KODAK PROFESSIONAL HC-110 Developer

Kodak alaris

TECHNICAL DATA / CHEMICALS

KODAK PROFESSIONAL HC-110 Developer is a highly concentrated liquid developer. It is intended for use with a variety of black-and-white films, some graphic-arts films, and some glass plates.

It can be used for replenished and non-replenished systems. Use KODAK PROFESSIONAL HC-110 Developer Replenisher to replenish.

FEATURES	BENEFITS
Highly active	Short development times
Liquid concentrate	Easy mixing
Clean solution	 Cleaner tanks, racks, and reels; less equipment maintenance
Long solution life	 Fewer chemical dumps; less waste
Stable solutions	 Easy process control, even with low utilization
Quality of stock solutions maintained over a long time	Good shelf life

PREPARING WORKING SOLUTIONS

You can prepare HC-110 Developer working solutions by diluting stock solution or concentrate. (Both mixing methods provide the same photographic characteristics.)

To prepare stock solution, dilute one part concentrate with three parts water. To prepare working solutions, dilute stock solution or concentrate according to the following tables. Mix either stock or working solutions at a temperature between 10 and 32°C (50 and 90°F). December 2017 • J-24

Take care when measuring the concentrate, because of its viscosity. Follow these recommendations for handling.

- Pour the concentrate slowly to avoid air bubbles. If air bubbles form, wait for them to dissipate before measuring the concentrate.
- Wait for the concentrate to run down the sides of the measuring container. (The concentrate will adhere to the sides of a graduated cylinder.)
- When measuring small amounts of concentrate, use a graduated cylinder accurate to 0.5 millilitre. (To simplify measuring small amounts, use a positive-displacement method such as a syringe.)
- Rinse the measuring container with water at least five times, and pour each rinse into the mixing container. This ensures that all the concentrate is dissolved in the water.
- Mix the solution for several minutes until the concentrate is fully dissolved.



KODAK PROFESSIONAL HC-110 Developer is a highly concentrated liquid that you must dilute before use. The following tables provide dilution instructions on preparing working solutions from **either** stock solution **or** concentrate. Exercise caution when following the mixing instructions in the tables, being certain not to intermingle their data. Follow normal safety precautions whenever working with chemicals to avoid possible physical harm.

	PREPAR	ING WORKING SOLUTIONS F	ROM STOCK SOLUTION ¹	
To Mix Wo	orking Solution	Add This Amount of	To This Amount of	Ratio of Stock Solution
Dilution	Amount	Stock Solution ²	Water ²	to Water
A	300 mL 500 mL 1 qt 1 L 5 L 7.6 L (2 gal) 18.9 L (5 gal)	75 mL 125 mL 236 mL (8 fl oz) 250 mL 1.25 L 1.9 L (2 qt) 4.73 L (5 qt)	225 mL 375 mL 708 mL (24 fl oz) 750 mL 3.75 L 5.7 L (6 qt) 14.17 L (15 qt)	1:3
В	300 mL 500 mL 1 qt 1 L 5 L 7.6 L (2 gal) 18.9 L (5 gal)	38 mL 63 mL 118 mL (4 fl oz) 125 mL 625 mL 950 mL (1 qt) 2.36 L (2.5 qt)	262 mL 437 mL 826 mL (28 fl oz) 875 mL 4.38 mL 6.65 L (7 qt) 16.54 L (17.5 qt)	1:7
С	7.6 L (2 gal) 18.9 L (5 gal)	1.54 L (52 fl oz) 3.78 L (4 qt)	6.08 L (6 qt 13 fl oz) 15.12 L (16 qt)	1:4
D	7.6 L (2 gal) 18.9 L (5 gal)	770 mL (26 fl oz) 1.89 L (2 qt)	6.84 L (7 qt 6 fl oz) 17.01 L (18 qt)	1:9
E	7.6 L (2 gal) 18.9 L (5 gal)	630 mL (21 fl oz) 1.58 L (1 qt 11 fl oz)	6.97 L (7 qt 11 fl oz) 17.32 L (18 qt 21 fl oz)	1:11
F	7.6 L (2 gal) 18.9 L (5 gal)	380 mL (13 fl oz) 950 mL (1 qt)	7.22 L (7 qt 19 fl oz) 17.95 L (19 qt)	1:19

^{1.}IMPORTANT NOTE: Due to the high viscosity of the developer concentrate, it is preferable to dilute it to a stock solution. This may be a more convenient way to store the chemical for future preparation into a working solution, per the

above instructions. ²Due to rounding of decimals, slight variations occur when amounts are given in millilitres and fluid ounces.

