

Pathways to Black and White



- INTRODUCTION
- KODAK BLACK-AND-WHITE FILMS
- KODAK BLACK-AND-WHITE PAPERS

INTRODUCTION

The pathway you choose to produce a finished black-and-white image will depend on your original and your specific application. The most fundamental path is to make a positive black-and-white reflection print from a black-and-white negative. The following shows a wide variety of ways to arrive at your final image.

KODAK BLACK-AND-WHITE FILMS

Kodak offers a variety of black-and-white films among which are *continuous-tone* (or pictorial) films and *copy* (or laboratory) films in a variety of sheet and roll sizes.

Continuous-Tone Films. General picture-taking continuous-tone films, such as KODAK PROFESSIONAL TRI-X 400 Film or KODAK PROFESSIONAL T-MAX Films, are usually used to make black-and-white enlargements on conventional black-and-white papers. However, you can also use some films to make positive slides or display transparencies in a range of contrasts.

Kodak also makes a variety of continuous-tone black-and-white chemicals for processing these films.

Copy (Laboratory) Films. Kodak makes a variety of films for producing duplicate negatives, copy negatives, positives, and images with special-contrast properties.

Copy negatives are usually negatives made by photographing black-and-white reflection prints. For best results, use KODAK PROFESSIONAL T-MAX 100 Film or a special copy film, such as KODAK Professional Copy Film.

Duplicate negatives are copies of other negatives. There are two ways to make a duplicate negative. The first way is to make a duplicate negative directly in one exposure using a special-purpose film, such as KODAK PROFESSIONAL B/W Duplicating Film SO-132. The second way is to expose the original negative onto another negative film to obtain an interpositive. Then expose that interpositive onto a second piece of film.

For special-purpose use, you may have to use a conventional developer in a non-conventional way or use a special-purpose developer. This applies especially when you need to alter the contrast of the original. You may want to experiment with some special-purpose developers such as KODAK Developers D-19, D-8, and D-11; KODALITH Developers; and KODAK T-MAX 100 Direct Positive Film Developing Outfit.

KODAK BLACK-AND-WHITE PAPERS

Kodak papers are either *fiber-base* or *resin-coated* (RC), and available in graded- or selective-contrast types. Generally, their most common function is to make black-and-white reflection positives (prints) from black-and-white film negatives.

Fiber-Base Papers. These papers are made from a chemically pure paper base coated with a bright white barium sulfate layer over which the emulsion is coated. This base is highly absorptive and requires relatively long wash times to remove processing chemicals.

Resin-Coated Papers. These papers are coated with a waterproof resin on both sides, which prevents processing chemicals from penetrating the paper base. Therefore, processing and washing times are much shorter.

Graded Papers. You can obtain levels of contrast with these papers by selecting the appropriate grade number. A grade 2 paper is “normal.” For higher contrast, use grade 3, 4, or 5. For lower contrast, use grade 0 or 1. Not all contrast grades are available in all paper types. Graded papers are primarily used in applications such as portraiture, where negative 4 quality and contrast are controlled by standard lighting and processing conditions.

Selective-Contrast Papers. You can control contrast levels with these papers by using filters, such as KODAK POLYMAX Filters*, to alter the blue/green ratio of the exposing light. POLYMAX Filters are available in kits and 90 and 150 mm square sets in grades –1 through 5+ that produce 12 contrast levels ranging from very low to extremely high. In many cases, using these filters with selective-contrast papers will produce contrast ranges much greater than those available with graded papers.

Special-Purpose Papers. To make black-and-white prints from color negatives, you can use KODAK PANALURE SELECT RC Paper or KODAK PROFESSIONAL PORTRA Black & White Paper.

PANALURE SELECT RC Paper is processed in conventional black-and-white chemicals, but KODAK PROFESSIONAL PORTRA Black & White Paper requires KODAK EKTACOLOR Chemicals for Process RA-4. PORTRA Black & White Paper is designed for the convenience of finishers who want to make black-and-white prints without having to maintain a separate black-and-white process. It's an alternative to conventional black-and-white papers, and is not designed for long-term keeping.

