

7 ROLLER-TRANSPORT PROCESSORS

STEPS AND CONDITIONS

Table 7-1
Steps and Conditions—Roller-Transport Processors

Step	Time (Minutes:Seconds)			Temperature °C (°F)	Comments*
	Lower Limit	Aim	Upper Limit		
Perform these steps in total darkness.					
First Developer	5:00†	6:00†	7:00†	36.7 to 39.4† (98 to 103)†	R, F
Wash	1:00	2:00	4:00	33.3 to 39.4 (92 to 103)	None
Reversal Bath	1:00	2:00	4:00	24 to 39.4 (75 to 103)	None
Remaining steps can be performed in room light.					
Color Developer	5:00	6:00	7:00	36.7 to 39.4 (98 to 103)	R, F
Pre-Bleach	2:00	2:00	4:00	24 to 39.4 (75 to 103)	None
Bleach	6:00	6:00	8:00	33.3 to 39.4 (92 to 103)	Air R, F
Fixer	4:00	4:00	6:00	33.3 to 39.4 (92 to 103)	R, F
Wash	2:00	2:00	4:00	33.3 to 39.4 (92 to 103)	None
Wash	2:00	2:00	4:00	33.3 to 39.4 (92 to 103)	None
Final Rinse	0:30	1:00	4:00	Ambient	None
Dry	As needed			Up to 63 (145)	

* **F = Filtration**
R = Recirculation

† Adjust the first-developer time and/or temperature to match the aim value for the LD step densities. Once you select a first-developer time and temperature, maintain the time within ± 5 seconds and the temperature within $\pm 0.2^\circ\text{C}$ (0.3°F). If possible, keep transfer times to 30 seconds or less.

TIME AND TEMPERATURE

Adjust the developer times and temperatures until the densities of your KODAK Control Strips, Process E-6, plot within the control limits. **Do not** exceed the ranges given in Table 7-1. If you do not need to adjust the temperatures, use the midpoint of the ranges; 6 minutes at 38°C (100.4°F) for both developers. Once you have selected the times and temperatures, keep them within the following tolerances.

First Developer	Color Developer
Time: ± 5 seconds	Time: ± 5 seconds
Temperature: $\pm 0.2^\circ\text{C}$ ($\pm 0.3^\circ\text{F}$)	Temperature: $\pm 0.3^\circ\text{C}$ ($\pm 0.5^\circ\text{F}$)

RECIRCULATION

Recirculate and filter the first and color developers, bleach, and fixer to remove any dirt; even small particles of dirt can cause abrasions on the film. Recirculation also provides more uniform temperature in the developers. Recirculate the reversal bath, pre-bleach, and final rinse *only as needed*. For more information on recirculation and filtration, see section 3, “Monitoring and Controlling Processing Solutions.”

For the bleach pumps, piping, and filter container, use Type 316 stainless steel or PVC materials. For any equipment that comes in contact with the fixer, use PVC or titanium. **Do not** use copper or brass with any processing solutions.

AGITATION

In roller-transport processors, the rollers provide any agitation needed. Unless the rollers are completely submerged, they may also provide the necessary aeration for the bleach and fixer. Aerate a fresh bleach tank solution by bubbling air through it for one hour before processing film. If the processor is shut down for longer than 3 days, you may need to bubble air through the bleach before processing film to prevent leuco-cyan dye from forming.

FINAL WASH

Use two 2-minute countercurrent-flow washes. You can use a single 4-minute final wash if it is well agitated and has a water-flow rate of 80 L/m² (2 gal/ft²).

BLEACH AERATION

In many roller-transport processors, recirculation and movement of the top rollers provide solution agitation, and bleach and fixer aeration. You may have to provide more aeration if the rollers in your processor do not provide adequate aeration. A low red density in the D-max control plot indicates insufficient aeration; high densities of the transparencies will appear red. We strongly recommend that you aerate the bleach in roller-transport processors.

REPLENISHMENT RATES

See Table 7-2 for the replenishment rates for roller-transport processors.

SILVER RECOVERY

You can recover silver from used fixer or fixer overflow by collecting the solution, and then passing it through a KODAK Chemical Recovery Cartridge, Junior Model II (3½-gallon size, CAT No. 166 9431), a KODAK Chemical Recovery Cartridge, Model II (5-gallon size, CAT No. 173 4953), or an equivalent cartridge.

Table 7-2
Replenishment Rates—Roller-Transport Processors

Film Size	Area per Roll or Sheet (ft ²)	First and Color Developers 2,153 mL/m ² (200 mL/ft ²)	Bleach 215 mL/m ² (20 mL/ft ²)	Other Solutions 1,076 mL/m ² (100 mL/ft ²)
		mL of Replenisher per Roll or Sheet		
135-24	0.395	79.0	7.9	39.5
135-36	0.556	111.0	11.1	55.6
120	0.550	110.0	11.0	55.0
220	1.090	218.0	21.8	109.0
4 x 5-in. sheets	0.134	27.0	2.7	13.4
5 x 7-in. sheets	0.238	48.0	4.8	23.8
8 x 10-in. sheets	0.549	110.0	11.0	54.9
11 x 14-in. sheets	1.064	213.0	21.3	106.4

Note: First wash rate is 3.8 L/min (1 gal/min); final wash rate is 7.5 L/min (2 gal/min).