KODAK PROFESSIONAL ELITE COLOR Films / 200 and 400

This family of colour negative films delivers an extra punch of colour. KODAK PROFESSIONAL ELITE COLOR Films / 200 and 400 feature deep, saturated colour to bring subjects to life, without sacrificing skin tones. Both films offer extremely fine grain for smooth enlargements through both optical prints and digital film scans, as well as outstanding sharpness for capturing fine detail.

Use KODAK PROFESSIONAL ELITE COLOR Films / 200 and 400 for landscape, nature, wildlife, family, and lifestyle photography. KODAK PROFESSIONAL ELITE COLOR Film / 400 provides extra speed for low light and action situations.

FEATURES	BENEFITS
• Colour Precision Technology	• Vibrant colour • Improved colour saturation without sacrificing skin reproduction
• Advanced T-GRAIN Emulsions with Kodak's proprietary ADA's (Advanced Developer Accelerators)	• Extremely fine grain • Remarkably detailed scans • Enlargements with very little grain
• High performance dye couplers	• Unsurpassed sharpness • Able to record fine detail and distinct edges
• Human-eye spectral sensitivity	• Unsurpassed colour accuracy—film sees colour much like the human eye • Renders difficult colours
• Unified Film Emulsion Technology	• Consistent look with 200 and 400 Films • Exceptional flexibility to capture a wide variety of scenes and situations

SIZES AVAILABLE

Availability may differ from country to country. See your dealer who supplies KODAK PROFESSIONAL Products.

KODAK PROFESSIONAL ELITE COLOR Film / 200

Size/Format	Code	Base
135	200	0.13 mm (0.005 inch) acetate

KODAK PROFESSIONAL ELITE COLOR Film / 400

Size/Format	Code	Base
135	400	0.13 mm (0.005 inch) acetate

STORAGE AND HANDLING

Store unexposed film at 21°C (70°F) or lower in the original sealed package. For extended periods, store film at 13°C (55°F) to preserve consistency.

To avoid moisture condensation on film that has been refrigerated, allow the film to warm up to room temperature before opening the package. Typical warm-up times are given in the table below.

Size	Warm-Up Times (Hours) to Reach Room Temperature of 21°C (70°F) From a Storage Temperature of:		
	-18°C (0°F)	2°C (35°F)	13°C (55°F)
135 magazine	1½	1¼	1

Load and unload roll-film cameras in subdued light.

Process film as soon as possible after exposure. Protect negatives from strong light, and store them in a cool, dry place. For long-term storage, keep negatives at a temperature between 2°C (35°F) and 13°C (55°F) and at a relative humidity between 30 and 35 percent.

DARKROOM RECOMMENDATIONS

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

EXPOSURE

Film Speed

Use the speed numbers in the tables below with cameras or meters marked for ISO, ASA, or DIN speeds or exposure indexes (EIs). Do not change the film-speed setting when metering through a filter. Metering through filters may affect light meter accuracy; see your meter or camera manual for specific information. For critical work, make a series of test exposures.

Light Source	KODAK WRATTEN Gelatin Filter[*]	ISO Speed	
		200 Film	**400 Film**
Daylight or Electronic Flash	None	200	400
Photolamp (3400 K)	No. 80B	64	125
Tungsten (3200 K)	No. 80A	50	100

[*] For best results without special printing.

Daylight

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

Lighting Conditions	Shutter Speed (Second) and Lens Opening	
	200 Film	**400 Film**
Bright or Hazy Sun on Light Sand or Snow	1/250 f/16	1/500 f/16
Bright or Hazy Sun (Distinct Shadows)	1/250 f/11[*]	1/500 f/11[*]
Weak, Hazy Sun (Soft Shadows)	1/250 f/8	1/500 f/8
Cloudy Bright (No Shadows)	1/250 f/5.6	1/500 f/5.6
Heavy Overcast or Open Shade[‡]	1/250 f/4	1/500 f/4

[*] Use f/5.6 for backlit close-up subjects.
[‡] Subject shaded from the sun but lighted by a large area of sky.

