

KODAK PROFESSIONAL PLUS-X 125 Film / 125PX

Kodak

TECHNICAL DATA / BLACK-AND-WHITE FILM

May 2007 • F-4018

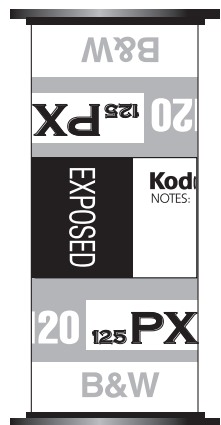
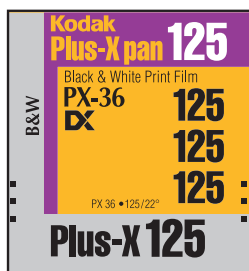
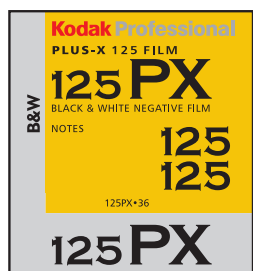
—NOTICE—

To reflect our enduring commitment to black-and-white photography, black-and-white film production will take place in an even more advanced film-coating facility. New technology applied to these superior, time-tested emulsions will result in slightly different processing times for the film family. But the same great films—those you've known and trusted for years—will still deliver the same breathtaking results.

Use the packaging examples below to determine which film you have, then refer to the corresponding publication for development times.

New packaging, refer to this publication (F-4018)

Former packaging, refer to Kodak publication F-8:



KODAK PROFESSIONAL PLUS-X 125 Film is a medium-speed, continuous-tone panchromatic film that is a good choice for general-purpose outdoor or studio photography. It features extremely fine grain and excellent sharpness.

KODAK PROFESSIONAL PLUS-X Film is available in 135 size and 35 mm long rolls on a 5-mil gray acetate base, and in 120 and 220 size on a 3.6-mil acetate base. The 120 and 220 sizes have a retouching surface on the emulsion side.

FEATURES	BENEFITS
• Extremely fine grain	• Excellent for producing high-quality images
• Wide exposure latitude	• Rich tonality maintained with overexposure and underexposure
• Very high sharpness	• Excellent for applications that require a high degree of enlargement
• High resolving power	• Good rendition of detail

SIZES AVAILABLE

Catalog numbers and packaging may differ from country to country. See your dealer who supplies KODAK PROFESSIONAL Products.

STORAGE AND HANDLING

Load and unload your camera in subdued light.

High temperatures or high humidity may produce unwanted quality changes. Store unexposed film at 24°C (75°F) or lower in the original sealed package. Always store film (exposed or unexposed) in a cool, dry place. For best results, process film as soon as possible after exposure.

Protect processed film from strong light, and store it in a cool dry place. For more information, see KODAK Publication No. E-30, *Storage and Care of KODAK Films and Papers—Before and After Processing*.

EXPOSURE

Daylight

Use the exposures in the table below for average front-lit subjects from 2 hours after sunrise to 2 hours before sunset.

Lighting Conditions	Shutter Speed (second)	Lens Opening
Bright/Hazy Sun on Light Sand or Snow	1/250	f/16
Bright or Hazy Sun, Distinct Shadows	1/250	f/11*
Weak, Hazy Sun (Soft Shadows)	1/250	f/8
Cloudy Bright (No Shadows)	1/250	f/5.6
Heavy Overcast, Open Shade†	1/250	f/4

* Use f/5.6 for backlit close-up subjects.

