

# KODAK High Definition 400 Film



KODAK High Definition 400 Film is the world's finest grain 400-speed color print film. It provides a unique balance of fine grain, sharpness, color reproduction, and contrast to yield results with excellent clarity and enlargement capability. This multi-purpose film is designed for exposure with daylight or electronic flash. You can also obtain pleasing results under most existing-light sources without filters.

Features	Benefits
<ul style="list-style-type: none"> <li>Very fine grain, unprecedented among 400-speed color films</li> </ul>	<ul style="list-style-type: none"> <li>Pictures that are very clear</li> <li>Improved enlargements</li> </ul>
<ul style="list-style-type: none"> <li>Excellent sharpness</li> </ul>	<ul style="list-style-type: none"> <li>Improved picture detail</li> <li>Pictures very clear, crisp</li> <li>Great enlargements</li> </ul>
<ul style="list-style-type: none"> <li>ISO 400 speed<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Better pictures in a wider range of light conditions</li> <li>Fewer underexposed pictures</li> <li>Sharper pictures with moving objects</li> <li>Longer flash range for better flash pictures over greater distances</li> <li>Reduced impact of "camera shake"</li> <li>Better pictures from zoom cameras</li> </ul>
<ul style="list-style-type: none"> <li>Excellent color reproduction, improved color consistency</li> </ul>	<ul style="list-style-type: none"> <li>Bright, vibrant prints</li> <li>Improved color consistency across a wider range of picture-taking situations</li> <li>Optimized performance with KODAK EKTACOLOR Edge Paper</li> </ul>
<ul style="list-style-type: none"> <li>KODAK Color Precision Technology for better skin tones</li> </ul>	<ul style="list-style-type: none"> <li>More natural-looking skin tones for improved "people pictures"</li> </ul>
<ul style="list-style-type: none"> <li>Scratch-resistant overcoat technology</li> </ul>	<ul style="list-style-type: none"> <li>Less negative scratching for fewer print defects</li> </ul>
<ul style="list-style-type: none"> <li>Print compatibility</li> </ul>	<ul style="list-style-type: none"> <li>Compatibility with all other Kodak films makes photofinishing workflows faster, easier</li> </ul>
<ul style="list-style-type: none"> <li>Scan ready</li> </ul>	<ul style="list-style-type: none"> <li>High-quality results from digital output systems</li> <li>Great prints for digital zoom and crop</li> </ul>

<sup>1</sup>Compared to Kodak 200-speed film.

## DARKROOM RECOMMENDATIONS

Handle unprocessed film in total darkness.

Process this film in total darkness through the bleach step in Process C-41.

Do not use a safelight.

## STORAGE AND HANDLING

Store unexposed film at 21°C (70°F) or lower in the *original sealed package*. Always store film (exposed or unexposed) in a cool, dry place. Process film as soon as possible after exposure.

Protect negatives from strong light, and store them in a cool, dry place. For more information on storing negatives, see KODAK Publication No. E-30, *Storage and Care of KODAK Photographic Materials—Before and After Processing*.

## EXPOSURE

### Film Speed:

Use these speed numbers with meters and cameras marked for ISO, ASA, or DIN speeds or exposure indexes. Do not change the ISO-speed setting when metering through a filter.

Light Source	KODAK WRATTEN Gelatin Filter <sup>1</sup>	ISO Speed
Daylight or Electronic Flash	None	400/27°
Photolamp (3400 K)	No. 80B	125/22°
Tungsten (3200 K)	No. 80A	100/21°

<sup>1</sup>For best results without special printing.

## Daylight Exposure:

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 (seconds)	Lens Opening
Bright/Hazy Sun on Light Sand or Snow	1/500	f/16
Bright or Hazy Sun, Distinct Shadows	1/500	f/11 <sup>1</sup>
Weak, Hazy Sun, Soft Shadows	1/500	f/8
Cloudy Bright, No Shadows	1/500	f/5.6
Heavy Overcast, Open Shade <sup>2</sup>	1/500	f/4

<sup>1</sup> Use f/5.6 for backlit close-up subjects.

<sup>2</sup> Subject shaded from the sun but lighted by a large area of sky.

