



USING

KODAK EKTACHROME R-3 LU Chemicals in Roller-Transport Processors

This publication gives the steps, conditions, and replenishment rates for using KODAK EKTACHROME R-3 First Developer Replenisher LU, KODAK EKTACHROME R-3 Color Developer II Replenisher (2x25 L size), and KODAK EKTACHROME R-3 Bleach-Fix II Replenisher (1x25 L size) in roller-transport processors.

These chemicals are designed primarily for use in roller-transport processors with utilization rates of 5 percent or less. Note that these chemicals may not be available outside the European market area.

KODAK EKTACHROME R-3 First Developer Replenisher LU

Use this chemical only to prepare a replenisher solution.

Do not use this developer replenisher to prepare a Process R-3 first developer tank solution; use *only* KODAK EKTACHROME R-3 First Developer II Replenisher.

If the EKTACHROME R-3 First Developer Replenisher LU is used to prepare a tank solution, there will be an increase in speed and a loss of maximum density. To prepare 1 litre of tank solution, use 995 mL of KODAK EKTACHROME R-3 First Developer II Replenisher plus 5 mL of KODAK EKTACHROME R-3 First Developer II Starter.

Do not use EKTACHROME R-3 First Developer Replenisher LU in processors with utilizations *higher* than 5 percent. This developer is available in Europe in a package to make two 20-litre mixes.

KODAK EKTACHROME R-3 Color Developer II Replenisher (2x25 L size)

Use this developer replenisher to prepare either a tank solution or a replenisher solution. It is available in a package to make two 25-litre mixes. To prepare a tank solution, add KODAK EKTACHROME R-3 Color Developer II Starter according to the directions on the starter container.

NOTE: It is important that you use the correct starter with the appropriate replenisher when making either first or color developer working tank solutions.

KODAK EKTACHROME R-3 Bleach-Fix II and Replenisher (1x25 L size) You may use this bleach-fix as either a tank solution or a replenisher solution. It is available in a size to make 25 litres.

WHEN SHOULD YOU USE KODAK EKTACHROME R-3 LU CHEMICALS?

Use these chemicals if you have a roller-transport processor with a utilization of 5 percent or less and you cannot maintain process control with the regular EKTACHROME R-3 Chemicals. Roller-transport processors with very low utilization may require replacement of the first developer and/or the colour developer and/or the bleach-fix tank solutions after several weeks' use.

HOW DO YOU CALCULATE PROCESSOR UTILIZATION?

Utilization is the amount of material actually processed compared to the amount that could have been processed if the processor had operated at maximum capacity during the hours it was at operating temperature during the week. Utilization is expressed as a percent of the capacity. The utilization rate may change from day to day, according to the amount of production. The recommendations given for EKTACHROME R-3 LU Chemicals are based on an average rate of utilization calculated over a period of *at least* one week. Day-to-day changes in the utilization rate are tolerable providing the variation in production remains between one half to double the average amount. If the production exceeds that range, an excessive amount of process variability may occur. If the rate of utilization changes significantly for an extended period, then recalculate the utilization and adjust the replenishment rates accordingly. If the percent utilization increases to greater than 5 percent, use EKTACHROME R-3 First Developer II Replenisher instead of EKTACHROME R-3 First Developer Replenisher LU. Between 5 and 10 percent utilization, apply the recommendations in section Z-129B, under "Compensating for Low Utilization" (page 8). You can use KODAK EKTACHROME R-3 Color Developer II Replenisher (2x25 L size) and KODAK EKTACHROME R-3 Bleach-Fix II and Replenisher (1x25 L size) at utilization rates *higher* than 5 percent.

To determine the percent utilization of your processor, first calculate capacity by using the following formula.

$$C = W \times S \times T \times N \times 60$$

Where:

- C = maximum *capacity* of processor per work week in square metres
- W = maximum product *width* in metres that can be processed
- S = processor *transport speed* in metres per minute
- T = number of hours that the processor is heated to operating *temperature* each day
- N = *number of days* worked per week
- 60 = the number of minutes in an hour

Example:

A lab has a processor that has a transport speed of 1.18 metres/minute and can process a maximum width of 0.60 metres. The lab operates five days a week and keeps the processor at operating temperature for 12 hours each day. The capacity of this processor would be:

$$0.60 \times 1.18 \times 12 \times 5 \times 60 = 2,549 \text{ square metres/week}$$

Once you have calculated capacity, calculate *utilization* using the following formula:

$$U = \frac{A}{C} \times 100$$

Where:

- U = percent *utilization*
- A = *average area* of product processed per week in square metres
- C = *maximum capacity* of processor per work week in square metres

Example:

Determine the value of A by recording the amount of product processed over a typical week. In this example, the lab typically processes about 120 square metres/week. Use that figure for your final calculation of the percent utilization of the processor.

$$U = \frac{120}{2,549} \times 100 = 4.7\%$$

Replenishment Rates

After calculating the percent utilization of your processor, set the replenishment rates. The rates given in Table 1 are starting points; you may need to adjust them for your type of processor and other variables of the processing system. You can use these replenishment rates as long as the control plots indicate that the process is in control, and there are no dirt problems from the solutions. However, at utilizations lower than 1 percent, the evaporation and oxidation is usually too great to maintain process stability beyond several weeks. If your processor has less than 1 percent utilization, either routinely replace the solutions every few weeks, or use the replenishment recommendations for 1 percent and replace the solutions when the process begins to drift out of control.

