

KODAK PLUS-X Pan and KODAK PLUS-X Pan Professional Films



NOTICE

—Discontinuance of KODAK PLUS-X Pan and PLUS-X Pan Professional Films—

KODAK PLUS-X Pan and PLUS-X Pan Professional Films is discontinued.

As a recommended alternative for roll formats, we suggest KODAK PROFESSIONAL PLUS-X 125 Film / 125PX. For sheet film, we suggest KODAK PROFESSIONAL T-MAX 100 / 100TMX Film. For more information, see KODAK Publications F-4016, *KODAK PROFESSIONAL T-MAX Films* and F-4018, *KODAK PROFESSIONAL PLUS-X 125 Film*, available from www.kodak.com/go/bwFilms

KODAK PLUS-X Pan and PLUS-X Pan Professional Films are medium-speed (ISO 125 / 22°) panchromatic films that are good choices for general-purpose outdoor or studio photography. They feature extremely fine grain and excellent sharpness.

PLUS-X Pan Film (PX) is available in 135 size and 35 mm long rolls on a 5-mil gray acetate base.

PLUS-X Pan Professional Film (PXP) is available in 120 and 220 size on a 3.6-mil acetate base. This film (PXP) has a retouching surface on the emulsion side.

KODAK PLUS-X Pan Professional Film / ESTAR Base / PXE, and sheet / ESTAR Thick Base / PXT

KODAK PLUS-X Pan Professional Films are medium-speed (ISO 125 / 22°) films that are recommended for general studio use, particularly when a high degree of enlargement is needed. They offer excellent separation of highlight tones and very fine grain. You can retouch the emulsion or the base side.

PLUS-X Pan Professional Film (PXE) is available in 70 mm long rolls on a 4-mil ESTAR Base.

PLUS-X Pan Professional Film (PXT) is available in sheet sizes on a 7-mil ESTAR Thick Base.

FEATURES

BENEFITS

- | | |
|---|---|
| <ul style="list-style-type: none"> PLUS-X Pan and PLUS-X Pan Professional Films feature extremely fine grain. Sheet and 70 mm PLUS-X Pan Professional Films feature very fine grain. Wide exposure | <ul style="list-style-type: none"> Excellent for producing high-quality images Rich tonality maintained with overexposure and underexposure |
|---|---|

FEATURES

BENEFITS

- | | |
|---|--|
| <ul style="list-style-type: none"> Very high sharpness High resolving power | <ul style="list-style-type: none"> Excellent for applications that require a high degree of enlargement Good rendition of detail |
|---|--|

SIZES AVAILABLE

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

KODAK PLUS-X Pan Film

Roll	Base	Letter Code	CAT No.
135-24	5-mil gray acetate	PX	159 2591
135-36	5-mil gray acetate	PX	165 3971

KODAK PLUS-X Pan Professional Film

Roll	Base	Letter Code	CAT No.
120 pro-pack	3.6 mil acetate	PXP	857 4121
220 pro-pack			871 7910

Roll mm x ft	Base	Spec Code	Letter Code	CAT No.
35 x 100	5-mil gray acetate	402	PX	164 2263

KODAK PLUS-X Pan Professional Film / ESTAR Base

Roll mm x ft	Base	Spec Code	Letter Code	CAT No.
70 x 100	ESTAR	473	PXE	165 0480

KODAK PLUS-X Pan Professional Film /

ESTAR Thick Base

Sheets Per Package	Size (inches)	Film Notch	Base	Letter Code	CAT No.
100	4 x 5		ESTAR Thick	PXT	144 3423
100	5 x 7				144 3118
25	8 x 10				144 3159
50	8 x 10				144 3217

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 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 on storing negatives, see KODAK Publication No. E-30, *Storage and Care of Photographic Materials—Before and After Processing*.

EXPOSURE

Daylight

Use the exposures in the table below for frontlighted subjects from 2 hours after sunrise to 2 hours before sunset.

