



KODAK XTOL Developer

for Small Tank and Tray Processing

DESCRIPTION

This is a new two-part powder developer for processing Kodak and other manufacturers' normally exposed, pushed, or pulled black-and-white films. It offers full emulsion speed and easy mixing.

Although this developer can be used in a variety of equipment from small tanks to high-volume processors, this publication will cover only *manual* processing with fresh, *unreplenished* solutions in small tanks (8 to 64 ounce) and trays.

For information on replenished processing in large tanks or information on processing in rotary tubes, see KODAK Publications J-106, *KODAK XTOL Developer for Replenished Processing Systems*, and J-108, *KODAK XTOL Developer for Rotary-Tube Processors*.

FEATURES	BENEFITS
<ul style="list-style-type: none"> • New ascorbic acid based black-and-white film developer 	<ul style="list-style-type: none"> • Offers very high image quality at full emulsion speed
<ul style="list-style-type: none"> • No hydroquinone 	<ul style="list-style-type: none"> • Convenient, room-temperature mixing
<ul style="list-style-type: none"> • Easy mixing 	<ul style="list-style-type: none"> • Two-part powder dissolves quickly in room-temperature water; ready for immediate use
<ul style="list-style-type: none"> • Versatile 	<ul style="list-style-type: none"> • Stable performance through a wide range of temperatures, dilutions, and agitation methods
<ul style="list-style-type: none"> • Excellent keeping properties • Long, stable useful life 	<ul style="list-style-type: none"> • Mixed solution has excellent shelf life (full bottles keep one year after mixing) • High resistance to breakdown from oxidation during storage or in replenished processors • Less waste
<ul style="list-style-type: none"> • Robust, abuse tolerant, and clean working 	<ul style="list-style-type: none"> • Stable performance across a wide range of temperatures, dilutions, and agitation methods • Long solution life

FEATURES	BENEFITS
<ul style="list-style-type: none"> • Contrast index similar to other developers 	<ul style="list-style-type: none"> • Produces negatives with printing characteristics like those expected from other general-purpose developers
<ul style="list-style-type: none"> • Provides more emulsion speed (shadow detail) than most developers for normal and push processing 	<ul style="list-style-type: none"> • Most films yield about 1/3 stop more emulsion speed than other developers • Enhanced shadow contrast and improved highlight detail with some films
<ul style="list-style-type: none"> • Fine grain and high sharpness 	<ul style="list-style-type: none"> • Enhanced sharpness, especially with dilution • Able to print 10 percent larger with equivalent sharpness and grain (image quality) than with other common developers

SIZES AVAILABLE

Sizes and catalog numbers may differ from country to country. See your dealer who supplies Kodak professional products.

To Make	CAT No.
1 litre	888 8182
5 litres	875 1752
50 litres	818 4517

MIXING

To mix 1 litre of XTOL Developer:

1. Start with 750 mL of water at normal room temperature, about 65°F (18°C) or warmer.
2. With stirring, slowly add Part A. Stir until completely dissolved. At this point, the solution may appear somewhat tawny or copper-colored. This is normal.
3. Continue stirring, and slowly add Part B. Stir until completely dissolved. The copper tint will clear from the solution as Part B is added.
4. Add water to bring the final solution to 1 litre, and stir until the solution is uniform.

To mix 5 litres of XTOL Developer:

1. Start with 4 litres of water at normal room temperature, about 65°F (18°C) or warmer.
2. With stirring, slowly add Part A. Stir until completely dissolved.
3. Continue stirring, and slowly add Part B. Stir until completely dissolved.
4. Add water to bring the final solution to 5 litres, and stir until the solution is uniform.

MANUAL PROCESSING

The development times and temperatures in the tables that follow are starting-point recommendations for fresh, unrefilled solutions. For critical applications, run tests to determine the best development time. Data for nominal film speeds are in **bold face** type.

First Use, Full-Strength Developer

Refer to **Table 1** for starting-point development times for roll films in fresh, full-strength developer, and **Table 4** for processing of sheet films.

Dilute Developer

KODAK XTOL Developer may be diluted 1:1, 1:2 or 1:3 with water (developer: water) for one-shot processing. Dilution will provide slightly greater film speed, enhanced sharpness, and slightly enhanced grain.

Refer to **Tables 2 and 3** for starting-point development times for roll films in fresh, diluted developer, and **Table 5** for sheet films.

Note: Use diluted developer only once. Do not replenish or reuse diluted developer.

Important: If your water supply is exceptionally hard, you may need to use purified water for higher dilutions to avoid cloudiness.

CAPACITY

The capacity of this developer used full strength with normal processing is approximately 15 rolls of 135-36 or 120 film (or equivalent 80 square inches [516 square metres]) per litre, with time compensation.

Time Compensation

To process the maximum number of rolls of film per litre of XTOL Developer, use time compensation according to the table below. Discard the developer after you process 15 rolls of film.

Time Compensation		
KODAK XTOL Developer		
Film Size	Number of Rolls (Per Litre)	Development-Time Increase
135-36 or 120 rolls (80 square inches* or equivalent)	1 to 5	Use normal development time
	6 to 10	Increase normal development time by 15 percent
	11 to 15	Increase adjusted development time by 15 percent

*80 square inches = 1 roll of 35 mm 36 exposures
1 roll of 120 film
4 4 x 5-inch sheets
1 8 x 10-inch sheet

DEVELOPMENT TABLES

Pages 4 through 13 contain tables of starting-point development times and temperatures for unused solutions with and without dilution in small tanks or trays with manual agitation. This information is for processing Kodak films as well as other manufacturers' films.

AGITATION

Agitating Rolls in Small Tanks

After 30 seconds of gentle, continuous initial agitation, agitate for 5 seconds at 30-second intervals.

Note: Sufficient agitation is important for consistent and uniform results. Agitation helps remove the by-products of development from the surface of the film so that fresh developer can act on the exposed silver halide in the emulsion. Since agitation affects the rate of development, particularly in high-density areas, consistent negative quality requires consistent agitation.