If your processor has low oxidation, you may be able to use rates 10 to 20 percent *lower* than those given in the table. For consistent process control, choose the conditions for the lowest utilization you encounter over a one-week period. Other than replenishment rates, the processing steps and conditions for roller-transport processors that use KODAK EKTACHROME R-3 LU Chemicals are the same as those given for EKTACHROME R-3 Chemicals. Those steps and conditions are given in Table 1 of KODAK Publication Z-129B, *Using KODAK EKTACHROME R-3 Chemicals in Continuous and Roller-Transport Processors*.

Table 1

Replenishment and Wash Rates for KODAK EKTACHROME R-3 LU Chemicals

Solution	Percent Utilization				
	5%	4%	3%	2%	1%
	mL/m ²				
EKTACHROME R-3 First Developer Replenisher LU	300	350	400	450	500
First Wash	5000	5000	5000	5000	5000
EKTACHROME R-3 Color Developer II Replenisher* (2x25 L size)	400	470	520	600	660
Second Wash	1000	1000	1000	1000	1000
EKTACHROME R-3 Bleach-Fix II and Replenisher** (1x25 L size)	330	330	330	330	330
Final Wash	5000	5000	5000	5000	5000

* The color-developer rate must be 1.33 times the first developer rate.

**For simplified processors with single bleach-fix tank or two bleach-fix tanks plumbed in parallel, the bleach-fix rate is 500 mL/m².

KODAK EKTACHROME RADIANCE Overhead and Display Materials—KODAK EKTACHROME RADIANCE Overhead and Display Materials require higher replenishment rates than EKTACHROME RADIANCE Paper. However, you can process EKTACHROME RADIANCE Overhead and Display Materials without increasing replenishment rates if the amount of material processed is less than 10 percent of the total processing load. If the area of KODAK EKTACHROME RADIANCE Overhead and Display Materials you process is equal to or greater than 10 percent of the machine's total processing load (or if you process *only* KODAK EKTACHROME RADIANCE Overhead and Display Materials), begin with the following replenishment rates:

- ▶ First Developer: multiply the values in Table 1 by 1.5
- ▶ Color Developer: 660 mL/m² for any percent utilization
- ▶ Bleach-Fix: For any percent utilization,
 - For processors with two bleach-fix tanks in a countercurrent configuration: 500 mL/m²
 - For processors with a single bleach-fix tank or two bleach-fix tanks plumbed in parallel: 750 mL/m²

Be Sure to Top Off the Tank Solutions Each Day

If your processor has low utilization, you will probably need to compensate for evaporation and oxidation of the tank solutions. Regularly topping off the tank solutions maintains proper tank concentrations and assures overflow during processing. This helps to reduce the accumulation of oxidation by-products that can result in precipitate formation and/or stain problems. Before processing, top off solutions by adding water to the first developer to bring the tank solution up to the overflow level. For the color developer and the bleach-fix, add replenisher to bring the tank solution to the overflow level. To simplify these additions and to make the results more reproducible, you may add an amount (of water for first developer or replenisher for color developer and bleach-fix) equal to 2.5 percent of the tank volume.

Monitor these additions by routinely checking the specific gravity of the tank solutions and then adjusting the volume of your additions accordingly. In cases of extreme under-utilization (less than 1 percent), and with high temperatures, or low humidity (less than 25 percent RH), the volume added may be insufficient. In such cases, it is acceptable to increase the daily additions to equal 5 percent of the tank volume.

Maintaining the Sulfite Level of the Bleach-Fix—Low utilization can cause bleach-fix sulfurization as a result of oxidation. To avoid sulfurization problems, maintain the sodium sulfite level in the bleach-fix tank solution at 5 g/L or greater. To maintain the sulfite level in roller-transport processors with a 5 to 10 percent utilization, maintain a replenishment rate of 330 mL/m², lower the bleach-fix temperature to 30°C, and top off the bleach-fix tank solution with replenisher. For roller-transport processors with less than 5 percent utilization, you can replace the two counter-current bleach-fix tanks with a single tank. In such a case, replenish the bleach-fix at a rate of 500 mL/m², lower the bleach-fix temperature to 30°C, and top off the bleach-fix tank solution with replenisher. If this is still not sufficient, make a DAILY addition of KODAK RA-4 Bleach-Fix Additive directly to the bleach-fix tank solution. The amount of the daily addition (in mL) = 0.05 x C, where C is the WEEKLY processor capacity in square metres. The additive is packaged with the following catalog numbers in these marketing regions:

Europe	CAT No. 507 7979
United States	CAT No. 803 6832
Australia	CAT No. 400 3547

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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Using KODAK EKTACHROME R-3 LU and R-3+

Chemicals in Roller-Transport Processors

KODAK Publication No. **Z-129H**

CAT 120 2613

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Major Revision 11-97
Printed in U.S.A.