Lighting Conditions	Shutter Speed (Second)	Lens Opening
Bright or 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 or Open Shade†	1/250	f/4

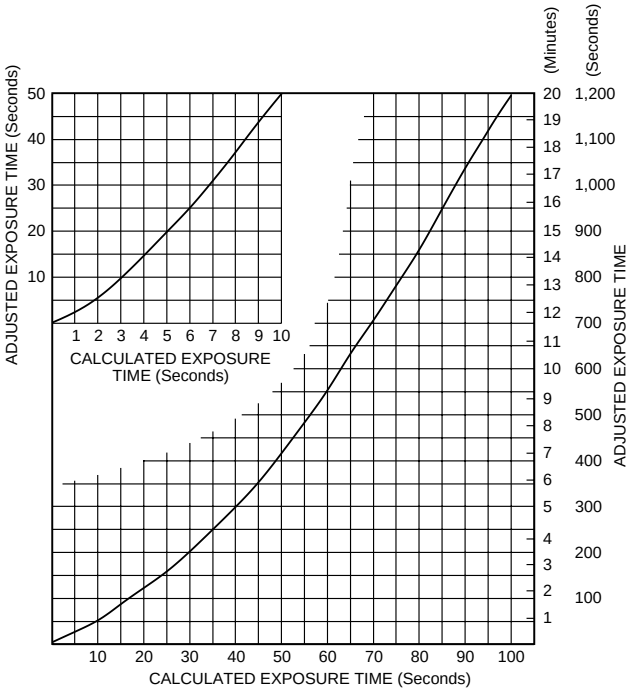
* Use f/5.6 at 1/250 for backlit close-up subjects.
† Subject shaded from the sun but lit by a large area of clear sky.

Exposure and Development Adjustment 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	Adjust aperture	+20%
1/10,000	+1½ stop	Adjust 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 graphs that follow will help you find the adjusted times for calculated exposure times between those given in the table.



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Filter Corrections

Multiply the normal exposure time by the filter factor.

KODAK WRATTEN Gelatin Filter	Daylight	Tungsten
	Multiply Exposure By (Filter Factor)	Multiply Exposure By (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 (deep red)*	25	12
No. 47 (blue)*	6	12
Polarizing Filter	2.5	2.5
No. 58 (green)*	8	8

* Filter recommended for making separation negatives.

DARKROOM RECOMMENDATIONS

Do not use a safelight. 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 K-4, *How Safe Is Your Safelight?*

MANUAL PROCESSING

These starting-point recommendations are intended to produce a contrast index of 0.56. Make tests to determine the best development time for your application.

Note: Development times shorter than 5 minutes may produce unsatisfactory uniformity.

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

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 (1½ - to 3½-gallon tank)—Rolls and Sheets

Agitate continuously for the first 15 to 30 seconds by raising and lowering the basket, rack, or spindle ½ 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.

KODAK PLUS-X Pan Film / PX KODAK PLUS-X Pan Professional Film / PXP										
KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	Small Tank*					Large Tank†				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX	6½	5½	5½	5	5	NR	NR	NR	NR	NR
T-MAX RS	6½	5½	4½	4	3½	9	8	7	6	5½
XTOL (135 PX)	6½	5¼	4¾	—	3¾	7½	6½	6	—	4
XTOL (120 PXP)	6¾	5½	5	—	3¾	8½	6¾	6	—	4½
HC-110 (Dil B)	6	5	4½	4	3½	6½	5½	5	4¾	4
D-76	6½	5½	5	4½	3¾	7½	6½	6	5½	4½
D-76 (1:1)	8	7	6½	6	5	—	—	—	—	—
MICRODOL-X	8	7	6½	6	5½	10	9	8	7½	7
MICRODOL-X (1:3)	NR	NR	11	10	9½	NR	NR	14	13	11

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

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

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 20°C(68°F) or 4¾ minutes at 24°C(75°F).

MANUAL PROCESSING (CONTINUED)

Provide continuous agitation; rotate the sheets 90 degrees as you interleave them. Prewetting sheet film may improve tray process uniformity.