* The filter kit, filter sets, and filter upgrade sets are now distributed by Tiffen Co. L.L.C. In the U.S. call 800-368-6257 or view their website at www.tiffen.com.

To Make B/W Positive Slides from B/W Negatives

Start with an Original Image on Any of These KODAK Films	To Produce a Final Image Exposed Onto One of These KODAK Films/Materials	Color Sensitivity*	Process in KODAK Developer†
Continuous-Tone B/W Negative PROFESSIONAL Technical Pan EKTAPAN * PROFESSIONAL T-MAX 100 PROFESSIONAL PLUS-X 125 VERICHROME Pan* PROFESSIONAL TRI-X 320 PROFESSIONAL TRI-X 400 PROFESSIONAL T-MAX 400 PROFESSIONAL T-MAX P3200	Continuous-Tone Positive Transparency		
	EASTMAN Fine Grain Release Positive 5302	Blue	D-76, DEKTOL
	PROFESSIONAL Technical Pan (all formats)	Pan, extended red	HC-110, D-76
	Line-Copy High-Contrast Positive Transparency		
	EKTAGRAPHIC HC Slide*	Ortho	D-11, KODALITH Super RT
	PROFESSIONAL Technical Pan (all formats)	Pan, extended red	DEKTOL, D-76, HC-110
	Continuous-Tone Display Positive (contrast depends upon original)		
	PROFESSIONAL DURAFLEX Plus Digital Display Material (reflection)	Pan	EKTACOLOR Chemicals for Process RA-4
	PROFESSIONAL DURATRANS Display Material (transparency)		
	PROFESSIONAL DURACLEAR Display Material (transparency)		
	Fine Grain Positive 7302	Blue	D-76, DEKTOL, D-11 (depending upon contrast)

*To be discontinued when current supplies run out.

To Make B/W Negatives from B/W Negatives or Prints

Start with a B/W Original Image	To Produce a Final Image Exposed Onto One of These KODAK B/W Films	Color Sensitivity*	Process in KODAK Developer†
Continuous-Tone B/W Print	Continuous-Tone Copy Negative		
	PROFESSIONAL T-MAX 100	Pan	T-MAX, T-MAX RS, XTOL, D-76, HC-110
	Professional Copy 4125*	Ortho	HC-110, DK-50
High-Contrast or Line-Copy B/W Print	High-Contrast B/W Negative		
	Contrast Process Ortho 4154*	Ortho	D-8, HC-110
	PROFESSIONAL Technical Pan (all sizes)	Pan, extended red	DEKTOL, D-76, HC-110
	Line-Copy B/W Negative		
	EKTAGRAPHIC HC Slide*	Ortho	D-11, KODALITH Super RT
	PROFESSIONAL Technical Pan (all sizes)	Pan, extended red	HC-110, DEKTOL
Continuous-Tone B/W Negative	Duplicate B/W Negative		
	PROFESSIONAL B/W Duplicating SO-132	Ortho	DEKTOL, DK-50

*To be discontinued when current supplies run out.

To Make B/W Contrast-Reducing Masks

Start with a B/W Original Image	To Produce a Final Image Exposed Onto One of These KODAK B/W Films	Color Sensitivity*	Process in KODAK Developer†
Contrasty Continuous-Tone B/W Negative	Contrast-Reducing Printing Mask		
	PROFESSIONAL T-MAX 100 (all sizes)	Pan	D-76, XTOL
Contrasty Continuous-Tone B/W Positive	Contrast-Reducing Printing Mask		
	PROFESSIONAL T-MAX 100 (all sizes)	Pan	D-76, XTOL
Color Negative	Contrast-Reducing Printing Mask		
	PROFESSIONAL T-MAX 100 (all sizes)	Pan	D-76, XTOL
Color Transparency	Contrast-Reducing Printing Mask		
	PROFESSIONAL T-MAX 100 (all sizes)	Pan	D-76, XTOL

