

KODAK TRI-X Pan and KODAK TRI-X Pan Professional Films



DESCRIPTION

KODAK TRI-X Pan Film / 5063 and 6043 KODAK TRI-X Pan Professional / 6049 and 4164

KODAK TRI-X Pan Film is a high-speed (ISO 400/27°) panchromatic film that is a good choice for photographing dimly lighted subjects or fast action, for photographing subjects that require good depth of field and fast shutter speeds, and for extending the distance range for flash pictures. TRI-X Pan (TX) Film 5063 is available in 135 size and 35 and 70 mm long rolls. TRI-X Pan (TX) Film 6043 is available in 120 size. You can retouch the 120-size film on the emulsion side. TRI-X Pan Film is recommended for push-processing applications.

Both **TRI-X Pan Professional Films** have an ISO speed of 320/26°, and feature excellent tone gradation and brilliant highlights. They are especially well suited to low-flare interior lighting or flash illumination. They are also useful for portraiture with low-contrast backlighting outdoors.

TRI-X Pan Professional (TXP) Film 6049 is available in 120 and 220 size on a 3.6-mil acetate base. You can retouch this film on the emulsion or base side.

TRI-X Pan Professional Film 4164 (TXT) is available in sheet sizes. You can retouch this film on the emulsion or base side.

FEATURES

BENEFITS

• Fine Grain	• Good for producing high-quality images
• Wide exposure latitude	• Rich tonality maintained with overexposure and underexposure
• High sharpness	• Good for applications that require a moderate degree of enlargement
• High resolving power	• 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 TRI-X Pan Film / 5063 and 6043

Roll	Film Code	BASE	Letter Code	CAT No.
135-24	5063	5-mil acetate	TX	198 4756
135-36	5063	5-mil acetate	TX	147 0764
135-36 pro-pack	5063	5-mil acetate	TX	166 1297
120	6043	3.6 mil acetate	TX	147 0186

KODAK TRI-X Pan Professional Film / 6049

Roll	Film Code	Base	Letter Code	CAT No.
120 pro-pack	6049	3.6 mil acetate	TXP	167 4290
220 pro-pack	6049	3.6 mil acetate	TXP	167 4431

KODAK TRI-X Pan Film / 5063

Size mm x ft	Film Code	Base	Spec Code	Letter Code	CAT No.
35 x 50	5063	5-mil acetate	401	TX	146 9170
35 x 100	5063	5-mil acetate	402	TX	146 9188
35 x 100	5063	5-mil acetate	417	TX	153 2936
70 x 100*	5063	5-mil acetate	473	TX	147 3081

* Not perforated

KODAK TRI-X Pan Professional Film / 4164

Sheets Per Package	Size (inches)	Film Code	Base	Letter Code	CAT No.
25	2¼ x 3¼	4164	7-mil ESTAR Thick	TXT	143 1535
25	4 x 5				143 0172
100	4 x 5				143 0198
100	5 x 7				143 0271
25	8 x 10				143 1618
50	8 x 10				143 1634

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 75°F (24°C) 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) and Lens Opening	
	Tri-X Pan Professional 6048, 4164	Tri-X Pan 5063, 6043
Bright or Hazy Sun on Light Sand or Snow	1/500 f/16	1/500 f/22
Bright or Hazy Sun (Distinct Shadows)	1/500 f/11*	1/500 f/16†
Weak, Hazy Sun (Soft Shadows)	1/500 f/8	1/500 f/11
Cloudy Bright (No Shadows)	1/500 f/5.6	1/500 f/8
Heavy Overcast or Open Shade‡	1/500 f/4	1/500 f/5.6

* Use f/5.6 at 1/500 for backlighted close-up subjects.

† Use f/8 at 1/500 for backlighted close-up subjects.