KODAK PLUS-X Pan Professional Film / PXE and PXT										
KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	Tray* or Large Tank†					Large Tank‡				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX RS	10	9	7½	6½	5	10	9	8	7½	7
XTOL	7½	6¼	5¾	—	4½	8½	7¼	6½	—	4¾
HC-110 (Dil B)	6	5	4¾	4½	4	8	7	6½	6	5½
D-76	7	6	5½	5	4½	9	8	7½	7	6
D-76 (1:1)	8	7	6½	6	5	—	—	—	—	—
MICRODOL-X	9	8	7½	7	6	11	10	9½	9	8
DK-50 (1:1)	5	4½	4¼	4	3½	6½	6	5¾	5½	5

* With continuous agitation.

† With gaseous-burst agitation (1 second every 10 seconds) that provides pressure to raise the solution level ⅝ inch (16 mm). Development times shorter than 5 minutes may produce unsatisfactory uniformity.

‡ With manual agitation at 1-minute intervals.

Note: If you use KODAK HC-110 Developer (Dilution B) to process long rolls of PLUS-X Pan Professional Film 2147 on spiral reels, develop for 8 minutes at 20°C (68°F) or 6 minutes at 24°C (75°F). With KODAK Developer DK-50, develop for 6½ minutes at 20°C (68°F) or 4½ minutes at 24°C (75°F).

ROTARY-TUBE PROCESSING

Rotary-Tube processors

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.

KODAK PLUS-X Pan Film / PX					
KODAK Developer or Developer and Replenisher	Development Time (Minutes)				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX	—	5½	5	4½	3½
T-MAX RS	—	4½	4½	4	4
XTOL	5½	4½	4	—	3
HC-110 (Dil B)	8	7	6	5	4
D-76	5½	5	4	3½	

KODAK PLUS-X Pan Professional Film / PXP					
KODAK Developer or Developer and Replenisher	Development Time (Minutes)				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX	—	5½	5	4½	3½
T-MAX RS	—	4½	4½	4	4
XTOL	5¾	4½	4	—	3
HC-110 (Dil B)	NR	NR	10	9	8
D-76	7	6	5	4½	4½

NR = Not Recommended

KODAK PLUS-X Pan Professional Film / PXE and PXT					
KODAK Developer or Developer and Replenisher	Development Time (Minutes)				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX RS	8	6½	5½	5	4½
XTOL (with PXT)*	5½	4½	4	—	3

* For PLUS-X Pan Professional Film / PXT

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, the results will be acceptable for many applications. We recommend exposing a test roll to determine the film speed that will give the best results for your application.

Note: KODAK T-MAX RS Developer and Replenisher and KODAK T-MAX Developer produce more enhanced shadow detail than current popular push-processing developers when you process film normally or push it two stops.

KODAK PLUS-X Pan Film / PX KODAK PLUS-X Pan Professional Film / PXP										
KODAK Developer or Developer and Replenisher	EI 500 (2-Stop Push Process) Development Time (Minutes)									
	Small Tank					Large Tank				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX	NR	NR	NR	NR	9	—	—	—	—	—
T-MAX RS	—	9	8½	7½	6½	NR	NR	NR	NR	8
XTOL (135 PX)	9¾	8	7¼	—	5½	—	—	—	—	—
XTOL (120 PXP)	11	8½	7½	—	5¾	—	—	—	—	—

NR = Not Recommended

Rotary-Tube

KODAK Developer or Developer and Replenisher	KODAK PLUS-X Pan Film / PX					KODAK PLUS-X Pan Professional Film / PXP				
	EI 500 (2-Stop Push Process) Development Time (Minutes)									
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX*	NR	9	8	7	6	NR	9	8	7	6
T-MAX RS	NR	9	8	7½	7	NR	9	8	7½	7
XTOL	7¾	6½	6	—	4½	8½	7	6	—	4½
D-76	8½	7½	6½	6	5½	—	—	—	—	—

* Use T-MAX Developer only for roll films.