Agitating Sheet Film in Trays

One sheet at a time, slip the film into the developer. Rock the tray immediately to make sure the film is covered with solution. To agitate the film, first raise the left side of the tray about $\frac{3}{4}$ inch (1.9 cm); lower it smoothly, and then immediately raise and lower the side nearest to you. Next, raise and lower the right-hand side, then the near side again. This agitation cycle takes about 8 seconds. Agitate continuously throughout the development time.

To process 2 to 6 sheets together:

1. Fill a tray with water that is the same temperature as the developer.
2. Immerse the sheets one at a time, emulsion side up, in the tray of water. Make sure that each sheet is covered with water before inserting the next one. Agitate by moving the bottom sheet to the top of the stack every few seconds, and go through the stack twice. Be careful that the corners of the sheet you are handling do not scratch the sheet under it.
3. Take the bottom sheet out of the tray of water, drain it for a few seconds, and place it in the developer emulsion side up. Make sure that the sheet is covered with developer, and transfer the rest of the sheets to the developer in the same way. Interleave the stack, from bottom to top, until development is complete.
Note: When you use interleaving agitation, go through the stack of sheets completely. Rotate the first sheet in the developer 180° from the rest of the stack so that the notch is at the opposite end. This identifies it as the first sheet; be sure that it is the first sheet you remove from each solution.
4. At the end of the development time, transfer the sheets to the stop bath one at a time. To avoid contaminating the developer with stop bath, use one hand for lifting the sheets from the developer and the other hand for placing them in the stop bath.

FINAL STEPS IN PROCESSING BLACK-AND-WHITE FILMS

Step	Time	Comments
• Stop Bath	30 seconds	Agitate continuously.
• Fixer	Fix for twice as long as it takes the film to clear (lose its milky appearance); see instructions for specific fixer.	Agitate continuously for the first 30 seconds and at 30-second intervals after that.
• Rinse	30 seconds	Rinse the film in the tank under running water.
• Hypo Clearing Agent	1 to 2 minutes	Agitate continuously for the first 30 seconds and at 30-second intervals after that.
• Wash	5 minutes	Run the wash water at least fast enough to provide a complete change of water in the container in 5 minutes. For rapid washing in a small tank, fill the tank to overflowing with fresh water and then dump it all out. Repeat this cycle 10 times.
• Dry	As needed	Dry in a dust-free place. To minimize drying marks, treat the film with KODAK PHOTO-FLO Solution after washing, or wipe the surface carefully with a soft viscose sponge.

STORAGE

Store mixed KODAK XTOL Developer in a tightly closed container. Solutions in full bottles have a longer shelf life; partially filled containers allow some oxidation of the solution.

Storage Life of Unused Solutions	
Full, Tightly Closed Container	Partially Filled, Tightly Closed Container
Approximately 1 year	At least 2 months

TABLE 1: Small-Tank Processing with Full-Strength Developer



Important

Development times shorter than 5 minutes may produce unsatisfactory uniformity.

FRESH, FULL-STRENGTH DEVELOPER									
ROLL FILM	FORMAT	EI	CI	DEVELOPMENT TIME (minutes)					
				65°F (18°C)	68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	85°F (29°C)
KODAK PLUS-X Pan / PX / 5062 KODAK PLUS-X 125 Pro	135	32/64	0.52	5.75	4.50*	4.00*	3.00*	2.50*	2.00*
		125	0.58	6.50	5.25	4.75*	3.75*	2.75*	2.25*
		250	0.65	7.75	6.50	5.75	4.50*	3.50*	2.50*
		500	0.75	9.25	8.00	7.25	5.50	4.25*	3.00*
		1000	0.85	12.25	10.25	9.25	7.25	5.25	3.75*
KODAK PLUS-X Pan Professional / PXP / 6057 KODAK PLUS-X 125 Pro	120/220	32/64	0.52	5.75	4.50*	4.00*	3.00*	2.50*	2.25*
		125	0.58	6.75	5.50	5.00	3.75*	3.00*	2.50*
		250	0.65	8.00	6.75	6.00	4.75*	3.50*	2.75*
		500	0.75	11.00	8.50	7.50	5.75	4.50*	3.50*
		1000	0.85	16.00	11.50	10.00	7.75	6.00	4.50*
KODAK VERICHROME Pan / VP / 6041	120	32/64	0.52	6.25	5.00	4.50*	3.50*	2.50*	1.50*
		125	0.58	7.50	6.00	5.25	4.00*	3.00*	2.00*
		250	0.65	8.75	7.00	6.00	4.75*	3.50*	2.50*
		500	0.75	11.00	8.50	7.50	5.75	4.50*	3.00*
		1000	0.85	13.50	11.00	9.50	7.25	5.50	3.75*
KODAK TRI-X Pan / TX / 5063 KODAK TRI-X 400 Pro	135	100/200	0.52	6.50	5.50	5.00	4.00*	3.25*	2.50*
		400	0.58	7.75	6.75	6.00	4.75*	3.75*	3.00*
		800	0.65	9.00	7.75	7.00	5.50	4.25*	3.50*
		1600	0.75	10.50	9.00	8.00	6.50	5.00	4.00*
		3200	0.85	12.50	10.50	9.50	7.50	5.75	4.50*
KODAK TRI-X Pan / TX / 6043 KODAK TRI-X 400 Pro	120	100/200	0.52	6.75	5.50	4.75*	3.75*	3.00*	2.25*
		400	0.58	7.50	6.25	5.50	4.25*	3.50*	2.75*
		800	0.65	8.50	7.00	6.25	5.00	4.00*	3.25*
		1600	0.75	10.25	8.75	7.75	6.00	4.75*	3.75*
		3200	0.85	12.00	10.25	9.00	7.00	5.50	4.50*
KODAK TRI-X Pan Professional / TXP / 6049	120/220	80/160	0.52	6.25	5.25	4.75*	3.75*	3.00*	2.25*
		320	0.58	7.50	6.25	5.50	4.50*	3.50*	2.75*
		640	0.65	9.00	7.50	6.75	5.50	4.25*	3.25*
		1250	0.75	11.50	9.50	8.50	6.75	5.50	4.25*
		2500	0.85	14.50	11.75	10.50	8.50	7.00	5.50
KODAK T-MAX 100 Professional / TMX / 5052 KODAK T-MAX 100 Pro	135	25/50	0.52	7.00	5.75	5.00	4.00*	3.25*	2.75*
		100	0.58	8.00	6.75	6.00	4.50*	3.75*	3.00*
		200	0.65	9.00	7.75	7.00	5.25	4.25*	3.50*
		400	0.75	10.50	9.00	8.00	6.25	5.00	4.00*
		800	0.85	12.00	10.50	9.50	7.25	6.00	4.75*
KODAK T-MAX 100 Professional / TMX / 6052 KODAK T-MAX 100 Pro	120	25/50	0.52	7.00	5.75	5.00	4.00*	3.25*	2.75*
		100	0.58	8.00	6.75	6.00	4.50*	3.75*	3.00*
		200	0.65	9.00	7.75	7.00	5.25	4.25*	3.50*
		400	0.75	10.50	9.00	8.00	6.00	5.00	4.00*
		800	0.85	12.00	10.25	9.50	7.25	6.00	4.75*