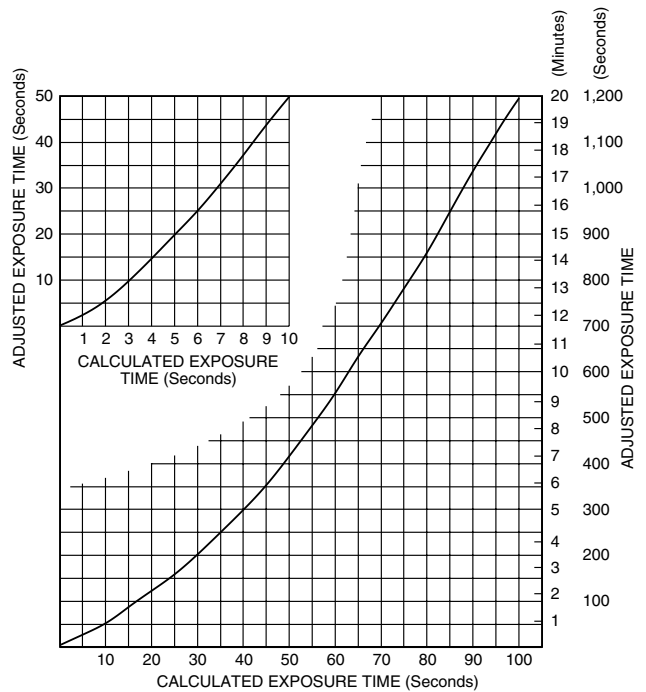
† Subject shaded from sun but lighted by a large area of clear sky.

Exposure and Development Adjustments for Long and Short Exposures

At the exposure times in the table below, compensate for the reciprocity characteristics of this film by increasing exposure and adjusting the development as shown.

If Indicated Exposure Time Is (Seconds)	Use This Lens-Aperture Adjustment	OR	This Adjusted Exposure Time (Seconds)	AND Use This Development Adjustment
1/100,000	+1 stop		Change Aperture	+20%
1/10,000	+1/2 stop		Change Aperture	+15%
1/1,000	None		None	+10%
1/100	None		None	None
1/10	None		None	None
1	+1 stop		2	-10%
10	+2 stops		50	-20%
100	+3 stops		1200	-30%

It may be difficult to use the table to estimate the adjusted times for calculated exposure times between 1 and 100 seconds. The graph that follows will help you find the adjusted times for calculated exposure times between those given in the table.



Filter Corrections

Multiply the normal exposure time by the filter factor.

KODAK WRATTEN Gelatin Filter	Daylight Filter Factor	Tungsten Filter Factor
No. 8 (yellow)	2	1.5
No. 11 (yellowish green)	4	4
No. 15 (deep yellow)	2.5	1.5
No. 25 (red)	6	4
No. 29 (red)	6	4
No. 47 (blue)	6	12
No. 58 (green)	8	8
Polarizing Filter	2.5	2.5

DARKROOM RECOMMENDATIONS

Handle unprocessed film in total darkness.

Using a safelight *will* affect your results. If absolutely necessary, after development is half complete, you can use a safelight equipped with a KODAK 3 Safelight Filter (dark green) with a 15-watt bulb for a few seconds. Keep the safelight at least 4 feet (1.2 metres) from the film. Run tests to determine that safelight use gives acceptable results for your application.

For information on safelight testing, see KODAK Publication No. K-4, *How Safe Is Your Safelight?*

PROCESSING

These starting-point recommendations are intended to produce negatives with a contrast appropriate for printing with a diffusion enlarger. To print negatives with a condenser enlarger, you may need to adjust the contrast by reducing your development time. Tank development times shorter than 5 minutes may produce unsatisfactory uniformity.

MANUAL PROCESSING

Small-Tank Processing (8- or 16-ounce tank)

With small single- or double-reel tanks, drop the loaded film reel into the developer and attach the top to the tank. Firmly tap the tank on the top of the work surface to dislodge any air bubbles. Provide initial agitation of 5 to 7 inversion cycles in 5 seconds; i.e., extend your arm and vigorously twist your wrist 180 degrees.

Then repeat this agitation procedure at 30-second intervals for the rest of the development time.

Large-Tank Processing (1/2- to 3 1/2-gallon tank)—Rolls and Sheets

Agitate continuously for the first 15 to 30 seconds by raising and lowering the basket, rack, or spindle 1/2-inch. Do not agitate the basket, rack, or spindle for the remainder of the first minute. Then agitate once per minute by lifting the basket, rack, or spindle out of the developer, tilting it approximately 30 degrees, draining it for 5 to 10 seconds, and reimmersing it. Alternate the direction of tilting the basket, rack, or spindle.

