KODAK PROFESSIONAL BW400CN Film

KODAK PROFESSIONAL BW400CN Film is a multi-purpose 400-speed black-and-white chromogenic film designed for processing in color negative chemistry and printing on color negative paper.

BW400CN Film features the finest grain available today in a professional chromogenic film. The result is a smooth, neutral tone image with outstanding highlight and shadow detail.

This film is designed for portrait/wedding, commercial and advanced amateur photographers looking for the power of black-and-white imagery coupled with the convenience of using Process C-41 for film and Process RA-4 for color prints.

This film is intended for exposure with daylight, electronic flash, and artificial illumination. You can also obtain pleasing results under other light sources, i.e. illumination in stadiums, without using filters.

Use KODAK FLEXICOLOR Chemicals for Process C-41 and process this film simultaneously with color negative films. This film can be printed on KODAK PROFESSIONAL PORTRA ENDURA, SUPRA ENDURA, and ULTRA ENDURA Papers, as well as other color negative papers.

Features	Benefits
• KODAK T-GRAIN® Emulsions	• Extremely fine grain and high sharpness • Excellent quality and detail in enlargements • Neutral, predictable results with a variety of printing devices • High quality film scans for ease of use in digital applications
• For processing in KODAK FLEXICOLOR Chemicals, Process C-41	• Rapid turnaround in any lab that processes color negative film • Neutral-toned black-and-white prints from color processes
• Optimized for printing on color negative papers	• Smooth, neutral images with outstanding highlight and shadow detail

SIZES AVAILABLE

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

Size	Base	CAT No. (US & Canada)	CAT No. (except US & C)
135-24	0.13 mm (0.005 in) acetate	N/A	860 7640
135-36		897 6995	130 4740
135-36 / 5 pk		183 3136	839 8075
120 (single)	0.10 mm (0.0039 in) acetate	N/A	126 5412
120 / 5 pk		899 0558	873 9286
220 / 5 pk		146 9717	N/A

STORAGE AND HANDLING

Before Exposure

Load and unload your camera in subdued light.

High temperatures or high humidity may produce unwanted quality changes. Store unexposed film at 21°C (70°F) or lower in the original package. Always store film (exposed or unexposed) in a cool, dry place. Though this film has excellent latent image keeping characteristics (after exposure, but before processing), 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*.

DARKROOM RECOMMENDATIONS

Do not use a safelight. Handle unprocessed film in total darkness.

EXPOSURE

Daylight Exposure:

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

Lighting Conditions	Shutter Speed (seconds)	Lens Opening
Bright/Hazy Sun on Light Sand or Snow	1/500	*f*/22
Bright or Hazy Sun, Distinct Shadows	1/500	*f*/16*
Weak, Hazy Sun, Soft Shadows	1/500	*f*/11
Cloudy Bright, No Shadows	1/500	*f*/8
Heavy Overcast, Open Shade†	1/500	*f*/5.6

* Use f/8 for backlighted close-up subjects.
† Subject shaded from the sun but lighted by a large area of sky.

Existing Light

Subject and Lighting Conditions	Shutter Speed (second)	Lens Opening
Home Interiors at Night —Average Light —Bright Light	 1/30 1/30	 *f*/2 *f*/2.8
Fireworks —Aerial Displays* —Displays on Ground	"Bulb" or "Time"† 1/60	 *f*/16 *f*/4
Interiors with Bright Fluorescent Light	1/60‡	*f*/4
Brightly Lit Street Scenes at Night	1/60	*f*/2.8
Neon and Other Lighted Signs	1/125	*f*/4
Floodlighted Buildings, Fountains, Monuments	1/15*	*f*/2
Night Football, Soccer, Baseball, Racetracks	1/125	*f*/2.8
Basketball, Hockey, Bowling	1/125	*f*/2
Stage Shows —Average Light —Bright Light	 1/60 1/125	*f*2.8
Circuses and Ice Shows —Floodlighted Acts —Spotlighted Acts	 1/125 1/250	*f*/2.8
School—State and Auditorium	1/30	*f*/2

*Leave shutter open for several bursts.
†Use a tripod or other firm camera support for exposure times longer than 1/30 second.
‡Use shutter speeds of 1/60 second or longer with fluorescent light.