FRESH, FULL-STRENGTH DEVELOPER									
ROLL FILM	FORMAT	EI	CI	DEVELOPMENT TIME (minutes)					
				65°F (18°C)	68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	85°F (29°C)
KODAK T-MAX 400 Professional / TMY / 5053 KODAK T-MAX 400 Pro	135	100/200	0.52	6.75	5.75	5.00	4.00*	3.25*	2.50*
		400	0.58	7.50	6.50	5.75	4.50*	3.50*	2.75*
		800	0.65	8.50	7.25	6.50	5.00	4.00*	3.25*
		1600	0.75	10.00	8.50	7.50	6.00	4.75*	3.75*
		3200	0.85	11.50	9.50	8.50	6.75	5.50	4.25*
KODAK T-MAX 400 Professional / TMY / 6053 KODAK T-MAX 400 Pro	120	100/200	0.52	6.75	5.75	5.25	4.00*	3.25*	2.50*
		400	0.58	7.50	6.50	5.75	4.50*	3.50*	2.75*
		800	0.65	8.50	7.25	6.50	5.25	4.00*	3.25*
		1600	0.75	10.00	8.50	7.75	6.00	4.75*	3.75*
		3200	0.85	11.50	10.00	9.00	7.00	5.50	4.25*
KODAK T-MAX P3200 Professional / TMZ / 5054	135	100/200	0.48	8.50	7.00	6.25	5.00	4.00*	3.00*
		400	0.52	9.00	7.50	6.75	5.50	4.25*	3.25*
		800	0.58	10.00	8.25	7.50	6.00	4.75*	3.75*
		1600	0.65	11.00	9.25	8.50	7.00	5.25	4.25*
		3200	0.75	13.00	11.00	10.00	8.00	6.25	4.75*
		6400	0.85	15.00	12.50	11.50	9.25	7.00	5.50
		12500	0.95	19.00	15.25	13.75	10.75	8.25	6.50
25000	1.05	23.00	18.50	16.50	12.50	9.50	7.50		
KODAK EKTAPAN / PNT / 4162	70 mm	25/50	0.52	6.00	5.25	4.50*	3.75*	2.75*	2.25*
		100	0.58	8.50	7.00	6.25	5.00	4.00*	3.25*
		200	0.65	10.50	9.00	8.00	6.50	5.00	4.00*
		400	0.75	13.50	11.50	10.00	8.00	6.50	5.25
		800	0.85	16.75	14.25	13.00	10.00	8.25	6.50
KODAK High Speed Infrared / HIE / 2481	135	See Publication F-13	0.52	6.50	5.50	5.00	4.00*	3.25*	2.50*
			0.58	7.25	6.00	5.50	4.50*	3.75*	3.00*
			0.65	8.00	6.75	6.00	5.00	4.25*	3.50*
			0.75	9.25	7.75	7.00	5.75	4.75*	4.00*
			0.85	10.50	9.00	8.00	6.50	5.50	4.75*
AGFAPAN APX 25	135	12	0.52	4.50*	3.75*	3.50*	2.75*	2.25*	2.00*
		25	0.58	5.75	4.75*	4.25*	3.25*	2.75*	2.50*
		50	0.65	8.00	6.50	5.75	4.25*	3.50*	3.00*
		100	0.75	14.50	10.25	8.75	6.50	5.25	4.00*
		200	0.85	NR	NR	NR	NR	NR	6.00
AGFAPAN APX 100	135	25/50	0.52	6.50	5.75	5.25	4.50*	3.25*	2.50*
		100	0.58	8.00	6.75	6.25	5.00	4.00*	3.00*
		200	0.65	10.00	8.75	7.75	6.00	4.75*	3.75*
		400	0.75	13.00	11.00	10.00	7.50	6.00	4.75*
		800	0.85	15.50	13.00	11.50	9.00	7.00	5.50
AGFAPAN 400	135	100/200	0.52	8.00	6.50	5.75	4.50*	3.50*	2.75*
		400	0.58	9.50	8.00	7.00	5.50	4.00*	3.25*
		800	0.65	12.00	9.75	8.50	6.50	5.00	4.00*
		1600	0.75	15.00	12.25	11.00	8.50	6.50	5.00
		3200	0.85	19.00	14.50	13.50	10.50	8.00	6.00