135, 120, and 220 Rolls

KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	Small Tank*					Large Tank†				
	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)
T-MAX	6¾	5¾	5¼	4¾	4¼	—	—	—	—	—
T-MAX RS	5	4¼	4	3½	3	5½	4¾	4½	4	3½
HC-110 (B)	4	3½	3	2¾	2½	4½	3¾	3½	3¼	2¾
D-76	6½	5½	5	4½	4	7¼	6¼	5¾	5¼	4½
D-76 (1:1)	10	8½	7¾	7¼	6	11¼	9¾	8¾	8	6¾
XTOL	135: 6½ 120: 7	135: 5½ 120: 6	135: 5 120: 5½	135: 4½ 120: 5	135: 4 120: 4¼	135: 7¼ 120: 7¾	135: 6¼ 120: 6¾	135: 5¾ 120: 6¼	135: 5¼ 120: 5½	135: 4½ 120: 4¾
XTOL (1:1)	—	8¼	7½	7	6	—	—	—	—	—
MICRODOL-X	9¼	8	7¼	6¾	5¾	10½	9	8¼	7½	6½
MICRODOL-X (1:3)	NR	13	11¾	10¾	9¼	NR	14¾	13¼	12	10¼

* With agitation at 30-second intervals. Development times shorter than 5 minutes may produce unsatisfactory results.

† With manual agitation at 1-minute intervals. Development times shorter than 5 minutes may produce unsatisfactory results.

NR = Not Recommended.

Note: Use only KODAK HC-110 Developer (Dilution B) to process long rolls of PLUS-X Pan Film on spiral reels. Develop for 6 minutes at 68°F (20°C) or 4 1/4 minutes at 75°F (24°C).

Rotary-Tube Processing

Follow the agitation recommendations for your processor. The times given below are starting-point recommendations. Make tests to determine if results at this rating are acceptable for your needs.

135 and 120 Rolls

KODAK Developer or Developer and Replenisher	Development Time (Minutes)				
	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)
T-MAX	6¾	5¾	5¼	4¾	4¼
T-MAX RS	5	4¼	4	3½	3
XTOL	6¾	5¾	5¼	4¾	4
XTOL (1:1)	—	8¼	7½	7	6
HC-110 (B)	4	3½	3	2¾	2½
D-76	6½	5½	5	4½	4

PUSH PROCESSING

Push processing allows you to expose the film at higher film-speed numbers for conditions such as low-level light, stop action, or existing light. However, there will be a loss of shadow detail and an increase in graininess.

Because of the film's exposure latitude, you can underexpose by one stop at EI 250 and use normal processing times. Prints will show a slight loss in shadow detail.

You can underexpose by two stops at EI 500 if you increase development time by push processing. Prints will show an increase in contrast and graininess with further loss of shadow detail. However, results should be acceptable for many applications. Expose a test roll to determine the film speed that gives the best results for your application.

You can underexpose the film by three stops (EI 1000) when you use 3-stop push processing in KODAK XTOL Developer. Prints will show an increase in contrast and graininess, and an additional loss of shadow detail. However, results should be acceptable for some applications. Expose some test rolls to determine the film speed that gives the best results for your application.

Small Tank

KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	135 Film					120 Film				
	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)
EI 500 (2-Stop Push Process)										
T-MAX	NR	NR	NR	NR	6¼	NR	NR	NR	NR	6¼
T-MAX RS	—	7¼	6½	6	5	NR	7¼	6½	6	5
D-76	9	7¾	7	6½	5½	9	7¾	7	6½	5½
XTOL	9¾	8¼	7½	—	5¾	9¾	8¼	7½	—	5¾
XTOL (1:1)	—	12¼	11¼	—	8¾	—	12¼	11¼	—	8¾
EI 1000 (3-Stop Push Process)										
XTOL	11½	10	9	—	7	11½	10	9	—	7
XTOL (1:1)	—	14¾	13½	—	10½	—	14¾	13½	—	10½

Large Tank

KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	135 Film					120 Film				
	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)
EI 500 (2-Stop Push Process)										
T-MAX RS	NR	NR	NR	NR	5¾	NR	NR	NR	NR	5¾
XTOL	10¾	9¼	8½	—	6½	10¾	9¼	8½	—	6½
EI 1000 (3-Stop Push Process)										
XTOL	13	11¼	10¼	—	8	NR	11¼	10¼	—	8

