

6 CONTINUOUS PROCESSORS

STEPS AND CONDITIONS

Table 6-1
Steps and Conditions—Continuous 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, S (exit)
Wash	1:00	2:00	4:00	33.3 to 39.4 (92 to 103)	None S (exit)
Reversal Bath	1:00	2:00	4:00	24 to 39.4 (75 to 103)	None S
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, S (exit)
Pre-Bleach	2:00	2:00	4:00	24 to 39.4 (75 to 103)	None S (exit)
Bleach	6:00	6:00	8:00	33.3 to 39.4 (92 to 103)	Air R, F, S (exit)
Fixer	4:00	4:00	6:00	33.3 to 39.4 (92 to 103)	Air R, F, S (exit)
Wash	1:00	2:00	4:00	33.3 to 39.4 (92 to 103)	None
Wash	1:00	2:00	4:00	33.3 to 39.4 (92 to 103)	None S (exit)
Final Rinse	0:30	1:00	4:00	Ambient	None S (exit)
Dry	As needed			Up to 63 (145)	

* F = Filtration
R = Recirculation
S = Squeegees

† 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 6-1. 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 sinusoidal- or helical-path processors, in which the top rollers are submerged, supply air to the bleach and fixer at $0.06 \text{ m}^3/\text{m}^2$ (1 cubic foot per 6 square feet) of film processed or $0.23 \text{ m}^3/\text{hr}$ (8 standard cubic feet per hour), whichever is greater.

Operate the gaseous-burst agitation only while film is being processed.

You may not need air agitation for the bleach and fixer in continuous processors in which the top rollers are above the solution level.

A low red density in the D-max control plot indicates insufficient bleach aeration; determine the amount of air agitation that is best for your processor.

REPLENISHMENT RATES

See Table 6-2 for the replenishment rates for continuous processors.

FINAL WASH

Use two 2-minute countercurrent-flow washes. You can use a single 4-minute wash if it is well agitated and has a water-flow rate of $80 \text{ L}/\text{m}^2$ (2 gal/ft²).

Table 6-2
Replenishment Rates—Continuous Processors

Step	Replenishment Rate mL/m ² (mL/ft ²)	Replenishment Rate (mL/linear foot of film)			
		Film Size			
		135	120	70 mm (unperforated)	70 mm (perforated)
First Developer	2,153 (200)	21.4	40.7	45.9	44.5
Reversal Bath	1,076 (100)	10.7	20.3	23.0	22.3
Color Developer	2,153 (200)	21.4	40.7	45.9	44.5
Pre-Bleach	1,076 (100)	10.7	20.3	23.0	22.3
Bleach	215 (20)	2.1	4.1	4.6	4.5
Fixer	1,076 (100)	10.7	20.3	23.0	22.3
Final Rinse	1,076 (100)	10.7	20.3	23.0	22.3

Note: First wash rates for film and leader are—

$40 \text{ L}/\text{m}^2$ (1 gal/ft²) or 400 mL/ft for 135-size film and 800 mL/ft for 120- and 70-mm sizes.

Final wash rates for film and leader are—

$80 \text{ L}/\text{m}^2$ (2 gal/ft²) or 800 mL/ft for 135-size film or 1,600 mL/ft for 120- and 70-mm sizes.

The replenishment rate for leader film is—

1.25 mL/linear foot.

LEADER

You can use acetate leader, such as EASTMAN Processing Machine Leader 2988 / ESTAR Base (CAT No. 159 7269).

You can also use KODAK FLEXICOLOR Machine Test Leader 5976 (35 mm x 400 ft, CAT No. 167 1536; 70 mm x 400 ft, CAT No. 152 4925) or EASTMAN Black-and-White Opaque Leader 7981 if you *haven't* used them in a process other than E-6 (these types of leaders absorb chemicals that can contaminate Process E-6 solutions).

For physical quality requirements, you may need to use other types of leaders. For more information, contact your technical sales representative.

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.