To Make B/W Positive Transparencies from B/W Negatives or Prints

Start with a B/W Original Image	To Produce a Final Image Exposed Onto One of These KODAK B/W Films	Color Sensitivity*	Process in KODAK Developer†
Continuous-Tone B/W Print	Continuous-Tone Positive Transparency		
	PROFESSIONAL T-MAX 100 (all sizes)	Pan	T-MAX 100 Direct Positive Film Developing Outfit\$
	Rapid Process Copy (roll)	Blue	DK-50
Line-Copy B/W Print	High-Contrast B/W Positive Transparency		
	PRECISION LINE, LPD4 or LPD7 (all sizes)	Ortho	D-11, KODALITH, Super RT, DEKTOL
	PROFESSIONAL Technical Pan (all sizes)	Pan, extended red	T-MAX 100 Direct Positive Film Developing Outfit\$
Line-Copy B/W Negative	High-Contrast B/W Positive Transparency		
	PROFESSIONAL Technical Pan (all sizes)	Pan, extended red	DEKTOL, D-76, HC-110
	EKTAGRAPHIC HC Slide (roll)*	Ortho	D-11, KODALITH, Super RT

*To be discontinued when stocks run out.

To Make B/W Presentation Slides from Printed Text or Graphics

Start with a B/W Original Image	To Produce a Final Image Exposed Onto One of These KODAK B/W Films	Color Sensitivity*	Process in KODAK Developer†
<i>Typewritten or Computer Print-Out (White Background)</i>	High-Contrast Presentation Slide or Reversed-Text Title Slide (Black Background)		
	PROFESSIONAL Technical Pan (all sizes)	Pan, extended red	DEKTOL, D-76, HC-110
	EKTAGRAPHIC HC Slide (roll)*	Ortho	D-11, KODALITH Super RT

*To be discontinued when stocks run out.

*Color-Sensitivity Classifications—

Blue-sensitive films are sensitive only to ultraviolet radiation and blue light. You can use a safelight with a KODAK Safelight Filter, Nos. OA (greenish yellow), OC (light amber), or 1A (light red) during handling and processing. These safelights provide fairly good light level for darkroom work.

Orthochromatic films are sensitive to ultraviolet radiation and blue and green light. You can use KODAK 1A Safelight Filter (light red) during handling and processing. This filter also permits a fairly good light level in the darkroom.

Panchromatic films are sensitive to all colors of light as well as ultraviolet radiation. They produce gray-tone rendering of subject colors that approximate their visual brightness, and can provide a variety of gray-tone renderings when you expose them with filters. No safelight is recommended, although you can use a green KODAK 3 Safelight Filter (dark green) with black-and-white films other than PROFESSIONAL T-MAX Films for a few seconds during processing. This safelight transmits only enough light to determine contours, not detail.

Extended red films are panchromatic films with extended red sensitivity. Do not use a safelight; handle these films in total darkness.

†**Note:** This list includes the Kodak developers most commonly used for processing these films or papers. See the developer, film, or paper instructions for processing and special agitation procedures.

§KODAK T-MAX 100 Direct Positive Film Developing Outfit is for producing continuous-tone positive black-and-white slides from PROFESSIONAL T-MAX 100 Film and for producing high-contrast positive black-and-white slides from KODAK PROFESSIONAL Technical Pan Film.

To Make B/W Reflection Prints from B/W or Color Negatives

Original Image	Finished Print on KODAK Paper	Process in KODAK Developer
Continuous-Tone B/W Negative	Graded Fiber-Base Print	
	Contact Printing Paper: AZO	DEKTOL, POLYMAX T
	Graded RC Print	
	KODABROME II RC	DEKTOL, POLYMAX T
	Reflection Print Suitable for Oil Coloring	
	P-MAX Art RC	DEKTOL, POLYMAX T
	Selective-Contrast RC Print	
	POLYCONTRAST III RC	DEKTOL, POLYMAX T
	POLYMAX II RC	DEKTOL, POLYMAX T
	Selective-Contrast Fiber-Base Print	
	POLYMAX Fine-Art	DEKTOL, POLYMAX T
Continuous-Tone Color Negative	Graded RC Print	
	PANALURE SELECT RC	DEKTOL, POLYMAX T
	PORTRA Black & White (for Process RA-4)	EKTACOLOR Chemicals for Process RA-4