Rotary Tube

KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	135 Film					120 Film				
	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)	65°F (18°C)	68°F (20°C)	70°F (21°C)	72°F (22°C)	75°F (24°C)
EI 500 (2-Stop Push Process)										
T-MAX	NR	8¾	8	7¼	6¼	NR	8¾	8	7¼	6¼
T-MAX RS	NR	7¼	6½	6	5	NR	7¼	6½	6	5
D-76	9	7¾	7	6½	5½	9	7¾	7	6½	5½
XTOL	9¾	8¼	7½	—	5¾	9¾	8¼	7½	—	5¾
XTOL (1:1)	—	12¼	11¼	—	8¾	—	12¼	11¼	—	8¾
EI 1000 (3-Stop Push Process)										
XTOL	11½	10	9	—	7	11½	10	9	—	7
XTOL (1:1)	—	14¾	13½	—	10½	—	14¾	13½	—	10½

NR = Not Recommended.

FINAL STEPS

65 to 75°F (18 to 24°C).

Step/Solution	Time (min:sec)
Rinse —with agitation:	
KODAK Indicator Stop Bath	0:30
KODAK EKTAFLU Stop Bath	0:30
Fix —with frequent agitation:	
KODAK Fixer	5:00 to 10:00
KODAK Rapid Fixer	2:00 to 4:00
KODAFIX Solution	2:00 to 4:00
KODAK POLYMAX T Fixer (1:3)	2:00 to 4:00
Wash:	
Running Water —OR—	20:00 to 30:00
Rinse with water	0:30
KODAK Hypo Clearing Agent	1:00 to 2:00
Running water	5:00
Final Rinse:	
KODAK PHOTO-FLO Solution	0:30
Dry —in a dust-free place	

MACHINE PROCESSING

Roller-Transport Processors

KODAK VERSAMAT Film Processors

You can process this film in roller-transport processors, such as the KODAK VERSAMAT Film Processor, Model 5, 11, or 411, with KODAK DURAFLO RT Developer Starter, KODAK DURAFLO RT Developer Replenisher, and KODAK Rapid Fixer.

Processing Steps and Conditions for KODAK VERSAMAT Film Processors

KODAK PROFESSIONAL PLUS-X 125 Films				
Step	No. of Racks	Path Length		Temperature
		Model 11	Models 5 and 411	
Develop	2	8.5 ft (2.6 m)	4 ft (1.2 m)	80 ± 0.5°F (26.5 ± 0.3°C)
Fix	3	12 ft (3.8 m)	6 ft (1.9 m)	80°F (26.5) nominal
Wash	2	8 ft (2.4 m)	4 ft (1.2 m)	70 to 75°F (21 to 24°C)
Dry		8 ft (2.4 m)	4 ft (1.2 m)	105 to 140°F (40.5 to 60°C)

The recommended machine speeds for processing KODAK PROFESSIONAL PLUS-X 125 Film to a contrast index of 0.56 is as follows:

Processor	PLUS-X 125 Film
KODAK VERSAMAT Film Processor, Models 5 and 411	4.0 ft (1.2 m) per minute
KODAK VERSAMAT Film Processor, Model 11	8.5 ft (2.6 m) per minute

You may need to use higher dryer temperatures (135 to 140°F [57 to 60°C]) to dry several sheet films processed in succession. If you are processing only roll films, a lower temperature will be adequate.

Processing Conditions for Other Roller-Transport Processors

Adjust the machine speed so that the development time for normally exposed film is approximately 60 seconds. The development time is measured from the time the film enters the developer to the time it enters the fixer. Differences in machine design that affect agitation and crossover times from one tank to the next may require development-time adjustments.

Replenishment Rates

Developer—Because most film loads will consist of a variety of film types, use an average replenishment rate of 0.20 mL per square inch of film processed.

Fixer—Use 0.55 mL per square inch.

Large Tank Rack-and-Tank Processors

The development times for large-tank rack-and-tank processors are based on a machine speed that transfers the film every 2 minutes. The times given below are starting-point recommendations. Make tests to determine if results are acceptable for your needs.

Large-Tank Rack-and-Tank Processing		
EI	KODAK Developer or Developer and Replenisher	Time (min) at 72°F (22°C)
125/22° 250/25°	T-MAX RS	3½ to 6
125/22° 250/25°	D-76	4 to 6
125/22° 250/25°	XTOL	4 to 6

Replenishment Rates

Stir or recirculate the solution after each addition of replenisher solution.