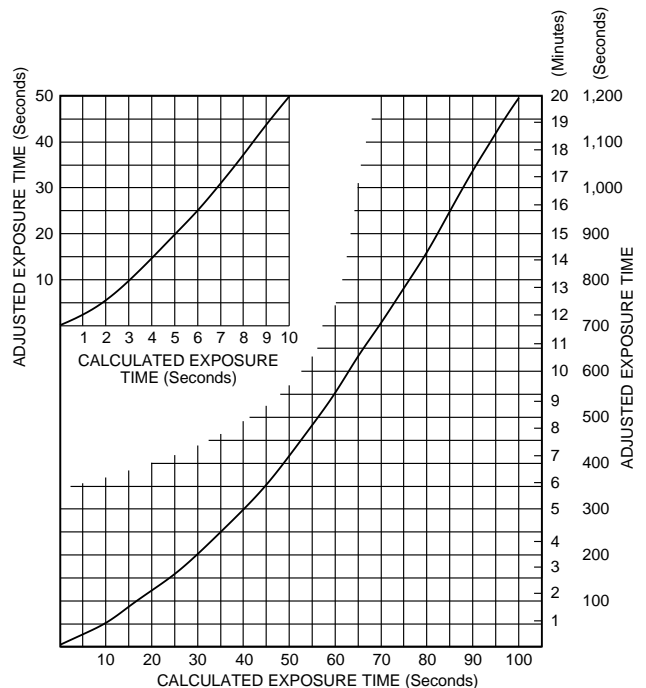
‡ Subject shaded from the sun but lighted by a large area of clear sky.

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		Adjust aperture	+20%
1/10,000	+½ 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 TRI-X Pan Film / 5063, 6043

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	3
No. 12 (deep yellow)	2.5	—
No. 15 (deep yellow)	2.5	1.5
No. 25 (red)	8	5
No. 47 (blue)*	6	12
No. 58 (green)*	6	6
Polarizing Filter	2.5	2.5

KODAK TRI-X Pan Professional Film / 6049 and 4164

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	2
No. 25 (red)	8	5
No. 29 (deep red)*†	16	10
No. 47 (blue)*	6	10
No. 58 (green)*	8	8
Polarizing Filter	2.5	2.5

* Filter recommended for making separation negatives.

† For TRI-X Pan Professional Film / 4164 only.

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

General Recommendations

Handle unprocessed film in total darkness.

The following 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 (½ 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 TRI-X Pan Film / 5063, 6043										
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	7	6	6	5½	5½	NR	NR	NR	NR	NR
T-MAX RS	7	6	5½	5½	5	12	10	8½	7½	6½
HC-110 (Dil B)	8½	7½	6½	6	5	9½	8½	8	7½	6½
D-76	9	8	7½	6½	5½	10	9	8	7	6
D-76 (1:1)	11	10	9½	9	8	13	12	11	10	9
DK-50 (1:1)	7	6	5½	5	4½	7½	6½	6	5½	5
MICRODOL-X	11	10	9½	9	8	13	12	11	10	9
MICRODOL-X (1:3)	NR	NR	15	14	13	NR	NR	17	16	15

* 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

KODAK TRI-X Pan Professional Film / 6049										
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	9	8	7½	7	6½	NR	NR	NR	NR	NR
T-MAX RS	5	4	3½	3½	3	7	6	5½	5½	5
HC-110 (Dil B)	5¾	5½	5¼	4¾	3¾	7	6¼	6	5½	5
D-76	9	8	7½	7	6	10	9	8½	8	7
DK-50 (1:1)	9	8	7½	7	6	10	9	8½	8	7
MICRODOL-X	11	10	9	8½	7½	12	11	10	9	8

* 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

MANUAL PROCESSING (continued)

Tray and Large-Tank Processing—Sheets

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

KODAK TRI-X Pan Professional Film / 4164										
KODAK Developer or Developer and Replenisher	Development Time (Minutes)									
	Tray*					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 RS	6	5	4	NR	NR	5½	5	4½	4½	4
HC-110 (Dil B)	6	5½	5	4½	4	8	7½	7	6	5
D-76	6	5½	5	5	4½	7½	7	6½	6	5½
MICRODOL-X	8	7	6	5½	5	10	9	8	7½	6½
DK-50 (1:1)	5	5	4½	4½	4	7	6½	6	5½	5

* With continuous agitation.

† With gaseous-burst agitation (1 second every 10 seconds) that provides pressure to raise the solution level 5/8 inch (16 mm). Development times shorter than 5 minutes may produce unsatisfactory uniformity.

†† With manual agitation at 1-minute intervals.

NR = Not Recommended

Note: KODAK T-MAX Developer is not recommended for processing sheet films.