KODAK Paper	Surface, Paper Weight, Contrast Grades
Fiber Base	
AZO	F-SW 2-3
POLYMAX Fine-Art	C- DW F-SW, DW N-SW, DW

KODAK Paper	Surface, Paper Weight, Contrast Grades
Resin-Coated Base	
PORTRA Black & White	F-MW N-MW E-MW
KODABROME II RC	F-MW 1-5; N-MW 1-4
P-MAX Art RC	V-HW 2-3
PANALURE SELECT RC	FM-MW
POLYCONTRAST III RC	F-MW N-MW E-MW
POLYMAX II RC	F-MW N-MW E-MW

Surface (texture and sheen)

C—Smooth, lustre
E—Fine-grained, lustre
F—Smooth, glossy
N—Smooth, semi-matt
V—Suede, double-matt

Base Weight

SW—Single weight
DW—Double weight
MW—Medium weight
HW—Heavy weight

KEY—

Continuous Tone	An image that exhibits a smooth gradation of tones or shades of gray from light to dark. Continuous-tone images may be positive or negative, or have high or low contrast.	Mask	An intermediate image made from a negative or transparency for the purpose of altering the characteristics of a negative or transparency. Once made, the mask is sandwiched “in register” with the negative or transparency to increase or reduce contrast.
Contrast	The difference in brightness between the lightest and darkest tones of an image or scene. Images or scenes that exhibit very light to very dark tones with few intermediate tones are called “high contrast.” “Low contrast” images are usually characterized by a short range of tones—such as middle gray to dark gray, without any black or white.	Negative	A developed photographic image in which the tonal relationships of the original scene are reversed—light tones are recorded as dark and dark tones as light. The “negative” is then “printed” to restore a normal, or positive image.
Copy Negative	A negative made from a positive print or transparency, for the purpose of making additional prints by conventional photographic means. Can also be used to correct defects or adjust the contrast of an original image to make subsequent printing easier, such as when hundreds of prints must be made from a negative that is difficult to print.	Negative Working	A photographic material that reverses the tones in an image. Conventional photographic materials are negative working because light-sensitive compounds usually darken or increase in visual density with increasing exposure to light. Therefore, a negative-working camera film reverses the tones of the original scene, and a companion negative-working print material reverses the tones again, back to their “normal” or positive relationship.
Duplicate Negative	A negative made from a negative that matches or enhances the contrast and characteristics of the original as closely as possible. Often made when an original is too valuable to be subjected to frequent handling. Usually made from direct-positive materials or by the “interpositive” method.	Positive	A photographic image with similar light-to-dark tonal values as those in the original scene. The ultimate result of the photographic process is usually a positive image. If it is on paper or similar opaque support, it’s commonly called a “print.” If the positive image is on a clear support, such as glass or film, it’s commonly called a “transparency” or “slide.”
Internegative	Usually a copy negative made from a transparency or color print.	Positive Working	A photographic material that retains the tonal value of the original scene (rather than reversing them). Light areas in the original create light areas in the camera film, etc. Also called “direct positive” because it does not require a separate printing (interpositive) step as negative-working films do.
Interpositive	A specific type of transparency, or film positive, that is the first step in a two-step negative duplication. A negative is “printed” onto a negative-working film that reverses the tonal values. The resulting film positive is then “printed” onto negative film, which restores the tonal relationships of the original negative. Requires rigorous control to maintain the exact contrast of the original through the steps.	Print	In photography, a print is usually a positive image on an opaque support, such as fiber-base or resin-coated paper. The image is viewed by reflecting light from the print surface.
Line or Line Copy	An image exhibiting only solid blocks or lines of tone with no tonal gradations, such as text on a page. These images may be positive or negative, and usually have very high contrast.	Transparency	A positive image on a transparent or translucent support, such as film. Viewed by directing light through the support. Also called “film positive.”