		RING WORKING SOLUTIONS	+ + + + + + + + + + + + + + + + + + + +		
To Mix W	/orking Solution	Add This Amount of	To This Amount of	Ratio of Concentrate	
Dilution Amount		Concentrate	Water ²	to Water	
	300 mL	19 mL	281 mL		
	500 mL	31 mL	469 mL		
	1 qt	59 mL (2 fl oz)	885 mL (30 fl oz)		
А	1L	63 mL	937 mL	1:15	
	5 L	313 L	4687 mL		
	7.6 L (2 gal)	473 mL (16 fl oz)	7.1 L (7.5 qt)		
	13.3 L (3.5 gal)	828 L (28 fl oz)	12.5 L (13 qt 4 fl oz)		
	300 mL	9 mL	291 mL		
	500 mL	16 mL	484 mL		
	1 qt	30 mL (1 fl oz)	914 mL (31 fl oz)		
В	1 L	31 mL	969 mL	1:31	
	5 L	156 mL	4844 mL		
	15.2 L (4 gal)	473 mL (16 fl oz)	14.7 L (15.5 qt)		
	26.6 L (7 gal)	828 mL (28 fl oz)	25.75 L (27 qt 4 fl oz)		
С	9.5 L (2.5 gal)	473 mL (16 fl oz)	9 L (9.5 qt)	1:19	
C	16.6 L (17.5 gal)	828 mL (28 fl oz)	15.75 L (16 qt 20 fl oz)	1.19	
D	18.9 L (5 gal)	473 mL (16 fl oz)	18.4 L (19.5 qt)	1:39	
D	33.3 L (8 gal 3 qt)	828 mL (28 fl oz)	32.5 L (34 qt 4 fl oz)	1.59	
F	22.7 L (6 gal)	473 mL (16 fl oz)	22.2 L (23.5 qt)	1.47	
E	39.8 L (10.5 gal)	828 mL (28 fl oz)	39 L (41 qt 4 fl oz)	1:47	
F	37.9 L (10 gal)	473 mL (16 fl oz)	37.4 L (39.5 qt)	1:79	
Г	66.3 L (17.5 gal)	828 mL (28 fl oz)	65.5 L (69 qt 4 fl oz)	1:79	

^{1.}IMPORTANT NOTE: The above instructions refer to the dilution of the package contents from the manufacturer (the developer concentrate), directly to a working solution, without use of an

intermediate stock solution.

² Due to rounding of decimals, slight variations occur when amounts are given in millilitres and fluid ounces.

DEVELOPMENT TIMES

If film is properly exposed, the times in the following tables should produce negatives with contrast suitable for printing with a diffusion enlarger (or by contact) on a normal-contrast black-and-white paper. If printing negatives with a condenser enlarger, decrease the development time by approximately 30 percent to produce lower contrast.

For critical applications, run tests to determine the best development time. If your negatives are consistently too dense or high in contrast, decrease the development time; if they're too thin or low in contrast, increase the development time.

The following tables offer starting-point recommendations. Adjust as needed.

D	EVELOPM	IENT TIM	ES FOR K	ODAK SH	EET FILN	IS				
				Deve	lopment ⁻	Time (Mir	utes)			
KODAK Film	Tray ¹ Continuous Agitation					Large Tank ² Manual Agitation at 1-Minute Intervals				
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)
DILUTION A	-									•
EKTAPAN / EKP ³	31/4	3	23/4	21/2	21/4	4	33/4	31/4	3	23/4
DILUTION B		1							1	
Commercial ³	23/4	21/4	21/4	2	13/4	—	—	_	—	—
EKTAPAN / EKP ³	5	41/2	4 1/4	4	31/2	7	6	51/2	5	41/4
PLUS-X Pan Professional / PXT ³	6	5	43/4	41/2	4	8	7	61/2	6	51/2
Technical Pan / TP				ng KODAI odak Alari						
T-MAX 100 Professional / TMX	81/2	71/2	7	61/2	51/2	111/2	91/2	81/2	71/2	7
PROFESSIONAL T-MAX 100	61/4	51/2	43/4	41/2	3 3/4	71/2	61/2	6	51/4	41/2
T-MAX 400 Professional and PROFESSIONAL T-MAX 400	9	71/2	7	61/2	6	10	81/2	71/2	7	61/2
TRI-X Pan Professional / TXT ³	6	5 ¹ /2	5	41/2	4	8	71/2	7	6	5
PROFESSIONAL TRI-X 320 Film / 320TXP	33/4	31/4	3	23/4	21/2	43/4	41/4	4	31/2	3

¹Prewet the film in clean water at 20°C (68°F) for 1 to 2 minutes with agitation. Each sheet should be thoroughly wet to prevent sticking (of sheets) and promote even development.

