



F I L M

Restoring the past, preserving the present, ensuring the future

# Kodak Panchromatic Separation Film 2238

**K**ODAK Panchromatic Separation Film 2238 (ESTAR Base) is a black-and-white film intended for making archival black-and-white separation positives from color negative originals. Other product applications for this film include special effects, density cover mattes, panchromatic masters from black-and-white negatives, and restoration work.

This new film replaces EASTMAN Panchromatic Separation Film 5235 and SO 202 (ESTAR Base). It provides improved image structure (sharpness and highlight grain), improved raw-stock keeping for more consistent results, and faster drying. There is also a reduced propensity for ferrotyping and the possibility to process at higher temperatures.

Improved spectral sensitization gives better color reproduction, similar to that of EASTMAN EXR Color Intermediate Film 5244/2244 (especially when using the recommended KODAK WRATTEN Gelatin Filter No. 70 for the red exposure with subtractive *or* additive printing light sources).

**NEW!**  
From Kodak



## BASE

KODAK Panchromatic Separation Film 2238 has a clear ESTAR Base.

## DARKROOM RECOMMENDATIONS

Carefully make safelight tests before proceeding with production work. Use a KODAK 3 Safelight Filter/dark green or a KODAK 10 Safelight Filter/dark amber using a 15-watt bulb no closer than 1.2 m (4 ft) from the film. Avoid undue exposure of the film under the No. 10 Filter.

## STORAGE

Store unexposed film at 13°C (55°F) or lower. For extended storage, store at -18°C (0°F) or lower. Process exposed film promptly. Store processed film according to the recommendations in ANSI/PIMA IT9.11-1998 or SMPTE RP131-1998: for medium-term storage (minimum of ten years), store at 25°C

(77°F) or lower, at a relative humidity of 20 to 50 percent; for extended-term storage

(for preservation of material having permanent value), store at 21°C (70°F) or lower at a relative humidity of 20 to 50 percent. For active use, store at 25°C (77°F) or lower, at a relative humidity of 50 +/- 5 percent. This relates to optimized film handling rather than preservation; static, dust-attraction and curl-related problems are generally minimized at the higher relative humidity. All three separations should be kept under the same conditions. After usage, the film should be returned to the appropriate medium- or long-term storage condition as soon as possible.

For more information about medium- and long-term storage, see ANSI/PIMA IT9-1998, SMPTE RP131-1998, and KODAK Publications No. H-1, *EASTMAN Professional Motion Picture Films*, and No. H-23, *The Book of Film Care, September 1992*.

## EXPOSURE AND FILTER RECOMMENDATIONS

Described below is a step-by-step method that can be used in determining the starting conditions for using this film. The recommendations include LAD and HD-LD guidelines that will assist in consistency of placement. These will be updated as testing continues.

### Additive Printing

This procedure assumes a standard additive lamphouse, standard dichroic filters and mirrors, and a KODAK WRATTEN Gelatin Filter No. 2B in the blue exposing light beam for making the blue separation, and a KODAK WRATTEN Gelatin Filter No. 70 in the red exposing light beam for making the red separation. For making the duplicate negative, a standard additive lamphouse is again assumed, except for a WRATTEN Filter No. 2E in the blue exposing light beam instead of the WRATTEN Filter No. 2B.

CLEAR,  
ESTAR BASE

## Subtractive Printing

These are the recommended KODAK WRATTEN Gelatin Filters:

Red Separation	Red No. 70
Green Separation	Green No. 99
Blue Separation	Blue No. 98

The film's curve shape can be influenced by the filters used for exposure.

For exposing the duplicate negative, use a WRATTEN 70 Filter for the red light exposure, a WRATTEN 99 Filter for the green light exposure, and for the blue light exposure, a WRATTEN 47B Filter plus a WRATTEN 2E Filter. The WRATTEN 98 Filter is the equivalent of a WRATTEN 47B plus a WRATTEN 2B Filter, but the 2E is the UV filter recommended for use with color intermediate film, which leads to the change for the duplicate negative exposure step.

## Printing Exposure Adjustment

This film has a different speed balance than EASTMAN Panchromatic Separation Film SO-202, and the following compensation should be made versus your SO-202 Film setup.