T-MAX RS Developer—Add 45 mL (1.5 ounces) of replenisher solution for each 135-36 or 120 roll of film processed.

Note: Do not use T-MAX RS Developer and Replenisher to replenish T-MAX Developer. They are not designed to work together.

D-76 and XTOL Developers—Add 70 mL (2.4 ounces) of replenisher solution for each 135-36 or 120 roll of film processed.

Note: Refer to KODAK Publication No. J-78, *KODAK PROFESSIONAL Developer D-76*, for modified replenisher mixing instructions.

Push Processing: Roller Transport Processors

To process pushed PLUS-X 125 Film in a machine with DURAFLO RT Developer, use a normal machine process with the machine speed shown in the appropriate table below.

EI	Machine Speed
KODAK VERSAMAT Film Processor, Models 5 and 411	
250/25°	4.0 ft (1.2 m)/min (normal)
500/28°	3.0 ft (0.9 m)/min
KODAK VERSAMAT Film Processor, Model 11	
250/25°	8.5 ft (2.6 m)/min (normal)
500/28°	6.4 ft (1.9 m)/min

Other Roller-Transport Processors	
EI	Development Time at 80°F (27°C)
250/25°	60 seconds (normal)
500/28°	80 seconds

IMAGE STRUCTURE

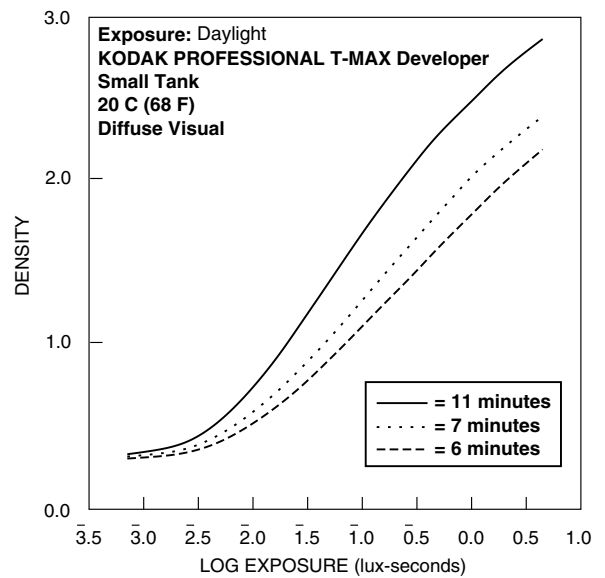
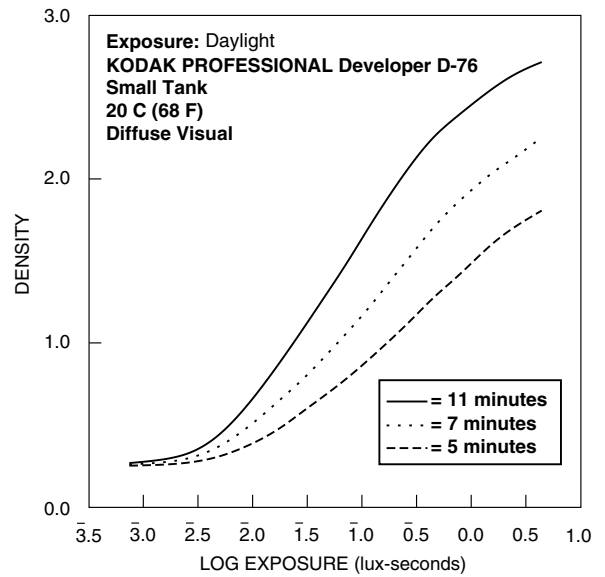
The data in this section is based on development in KODAK HC-110 Developer (Dilution B), 70°F (21°C), 5 minutes in a large tank, with manual agitation at 1-minute intervals.