² Tank-development times shorter than 5 minutes may produce unsatisfactory uniformity.

^{3.}Tray development times also apply to tank development using gaseous-burst agitation. Set the burst duration for 1 second with 10 seconds between bursts; provide sufficient pressure to increase the solution level 16 mm (5/8 inch).

				Deve	lopment ⁻	Time (Mir	utes)			
KODAK Film	Small Tank ¹ Manual Agitation at 30-Second Intervals				Large Tank ² Manual Agitation at 1-Minute Intervals					
	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)
DILUTION A				1		1	1	1	1	
Recording 2475	51/2	4 1/4	4	3 1/2	3			NR		
TRI-X Pan / TX	41/4	33/4	31/4	3	21/2	43/4	41/4	4	3 3/4	31/4
TRI-X Pan Professional / TXP			NR			31/2	3	3	23/4	21/4
DILUTION B						1	1	I	I	1
PLUS-X Pan / PX PLUS-X Pan Professional / PXP ³	6	5	41/2	4	31/2	61/2	51/2	5	43/4	4
PROFESSIONAL PLUS-X 125	4	31/2	3	2 ³ /4	21/2	41/2	33/4	31/2	31/4	2 ³ /4
Recording 2475	11	9	8	7	6	NR			1	
Technical Pan / TP		mation or applicatio								
T-MAX 100 Professional / TMX	8	7	61/2	6	5	81/2	71/2	7	61/2	5 ¹ /2
PROFESSIONAL T-MAX 100	61/2	6	51/2	5	4	71/2	61/2	6	5 ¹ /4	4 ¹ / ₂
T-MAX 400 Professional and PROFESSIONAL T-MAX 400	61/2	6	51/2	5	4 ¹ /2	8	7	61/2	6	5
T-MAX P3200 Professional / TMZ					See the ta			1	1	
PROFESSIONAL T-MAX P3200	1				see the ta	DIES DEIOV	V.			
TRI-X Pan / TX	81/2	71/2	61/2	6	5	9 1/2	81/2	8	7 1/2	61/2
TRI-X Pan Professional / TXP	53/4	51/2	51/4	43/4	33/4	7	6 1/4	6	51/2	5
PROFFESSIONAL TRI-X 400 Film / 400TX	41/2	33/4	31/2	3	21/2	5	41/2	4	31/2	3
PROFESSIONAL TRI-X 320 Film / 320TXP	51/4	43/4	41/4	4	31/2	61/4	51/2	5	41/2	4
VERICHROME Pan / VP	6	5	4 1/2	4	2	8	6 1/2	6	51/2	41/2

¹Development on a reel in a small roll-film tank. ²Development of several reels in a basket. ³Development times also apply to tank development using gaseous-burst agitation. Set the burst duration for 1 second with 10 seconds between bursts; provide sufficient pressure to increase the solution level 16 mm (5/8 inch).

NR = Not recommended

Note: Tank-development times shorter than 5 minutes may produce unsatisfactory uniformity.

Dilution B		Development Time (Minutes)										
Dilution B				Small Tank ¹						' Tube ²		
Exposed at El	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)	27°F (80°F)	29°F (85°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)	27°F (80°F)	29°F (85°F)
400 / 27°	71/2	61/2	51/2	5	41/2	31/2	7	61/4	5 ³ /4	5	41/4	31/4
800/30°	8	7	6	51/2	43/4	4	8	7	6	51/4	4 ¹ / ₂	31/2
1600 / 33°	9	71/2	61/2	6	5	41/2	8 ³ /4	71/2	61/2	5 ³ /4	43/4	3 ³ /4
3200 / 36°	111/2	10	8 ¹ /2	71/2	61/2	5 ³ /4	111/2	10	8 ¹ /2	71/2	61/2	5
6400 / 39°	14	12	101/2	9 ¹ /2	8	63/4	13	11 ¹ /2	10	9	8	6

^{1.}Development on a reel, in a small roll-film tank, with manual agitation at 30-second intervals. ^{2.}Development in a rotary-tube processor with continuous agitation.