FRESH, FULL-STRENGTH DEVELOPER									
ROLL FILM	FORMAT	EI	CI	DEVELOPMENT TIME (minutes)					
				65°F (18°C)	68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	85°F (29°C)
FUJI NEOPAN 400 Professional	135	100/200	0.52	9.00	7.50	6.50	5.00	3.75*	3.00*
		400	0.58	10.00	8.25	7.25	5.75	4.50*	3.25*
		800	0.65	11.50	9.75	8.75	6.50	5.00	3.75*
		1600	0.75	13.50	11.50	10.50	8.00	6.25	4.50*
		3200	0.85	16.00	13.50	12.00	9.50	7.50	5.25
FUJI NEOPAN 1600 Professional	135	200	0.52	4.25*	4.00*	3.50*	3.00*	2.25*	1.75*
		400	0.58	5.00	4.50*	4.00*	3.25*	2.50*	2.00*
		800	0.65	5.50	5.00	4.50*	3.50*	3.00*	2.25*
		1600	0.75	6.50	5.75	5.00	4.00*	3.50*	2.50*
		3200	0.85	7.50	6.50	5.50	4.75*	4.00*	3.00*
		6400	0.95	9.00	7.25	6.50	5.50	4.75*	3.25*
ILFORD PAN F Plus	135	25	0.52	7.25	6.00	5.50	4.25*	3.25*	2.50*
		50	0.58	8.50	7.00	6.00	4.75*	3.75*	3.00*
		100	0.65	9.50	8.00	7.00	5.50	4.25*	3.25*
		200	0.75	11.00	9.00	8.00	6.25	4.75*	3.75*
		400	0.85	12.50	10.00	9.00	7.00	5.50	4.25*
ILFORD FP-4 Plus	135	32/64	0.52	8.00	6.50	5.50	4.50*	3.50*	2.50*
		125	0.58	9.50	8.00	6.50	5.25	4.00*	2.75*
		250	0.65	11.00	9.00	7.50	6.00	4.50*	3.25*
		500	0.75	14.00	11.00	9.25	7.50	5.50	4.00*
		1000	0.85	17.50	14.00	11.50	9.25	7.00	5.00
ILFORD HP-5 Plus	135	100/200	0.52	8.50	7.50	6.75	5.25	4.00*	2.75*
		400	0.58	10.00	8.50	8.00	6.25	4.75*	3.25*
		800	0.65	12.00	10.50	9.50	7.50	5.75	4.00*
		1600	0.75	16.00	13.00	12.00	9.00	7.00	5.00
		3200	0.85	NR	17.50	15.00	11.50	8.50	6.00
ILFORD DELTA 100 Professional	135	25/50	0.52	8.00	6.75	6.00	4.50*	3.50*	2.50*
		100	0.58	9.50	8.00	7.00	5.50	4.25*	3.25*
		200	0.65	11.50	9.50	8.50	6.50	5.00	4.00*
		400	0.75	14.50	11.50	10.50	8.00	6.25	5.00
		800	0.85	18.50	14.50	12.75	9.50	7.50	5.75
ILFORD DELTA 400 Professional	135	100/200	0.52	7.00	6.00	5.50	4.25*	3.25*	2.50*
		400	0.58	8.00	7.00	6.25	5.00	4.00*	3.00*
		800	0.65	9.50	8.00	7.50	5.75	4.50*	3.50*
		1600	0.75	11.50	10.00	9.00	7.00	5.50	4.00*
		3200	0.85	14.00	12.00	10.70	8.25	6.50	4.75*

* Development times shorter than 5 minutes may produce unsatisfactory uniformity.

TABLE 2: Small-Tank Processing with Fresh Dilute Developer



Important

Development times shorter than 5 minutes may produce unsatisfactory uniformity.

FRESH, DILUTE DEVELOPER															
ROLL FILM	FORMAT	EI	CI	DEVELOPER DILUTION											
				1:1				1:2				1:3			
				68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C
KODAK PLUS-X Pan / PX / 5062 KODAK PLUS-X 125 Pro	135	32/64	0.52	6.50	6.00	5.00	4.00*	7.50	7.00	5.50	4.50*	9.50	8.50	6.50	5.25
		125	0.58	7.50	7.00	5.50	4.50*	8.50	8.00	6.50	5.25	10.50	9.50	7.50	6.00
		250	0.65	8.75	8.00	6.50	5.25	9.75	9.00	7.50	6.00	12.00	11.00	9.00	6.75
		500	0.75	11.00	10.00	8.00	6.50	13.00	12.00	9.50	7.50	15.50	14.00	11.50	8.00
		1000	0.85	15.50	14.00	11.00	8.50	16.50	15.00	12.50	9.00	19.50	18.00	15.00	10.00
KODAK PLUS-X Pan Professional / PXP / 6057 KODAK PLUS-X 125 Pro	120/220	32/64	0.52	6.00	5.50	4.25*	3.00*	7.25	6.75	5.00	3.25*	8.75	8.25	6.50	4.50*
		125	0.58	7.25	6.50	5.00	3.50*	8.50	8.00	6.25	4.25*	10.25	9.50	7.50	5.50
		250	0.65	8.75	8.00	6.00	4.25*	10.25	9.50	7.50	5.25	12.00	11.25	9.00	6.50
		500	0.75	11.00	10.00	7.75	5.50	12.75	12.00	9.75	6.75	14.50	13.50	11.00	8.00
		1000	0.85	15.25	14.00	11.00	7.50	16.75	16.00	13.00	9.00	18.25	17.00	13.75	10.00
KODAK VERICHROME Pan / VP / 6041	120	32/64	0.52	6.75	6.00	4.50*	2.75*	7.50	7.00	5.25	3.50*	9.25	8.50	6.50	4.50*
		125	0.58	7.50	7.00	5.25	3.25*	8.50	8.00	6.25	4.50*	10.25	9.50	7.50	5.50
		250	0.65	8.75	8.00	6.25	4.25*	10.25	9.50	7.50	5.50	11.75	11.00	9.00	6.50
		500	0.75	10.75	10.00	8.00	5.50	12.75	12.00	9.75	7.00	14.00	13.25	11.00	8.00
		1000	0.85	13.75	13.00	10.50	7.50	16.25	15.00	12.00	8.50	16.50	15.50	13.25	10.00
KODAK TRI-X Pan / TX / 5063 KODAK TRI-X 400 Pro	135	100/200	0.52	8.00	7.50	6.50	5.50	8.75	8.50	7.50	6.50	10.75	10.00	8.50	7.50
		400	0.58	8.75	8.25	7.00	6.00	10.50	10.00	8.50	7.00	12.50	11.50	9.50	8.25
		800	0.65	10.00	9.50	8.00	6.50	12.50	11.50	9.50	7.50	14.00	13.00	11.00	9.00
		1600	0.75	11.75	11.00	9.00	7.25	14.50	13.50	11.00	8.50	16.50	15.50	12.75	10.25
		3200	0.85	13.50	12.50	10.50	8.00	17.00	15.50	12.50	9.50	20.00	18.00	15.00	11.50
KODAK TRI-X / TX Pan / 6043 KODAK TRI-X 400 Pro	120	100/200	0.52	6.75	6.25	5.00	3.75*	8.50	8.00	6.25	4.50*	9.50	8.75	7.00	5.50
		400	0.58	8.00	7.25	6.00	4.50*	10.25	9.50	7.50	5.50	11.00	10.50	8.50	6.50
		800	0.65	9.25	8.50	7.00	5.50	12.00	11.00	9.00	6.50	13.50	12.50	10.00	7.50
		1600	0.75	11.00	10.50	8.50	6.50	14.50	13.50	10.75	7.75	16.25	15.25	12.25	9.00
		3200	0.85	13.50	12.50	10.25	7.75	17.00	16.00	13.00	9.50	19.75	18.50	15.00	11.00
KODAK TRI-X Pan Professional / TXP / 6049	120/220	80/160	0.52	7.75	7.00	5.50	4.00*	10.25	9.50	7.50	6.00	12.25	11.50	9.50	7.50
		320	0.58	8.75	8.00	6.50	5.00	12.00	11.00	9.00	7.00	14.25	13.25	11.00	9.00
		640	0.65	10.25	9.50	8.00	6.00	14.00	13.00	10.50	8.50	17.25	16.25	13.50	10.50
		1250	0.75	12.75	12.00	10.00	8.00	16.50	15.25	13.00	10.00	21.50	20.00	16.50	13.00
		2500	0.85	15.75	14.50	12.00	10.00	21.00	19.50	16.00	12.50	25.50	24.00	20.00	16.50
KODAK T-MAX 100 Professional / TMX / 5052 KODAK T-MAX 100 Pro	135	25/50	0.52	8.00	7.25	6.00	5.00	11.50	10.50	8.50	6.50	14.50	13.50	11.50	9.00
		100	0.58	9.25	8.50	7.00	5.50	12.50	11.50	9.50	7.25	16.00	15.00	12.50	10.00
		200	0.65	10.25	9.50	8.00	6.25	13.75	13.00	10.50	8.25	18.25	17.00	14.00	11.00
		400	0.75	12.50	11.50	9.00	7.00	15.75	14.50	12.00	9.50	20.50	19.00	15.50	12.50
		800	0.85	14.50	13.00	10.50	8.00	18.00	16.50	13.50	10.50	23.00	21.00	17.50	14.00
KODAK T-MAX 100 Professional / TMX / 6052 KODAK T-MAX 100 Pro	120	25/50	0.52	8.75	8.00	6.00	4.50*	11.75	11.00	8.75	7.00	15.00	14.00	11.25	9.50
		100	0.58	10.00	9.00	6.75	5.25	13.00	12.00	10.00	8.00	16.75	15.50	12.75	10.50
		200	0.65	11.00	10.00	7.50	6.00	14.50	13.50	11.25	9.00	18.75	17.50	14.25	11.50
		400	0.75	12.75	11.50	8.75	6.75	16.75	15.50	12.50	10.00	21.00	19.50	16.00	12.50
		800	0.85	15.25	13.50	10.00	7.50	19.00	17.50	13.75	11.00	23.50	22.00	18.25	14.00

