source of information on mixing and storing chemicals is the instructions provided with each chemical. Instructions are written to provide you with accurate information. Follow instructions carefully to save money.

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