Note: Tank-development times shorter than 5 minutes may produce unsatisfactory uniformity.

DEVELOPMENT TIMES FOR KODAK PROFESSIONAL T-MAX P3200 FILM

Dilution B		Development Time (Minutes)											
Dilution B		Small Tank ¹					Rotary Tube ²						
Exposed at El	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)	27°F (80°F)	29°F (85°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)	27°F (80°F)	29°F (85°F)	
400 / 27°	71/2	61/2	51/2	5	41/4	33/4	71/2	61/2	51/2	5	41/4	33/4	
800 / 30°	8 ¹ /2	71/4	61/4	5 ³ /4	43/4	41/4	8 ¹ /2	71/4	61/4	5 ³ /4	43/4	4 ¹ /4	
1600 / 33°	9 ¹ /4	8	63/4	61/4	51/4	41/2	91/4	8	63/4	6 1/4	5 1/4	4 ¹ /2	
3200 / 36°	10 ¹ /2	9	73/4	7	6	51/4	10 ¹ /2	9	73/4	7	6	51/4	
6400/39°	12	10 1/4	8 ³ /4	8	6 ³ /4	5 ³ /4	12	101/4	8 ³ /4	8	6 ³ /4	5 ³ /4	

^{1.}Development on a reel, in a small roll-film tank, with manual agitation at 30-second intervals. ^{2.}Development in a rotary-tube processor with continuous agitation.

Note: Tank-development times shorter than 5 minutes may produce unsatisfactory uniformity.

DEVELOPMENT TIMES FOR KODAK FILMS IN ROTARY TUBES									
KODAK Film	Development Time (Minutes) ¹ Dilution B								
KODAK FIIM	18°C (65°F)	20°C (68°F)	21°C (70°F)	22°C (72°F)	24°F (75°F)				
ROLL FILM		1	1						
T-MAX 100 Professional / TMX	-	6 1/2	6	51/2	41/2				
PROFESSIONAL T-MAX 100	7	5 ³ /4	5 1/4	4 3/4	4				
T-MAX 400 Professional and PROFESSIONAL T-MAX 400	_	6	51/2	5	5				
TRI-X Pan / TX	7	6	51/2	41/2	4				
TRI-X Pan Professional / TXP	-	8 ¹ /2	8	61/2	5				
PROFESSIONAL TRI-X 400 Film / 400TX	41/2	33/4	31/2	3	21/2				
PROFESSIONAL TRI-X 320 Film / 320TXP	51/4	43/4	41/4	4	31/2				
PLUS-X / PX	8	7	6	5	4				
PROFESSIONAL PLUS-X 125	4	3 1/2	3	2 ³ /4	2 1/2				
SHEET FILM									
T-MAX 100 Professional / TMX	—	61/2	6	5 ¹ /2	41/2				
PROFESSIONAL T-MAX 100	7	5 ³ /4	5 1/4	4 ³ /4	4				
T-MAX 400 Professional and PROFESSIONAL T-MAX 400	_	6	51/2	5	5				
PROFESSIONAL TRI-X 320 Film / 320TXP	3 1/4	3	2 ³ /4	2 1/2	2 ¹ /4				

¹Development in a rotary-tube processor with continuous agitation.

KODAK Film	Application	Dilution	Development Time (Minutes) at 20°C (68°F) ¹						
	Conving photographs	В		2 1/4					
Commercial	Copying photographs	D		41	/2				
	Gravure	С			3				
Professional Copy	Copying photographs	E	4						
			Printer						
Separation Negative 4131, Type 1	Color-separation negatives made from masked transparencies	С	Cyan	Magenta	Yellow	Black			
	nom masked transparencies		4	31/2	4	3			
			Printer Masks						
Pan Masking	Camera-back masking	E	Cyan	Magenta	Yellow	Black			
4570		 	4	4	4	—			
	Transparency masking	D	31/4	3 1/4	31/4	31/4			

¹.Development in a tray with continuous agitation.

REPLENISHMENT

General

Replenish tank solutions of HC-110 Developer with a solution made from KODAK PROFESSIONAL HC-110 Developer Replenisher. To prepare a replenisher stock solution, pour the contents (16 ounces [473 mL]) of the replenisher concentrate into a mixing container that holds at least 3.8 litres (1 gallon). Add enough water to bring the total volume to 3.8 litres (1 gallon). Stir the solution until it is uniform. You can store the replenisher stock solution at 18 to 24°C (65 to 75°F) for up to 6 months in a full, tightly closed bottle, or up to 2 months in a half-full, tightly closed bottle.