FRESH, DILUTE DEVELOPER

ROLL FILM	FORMAT	EI	CI	DEVELOPER DILUTION											
				1:1				1:2				1:3			
				68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C
KODAK T-MAX 400 Professional / TMY / 5053 KODAK T-MAX 400 Pro	135	100/200	0.52	8.00	7.50	6.50	5.50	9.50	9.00	7.50	6.50	12.25	11.50	10.00	8.00
		400	0.58	8.75	8.00	7.00	6.00	10.50	10.00	8.50	7.00	13.50	13.00	11.00	8.75
		800	0.65	9.50	9.00	7.75	6.50	12.25	11.50	9.50	7.50	15.00	14.00	12.50	9.50
		1600	0.75	10.75	10.00	8.50	7.00	13.75	13.00	11.00	8.50	17.00	16.00	14.00	11.00
		3200	0.85	12.50	11.50	9.25	7.50	16.00	15.00	12.50	9.50	20.00	18.50	16.00	12.00
KODAK T-MAX 400 Professional / TMY / 6053 KODAK T-MAX 400 Pro	120	100/200	0.52	8.00	7.50	6.25	5.00	11.00	10.00	8.00	6.50	13.75	12.50	9.50	8.00
		400	0.58	9.25	8.50	7.00	5.50	12.50	11.50	9.00	7.25	15.50	14.00	11.00	9.00
		800	0.65	10.75	10.00	8.00	6.00	14.25	13.00	10.25	8.00	17.25	15.50	12.50	10.00
		1600	0.75	12.50	11.50	9.25	7.00	16.50	15.00	11.75	9.25	19.50	18.00	14.00	11.50
		3200	0.85	14.25	13.00	10.50	8.00	19.25	17.50	13.50	10.50	22.75	20.50	16.00	13.00
KODAK T-MAX P3200 Professional / TMZ / 5054	135	100/200	0.48	10.50	9.50	7.50	6.50	14.25	13.00	10.00	8.00	17.25	16.00	12.50	10.50
		400	0.52	11.50	10.00	8.50	7.00	15.50	14.00	11.00	8.50	18.50	17.00	14.00	11.50
		800	0.58	12.50	11.50	9.00	7.50	16.50	15.00	12.00	9.50	20.50	19.00	15.50	12.50
		1600	0.65	14.00	13.00	10.00	8.00	19.00	17.00	13.50	10.50	23.00	21.50	17.00	14.00
		3200	0.75	16.50	15.00	11.50	9.00	22.00	20.00	15.50	12.50	27.00	24.00	20.00	16.00
		6400	0.85	19.50	17.50	14.00	10.50	26.50	23.00	18.50	14.50	NR	28.00	24.00	18.50
		12500	0.95	22.50	20.00	16.50	12.50	NR	26.00	22.00	17.00	NR	NR	28.00	21.00
		25000	1.05	26.00	22.50	20.00	15.00	NR	NR	NR	20.00	NR	NR	NR	23.50
KODAK High Speed Infrared / HIE / 2481	135	See Pub. F-13	0.52	8.00	7.50	6.25	5.00	11.50	10.50	8.50	7.00	15.25	14.00	11.25	9.00
			0.58	8.75	8.25	7.00	5.50	12.50	11.50	9.00	7.50	17.00	15.50	12.25	10.00
			0.65	9.75	9.00	7.50	6.00	13.75	12.75	10.00	8.25	18.50	17.00	13.75	11.00
			0.75	10.75	10.00	8.50	6.75	15.75	14.50	11.50	9.00	21.00	19.25	15.50	12.50
			0.85	12.50	11.50	9.25	7.50	18.00	16.50	13.00	10.50	24.00	22.00	17.50	14.50
AGFAPAN APX 25	135	12	0.52	5.00	4.50*	3.50*	2.75*	7.75	7.00	5.50	4.00*	10.25	9.50	7.75	6.00
		25	0.58	6.00	5.50	4.50*	3.50*	9.25	8.50	6.75	5.00	11.75	11.00	9.00	7.00
		50	0.65	8.00	7.50	6.00	4.50*	11.00	10.00	8.00	6.00	14.00	13.00	10.50	8.50
		100	0.75	10.50	9.50	7.75	6.00	14.00	13.00	10.50	8.00	17.50	16.00	13.00	10.00
		200	0.85	14.50	13.00	10.50	8.50	17.00	16.00	13.00	10.50	21.50	20.00	16.00	13.00
AGFAPAN APX 100	135	25/50	0.52	8.00	7.50	6.00	4.75*	12.00	11.00	8.50	7.00	15.25	14.00	11.50	10.00
		100	0.58	9.75	9.00	7.00	5.50	13.75	12.50	9.75	8.00	17.25	16.00	13.00	11.50
		200	0.65	12.00	11.00	8.25	6.50	15.25	14.00	11.00	9.00	19.50	18.00	15.00	13.00
		400	0.75	15.50	13.50	10.00	7.50	18.75	17.00	13.00	10.50	23.00	21.00	17.75	15.00
		800	0.85	22.00	18.50	13.00	9.00	23.00	20.50	16.00	12.50	29.00	25.00	21.00	17.00
AGFAPAN 400	135	100/200	0.52	10.50	9.00	6.50	5.00	13.50	12.00	8.50	6.50	16.50	15.00	11.50	8.50
		400	0.58	12.00	10.50	8.00	6.00	15.75	14.00	10.50	8.00	19.25	17.50	13.50	10.50
		800	0.65	14.50	13.00	9.50	7.50	19.00	17.00	12.50	9.50	22.50	20.50	16.00	12.50