NR = Not Recommended

KODAK PLUS-X Pan Professional Film / PXE and PXT					
KODAK Developer or Developer and Replenisher	EI 500 (2-Stop Push Process) Development Time (Minutes)				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°C (75°F)
T-MAX RS	11½	10½	10	9	8
XTOL	9½	8	7	—	5¼

FINAL STEPS IN TANK, TRAY, AND ROTARY-TUBE PROCESSING—

18 to 24°C (65 to 75°F).

Step/Solution	Time (min:sec)
Rinse —with agitation:	
KODAK Indicator 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
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	

IMAGE-STRUCTURE CHARACTERISTICS

The data in this section is based on development to a contrast index of 0.56:

- **KODAK PLUS-X Pan Film / PX**

KODAK HC-110 Developer (Dilution B), 21°C (70°F), 5 minutes in a large tank, with manual agitation at 1-minute intervals

- **KODAK PLUS-X Pan Professional Film / PXP**

KODAK HC-110 Developer (Dilution B), 21°C (70°F), 5 minutes in a large tank, with manual agitation at 1-minute intervals

- **KODAK PLUS-X Pan Professional Film / PXE and sheet / PXT**

KODAK HC-110 Developer (Dilution B), 20°C (68°F), 6½ minutes in a large tank, with manual agitation at 1-minute intervals

KODAK PLUS-X Pan Film / PX

KODAK PLUS-X Pan Professional Film / PXP

Diffuse rms Granularity* 10 Extremely Fine

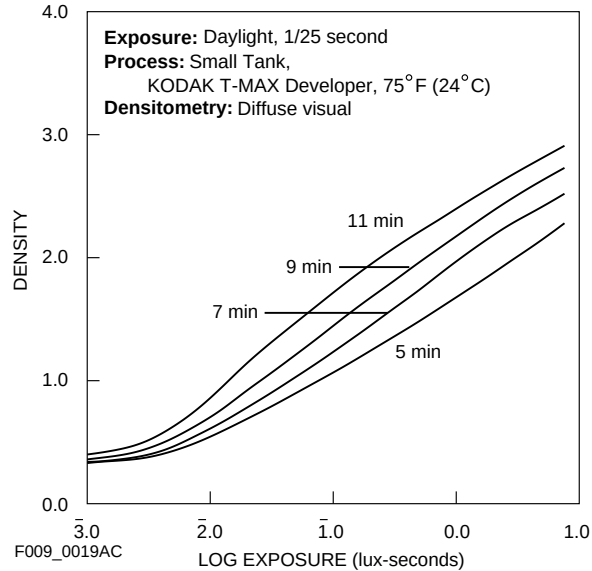
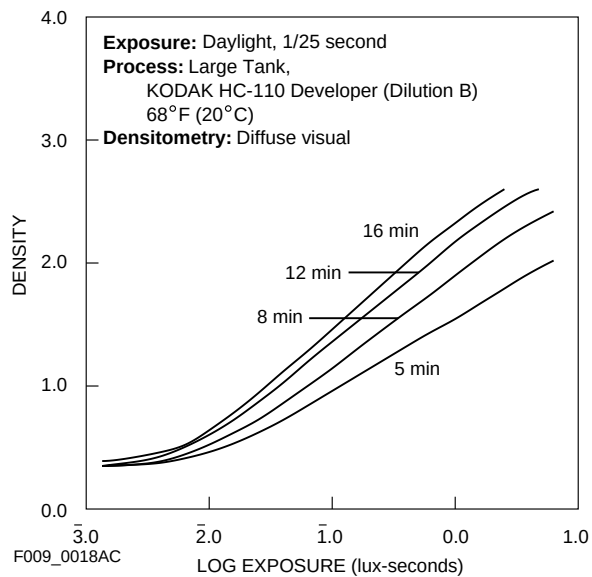
KODAK PLUS-X Pan Professional Film / PXE and PXT