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 TRI-X Pan Film / 5063, 6043					
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	6½	6	5½	5	4½
T-MAX RS	6½	6	5½	5	4
HC-110 (Dil B)	7	6	5½	4½	4
D-76	7½	7	6	5	4½

* With continuous agitation.

KODAK TRI-X Pan Professional Film / 6049					
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	—	8	7½	7½	6
T-MAX RS	—	3½	3	2½	2
HC-110 (Dil B)	—	8½	8	6½	5
D-76	—	7½	7	6½	5½

PUSH PROCESSING for KODAK TRI-X PAN FILM / 5063, 6043

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 800 and use normal processing times. Prints will show a slight loss in shadow detail.

You can underexpose by two stops at EI 1600 if you increase development time by push processing. Prints will show an increase in contrast and graininess with additional loss of shadow detail. However, the results will be acceptable for many applications.

You can underexpose by three stops at EI 3200 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.

Following are starting-point recommendations to produce a contrast index of 0.72 (representative of a 2-stop push).

KODAK Developer	Increase Development Time by
T-MAX	+50%
T-MAX RS	+50%
HC-110 (Dil B)	+100%
D-76	+60%
MICRODOL-X (1:3)	+60%
DK-50 (1:1)	+50%

KODAK TRI-X Pan Film / 5063, 6063										
KODAK Developer or Developer and Replenisher	Small Tank*									
	EI 1600 (2-Stop Push Process) Development Time (Minutes)					EI 3200 (3-Stop Push Process) Development Time (Minutes)				
	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	11½	10	9½	9	8½	NR	NR	NR	NR	11
T-MAX RS	—	9½	9	8½	8	NR	12	11½	11½	11
D-76	16	13	12	11	10	NR	NR	NR	NR	NR
HC - 110 (B)	18	16	15	13½	12	NR	NR	NR	NR	NR

* With agitation at 30-second intervals.
NR = Not Recommended

KODAK Developer or Developer and Replenisher	Large Tank*									
	EI 1600 (2-Stop Push Process) Development Time (Minutes)					EI 3200 (3-Stop Push Process) Development Time (Minutes)				
	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 RS	—	14	12½	10½	9	—	—	—	—	13½
D-76	15	13	12	11	10	NR	NR	NR	NR	NR
HC-110 (B)	18	16	15	13½	12	NR	NR	NR	NR	NR

* With manual agitation at 1-minute intervals.
NR = Not Recommended

Note: KODAK T-MAX Developer is not recommended for processing in large tanks.

KODAK Developer or Developer and Replenisher	Rotary Tube*									
	EI 1600 (2-Stop Push Process) Development Time (Minutes)					EI 3200 (2-Stop Push Process) Development Time (Minutes)				
	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	—	9	8	7½	6½	—	12	11	10	9
T-MAX RS	—	10	9	8	7	—	12	11	10	9
D-76	—	—	9	8	7	—	—	11	10	9½
HC-110 (B)	11½	11	10½	10	10	NR	NR	NR	NR	NR

* With continuous agitation
NR = Not Recommended

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

65 to 75° F (18 to 24° C)

Step/Solution	Time (min:sec)
Rinse —with agitation:	
KODAK Indicator Stop Bath	0:30
KODAK EKTA-FLO 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	5:00 to 10:00
KODAK POLYMAX T Fixer (1:3)	5:00 to 10:00
Wash:	
Running water —OR—	20:00 to 30:00
Rinse with water	0:30
KODAK Hypo Cleaning 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 following information is based on development in KODAK HC-110 Developer (Dilution B), 68°F (20°C), to a contrast index of 0.56.

- **KODAK TRI-X Pan Film / 5063 and 6043:**
7½ minutes in small tank with manual agitation at 30-second intervals
- **KODAK TRI-X Pan Professional Film / 4164:**
7½ minutes in large tank with manual agitation at 1-minute intervals
- **KODAK TRI-X Pan Professional Film / 6049:**
5½ minutes in small tank with manual agitation at 1-minute intervals