Resolving Power		Diffuse rms Granularity*
ISO RPL TOC 1.6:1)	ISO RPL TOC 1000:1)	
50	125	10 (extremely fine)

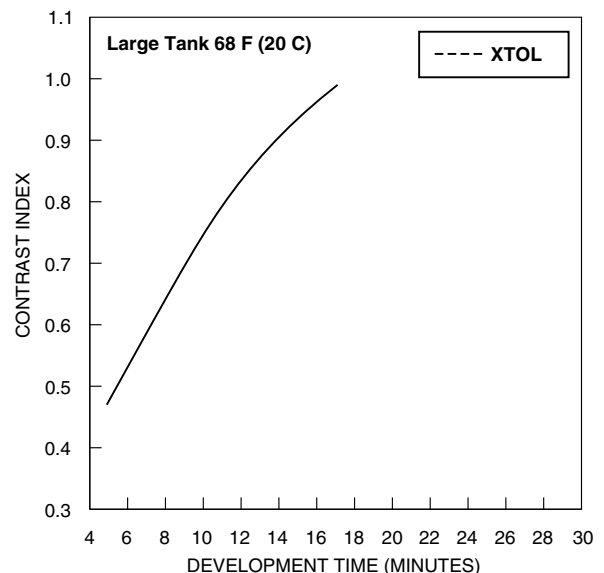
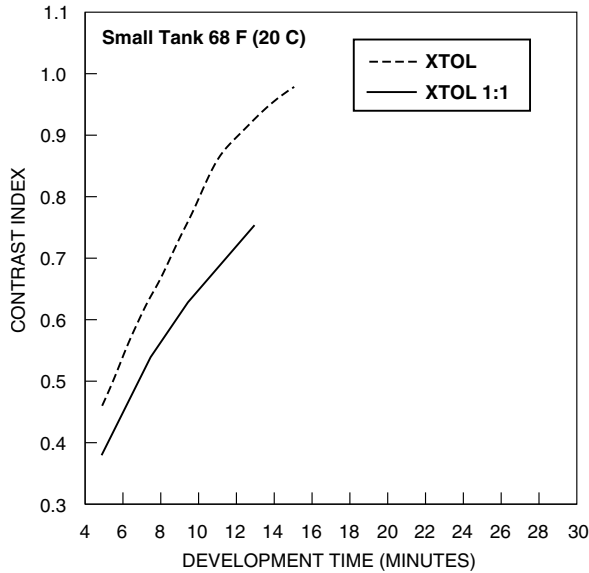
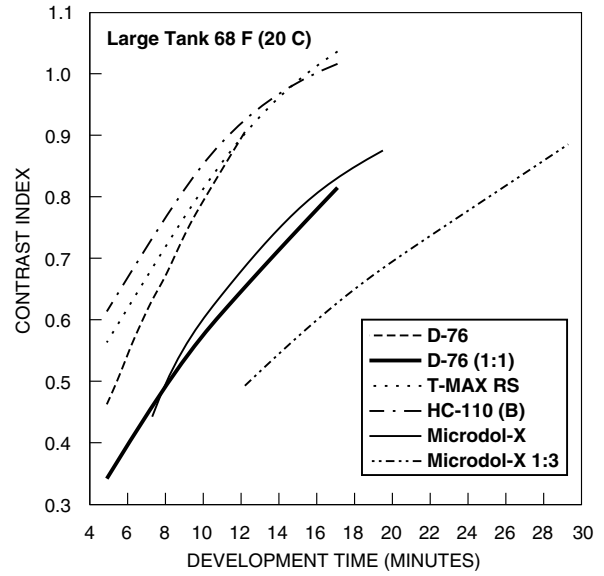
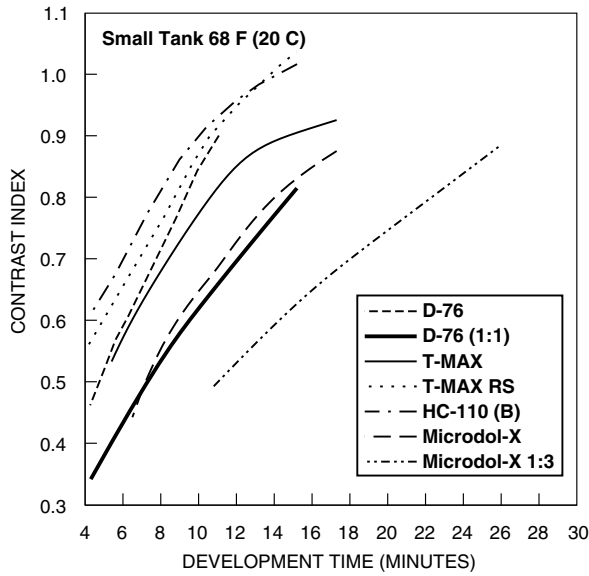
* Read at a net diffuse density of 1.0, using a 48-micrometre aperture, 12X magnification.