Electronic Flash

Use the guide numbers in the table below as starting-point recommendations for your equipment. Select the unit output closest to the number given by your flash manufacturer. Then find the guide number for feet or metres.

To determine the lens opening, divide the guide number by the flash-to-subject distance. If negatives are consistently too dense (overexposed), use a higher guide number; if they are too thin (underexposed), use a lower number.

Unit Output (BCPS)*	Guide Number	
	For Distances in Feet	For Distances in Metres
350	85	26
500	100	30
700	120	36
1000	140	42
1400	170	50
2000	200	60
2800	240	70
4000	280	85
5600	340	105
8000	400	120

*BCPS = beam candlepower seconds

Exposure Adjustments for Long and Short Exposures

No exposure compensation for reciprocity failure is necessary for exposures between 1/10,000 and 120 seconds. We do not recommend exposures longer than 120 seconds. For critical applications, make tests under your conditions.

Filter Factors

Multiply the normal (unfiltered) 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)	1.4	1.25
No. 11 (yellowish Green)	3	3
No. 15 (deep yellow)	2	1.4
No. 25 (red)	8	3
No. 47 (blue)	12.5	16
No. 58 (green)	5.6	4
Polarizing Filter*	2.5	2.5

*Average filter factor, which may vary slightly depending on the manufacturer. Polarizing filters are not manufactured by Kodak.

PROCESSING

Process BW400CN Film in KODAK FLEXICOLOR Chemicals for Process C-41. You can have this film processed by any photofinisher who processes color negative films like KODAK PROFESSIONAL PORTRA Film. BW400CN Film is fully compatible with Process C-41, and can be intermixed with color negative films during processing in all equipment, from minilabs to high volume continuous, roller transport, or rack-and-tank processors.

You can also use KODAK FLEXICOLOR Chemicals in the 1-gallon size to process this film in a small tank or a rotary-tube processor. For specifications on Process C-41, see Kodak Publication No. Z-131, *Using KODAK FLEXICOLOR Chemicals*.

Important

Do not process this film in conventional black-and-white chemicals.

Negative Appearance

The appearance of processed negatives on BW400CN Film is similar to color negative films, but with no color in the negative images.

JUDGING NEGATIVE EXPOSURES

You can check the exposure level of the processed negatives with a suitable electronic densitometer equipped with a filter such as the red filter for Status M Densitometry, or a KODAK WRATTEN Gelatin Filter No. 92. Depending on the subject and the light source used for exposure, a normally exposed color negative measured through the red filter should have the approximate densities listed below. These densities apply for the recommended light sources and correct processing of the negative.

Densities of Properly Exposed and Processed Negatives:

Area on the Negative:	Densities:
The KODAK Gray Card* (gray side) receiving the same illumination as the subject	0.80 to 1.00
The lightest step (darkest in the negative) of a KODAK Paper Gray Scale receiving the same illumination as the subject	1.15 to 1.35
Normally lighted forehead of person with light complexion†	1.05 to 1.35
Normally lighted forehead of person with dark complexion†	0.90 to 1.20

* KODAK Publication No. R-27

† Because of the extreme range in skin color, use these values only as a guide. For best results, use a KODAK Gray Card (gray side).

RETOUCHING

Treat the negative as if it were a color negative.

You can retouch 120 / 220-size BW400CN Film on both the emulsion and base sides. 35 mm film can be retouched on the emulsion side only.

Both retouching dye and black graphite lead pencil can be used to retouch this film. When retouching with pencil on the emulsion side, use KODAK Retouching Fluid to improve the tooth of the film.