Red	<ul style="list-style-type: none"><li>+40 lights or 1.00 less ND when printing with an additive light source. SO-202 did not recommend the use of a WRATTEN 70 Filter, which creates this difference.</li><li>No change is needed for subtractive printers versus the SO-202 setup.</li></ul>
Green	<ul style="list-style-type: none"><li>+4 lights or 0.10 less ND</li></ul>
Blue	<ul style="list-style-type: none"><li>none</li></ul>

## Printing and Processing the Separations

To establish developer time needed for optimum R, G, and B contrasts:

Expose a loop containing EASTMAN Laboratory Aim Density (LAD) Film (or a frame of LAD for optical printers) onto this film using the R (plus a WRATTEN 70 Filter), G, and B individual channels. Expose enough footage of each to run a developer time series. Use at least 30-second increments centered around your times for SO-202 Film. Using Status M densitometry, read the LAD, low density (LD), and high density (HD) patches. These are the three large patches at the side of the LAD girl image. The LD patch is at the top (next to the top of the LAD girl's

head), the HD patch is in the middle, and the LAD patch is the bottom most of the three. Record the Status M red densities from the red light exposure, the green densities from the green light exposure, and the blue densities from the blue light exposure.


Read the LAD patch on the respective R, G, and B, separations to get density measurements.

Aims for this measurement are:

Red	1.10
Green	1.40
Blue	1.50

The LAD aims assume timed separations.

Use the development time for the R, G, and B separations that gives an HD-LD delta density closest (within +/- .03) to the respective HD-LD delta densities obtained from the original color negative LAD patches, and adjust printer exposure to produce the LAD aim density at that time. Sensitometer exposures made with WRATTEN 70, WRATTEN 99, and WRATTEN 98 Filters, and processed with the corresponding separation should have the following Status M gammas:



Status M gamma:

Red Light Exposure	0.90 to 0.95
Green Light Exposure	0.90 to 0.95
Blue Light Exposure	0.80 to 0.85

NOTE: In a process using standard KODAK D-96 Developer at 21°C (70°F), the above densities and gammas were obtained at:

Red Light Exposure	6 minutes
Green Light Exposure	5 minutes
Blue Light Exposure	4 minutes

## PRINTING THE DUPLICATE NEGATIVE

Use the R,G, and B separations generated in the previous step that are closest to the LAD and HD-LD aims. You should need no compensation in setup versus your SO-202 setup.

Adjust your printing exposure until your LAD results are within the established LAD tolerance for a duplicate negative (DN) made on EASTMAN EXR Color Intermediate Films 5244/7244/2244.

DN LAD for 5244 is:

Red	1.00 +/- 0.10
Green	1.45 +/- 0.10
Blue	1.55 +/- 0.10

These conditions represent a starting point, and can be adjusted based on your system, preference, and the appearance of your work.

## PROCESSING

This film can be processed to a wide range of contrasts in either KODAK Developer D-96 or D-97. The film is designed to fit into the processing population of films processed in either D-96 or D-97 developer. Sensitometry produced in D-96 Developer is more suitable for separations, while higher densities for mattes can be obtained using D-97 Developer. For details on the processes, see KODAK Publication H-24, *Manual for Processing EASTMAN Motion Picture Films, Module 15*. For reference, also see the developer time series D-log H curves provided in this document.

If the processed film is to be used for long-term storage, adequate washing must be provided to reduce

the retained thiosulfate level.

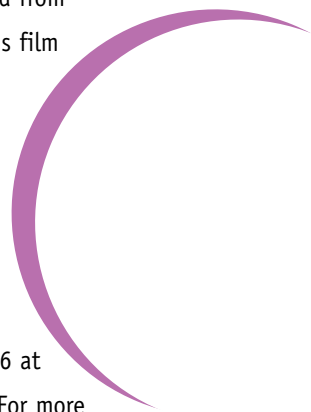
Testing for retained thiosulfate should be performed in accordance with and adhering to the limits specified in ANSI/PIMA IT9.1-1996. Normally processed Panchromatic Separation Film is blue/gray in low-density areas, giving the film an overall blue/gray appearance.

## IDENTIFICATION

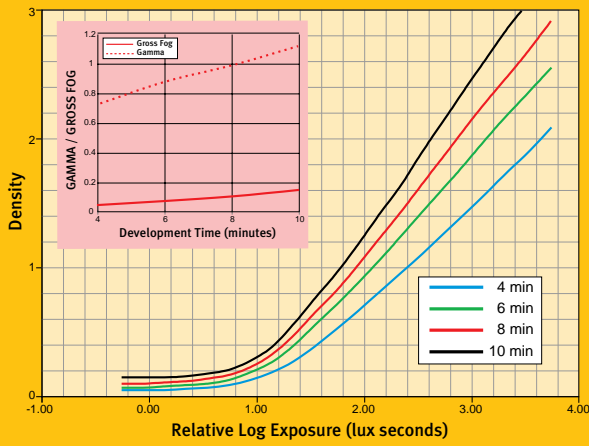
This film has "EASTMAN SAFETY FILM" and the strip numbers latent image printed on the edge of the film.