Diffuse rms Granularity* 14 Very Fine

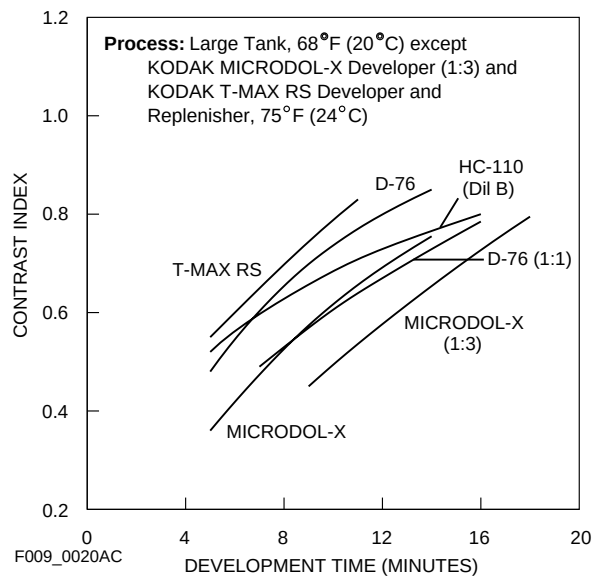
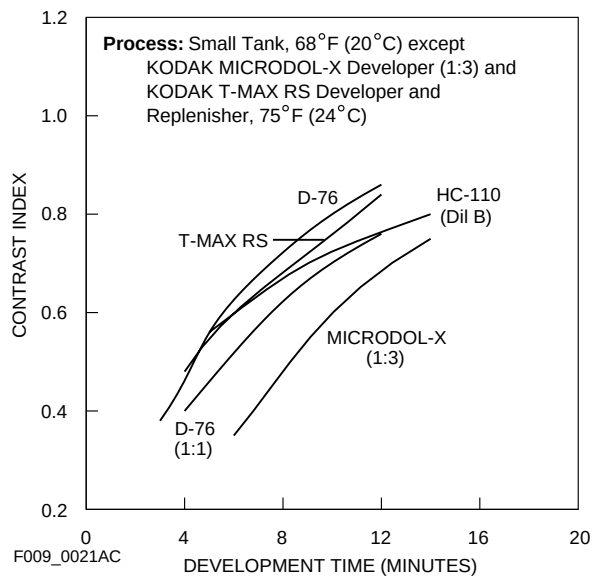
* Read at a net diffuse density of 1.0, using a 48-micrometre aperture, 12X magnification.