Electronic Flash

Use the appropriate guide number 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 Distances in Feet/Metres	
	200 Film	**400 Film**
350	60/18	85/26
500	70/21	100/30
700	85/26	120/36
1000	100/30	140/42
1400	120/36	170/50
2000	140/42	200/60
2800	170/50	240/70
4000	200/60	280/85
5600	240/70	340/100
8000	280/85	400/120

[*] BCPS = beam candlepower seconds

Fluorescent and High-Intensity Discharge Lamps

Use the colour-compensating filters and exposure adjustments in the tables below as starting points to expose these films under fluorescent or high-intensity discharge lamps. For critical applications, make a series of test exposures under your actual conditions.

To avoid the brightness and colour variations that occur during a single alternating-current cycle, use exposure times of 1⁄60 second or longer with fluorescent lamps; with high-intensity discharge lamps, use exposure times of 1⁄125 second or longer.

Type of Fluorescent Lamp	KODAK Color Compensating Filter(s)	Exposure Adjustment	KODAK Color Compensating Filter(s)	Exposure Adjustment
	200 Film		**400 Film**	
Daylight	20R + 5M	+ 1 stop	20R + 5M	+ 1 stop
White	30B + 20C	+ 1 ⅔ stops	50C + 30M	+ 1 ⅔ stops
Warm White	40B + 50C	+ 2 stops	40B + 50C	+ 2 stops
Warm White Deluxe	90C + 30M	+ 2 stops	90C + 30M	+ 2 stops
Cool White	20B	+ 1 stop	30B	+ 1 stop
Cool White Deluxe	10B + 30C	+ 1 stop	40C + 10M	+ 1 stop
T8 741 (CCT = 4100 K)*	40B + 30C	+ 1 ⅔ stops	40B + 20C	+ 1 ⅔ stops
T8 830 (CCT = 3000 K)*	50B + 70C	+ 2 ⅓ stops	50B + 60C	+ 2 ⅓ stops
T8 835 (CCT = 3500 K)*	40B + 50C	+ 1 ⅔ stops	40B + 40C	+ 1 ⅔ stops
T8 841 (CCT = 4100 K)*	30B + 30C	+ 1 ⅓ stops	50C + 20M	+ 1 ⅓ stops

* CCT = Correlated Colour Temperature. Phosphor emission emulates the colour temperature of a continuous spectrum lamp, such as tungsten.

High-Intensity Discharge Lamp (CCT)*	KODAK Color Compensating Filter(s)	Exposure Adjustment	KODAK Color Compensating Filter(s)	Exposure Adjustment
	200 Film		**400 Film**	
High-Pressure Sodium Vapor (2700 K)	50B + 80C	+ 2 ⅔ stops	50B + 70C	+ 2 ⅔ stops
High-Pressure Sodium Vapor (2200 K)	50B + 90C	+ 3 stops	50B + 90C	+ 3 stops
High-Pressure Sodium Vapor (2100 K)	30B + 170C	+ 4 stops	20M + 200C	+ 4 stops
Metal Halide (4300 K)	10B	+ ⅔ stop	10M	+ ⅔ stop
Metal Halide (3200 K)	80C + 5M	+ 1 ⅔ stops	80C + 10M	+ 1 ⅔ stops
Mercury Vapor (3700 K)	20B + 20C	+ 1 stop	20B + 10C	+ 1 stop

* CCT = Correlated Colour Temperature. Phosphor emission emulates the colour temperature of a continuous spectrum lamp, such as tungsten.

Adjustments for Long and Short Exposures

No filter correction or exposure compensation is required using 200 and 400 Film for exposures from 1⁄10,000 second to 10 seconds. For critical applications with longer exposure times, make tests under your conditions.

PROCESSING

Process these films in KODAK FLEXICOLOR Chemicals for Process C-41 with the following replenishment and wash rates.

Replenishment and Wash Rates / 200 Film

Film Size	KODAK FLEXICOLOR Developer Replenisher	KODAK FLEXICOLOR Developer Replenisher LORR	KODAK FLEXICOLOR Bleach III, Fixer, and Stabilizer	Wash Water[*]
135	1012 mL/m^2 94 mL/ft^2	506 mL/m^2 47 mL/ft^2	861 mL/m^2 80 mL/ft^2	31 L/m^2 2.9 L/ft^2

[*] Rates are for first wash and a two-stage countercurrent final wash. Double these rates for a single stage final wash.