When ready to replenish the tank solution, prepare replenisher working solution by diluting the replenisher stock solution with water according to the table below.

PREPAR	PREPARING REPLENISHER SOLUTIONS									
For This Dilution of Developer Working Solution	Add This Amount of Replenisher Stock Solution	To This Amount of Water								
A	1 part	none								
В	2 parts	1 part								
С	1 part	none								
D	1 part	1 part								
E	8 parts	11 parts								
F	—	—								

Note: Dilution F is very dilute; we do not recommend replenishing this solution.

Replenishment Rate

Add 22 mL (3/4 fluid ounce) of replenisher solution for each 20.3 x 25.4 cm (8 x 10-inch) sheet, 135-36 roll, or 120 roll (or equivalent) processed. Stir or recirculate the solution thoroughly after each addition. With an average drain time of 10 seconds between the developer and the stop bath, this amount of replenisher will usually match the carry-out of developer. However, if more solution is carried out than replaced, add fresh developer working solution (of the appropriate dilution) to make up the difference.

Note: If negatives become too thin or low in contrast, increase the replenishment rate; if they become too dense or high in contrast, decrease the replenishment rate.

When you aren't processing film, cover the tanks with floating lids to minimize oxidation.

Process Control

When replenishing tank solutions, monitor the developer activity with KODAK Black-and-White Process Control Strips. Depending on the utilization, you can use a tank solution for up to one month if the control strips indicate proper developer activity.

If you don't use control strips, discard the tank solution when you have —

- Replenished the solution for two weeks;
- Added an amount of replenisher that equals the original volume of the working solution; or
- Processed fifty 20.3 x 25.4 cm sheets per litre (two hundred 8 x 10-inch sheets [or equivalent] per gallon) of developer.

Capacity

Discard the developer after processing the number of sheets (or equivalent) listed below.

	DEVELOP		CAPACITY OF DEVELOPER WORKING SOLUTIONS										
	Т	ray		without iishment									
Dilution	8 x 10-in. Sheets per Gallon	20.3 x 25.4 cm Sheets per Litre	8 x 10-in. Sheets per Gallon	20.3 x 25.4 cm Sheets per Litre									
А	20	5	40	10									
В	10	2.5	20	5									
С	15	4	30	8									
D	8	2	15	4									
Е	5	1.5	10	3									
F	2	1	NR	NR									

NR = Not recommended

STORAGE LIFE

The table below provides guidelines for storing unused solutions at 18 to 24°C (65 to 75°F). The storage temperature is important as higher temperatures cause solutions to oxidize rapidly.

STORAGE LIFE (MONTHS) OF UNUSED SOLUTIONS ¹								
Solution	Full, Tightly Closed Bottle	Half-Filled, Tightly Closed Bottle	Tank with Floating Lid					
Developer	1	L						
Stock Solution	6	2	2					
Working Solution— Dilution A	6	2	2					
Dilution B	3	1	1					
Dilution C	6	2	2					
Dilution D	3	1	1					
Dilution E	2	1	1					
Dilution F	NR	NR	NR					
Replenisher	1	<u> </u>						
Stock Solution	6	2	2					

^{1.}Stored at 18 to 24°C (65 to 75°F).

NR = Not recommended

MORE INFORMATION

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

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

E103CF	Chemicals for KODAK PROFESSIONAL Black-and-White
	Films

- F-7 KODAK VERICHROME Pan Film
- F-8 KODAK PLUS-X Pan and KODAK PLUS-X Pan Professional Films
- F-9 KODAK TRI-X Pan and KODAK TRI-X Pan Professional Films
- F-10 KODAK EKTAPAN Film
- F-16 KODAK Commercial Film
- F-32 KODAK T-MAX Professional Films
- F-4016 KODAK PROFESSIONAL T-MAX Films
- F-4017 KODAK PROFESSIONAL TRI-X 320 and 400 Films
- F-4018 KODAK PROFESSIONAL PLUS-X 125 Film
- P-255 KODAK PROFESSIONAL Technical Pan Films

For the latest version of technical support publications for KODAK PROFESSIONAL Products, visit: www.kodakalaris.com/go/professional

Note: The Kodak Alaris materials described in this publication for use with KODAK HC-110 Developer Replenisher are available from dealers who supply KODAK PROFESSIONAL products. You can use other materials, but you may not obtain similar results.

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