KODAK PLUS-X PAN FILM / PX

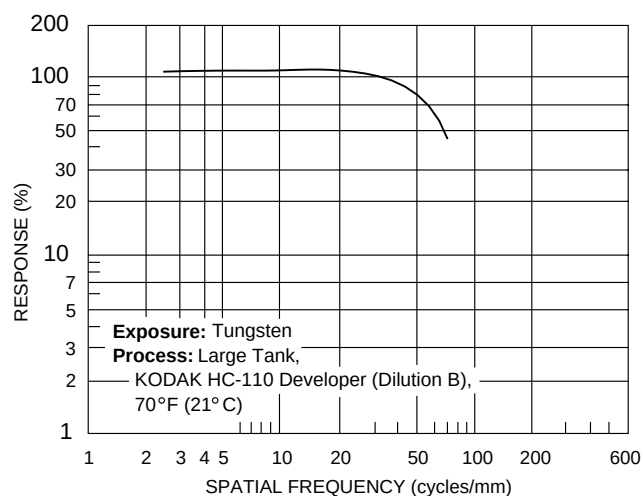
Characteristic Curves



Contrast-Index Curves



Modulation-Transfer Curve

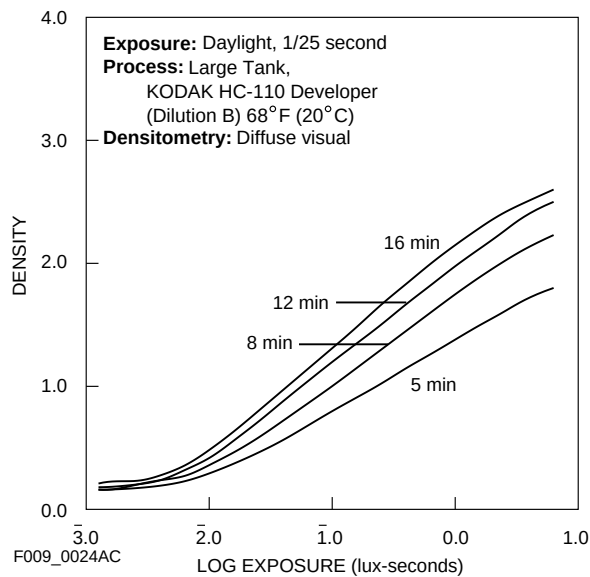


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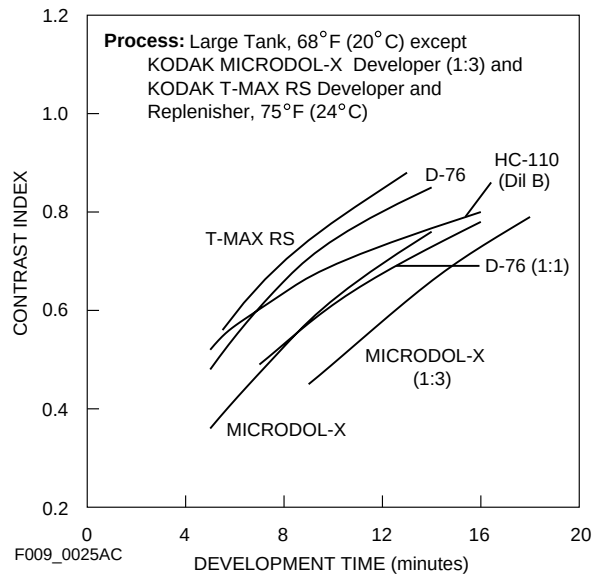
NOTICE: The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings, and therefore do not apply directly to a particular box or roll of photographic material. They do not represent 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.