Replenishment and Wash Rates / 400 Film

Film Size	KODAK FLEXICOLOR Developer Replenisher	KODAK FLEXICOLOR Developer Replenisher LORR	KODAK FLEXICOLOR Bleach III, Fixer, and Stabilizer	Wash Water[*]
135	1400 mL/m^2 130 mL/ft^2	700 mL/m^2 65 mL/ft^2	861 mL/m^2 80 mL/ft^2	31 L/m^2 2.9 L/ft^2

[*] Rates are for first wash and a two-stage countercurrent final wash. Double these rates for a single stage final wash.

JUDGING NEGATIVE EXPOSURES

You can check the exposure level with a suitable electronic densitometer equipped with a filter such as a KODAK WRATTEN Gelatin Filter No. 92 or the red filter for Status M densitometry. Depending on the subject and the light source used for exposure, a normally exposed and processed colour negative measured through the red filter should have the approximate densities listed below.

Because of the extreme range in skin colour, use these red density values for a normally lit forehead only as a guide. For best results, use a *KODAK Gray Card* (gray side).

Area Measured	200 Film Density Reading
KODAK Gray Card (gray side) receiving same illumination as subject	0.80 to 1.00
Lightest step (darkest in the negative) of a *KODAK Paper Gray Scale* receiving same illumination as subject	1.20 to 1.40
Highest diffuse density on normally lighted forehead —light complexion —dark complexion	1.05 to 1.35 0.90 to 1.25

Area Measured	400 Film Density Reading	
	EI 400	EI 800 (Push 1)
KODAK Gray Card (gray side) receiving same illumination as subject	0.80 to 1.00	1.00 to 1.20
Lightest step (darkest in the negative) of a *KODAK Paper Gray Scale* receiving same illumination as subject	1.15 to 1.35	1.40 to 1.60
Highest diffuse density on normally lighted forehead —light complexion —dark complexion	1.05 to 1.35 0.90 to 1.20	1.20 to 1.50 0.95 to 1.30

RETOUCHING

Retouch only the emulsion side on 135 size films.

For information on retouching equipment, supplies, and techniques, see KODAK Publication No. E-71, *Retouching Color Negatives*.

PRINTING NEGATIVES

This film is optimized for printing on KODAK PROFESSIONAL PORTRA ENDURA, SUPRA ENDURA and ULTRA ENDURA Papers, KODAK PROFESSIONAL DURAFLEX Plus Digital Display Material, and on KODAK PROFESSIONAL ENDURA Metallic Paper.

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

Make black-and-white prints on KODAK PANALURE SELECT RC Paper for conventional black-and-white processing, or KODAK PROFESSIONAL PORTRA Black & White Paper for Process RA-4.

To set up a colour printer or negative analyzer, use the following control negatives.

KODAK PROFESSIONAL PORTRA Printer Control Negative	CAT No.
Set / Size 135*	179 8511

* This set includes one each: very under, under, normal, over, and very over negatives.

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

SCANNING NEGATIVES

You can easily scan KODAK PROFESSIONAL Film negatives with a variety of linear-array-CCD, area-array-CCD, and PMT film scanners. You can scan negatives on desktop scanners as well as high-end drum scanners.

Because no standards exist to define the coloured filter sets that film scanners use to capture the red, green, and blue information of the film image, each manufacturer's scanner has its own characteristic output. The output depends on the scanner's sensitivity to the dyes in the film. This sensitivity is determined by the spectral distribution of the coloured filter sets and/or the spectral sensitivity of the charge-coupled-device (CCD). In addition to these spectral specifications, scanner output depends on the look-up tables or matrices that the scanner uses to output information for CRT monitors, transmission, etc. These tables or matrices are part of either "plug-in" programs used with specific software packages designed for image manipulation, updateable ROMs included with the equipment, or fixed algorithms for calibrating and balancing, similar to those used in photographic colour printing equipment.

The generic "colour negative film" channel designation available with scanner software is only a starting point. You can adjust the final colour balance and the scene-dependent contrast and brightness of an image by using the scanner's controls during pre-scan, or by using an image-manipulation software program or workstation after acquisition. Some scanners allow you to use "plug-in" programs to customize scanner setups.

For more information, visit the following Web sites.