If you plan to use retouched BW400CN Film for printing on color negative paper, follow the Dye / Filter "Layering" Technique.

For more information about retouching techniques, supplies, and equipment, see KODAK Publication E-71, *Retouching Color Negatives.*

Dye / Filter Layering Technique

To retouch small areas, use *diluted* KODAK Liquid Retouching Colors. For most retouching, you will need only two dyes: red-yellow and cyan. Prepare the diluted dyes according to the following formulas:

		Water:		
Diluted Dyes	**Formula**	**Dilution 1**	**Dilution 2**	**Dilution 3**
Red-yellow	5 drops red dye plus 1 drop yellow dye plus distilled water	18 drops distilled water (1:3)	30 drops distilled water (1:5)	60 drops distilled water (1:10)
Cyan	3 drops cyan dye plus distilled water	15 drops distilled water (1:5)	30 drops distilled water (1:10)	60 drops distilled water (1:20)

1. Hold a WRATTEN Gelatin Filter No. 58 (green) near your eye, and view the negative through the filter. Evaluate the areas to be retouched; if they appear lighter than the surrounding areas, apply red-yellow dye by using the technique described in step 2.
2. Dip the brush into the dye, and stroke the tip on water-dampened cotton, tissue, or paper towel until the tip is almost dry. Smoothly apply a small amount of dye to the **base side** of the negative.

Note: When you retouch along sharp edges in an image or make very fine corrections, apply dye to the **emulsion side**. This allows for more precise alignment of the retouching with the image and avoids parallax problems from inaccurate application.

3. Hold a WRATTEN Gelatin Filter No. 25 (red) near your eye, and view the negative through the filter. Evaluate the areas to be retouched; if they appear lighter than the surrounding area, apply cyan dye by using the technique described in step 2.

4. View the negative without using a filter. If a retouched area appears slightly red or slightly cyan, add a very small amount of the opposite-colored dye until the area appears neutral.

After you have finished retouching and the negative is dry, sandwich the PORTRA 400BW negative with a piece of unexposed and processed D-min of another color negative film, such as KODAK PROFESSIONAL PORTRA 160VC Film. Although you can print it onto color paper without the "extra D-min," this may make it easier to print on color paper.

For more information about retouching techniques, supplies, and equipment, see KODAK Publication E-71, *Retouching Color Negatives*.

PRINTING NEGATIVES

Note: BW400CN Film is optimized for printing on color negative papers. BW400CN Film can be printed on traditional black-and-white papers, but the printing time will be substantially longer and require a higher contrast grade of paper (3.5 to 4). For best results when printing onto black-and-white paper, we recommend a traditional black-and-white film such as KODAK PROFESSIONAL TRI-X 400 or T-MAX 100 Film.

BW400CN Film is designed to deliver excellent black-and-white prints on professional color papers. When printing on color papers, you can also create special-effect tones, such as sepia, simply by changing the printer color balance.

You can make black-and-white prints from BW400CN Film negatives by enlarging them on KODAK PROFESSIONAL PORTRA ENDURA, SUPRA ENDURA and ULTRA ENDURA Papers, KODAK PROFESSIONAL DURAFLEX Plus Digital Display Material, KODAK PROFESSIONAL ENDURA Metallic Paper, and KODAK PROFESSIONAL PORTRA Black & White Paper for Process RA-4. For a sepia-tone print, try KODAK PROFESSIONAL PORTRA Sepia Black & White Paper.

Make color slides and transparencies by printing the negatives on KODAK PROFESSIONAL ENDURA Transparency Display Material or KODAK PROFESSIONAL ENDURA Clear Display Material.

Starting Printing Filter Pack

When working with a color enlarger to print on professional color papers and display materials, add 5M to your KODAK PROFESSIONAL PORTRA 160NC Film filter balance, and make adjustments to balance the print to a desired tone.