KODAK TRI-X Pan Film / 5063, 6043

Diffuse rms Granularity* 17 Fine

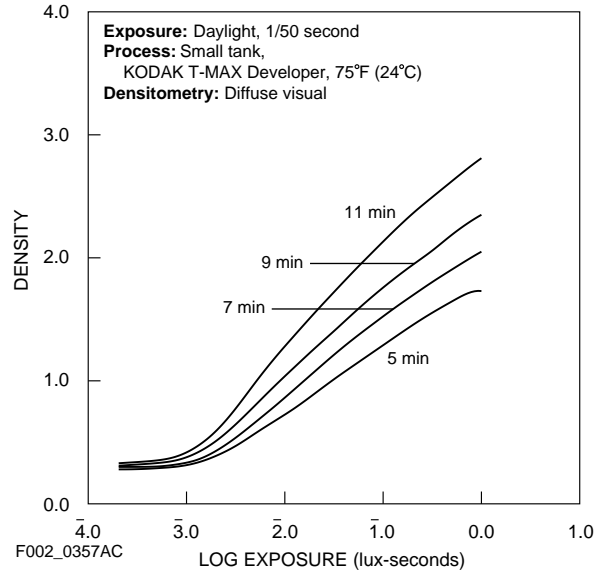
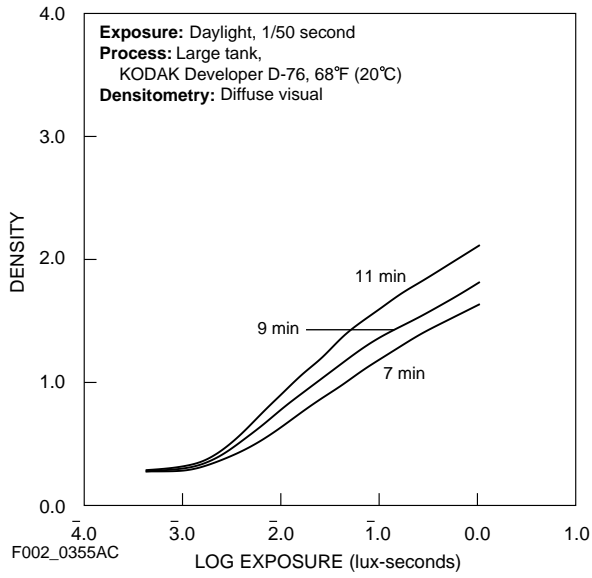
KODAK TRI-X Pan Professional Film / 6049, 4164

Diffuse rms Granularity* 16 Fine

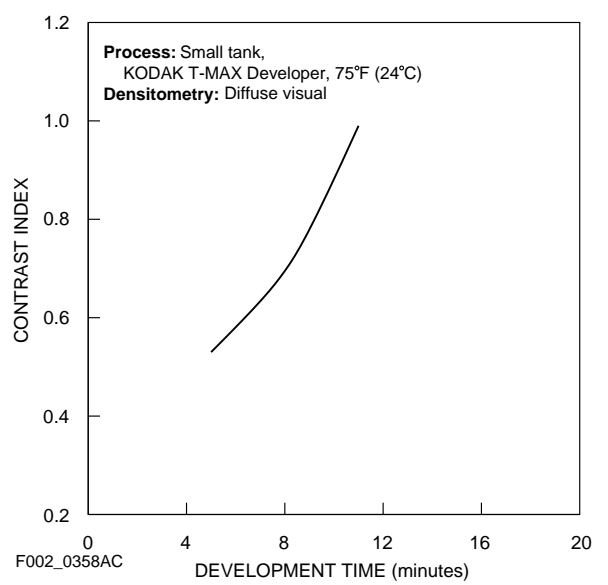
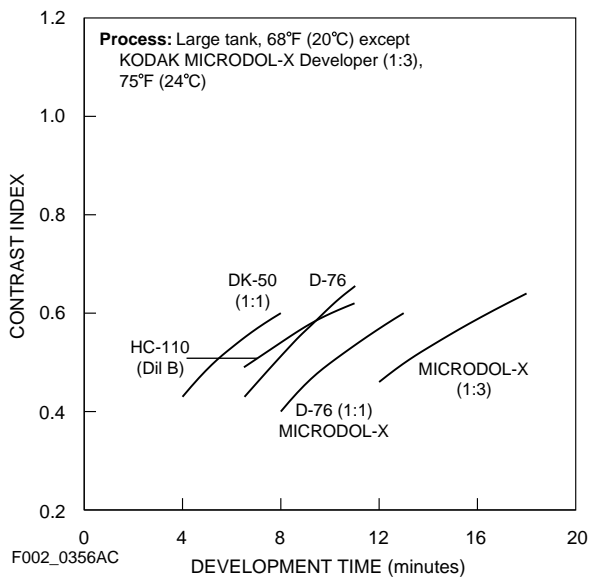
* Read at a net diffuse density of 1.0, using a 48-micrometre aperture, 12X magnification.