To access	Go to
Film Terms for KODAK PHOTO CD Imaging Workstations	www.kodak.com/go/pcdFilmTerms
Drivers for KODAK Film Scanners	www.kodak.com/go/scannerDrivers

IMAGE STRUCTURE

Print Grain Index

The Print Grain Index number refers to a method of defining graininess in a print made with diffuse-printing illumination. It replaces rms granularity and has a different scale which cannot be compared to rms granularity.

- The method uses a uniform perceptual scale, with a change of four units equaling a *just noticeable difference* in graininess to 90 percent of observers.

- A Print Grain Index rating of 25 on the scale represents the approximate visual threshold for graininess. A higher number indicates an increase in the amount of graininess observed.

- The standardized inspection (print-to-viewer) distance for all print sizes is 14 inches, the typical viewing distance for a 4 x 6-inch print.

- In practice, larger prints will likely be viewed from distances greater than 14 inches, which reduces apparent graininess.

- Print Grain Index numbers may not represent graininess observed from more specular printing illuminants, such as condenser enlargers.

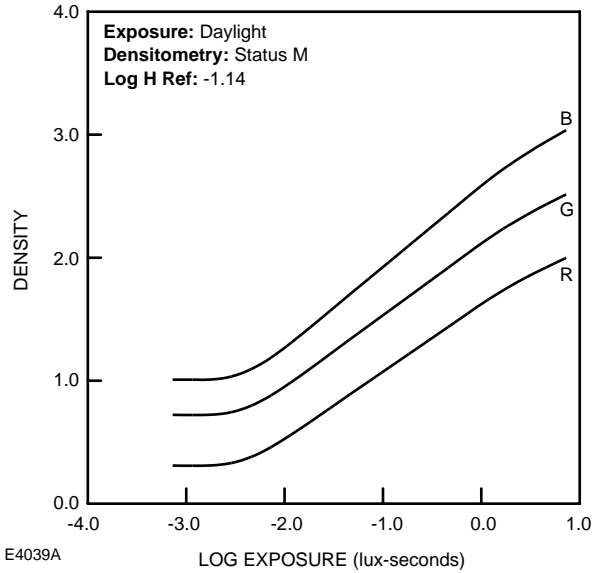**Negative Size: 24 x 36 mm (Size 135)**

Print Size in inches	4x6	8x10	16x20
Magnification	4.4X	8.8X	17.8X
Print Grain Index for—			
200 Film	32	54	84
400 Film	39	61	90

For more information, see KODAK Publication No. E-58, *Print Grain Index—An Assessment of Print Graininess from Color Negative Films.*
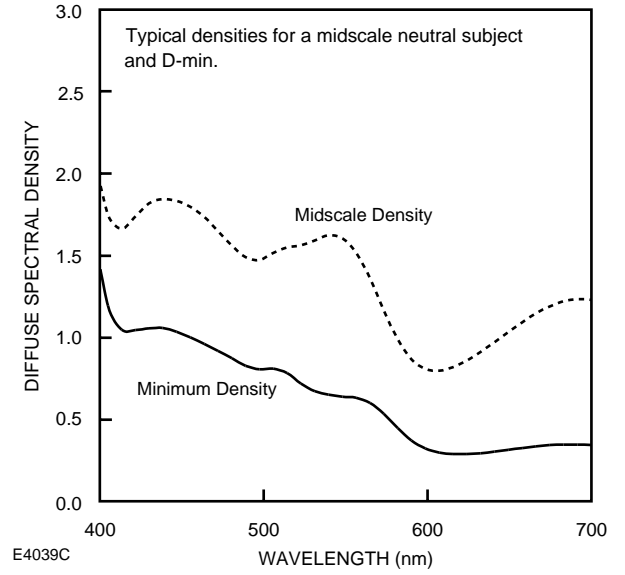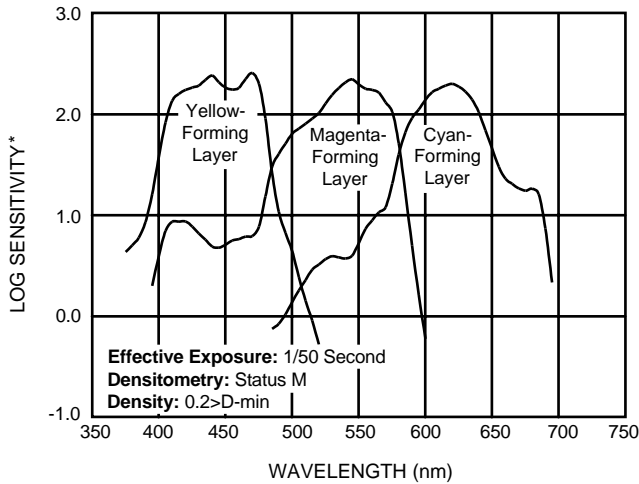
CURVES
KODAK PROFESSIONAL ELITE COLOR Film / 200