		1600	0.75	18.00	16.50	12.50	9.50	23.00	21.00	16.00	12.00	28.50	26.00	20.00	15.50
		3200	0.85	21.50	20.00	15.00	12.00	NR	25.00	19.00	15.00	NR	NR	25.00	20.00
FUJI NEOPAN 400 Professional	135	100/200	0.52	8.25	7.50	6.00	4.50*	11.00	10.00	7.75	6.50	13.50	12.50	10.00	8.00
		400	0.58	9.75	9.00	7.00	5.25	12.50	11.50	9.00	7.50	15.75	14.50	11.50	9.00
		800	0.65	11.50	10.50	8.00	6.00	14.50	13.00	10.50	8.50	18.50	16.50	13.00	10.00
		1600	0.75	13.50	12.50	9.75	7.25	17.00	15.50	12.00	9.50	22.50	20.00	15.50	11.50
		3200	0.85	16.50	15.00	11.50	8.50	20.50	18.50	14.00	11.00	26.00	23.50	18.00	13.50

FRESH, DILUTE DEVELOPER															
ROLL FILM	FORMAT	EI	CI	DEVELOPER DILUTION											
				1:1				1:2				1:3			
				68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C
FUJI NEOPAN 1600 Professional	135	200	0.52	5.50	5.00	4.00*	3.50*	7.00	6.50	5.25	4.50*	9.25	8.50	7.00	5.50
		400	0.58	6.00	5.50	4.50*	3.75*	7.75	7.25	5.75	4.75*	10.25	9.50	7.50	6.00
		800	0.65	6.75	6.25	5.00	4.25*	8.50	8.00	6.50	5.25	11.50	10.50	8.25	6.75
		1600	0.75	7.50	7.00	5.75	4.75*	10.00	9.25	7.50	6.00	13.00	12.00	9.50	7.50
		3200	0.85	8.50	8.00	6.50	5.25	11.25	10.50	8.50	6.75	14.75	13.50	10.50	8.50
		6400	0.95	9.75	9.00	7.50	6.00	13.00	12.00	9.75	7.50	16.50	15.00	12.00	9.50
ILFORD PAN F Plus	135	25	0.52	6.75	6.00	4.50*	3.50*	8.75	8.00	6.00	4.50*	10.50	9.50	7.50	5.50
		50	0.58	7.75	7.00	5.25	4.00*	10.00	9.00	7.00	5.00	12.00	11.00	8.50	6.25
		100	0.65	9.50	8.50	6.25	4.50*	11.50	10.50	8.00	5.75	13.50	12.50	9.75	7.25
		200	0.75	11.25	10.00	7.50	5.50	13.25	12.00	9.00	6.75	15.75	14.50	11.25	8.50
		400	0.85	13.00	11.50	8.50	6.50	15.50	14.00	10.50	8.00	18.50	16.75	13.00	10.00
ILFORD FP-4 Plus	135	64	0.52	8.50	7.50	5.50	4.00*	10.00	9.00	7.00	5.00	12.50	11.00	8.00	6.50
		125	0.58	10.00	9.00	6.50	5.00	11.50	10.50	8.00	6.00	14.75	13.00	9.50	7.50
		250	0.65	12.00	10.75	8.00	6.00	13.75	12.50	9.50	7.00	17.00	15.00	11.00	9.00
		500	0.75	14.50	13.00	9.50	7.00	17.25	15.50	11.50	8.00	20.00	18.00	13.50	10.50
		1000	0.85	17.50	15.50	11.50	8.50	21.00	18.50	13.50	9.50	23.50	21.00	16.00	12.50
ILFORD HP-5 Plus	135	100/200	0.52	10.25	9.00	6.50	5.00	12.75	11.50	8.75	6.50	14.50	13.00	10.00	8.00
		400	0.58	12.00	10.50	7.50	5.75	15.50	14.00	10.50	7.50	18.00	16.00	12.00	9.50
		800	0.65	14.25	12.50	8.75	6.50	18.00	16.50	12.50	9.00	23.00	20.00	15.00	11.00
		1600	0.75	18.00	16.00	11.50	8.00	21.00	19.00	15.00	11.00	27.50	25.00	18.75	13.50
		3200	0.85	22.50	20.00	14.00	10.00	NR	22.50	17.75	13.50	NR	NR	NR	16.50
ILFORD DELTA 100 Professional	135	25/50	0.52	9.00	8.00	6.00	4.75*	11.00	10.00	8.00	6.00	13.50	12.00	9.50	7.50
		100	0.58	10.50	9.50	7.25	5.50	13.00	12.00	9.00	7.00	15.50	14.00	11.00	9.00
		200	0.65	12.00	11.00	8.50	6.50	15.00	14.00	10.50	8.00	17.50	16.50	12.75	10.50
		400	0.75	14.00	12.75	10.25	8.00	17.50	16.00	12.50	9.50	20.50	19.50	15.00	12.50
		800	0.85	16.75	15.50	12.50	9.50	21.50	19.50	14.50	11.50	24.25	22.50	18.00	14.50
ILFORD DELTA 400	135	100/200	0.52	9.00	8.00	6.00	4.75*	12.00	10.50	7.50	5.50	14.50	13.00	10.00	7.75
		400	0.58	10.50	9.50	7.00	5.50	14.00	12.50	9.00	6.50	16.50	15.00	11.50	9.00
		800	0.65	12.25	11.00	8.50	6.50	16.25	14.50	10.50	7.75	19.50	17.50	13.50	10.50
		1600	0.75	14.50	13.00	10.00	8.00	19.50	17.50	13.00	9.50	23.00	21.00	16.50	13.00
		3200	0.85	17.00	15.50	12.00	9.50	23.50	21.50	16.00	11.50	NR	26.00	20.00	15.50