CURVES

Characteristic Curves

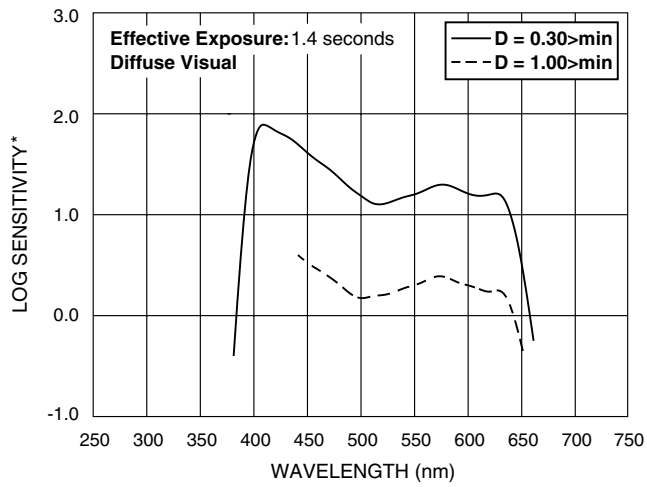


Contrast Index Curves



NOTICE: The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings, and therefore do not apply directly to a particular box or roll of photographic material. They do not represent standards or specifications that must be met by Eastman Kodak Company. The company reserves the right to change and improve product characteristics at any time.

Spectral Sensitivity Curve



*Sensitivity = reciprocal of exposure (erg/cm²) required to produce specified density

KODAK PROFESSIONAL PLUS-X 125 Film / 125PX

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 contact Kodak in your country for more information.

E-30	Storage and Care of Photographic Materials—Before and After Processing
ED-1	Processing KODAK Black-and-White Films and Papers
E103BF	KODAK PROFESSIONAL Black-and-White Films
E103BP	KODAK PROFESSIONAL Black-and-White Papers
E103CF	Chemicals for KODAK PROFESSIONAL Black-and-White Films
F-2	Pathways to Black and White
G-10	KODAK AZO Paper
G-16	KODABROME II RC Paper
G-21	KODAK POLYCONTRAST III RC Paper
G-23	Toning KODAK Black-and-White Materials
G-24	KODAK POLYMAX Fine-Art Paper
G-26	KODAK POLYMAX II RC Paper
G-27	KODAK PANALURE SELECT RC Paper
G-28	KODAK P-MAX Art RC Paper
J-24	KODAK HC-110 Developer
J-78	KODAK Developer D-76
J-86	KODAK T-MAX Developers
J-87	KODAK T-MAX 100 Direct Positive Film Developing Outfit
J-109	KODAK XTOL Developer

The following books are available from photo-specialty dealers who sell Kodak products:

F-5	KODAK Professional Black-and-White Films
R-20	KODAK Black-and-White Darkroom DATAGUIDE

Kodak, D-76, Duraflo, HC-110, Microdol-X, Photo-Flo, T-Max, T-Max RS, Tri-X, Versamat, Wratten, and Xtol are trademarks.

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For the latest version of technical support publications for KODAK PROFESSIONAL Products, visit Kodak on-line at:

<http://www.kodak.com/go/professional>

If you have questions about KODAK PROFESSIONAL Products, call Kodak.

In the U.S.A.:

1-800-242-2424, Ext. 19, Monday-Friday

9 a.m.-7 p.m. (Eastern time)

In Canada:

1-800-465-6325, Monday-Friday

8 a.m.-5 p.m. (Eastern time)

Note: The Kodak materials described in this publication for use with KODAK PROFESSIONAL PLUS-X 125 Films are available from dealers who supply KODAK PROFESSIONAL Products. You can use other materials, but you may not obtain similar results.