Characteristic Curves

Exposure: Daylight
Densitometry: Status M
Log H Ref: -1.14

DENSITY

LOG EXPOSURE (lux-seconds)

E4039A

Spectral-Dye-Density Curves

Typical densities for a midscale neutral subject and D-min.

DIFFUSE SPECTRAL DENSITY

Midscale Density

Minimum Density

WAVELENGTH (nm)

E4039C

Spectral-Sensitivity Curves

LOG SENSITIVITY*

Yellow-Forming Layer

Magenta-Forming Layer

Cyan-Forming Layer

Effective Exposure: 1/50 Second
Densitometry: Status M
Density: 0.2>D-min

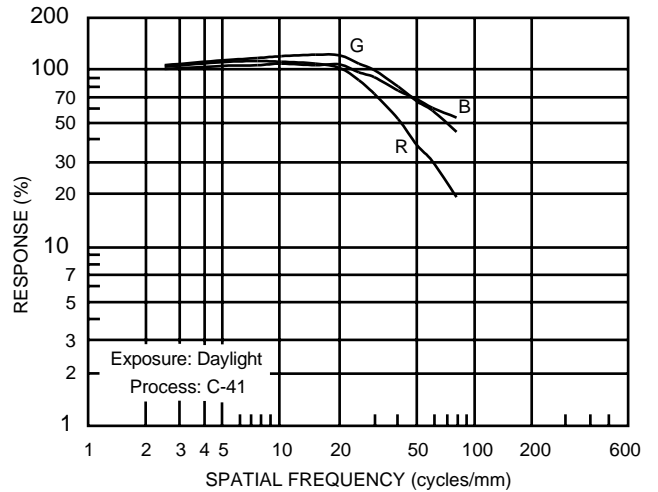WAVELENGTH (nm)

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

E4039B

Modulation Transfer Function

RESPONSE (%)

G

B

R

Exposure: Daylight
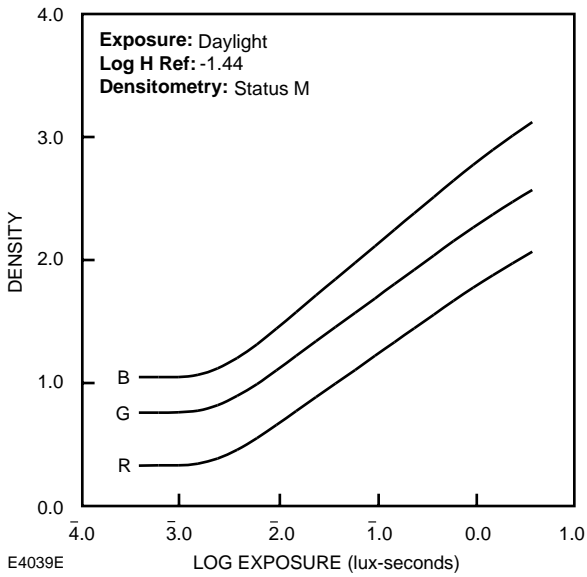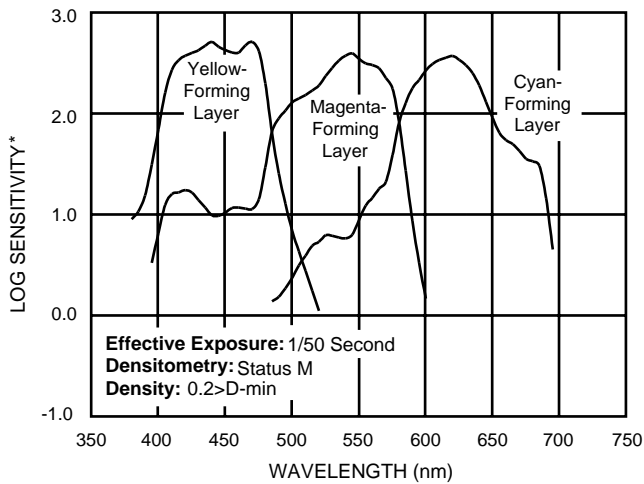Process: C-41

SPATIAL FREQUENCY (cycles/mm)

E4039D

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.