KODAK TRI-X Pan Film / 5063, 6043

Characteristic Curves

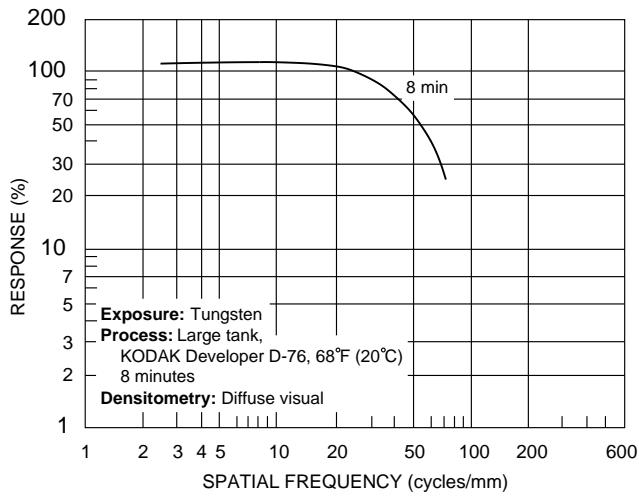


Contrast-Index Curves



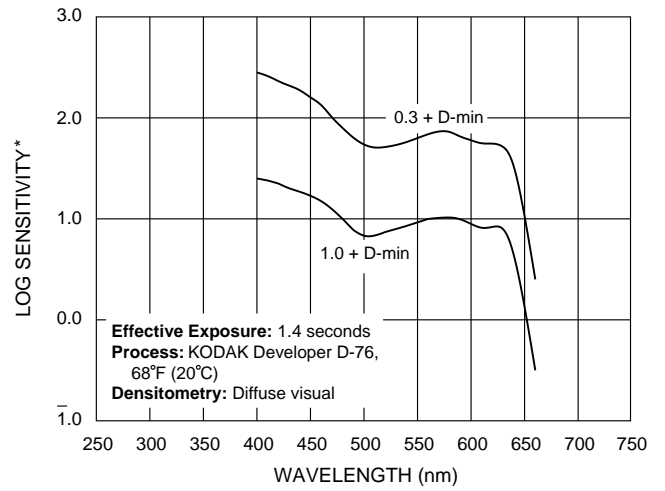
KODAK TRI-X Pan Film / 5063, 6043

Modulation Transfer Curve



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Spectral-Sensitivity Curve

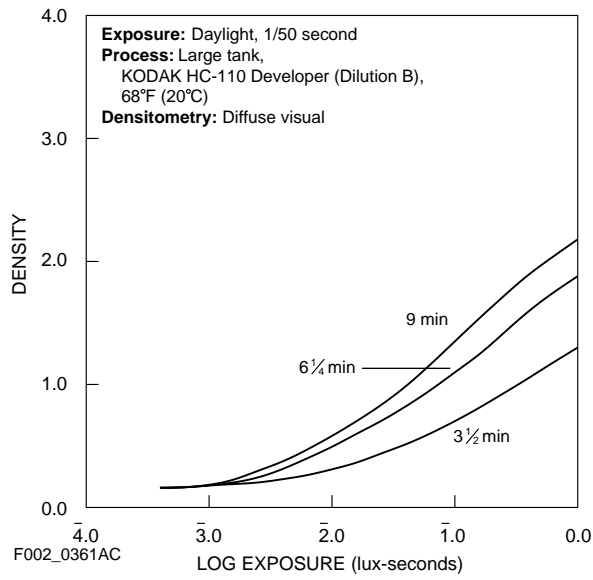


*Sensitivity = reciprocal of exposure (ergs/cm²) required to produce specified density