MORE INFORMATION

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

More information on KODAK PROFESSIONAL Black-and-White Films and Papers is available on the Kodak website or contact Kodak in your country.

Black-and-White Chemicals

E103CF	<i>Chemicals for KODAK PROFESSIONAL Black-and-White Films</i>
E103CP	<i>Chemicals for KODAK PROFESSIONAL Black-and-White Papers</i>
J-5	<i>KODAK POLYMAX T Developer and KODAK POLYMAX T Fixer</i>
J-24	<i>KODAK HC-110 Developer</i>
J-78	<i>KODAK Developer D-76</i>
J-85	<i>KODAK POLYMAX RT Chemicals</i>
J-86	<i>KODAK T-MAX Developers</i>
J-87	<i>KODAK T-MAX 100 Direct Positive Film Developing Outfit</i>
J-109	<i>KODAK XTOL Developer</i>

Black-and-White Papers

E103BP	<i>KODAK PROFESSIONAL Black-and-White Papers</i>
G-10	<i>KODAK AZO Paper</i>
G-16	<i>KODAK PROFESSIONAL KODABROME II RC Paper</i>
G-21	<i>KODAK PROFESSIONAL POLYCONTRAST III RC Paper</i>
G-23	<i>Toning KODAK Black-and-White Materials</i>
G-24	<i>KODAK POLYMAX Fine-Art Paper</i>
G-26	<i>KODAK PROFESSIONAL POLYMAX II RC Paper</i>
G-27	<i>KODAK PANALURE SELECT RC Paper</i>
G-28	<i>KODAK P-MAX Art RC Paper</i>

Black-and-White Films

E103BF	<i>KODAK PROFESSIONAL Black-and-White Films</i>
F-7	<i>KODAK VERICHROME Pan Film</i>
F-8	<i>KODAK PLUS-X Pan and KODAK PLUS-X Pan Professional Films</i>
F-9	<i>KODAK TRI-X Pan and KODAK TRI-X Pan Professional Films</i>
F-10	<i>KODAK EKTAPAN Film</i>
F-11	<i>KODAK Professional B/W Duplicating Film</i>
F-12	<i>KODAK EKTAGRAPHIC HC Slide Film</i>
F-13	<i>KODAK High Speed Infrared Film</i>
F-32	<i>KODAK PROFESSIONAL T-MAX Films</i>
F-2350	<i>KODAK PROFESSIONAL T400 CN Film</i>
F-4016	<i>KODAK PROFESSIONAL T-MAX Films</i>
F-4017	<i>KODAK PROFESSIONAL TRI-X 320 and 400 Films</i>
F-4018	<i>KODAK PROFESSIONAL PLUS-X 125 Film</i>
G-72	<i>KODAK PRECISION LINE Film</i>
P-255	<i>KODAK PROFESSIONAL Technical Pan Films</i>

Reference and Techniques

E-30	<i>Storage and Care of KODAK Photographic Materials—Before and After Processing</i>
F-3	<i>Code Notches for KODAK Sheet Films</i>
F-33	<i>KODAK PROFESSIONAL Black-and-White Films, Papers, and Chemicals</i>
J-2A	<i>Health, Safety, and Environmental Emergency Card</i>
J-4	<i>Safe Handling of Photographic Chemicals</i>
J-4S	<i>The Prevention of Contact Dermatitis in Photographic Work</i>
K-4	<i>How Safe Is Your Safelight?</i>

Process Monitoring

Z-133E	<i>Monitoring and Troubleshooting KODAK Black-and-White Film Processes</i>
--------	--

Pathways to Black and White

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 are available from dealers who supply KODAK PROFESSIONAL Products. You can use other materials, but you may not obtain similar results.



Kodak Professional Division
EASTMAN KODAK COMPANY

Kodak Professional