KODAK PLUS-X PAN PROFESSIONAL FILM / PXP

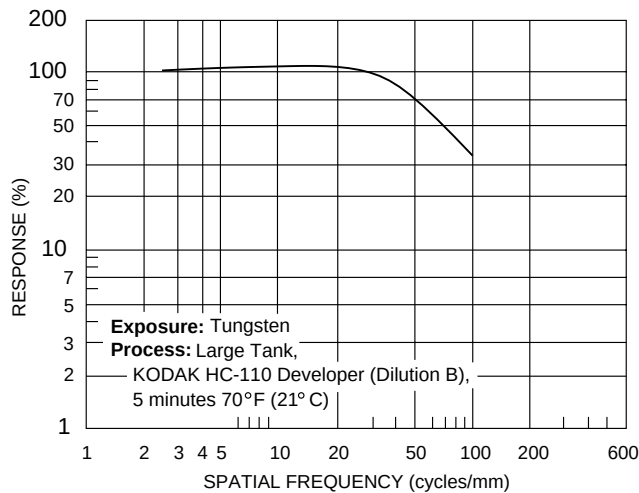
Characteristic Curves



Contrast-Index Curves

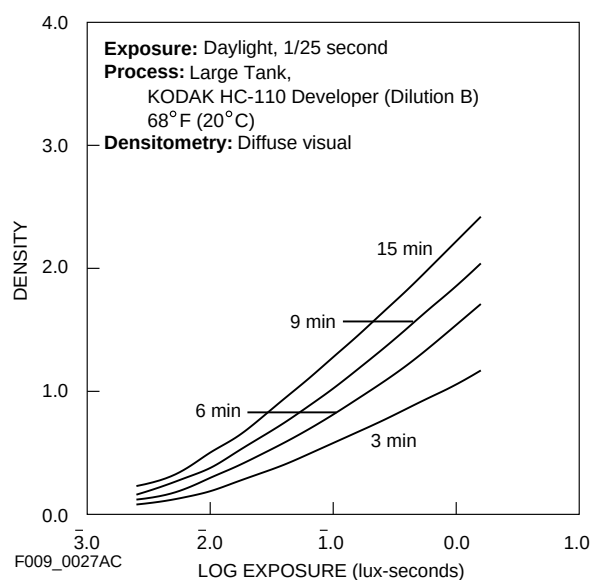


Modulation-Transfer Curve

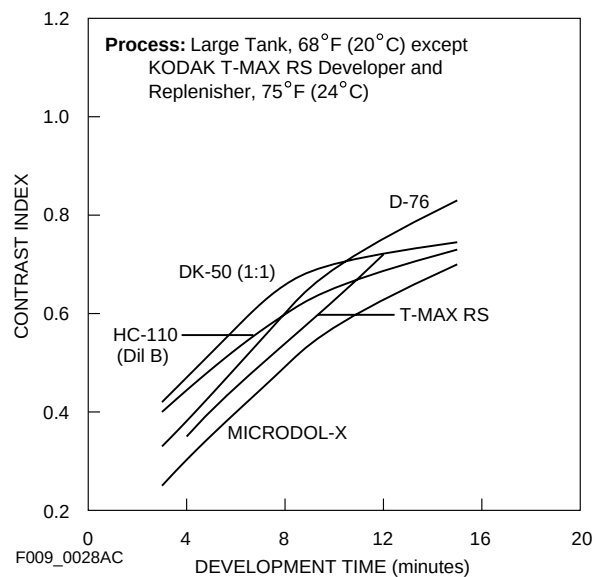


KODAK PLUS-X PAN PROFESSIONAL FILM / PXE AND PXT

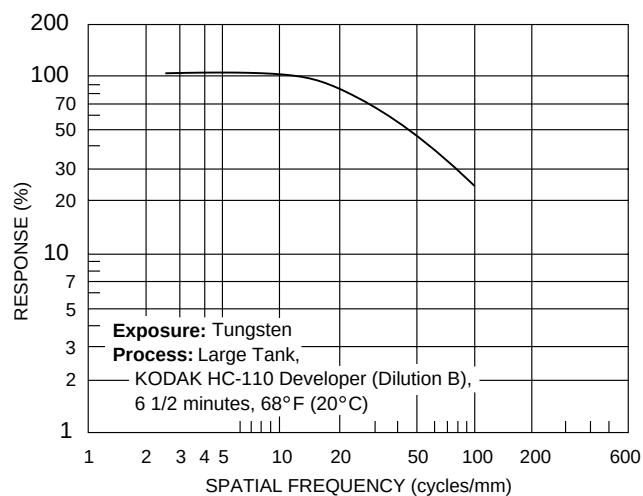
Characteristic Curves



Contrast-Index Curves



Modulation-Transfer Curve



KODAK PLUS-X Pan and KODAK PLUS-X Pan Professional Films

MORE INFORMATION

Kodak has many publications to assist you with information on Kodak products, equipment, and materials.

Additional information is available on the Kodak website.

The following publications are available from Kodak Customer Service, from dealers who sell Kodak products, or you can contract Kodak in your country for more information.

E-30	<i>Storage and Care of KODAK Photographic Materials—Before and After Processing</i>
E103BF	<i>KODAK Black-and-White Films (Matrix)</i>
E103CF	<i>Chemicals for KODAK Black-and-White Films (Matrix)</i>
J-24	<i>KODAK HC-110 Developer</i>
J-78	<i>KODAK Developers D-76</i>
J-86	<i>KODAK T-MAX Developers</i>
K-4	<i>How Safe Is Your Safelight?</i>

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 PLUS-X Pan and PLUS-X Pan Professional Films are available from dealers who supply KODAK PROFESSIONAL Products. You can use other materials, but you may not obtain similar results.

Kodak Professional