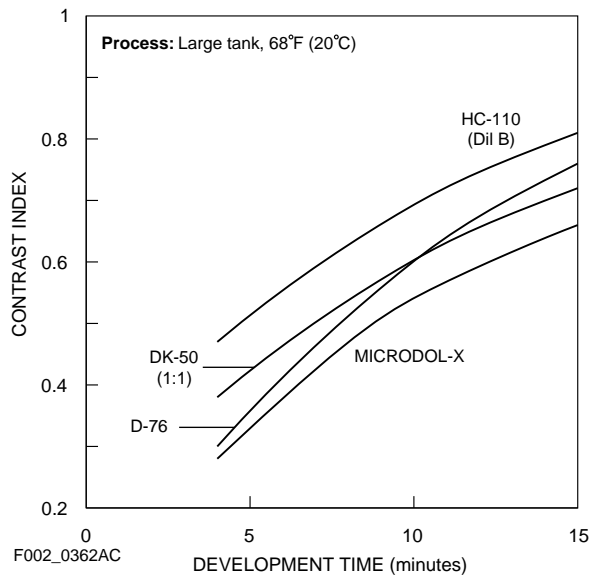
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NOTICE: The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings, and therefore do not apply directly to a particular box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

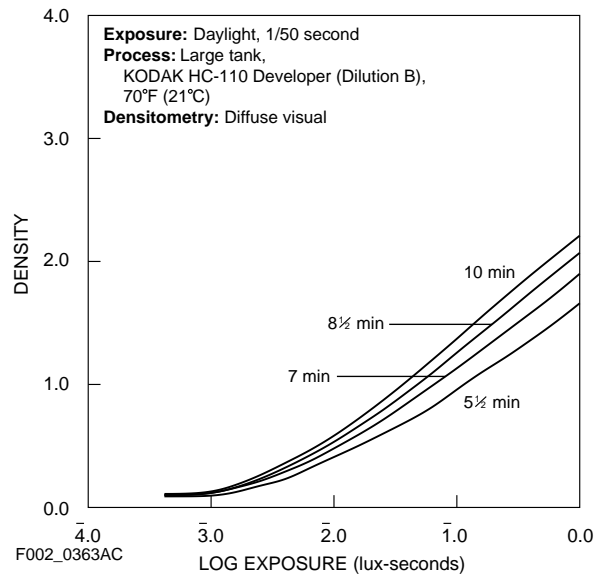
Characteristic Curves



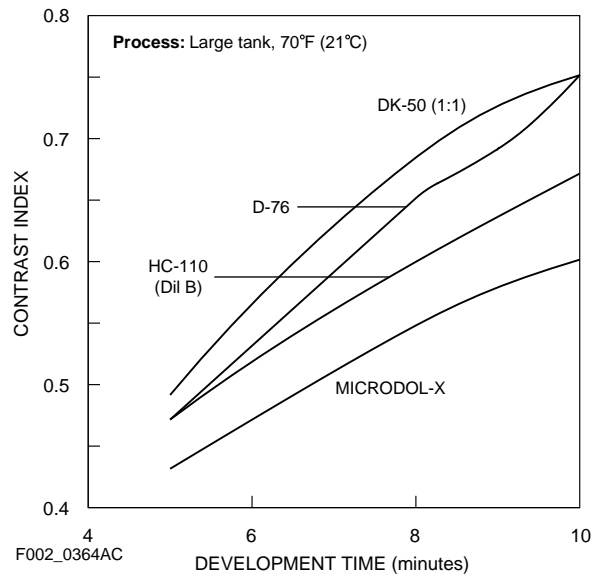
Contrast-Index Curves



Characteristic Curves



Contrast-Index Curves



KODAK TRI-X Pan and KODAK TRI-X Pan Professional Films

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.

- E-30 *Storage and Care of KODAK Photographic Materials—Before and After Processing*
- J-24 *KODAK HC-110 Developer*
- J-78 *KODAK Developers D-76*
- J-86 *KODAK T-MAX Developers*
- K-4 *How Safe Is Your Safelight?*

Kodak Information Center's Faxback System

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If you have questions about Kodak products, call Kodak.

In the U.S.A.:

*1-800-242-2424, Ext. 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 Kodak materials described in this publication for use with KODAK TRI-X Pan and TRI-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.



PROFESSIONAL & PRINTING
IMAGING