Digital Files

You can scan your image to a file and print digitally to —

KODAK PROFESSIONAL PORTRA ENDURA Paper

KODAK PROFESSIONAL SUPRA ENDURA Paper

KODAK PROFESSIONAL ULTRA ENDURA Paper

KODAK PROFESSIONAL ENDURA Transparency Display Material

KODAK PROFESSIONAL ENDURA Clear Display Material

KODAK PROFESSIONAL DURAFLEX Plus Digital Display Material

KODAK PROFESSIONAL ENDURA Day/Night Display Material

KODAK PROFESSIONAL ENDURA Metallic Paper

IMAGE STRUCTURE

Sharpness: Extremely high

Degree of Enlargement: Extremely high

Print Grain Index Magnification Table:

Print Grain Index numbers for diffuse printing illumination.

- This is a method which replaces rms granularity. It is on a different scale, which cannot be compared to rms granularity.
- The scale is a uniform perceptual scale, with a change of 4 units representing a Just Noticeable Difference for 90% of observers.
- Index value representing the approximate visual threshold for graininess: 25.
- Standardized inspection distance for all print sizes: 35.6 cm (14 inches).
- In practice, prints larger than 10.2 x 15.2 cm (4x6 inches) will likely be viewed from distances greater than 35.6 cm (14 inches), thereby reducing overall graininess that is perceived.
- These Grain Index numbers may not represent graininess observed from more specular printing illuminants, such as condenser enlargers.

Negative Size: 24 x 36 mm (Size 135)

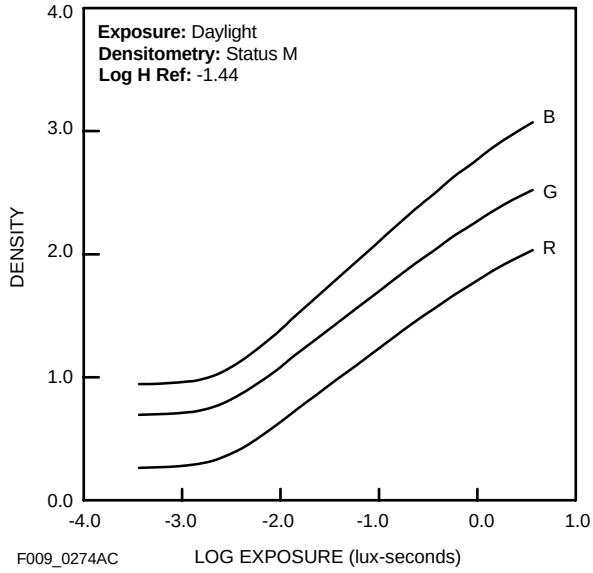
Print Size in inches	4x6	8x10	16x20
Magnification	4.4X	8.8X	17.8X
Print Grain Index	less than 25	40	70

Negative Size: 6 x 6 cm (Size 120/220)

Print Size in inches	4x6	8x10	16x20
Magnification	2.6X	4.4X	8.8X
Print Grain Index	less than 25	less than 25	40

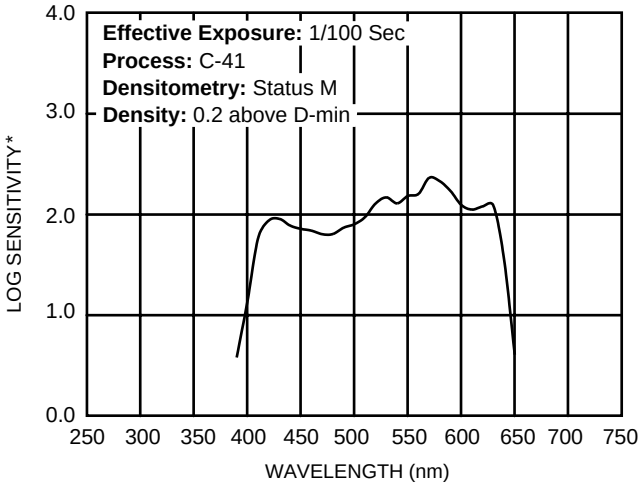
CURVES

Characteristic Curve



F009_0274AC

Spectral-Sensitivity Curve



*Sensitivity = reciprocal of exposure (erg/cm^2) required to produce specified density