## Existing Light

Subject and Lighting Conditions	Shutter Speed	Lens Opening
Home Interiors at Night —Average Light —Bright Light	1/30 1/30	f/2.8 f/2.8
Aerial Fireworks	Bulb <sup>1</sup>	f/4
Interiors with Bright Fluorescent Light	1/60 <sup>2</sup>	f/4
Brightly Lighted Street Scenes at Night	1/60	f/2.8
Neon and Other Lighted Signs	1/125	f/2.8
Floodlighted Buildings, Fountains, Monuments	1/60	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	1/15 <sup>1</sup> 1/15 <sup>1</sup>	f/2.8 f/2.8
Circuses —Floodlighted Acts —Spotlighted Acts	1/125 1/250	f/2.8 f/2.8
Ice Shows —Floodlighted Acts —Spotlighted Acts	1/125 1/250	f/2.8 f/2.8
School —Stage and Auditorium	1/30	f/2

<sup>1</sup> Use a tripod or other firm camera support for exposure times longer than 1/30 second.

<sup>2</sup> 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) <sup>1</sup>	Guide Number for Distances in Feet/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	340/104
8000	400/120

<sup>1</sup> BCPS = beam candlepower seconds.

## Fluorescent and High-Intensity Discharge Lights

For best results without special printing, use the color-correction filters in the table below as starting points when you expose these films under fluorescent and high-intensity discharge lamps. Use exposure times of 1/60 second or longer to avoid the brightness and color variations that occur during a single alternating-current cycle.

### Fluorescent Light Source

Fluorescent Lamp Type	KODAK Color Compensating Filter(s)	Exposure Adjustment
"Daylight"	20R + 5M	+ 1 stop
White	50C + 30M	+ 1 2/3 stop
Warm White	40B + 50C	+ 2 stops
Warm White Deluxe	90C + 30M	+ 2 stops
Cool White	30B	+ 1 stop
Cool White Deluxe	40C + 10M	+ 1 stop

### High-Intensity Discharge Lamp Source

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

## PROCESSING

Process KODAK High Definition 400 Film in KODAK FLEXICOLOR Chemicals for Process C-41. For more information, see KODAK Publication No. Z-131, *Using KODAK FLEXICOLOR Chemicals*.

## JUDGING NEGATIVE EXPOSURES

Expose this film properly for optimum results.

Check the exposure level of the color negative 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 <sup>1</sup> (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 <sup>2</sup>	1.05 to 1.35
Normally lighted forehead of person with dark complexion <sup>2</sup>	0.90 to 1.20

<sup>1</sup>KODAK Publication No. R-27

<sup>2</sup>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).

## PRINTING NEGATIVES

This film is optimized for printing on KODAK EDGE Generations, KODAK EKTACOLOR EDGE 8, KODAK ROYAL Generations, KODAK EKTACOLOR ROYAL VIII, KODAK EKTACOLOR EDGE 9 AP, and KODAK EKTACOLOR ROYAL IX AP, and KODAK PROFESSIONAL Color Metallic Papers. The film can also be printed on KODAK EKTACOLOR EDGE 7 Paper.

Make color slides and transparencies by printing the negatives on KODAK VERICOLOR Slide Film, KODAK PROFESSIONAL ENDURA Transparency Optical Display Material, or KODAK PROFESSIONAL ENDURA Clear Optical Display Material.

You can scan an image to a file and print digitally to KODAK PROFESSIONAL ULTRA ENDURA Paper, KODAK PROFESSIONAL Color Metallic Paper, KODAK PROFESSIONAL ENDURA Transparency Digital Display Material, KODAK PROFESSIONAL ENDURA Clear Digital Display Material, and KODAK PROFESSIONAL DURAFLEX® Plus Digital Display Material.

Make black-and-white prints on KODAK PANALURE SELECT RC Papers for conventional black-and-white processing or on KODAK PROFESSIONAL PORTRA Black & White Paper for Process RA-4. Starting recommendations for KODAK EKTACOLOR Edge 8 Paper are available online at [www.kodak.com/go/photofinishing](http://www.kodak.com/go/photofinishing).

## RETOUCHING

Negatives on this film can be retouched on the emulsion side with retouching pencils, after applying a retouching fluid, such as KODAK Retouching Fluid.

## IMAGE STRUCTURE

<b>Sharpness:</b>	Extremely High
<b>Degree of Enlargement:</b>	Extremely High
<b>Print Grain Index:</b>	39

## Print Grain Index Magnification Table:

Print Grain Index numbers for diffuse printing illumination.