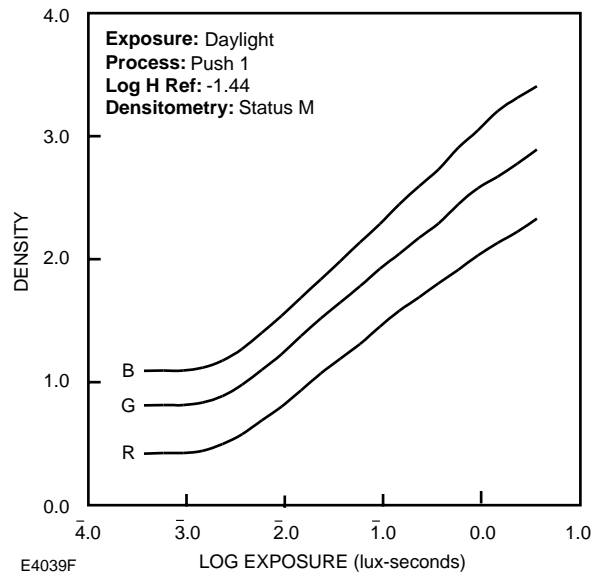# KODAK PROFESSIONAL ELITE COLOR Film / 400
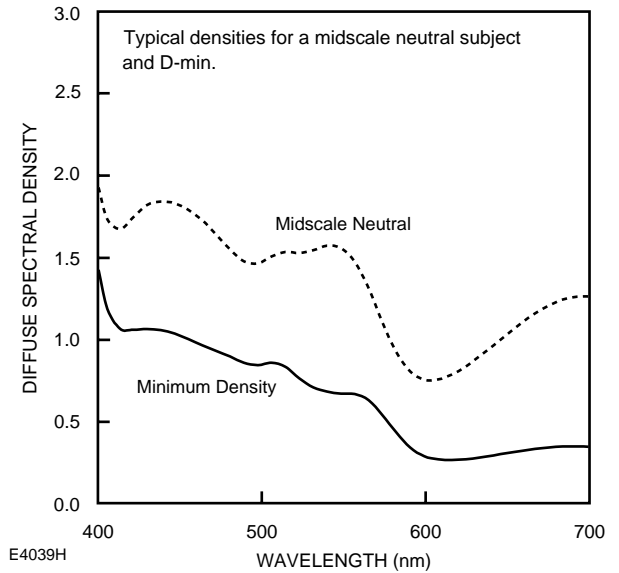
Characteristic Curves, EI 400

Exposure: Daylight
Log H Ref: -1.44
Densitometry: Status M

DENSITY vs LOG EXPOSURE (lux-seconds)

B
G
R

E4039E

Characteristic Curves, EI 800 (Push 1)

Exposure: Daylight
Process: Push 1
Log H Ref: -1.44
Densitometry: Status M

DENSITY vs LOG EXPOSURE (lux-seconds)

B
G
R

E4039F

Spectral-Sensitivity Curves

LOG SENSITIVITY* vs WAVELENGTH (nm)

Yellow-Forming Layer
Magenta-Forming Layer
Cyan-Forming Layer

Effective Exposure: 1/50 Second
Densitometry: Status M
Density: 0.2>D-min

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

E4039G

Spectral-Dye-Density Curves

DIFFUSE SPECTRAL DENSITY vs WAVELENGTH (nm)

Typical densities for a midscale neutral subject
and D-min.

Midscale Neutral

Minimum Density

E4039H

Modulation Transfer Function

RESPONSE (%) vs SPATIAL FREQUENCY (cycles/mm)

B
G
R

Exposure: Daylight
Process: C-41

E4039I

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 Paper*
E-2468	*KODAK PROFESSIONAL PORTRA 100T Film*
G-4006	*KODAK PROFESSIONAL PORTRA Black-and-White Paper*
G-4019	*KODAK PROFESSIONAL PORTRA Sepia Black-and-White Paper*
G-27	*KODAK PROFESSIONAL PANALURE SELECT RC 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 Films 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