## IMAGE STRUCTURE

The modulation-transfer curves, and the diffuse rms granularity data were generated from samples of this film exposed with red, green, and blue light and processed in KODAK Developer D-96 at 70°F (21°C). For more information on image-structure characteristics, see KODAK Publication No. H-1, *EASTMAN Professional Motion Picture Films*.

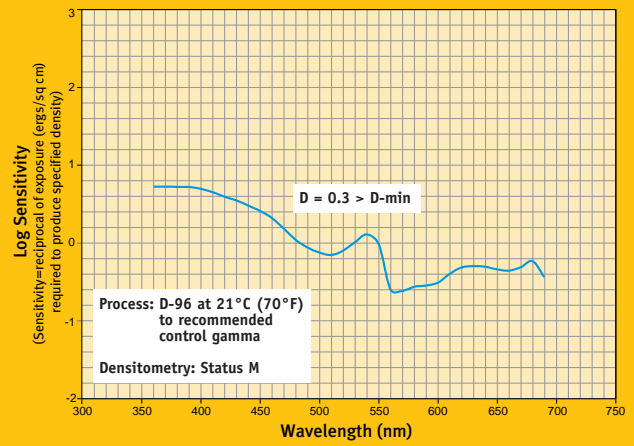


**Red Curve with Gamma and Gross Fog Inserted**

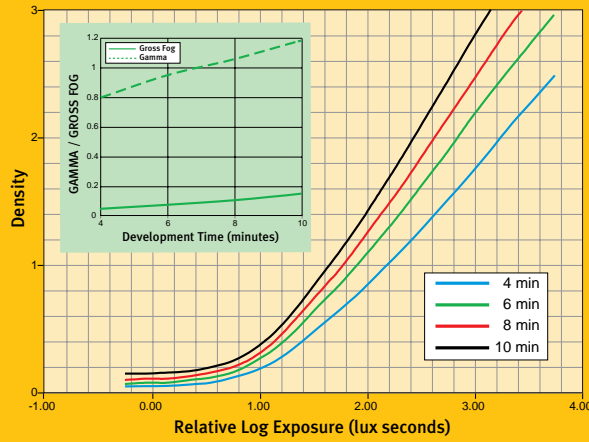


Exposure: Tungsten plus KODAK WRATTEN Filter No. 70 (red) 1/25 second  
 Process: D-96 at 21°C (70°F)  
 Densitometry: Status M (red)

**Spectral Sensitivity Curve**

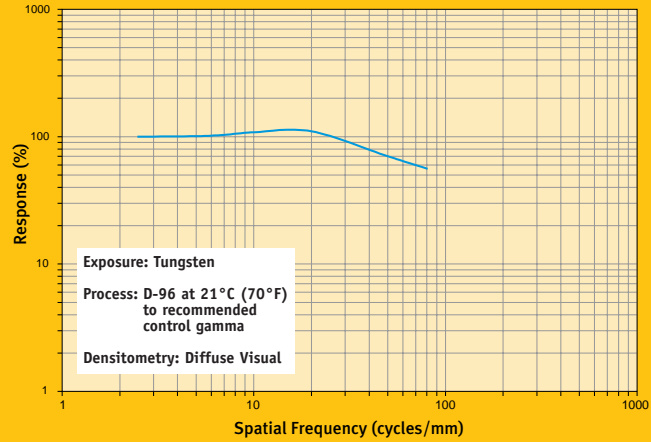


**Green Curve with Gamma and Gross Fog Inserted**

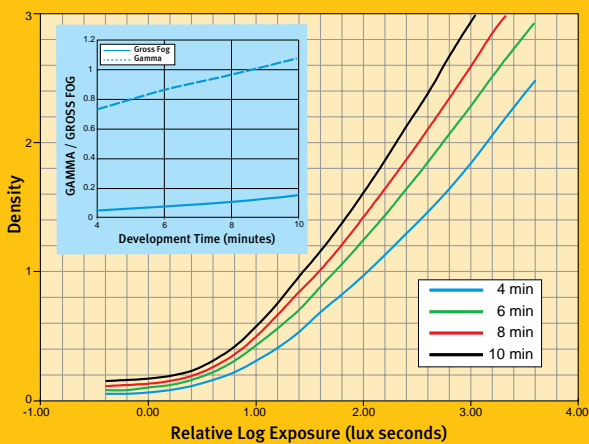


Exposure: Tungsten plus KODAK WRATTEN Filter No. 99 (green) 1/25 second  
 Process: D-96 at 21°C (70°F)  
 Densitometry: Status M (green)