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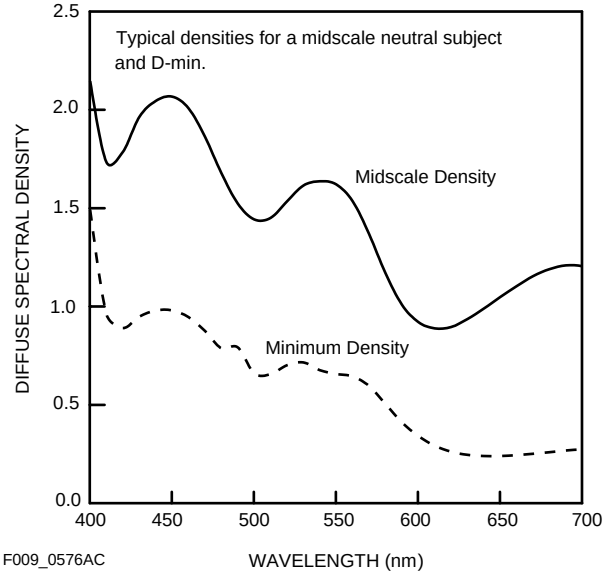
NOTICE: The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings, and therefore do not apply directly to a particular box or roll of photographic material. They do not represent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

KODAK PROFESSIONAL BW400CN Film

Spectral-Dye-Density Curves



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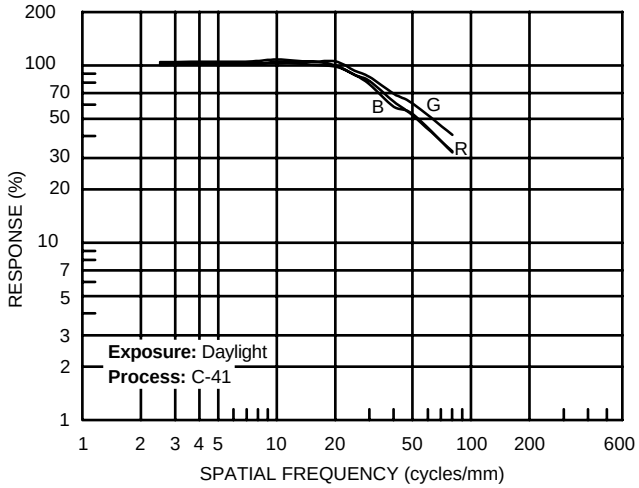
Modulation Transfer Function



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MORE INFORMATION

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

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

E-30	*Storage and Care of KODAK Photographic Materials—Before and After Processing*
E-58	*Print Grain Index*
E-71	*Retouching Color Negatives*
E-4021	*KODAK PROFESSIONAL PORTRA and SUPRA ENDURA Papers*
E-4020	*KODAK PROFESSIONAL ULTRA ENDURA Paper*
E-4031	*KODAK PROFESSIONAL ENDURA Transparency and Clear Display Materials*
E-4028	*KODAK PROFESSIONAL ENDURA Metallic Paper*
E-4034	*KODAK PROFESSIONAL ENDURA Day/Night Display Material*
G-4006	*KODAK PROFESSIONAL PORTRA Black & White Paper*
E-4019	*KODAK PROFESSIONAL PORTRA Sepia Black & White Paper*
J-38	*Using KODAK FLEXICOLOR Chemicals in Sink-Line, Bath, and Rotary-Tube Processors*
Z-131	*Using KODAK FLEXICOLOR Chemicals*

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 BW400CN Film are available from dealers who supply KODAK PROFESSIONAL Products. You can use other materials, but you may not obtain similar results.

EASTMAN KODAK COMPANY

Kodak Professional
Imaging Solutions

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