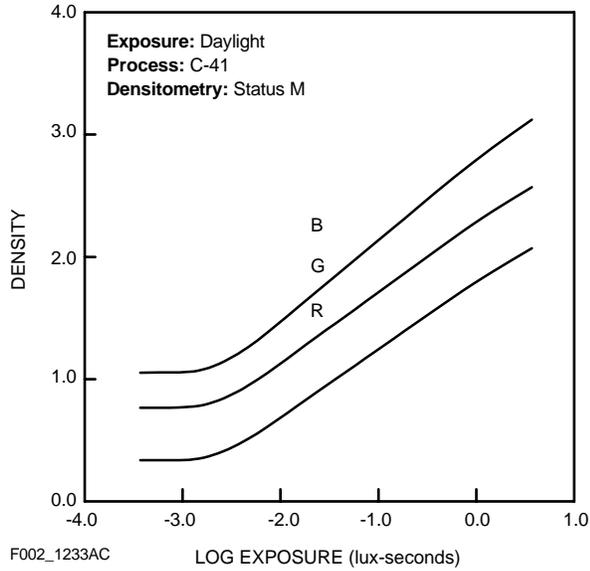
Negative Size: 24 x 36 mm; 135 format or 35 mm Roll Film

Negative Size:	24 x 36 mm (135 size)
Print Size in inches:	4x6
Print Size in centimeters:	10.2x15.2
Magnification:	4.4X
Print Grain Index number:	39

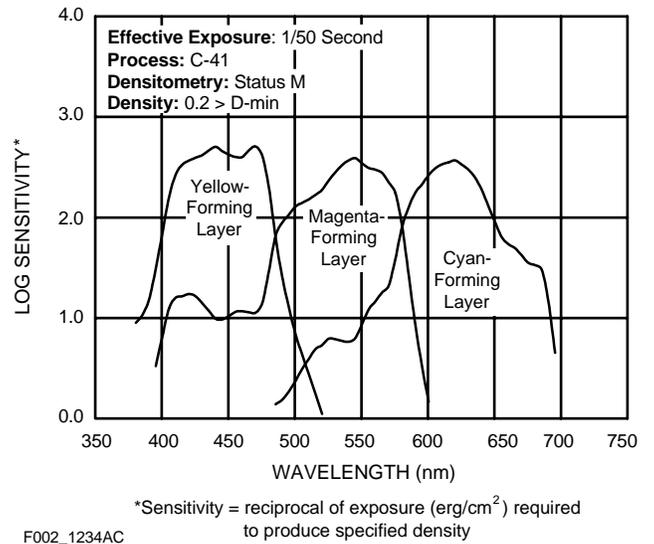
- This is a new method which replaces rms granularity. It is on a different scale, which cannot be compared to rms granularity.
- The scale is a uniform perceptual scale, with a change of 4 units representing a Just Noticeable Difference for 90% of observers.
- Index value representing the approximate 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.

# CURVES

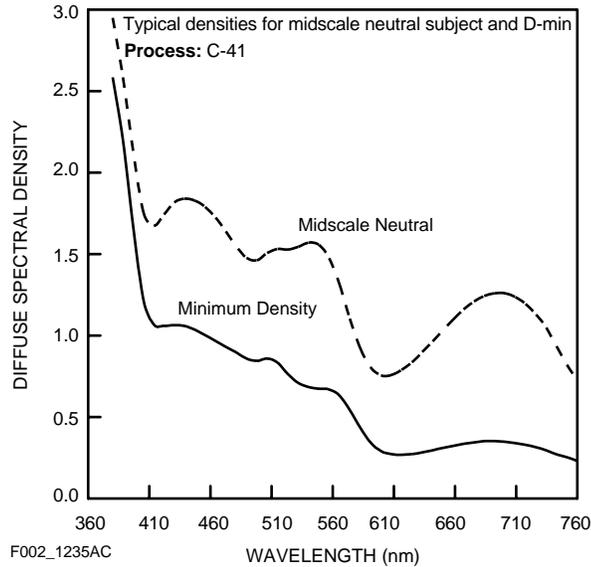
## Characteristic Curves



## Spectral Sensitivity Curves



## Spectral Dye Density Curves



**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 High Definition 400 Film

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## MORE INFORMATION

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

Additional information is available on the Kodak website at [www.kodak.com](http://www.kodak.com).

Many publications are available online, or you can contact Kodak in your country for more information.

For the latest version of technical support publications for KODAK Products, visit Kodak on-line at: <b><a href="http://www.kodak.com">http://www.kodak.com</a></b>
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If you have questions about KODAK Products, call Kodak.
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In the U.S.A.:
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1-800-242-2424, Monday–Friday
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9 a.m.–7 p.m. (Eastern time)
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In Canada:
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1-800-465-6325, Monday–Friday
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8 a.m.–5 p.m. (Eastern time)
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**Note:** The Kodak materials described in this publication for use with KODAK High Definition 400 Film are available from dealers who supply Kodak products. You can use other materials, but you may not obtain similar results.

Consumer Imaging  
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