**Modulation-Transfer Curve**

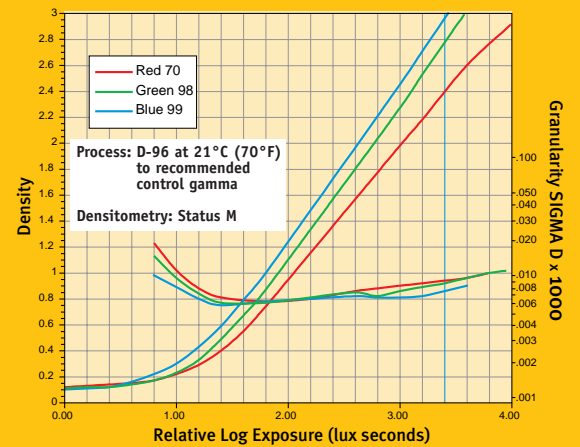


**Blue Curve with Gamma and Gross Fog Inserted**



Exposure: Tungsten plus KODAK WRATTEN Filter No. 98 (blue) 1/25 second  
 Process: D-96 at 21°C (70°F)  
 Densitometry: Status M (blue)

**Diffuse rms Granularity Curve**



Note: To find the rms Granularity value for a given density, find the density on the left vertical scale and follow horizontally to the characteristic curve and then go vertically (up or down) to the granularity curve. At that point, follow horizontally to the Granularity Sigma D scale on the right. Read the number and multiply by 1000 for the rms value.

Notice for all charts: While the data presented are typical of production coatings, they do not represent standards which must be met by Eastman Kodak Company. Varying storage, exposure, and processing conditions will affect results. The company reserves the right to change and improve the product characteristics at any time.

## AVAILABLE ROLL LENGTHS

*Kodak Panchromatic Separation*

Film 2238

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<b>147 1358</b>	1 roll x 2000 ft. 35MM
	BH1866 perfs K core    SP242

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<b>134 5768</b>	1 roll x 1000 ft. 35MM
	BH1866 perfs U core    SP718

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**For further information,  
check with your local  
country representative.**

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**KODAK ON-LINE AT:**

[www.kodak.com/go/motion](http://www.kodak.com/go/motion)

# KODAK LOCATIONS

EASTMAN KODAK COMPANY  
ROCHESTER, NEW YORK 14650  
FOR DIRECT ORDERING  
IN THE UNITED STATES AND CANADA:  
1-800-621-FILM

ATLANTA, GEORGIA:  
4 Concourse Parkway  
Suite 300  
Atlanta, Georgia 30328-6105  
Information: 800-800-8398  
Direct Ordering: (800) 621-FILM

CHICAGO, ILLINOIS:  
815 West Van Buren  
Suite 320  
Chicago, Illinois 60607  
Information: 312-492-1423  
Direct Ordering: (800) 621-FILM

DALLAS, TEXAS:  
11337 Indian Trail  
Dallas, Texas 75229  
Information: 972-481-1150  
312-492-1423  
Direct Ordering: (800) 621-FILM

HOLLYWOOD, CALIFORNIA:  
6700 Santa Monica Boulevard  
P.O. Box 38939  
Hollywood, California  
90038-1203  
Information: 323-464-6131  
Direct Ordering: (800) 621-FILM

NEW YORK, NEW YORK:  
360 West 31st Street  
New York, New York  
10001-2727  
Information: 212-631-3450  
Direct Ordering: (800) 621-FILM

LATIN AMERICAN  
REGIONAL OFFICE:  
8600 NW 17th Street  
Suite 200  
Miami, Florida 33126  
Information: 305-507-5146  
Direct Ordering: (800) 621-FILM

MONTREAL, CANADA:  
Kodak Canada Inc.  
4 Place du Commerce  
Suite 100  
Ile des Soeurs  
Verdun, Quebec  
Canada H3E 1J4  
Information: 514-761-7001  
Direct Ordering: (800) 621-FILM

TORONTO, CANADA:  
Kodak Canada Inc.  
3500 Eglinton Avenue West  
Toronto, Ontario  
Canada M6M 1V3  
Information: 416-761-4922  
Direct Ordering: (800) 621-FILM

VANCOUVER, CANADA:  
Kodak Canada Inc.  
4185 Still Creek Drive  
Suite C150  
Burnaby, British Columbia  
Canada V5C 6G9  
Information: 604-570-3526  
Direct Ordering: (800) 621-FILM



## AVAILABLE ROLL LENGTHS

*Kodak Panchromatic Separation*

Film 2238

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<b>147 1358</b>	1 roll x 2000 ft. 35MM		
	BH1866 perfs K core	SP242	

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<b>134 5768</b>	1 roll x 1000 ft. 35MM		
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