

# KODAK ULTRA MAX 400 Film

# Kodak

## TECHNICAL DATA / COLOR NEGATIVE FILM

February 2009 • E-7023

KODAK ULTRA MAX 400 Film is a worry-free, easy-to-use high speed film designed for snapshotters. ULTRA MAX 400 Film gives you the flexibility you need to take consistently better pictures in more picture taking situations—better low-light picture quality with fewer underexposures, better results with zoom lenses, greater flash range, better "stop-action" photos, and reduced impact of camera shake.

Even when enlarged, ULTRA MAX 400 Film delivers excellent sharpness and fine grain for crisp, clear pictures. Optimized color precision technology provides consistently bright, vibrant colors with accurate skin-tone reproduction for natural-looking people pictures.

ULTRA MAX 400 Film is designed for processing in KODAK FLEXICOLOR Chemicals for Process C-41. It is printing compatible with KODAK GOLD Films.

FEATURES	ADVANTAGES	BENEFIT
<ul style="list-style-type: none"><li>Advanced T-GRAIN Emulsion technology</li><li>Antenna dye sensitization</li><li>Advanced development accelerators</li><li>Optimized color precision technology</li></ul>	<ul style="list-style-type: none"><li>True 400 speed</li><li>Outstanding underexposure latitude</li><li>Long flash range</li><li>Fine grain and high sharpness</li><li>Great skin tones and superb color</li></ul>	<ul style="list-style-type: none"><li>Better pictures under more conditions (inside, outside, bad light, fast action)</li></ul>

## STORAGE AND HANDLING

Load and unload your camera in subdued light.

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*.

## DARKROOM RECOMMENDATIONS

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

## EXPOSURE

### Film Speed: ISO/DIN 400/27°

Use these speed numbers in the table below with cameras or meters marked for ISO, ASA, or DIN speeds or exposure

indexes. Do not change the film-speed setting when you use a filter if your camera has through-the-lens metering. For critical work, make a series of test exposures.

## 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 (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
Weak, Hazy Sun (Soft Shadows)	1/500	f/8
Cloudy Bright (No Shadows)	1/500	f/5.6
Heavy Overcast, Open Shade†	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 a starting point 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 too dark (overexposed), use a higher guide number; if they are too light (underexposed), use a lower number.

Unit Output (BCPS)*	Guide Number	
	Distance in Feet	Distance in Meters
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

**Automatic Flash Units:** Set ISO / ASA selector to 400.

## 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.

Though this film is tolerant of mixed-lighting situations, for best color results under uniform fluorescent or high-intensity discharge sources, use the exposure and filter recommendations given below. These recommendations are starting points.

Actual filtration may vary between lamps and lamp manufacturers. Depending on the specific source, additional filtration or special printing may be required to achieve best results.

Type of Fluorescent Lamp	KODAK Color Compensating Filters	Exposure Adjustment
Daylight	40R	+ 2/3 stop
White	20C + 30M	+ 1 stop
Warm White	40B	+ 1 stop
Warm White Deluxe	30B + 30C	+ 1 1/3 stops
Cool White	30M	+ 2/3 stop
Cool White Deluxe	10C + 10M	+ 2/3 stop

**Note:** When you do not know the type of fluorescent lamps, try a 10C + 20M filter combination and increase exposure by 2/3 stop; color rendition may be less than optimum.

Type of High-Intensity Discharge Lamp	KODAK Color Compensating Filters	Exposure Adjustment
High Pressure Sodium Vapor	70B + 50C	+ 3 stops
Metal Halide	10R + 20M	+ 2/3 stop
Mercury Vapor with Phosphor	20R + 20M	+ 2/3 stop
Mercury Vapor without Phosphor	80R	+ 1 2/3 stops

**Note:** Some primary color filters were used in the tables above to reduce the number of filters and/or to keep the exposure adjustment to a minimum. Red filters were substituted for equivalent filtration in magenta and yellow. Blue filters were substituted for equivalent filtration in cyan and magenta.

## Adjustments for Long and Short Exposures

You do not need to make any exposure or filter adjustments for exposure times of 1/10,000 second to 1 second. Exposures longer than 1 second may require compensation and filtration.

## PROCESSING

Process in KODAK FLEXICOLOR Chemicals for Process C-41.

Information on replenishment rates is available online at [www.kodak.com/go/photofinishing](http://www.kodak.com/go/photofinishing).

## JUDGING NEGATIVE EXPOSURES

You can 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 Measured on the Negative	Density Reading
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	1.20 to 1.40
Normally lighted forehead of person with light complexion†	1.10 to 1.40
Normally lighted forehead of person with dark complexion†	0.85 to 1.25

\*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).

## PRINTING NEGATIVES

This film is optimized for printing on KODAK EKTACOLOR EDGE Paper, KODAK ROYAL Digital Color Paper, and KODAK PROFESSIONAL ENDURA Metallic Paper.

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

You can scan an image to a file and print digitally to KODAK EKTACOLOR EDGE Paper, KODAK ROYAL Digital Color Paper, KODAK PROFESSIONAL ENDURA Papers, KODAK PROFESSIONAL ENDURA Metallic Paper, KODAK PROFESSIONAL ENDURA Transparency Display Material, or KODAK PROFESSIONAL ENDURA Clear Display Material.