* Development times shorter than 5 minutes may produce unsatisfactory uniformity.

TABLE 3: Small-Tank Processing with Fresh, Dilute Developer



Important

Development times shorter than 5 minutes may produce unsatisfactory uniformity.

FRESH, DILUTE DEVELOPER							
ROLL FILM	FORMAT	EI	CI	DEVELOPER DILUTION			
				1:2	1:3	1:4	1:5
				70°F (21°C)	70°F (21°C)	70°F (21°C)	70°F (21°C)
KODAK Technical Pan / 2415	135	4	0.60	6.00			
		8	0.60		8.00		
		12.5	0.60			10.50	
		25	0.60				12.50

TABLE 4: Tray Processing with Full-Strength Developer



Important

Development times shorter than 4 minutes may produce unsatisfactory uniformity.

FRESH, FULL-STRENGTH DEVELOPER									
SHEET FILM	FORMAT	EI	CI	DEVELOPMENT TIME (minutes)					
				65°F (18°C)	68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	85°F (29°C)
KODAK PLUS-X Pan Professional / PXT / 4147	Sheet	32/64	0.52	6.50	5.25	4.75	3.75*	3.00*	2.25*
		125	0.58	7.50	6.25	5.75	4.50	3.50*	2.75*
		250	0.65	9.25	7.75	7.00	5.50	4.50	3.50*
		500	0.75	12.00	10.00	9.00	7.00	5.50	4.50
		1000	0.85	15.00	12.75	11.50	9.00	7.25	5.75
KODAK T-MAX 100 Professional / TMX / 4052	Sheet	25/50	0.52	7.50	6.25	5.50	4.50	3.50*	2.75*
		100	0.58	8.50	7.25	6.50	5.00	4.00	3.25*
		200	0.65	9.50	8.25	7.50	5.50	4.50	3.50*
		400	0.75	10.75	9.50	8.50	6.50	5.25	4.25
		800	0.85	12.00	11.00	10.00	7.50	6.00	5.00
KODAK TRI-X Pan Professional / TXT / 4164	Sheet	80/160	0.52	6.25	5.25	4.25	3.75*	2.75*	2.25*
		320	0.58	7.50	6.50	5.75	4.50	3.50*	2.75*
		640	0.65	9.25	7.75	7.00	5.25	4.25	3.50*
		1250	0.75	11.50	9.50	8.50	6.50	5.25	4.25
		2500	0.85	14.00	11.75	10.50	8.00	6.75	5.25
KODAK T-MAX 400 Professional / TMY / 4053	Sheet	100/200	0.52	7.50	6.50	5.50	4.50	3.50*	2.75*
		400	0.58	8.50	7.25	6.25	5.00	4.00	3.00*
		800	0.65	9.25	8.00	7.00	5.50	4.50	3.50*
		1600	0.75	10.75	9.25	8.00	6.50	5.00	4.00
		3200	0.85	12.50	10.50	9.00	7.50	5.75	4.75
KODAK EKTAPAN / PNT / 4162	Sheet	25/50	0.52	6.75	5.50	4.75	3.75*	2.75*	2.00*
		100	0.58	8.50	7.25	6.25	5.00	3.75*	2.75*
		200	0.65	10.50	9.00	7.75	6.00	4.75	3.50*
		400	0.75	13.50	11.50	10.00	8.00	6.25	5.00
		800	0.85	17.50	15.00	13.00	10.00	8.00	6.50

TABLE 5: Tray Processing with Fresh, Dilute Developer



Important

Development times shorter than 4 minutes may produce unsatisfactory uniformity.