Make black-and-white prints on any of the materials mentioned above using the recommendations in KODAK Publication CIS-274, *Printing Black-and-White Images Without KODAK Black-and-White Papers*.

## 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

### Print Grain Index Magnification Table:

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.

This method uses a uniform perceptual scale, with a change for four units equaling a *just noticeable difference* in graininess for 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.

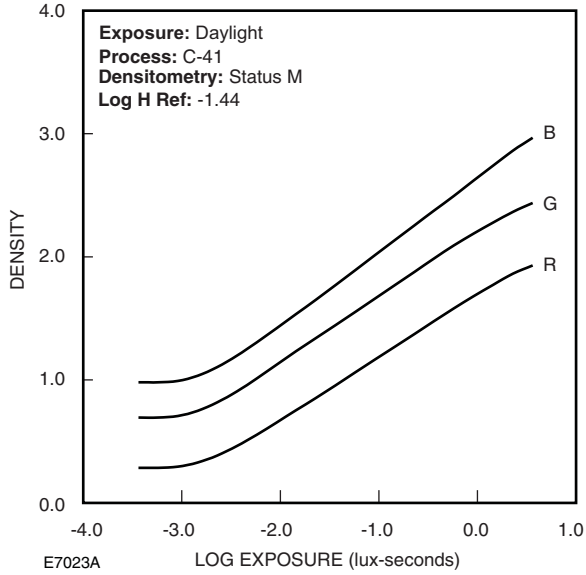
Print Grain Index numbers may not represent graininess observed from more specular printing illuminants, such as condenser enlargers.

The Print Grain Index numbers listed in this publication apply to the following standards:

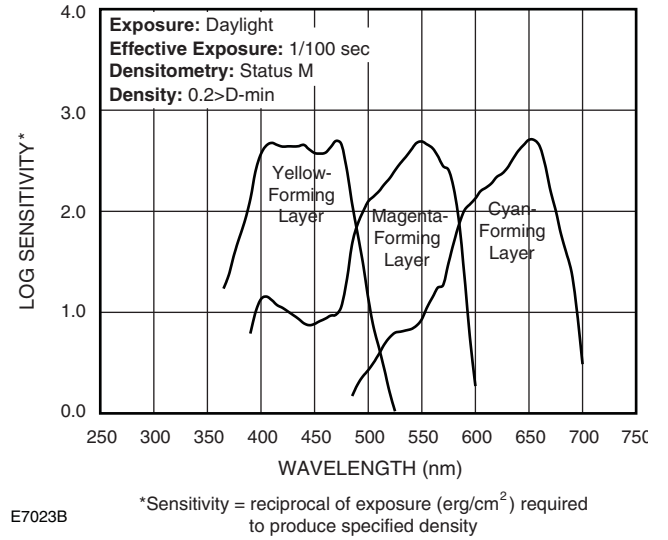
<b>Negative Size:</b>	24 x 36 mm (135-size standard format)
<b>Print Size:</b>	4 x 6 inches (10.2 x 15.2 cm)
<b>Magnification:</b>	4.4X
<b>Print Grain Index:</b>	46

# CURVES

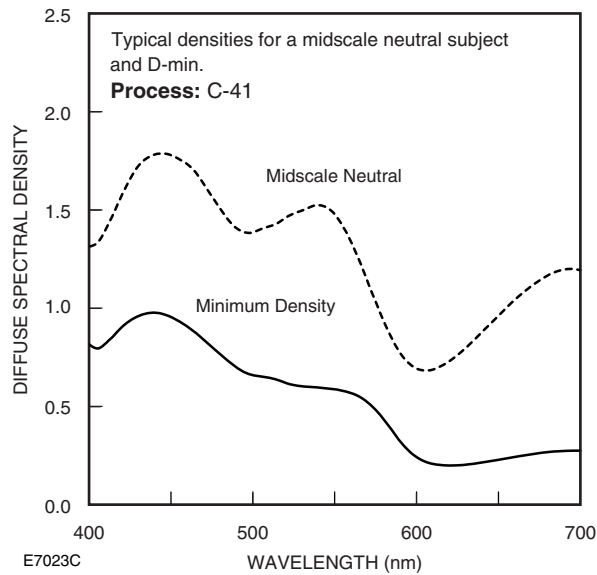
**Characteristic Curves**



**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.

## 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.

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

E-30	<i>Storage and Care of KODAK Photographic Materials— Before and After Processing</i>
E-7022	<i>KODAK GOLD 100 and 200 Films</i>
E-7024	<i>KODAK ULTRA MAX 800 Film</i>
E-4035	<i>KODAK PROFESSIONAL ULTRA COLOR Films</i>
E-4040	<i>KODAK PROFESSIONAL PORTRA Films</i>
E-7020	<i>KODAK EKTACOLOR EDGE Paper</i>
E-7021	<i>KODAK ROYAL Digital Color Paper</i>
E-4020	<i>KODAK PROFESSIONAL ULTRA ENDURA Paper</i>
E-4021	<i>KODAK PROFESSIONAL PORTRA and SUPRA ENDURA Papers</i>
E-4038	<i>KODAK PROFESSIONAL ENDURA Transparency and Clear Display Materials</i>

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>
If you have questions about KODAK Products, call Kodak. In the U.S.A.: 1-800-242-2424, 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 products. You can use other materials, but you may not obtain similar results.

# KODAK ULTRA MAX 400 Film

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**Kodak**

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