FRESH, DILUTE DEVELOPER															
SHEET FILM	FORMAT	EI	CI	DEVELOPER DILUTION											
				1:1				1:2				1:3			
				68°F (20°C)	70°F (21°C)	75°F (24°C)	80°F (27°C)	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C	68°F 20°C	70°F 21°C	75°F 24°C	80°F 27°C
KODAK PLUS-X Pan Professional / PXT / 4147	Sheet	32/64	0.52	7.25	6.50	5.00	3.75*	8.75	8.00	6.00	5.00	10.50	9.50	7.50	6.00
		125	0.58	8.25	7.50	6.00	4.75	10.25	9.50	7.50	6.00	12.50	11.50	9.00	7.00
		250	0.65	10.25	9.50	7.50	6.00	13.00	12.00	9.50	7.25	15.25	14.00	11.00	8.50
		500	0.75	13.50	12.50	10.50	8.00	16.75	15.50	12.50	9.50	19.50	18.00	14.50	11.00
		1000	0.85	19.00	17.00	13.00	10.50	21.75	20.00	16.00	12.00	24.75	23.00	19.00	15.00
KODAK T-MAX 100 Professional / TMX / 4052	Sheet	25/50	0.52	9.25	8.50	6.50	5.25	12.75	11.00	8.25	6.00	15.50	14.50	11.75	9.50
		100	0.58	10.50	9.50	7.50	6.00	13.75	12.50	9.75	7.25	17.25	16.00	13.00	10.50
		200	0.65	11.50	10.50	8.50	7.00	15.25	14.00	11.00	8.50	18.75	17.50	14.25	11.50
		400	0.75	13.25	12.00	9.75	8.00	17.25	16.00	12.75	9.75	21.50	20.00	16.25	13.00
		800	0.85	15.25	14.00	11.25	9.00	19.25	18.00	14.50	11.00	24.25	22.50	18.25	14.50
KODAK TRI-X Pan Professional / TXT / 4164	Sheet	80/160	0.52	7.75	7.00	5.00	3.75*	9.25	8.50	6.75	5.00	12.00	11.00	8.50	6.00
		320	0.58	9.00	8.00	6.00	4.50	11.50	10.50	8.00	5.75	14.25	13.00	10.00	7.00
		640	0.65	10.50	9.50	7.00	5.50	13.50	12.50	9.50	7.00	16.50	15.00	12.00	8.25
		1250	0.75	13.50	12.00	8.50	6.75	17.00	15.50	12.00	8.75	21.00	19.00	14.50	10.25
		2500	0.85	17.00	15.00	10.50	8.00	21.00	19.00	14.50	10.50	26.50	24.00	17.50	12.50
KODAK T-MAX 400 Professional / TMY / 4053	Sheet	100/200	0.52	9.50	8.50	6.50	5.50	11.25	10.50	8.50	7.25	14.75	13.50	10.50	8.75
		400	0.58	10.50	9.50	7.25	6.00	13.00	12.00	9.50	8.00	16.25	15.00	11.50	9.75
		800	0.65	11.75	10.50	8.25	6.75	14.75	13.50	10.50	8.75	17.75	16.50	13.00	10.75
		1600	0.75	13.25	12.00	9.25	7.50	17.00	15.50	12.25	10.00	20.00	19.00	15.00	12.25
		3200	0.85	15.00	13.50	10.50	8.50	19.00	17.50	13.75	11.25	23.50	21.50	17.00	14.00
KODAK EKTAPAN / PNT / 4162	Sheet	25/50	0.52	8.00	7.00	4.50	2.50*	10.00	9.00	6.50	4.75	12.25	11.00	8.50	6.75
		100	0.58	9.50	8.50	6.00	3.75*	12.00	11.00	8.50	6.00	14.25	13.00	10.50	8.50
		200	0.65	12.25	11.00	8.00	5.50	15.50	14.00	10.50	7.75	18.00	16.50	13.00	10.50
		400	0.75	15.50	14.00	10.50	7.50	19.75	18.00	14.00	10.50	23.50	21.50	17.00	13.75
		800	0.85	19.50	18.00	14.25	10.50	24.00	22.00	18.00	13.75	28.50	26.00	21.00	17.00

* Development times shorter than 4 minutes may produce unsatisfactory uniformity.

KODAK XTOL Developer for Small Tank and Tray Processing

DISPOSAL

Dispose of used developer in accordance with your local regulations. Refer to the Material Safety Data Sheets for additional information.

If you have environmental or safety questions about Kodak products or services, contact Kodak Environmental Services at 1-716-477-3194, between 8 a.m. and 5 p.m. (Eastern time).

Kodak also maintains a 24-hour health hotline to answer questions about the safe handling of photographic chemicals. If you need health-related information about Kodak products, call 1-716-722-5151.

MORE INFORMATION

Kodak has many publications to assist you with information on Kodak products, equipment, and materials. The following publications are available from dealers who sell Kodak products, or you can order them directly from Kodak through the order form in KODAK Publication No. L-1, *KODAK Index to Photographic Information*. To obtain a copy of L-1, send your request with \$1 to Eastman Kodak Company, Department 412-L, Rochester, New York 14650-0532.

If you have environmental or safety questions about Kodak products or services, contact Kodak Environmental Services at 1-716-477-3194, between 8 a.m. and 5 p.m. (Eastern time).

Kodak also maintains a 24-hour health hotline to answer questions about the safe handling of photographic chemicals. If you need health-related information about Kodak products, call 1-716-722-5151.

- J-106 *KODAK XTOL Developer for Replenished Processing Systems*
- J-108 *KODAK XTOL Developer for Rotary-Tube Processors*
- F-7 *KODAK VERICHROME Pan Film*
- F-8 *KODAK PLUS-X Pan and PLUS-X Pan Professional Films*
- F-9 *KODAK TRI-X Pan and TRI-X Pan Professional Films*
- F-10 *KODAK EKTAPAN Film*
- F-13 *KODAK High Speed Infrared Film*
- F-32 *KODAK T-MAX Professional Films*
- P-255 *KODAK Technical Pan Film*

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U.S. 1-800-242-2424, Ext. 33
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If you have questions about Kodak products, call Kodak.

In the U.S.A.:

*1-800-242-2424, extension 19, Monday–Friday
8 a.m.–8 p.m. (Eastern time)*

In Canada:

*1-800-465-6325, Monday–Friday
8:30 a.m.–5 p.m. (Eastern time)*

*Or contact Kodak on-line at:
<http://www.kodak.com/>*

Note: The products described in this publication may not be available in all countries. In countries other than the U.S., contact your local Kodak representative, or your usual supplier of Kodak products



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