

KODAK Panchromatic Separation Film 2238

1) Description

KODAK Panchromatic Separation Film 2238 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.

Compared with EASTMAN Panchromatic Separation Film 5235/SO-202, which this new film replaces, 2238 Film provides improved image structure (sharpness and highlight grain), improved raw stock keeping for more consistent results, faster drying, reduced propensity for ferrotyping, and the option to use higher processing 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).

2) Base

KODAK Panchromatic Separation Film has a clear, ESTAR base.

3) 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 at least 1.2 m (4 ft) from the film. Avoid undue exposure of the film under the No. 10 Filter.

4) 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 ISO 18911:2010, *Imaging Materials - Processed Safety Photographic Films - Storage Practices*. 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 extended-term storage condition as soon as possible.

Printer Conditions

Described 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 DN, a

standard additive lamphouse is again assumed, except for a WRATTEN Filter No. 2E in the blue exposing light beam instead of the WRATTEN 2B Filter.

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 shapes can be influenced by the filters used during exposure.

For exposing the DN, use of 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 DN exposure step.

Printing Exposure Adjustments:

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

Red:	<ul style="list-style-type: none"> • +40 lights or 1.00 less ND when printing with an additive light source. SO-202 did not recommend the use of a WR70 filter, which creates this difference. • No change is needed for subtractive printers versus the SO-202 setup.
Green:	+4 lights or 0.10 less ND
Blue:	none

Printing and Processing the Separations :

To establish developer times 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 light beams. 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 the LAD patch measurements are:	Red: 1.10
	Green: 1.40
	Blue: 1.50

The LAD aims assume timed separations. This means the subject content of the film has been timed and printed relative to LAD, either using information obtained from an electronic film color analyzer for timing relative to LAD, or from information obtained when it was printed onto a color print film where the LAD and the subject content of the film were good at the same time. This also assumes that these exposing relationships that achieved the simultaneous LAD/film content optimization are used when making the separations.

Use the development time for the R, G, and B separations that give an HD-LD delta density closest, within +/-0.03, 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 W70, W99, and W98 filters, and processed with the corresponding separation should have the following Status M overall gradient (OG):

Red	0.90 to 0.95 for the red light exposure
Green	0.90 to 0.95 for the green light exposure
Blue	0.80 to 0.85 for the blue light exposure

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

6 1/2 min	for the red-light exposure
5 1/2 min	for the green-light exposure
5 1/2 min	for the blue-light exposure

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 delta aims. You should need no compensation in setup vs your SO-202 setup.

Adjust your printing exposure until your LAD results are within the established LAD tolerances 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 appearance of your work.

5) 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 extended-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.

6) Identification

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

7) 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."

rms Granularity

Refer to curve.

Read with a microdensitometer, (red, green, blue) using a 48-micrometre aperture.

8) Available Roll Lengths

For information on film roll lengths, check Kodak's Professional Motion Imaging Price Catalog or see a Kodak sales representative in your country.

9) Graphs¹

Process: D-96; 21°C(70°F) unless otherwise specified.

MTF

A) (12-98)

NOTE: These photographic modulation-transfer values were determined by using a method similar to the one described in ANSI Standard PH2.39-1977(R1990). The film was exposed with the specified illuminant to spatially varying sinusoidal test patterns having an aerial image modulation of a nominal 35 percent at the image plane, with processing as indicated. In most cases, the photographic modulation-transfer values are influenced by development-adjacency effects and are not equivalent to the true optical modulation-transfer curve of the emulsion layer in the particular photographic product.

¹NOTICE: While the data presented are typical of production coatings, they do not represent standards that must be met by Kodak. Varying storage, exposure, and processing conditions will affect results. The company reserves the right to change and improve product characteristics at any time.

rms Granularity:

B) (1-99)

rms Granularity curve - 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.

Spectral Sensitivity:

C) (1-99)

Developer Time Series D-96; 70°F (21°C):

D) Red (1-99)

E) Green (1-99)

F) Blue (1-99)

Developer Time Series D-97; 70°F (21°C):

G) Red (12-98)

H) Green (12-98)

I) Blue (12-98)

Gamma

J) D-96 (1-99)

K) D-97 (1-99)

Gross Fog

L) D-96 (1-99)

M) D-97 (1-99)

NOTE: The Kodak materials described in this publication for use with EASTMAN Panchromatic Separation Film 2238 are available from dealers who supply Kodak products. You can use other materials, but you may not obtain similar results.

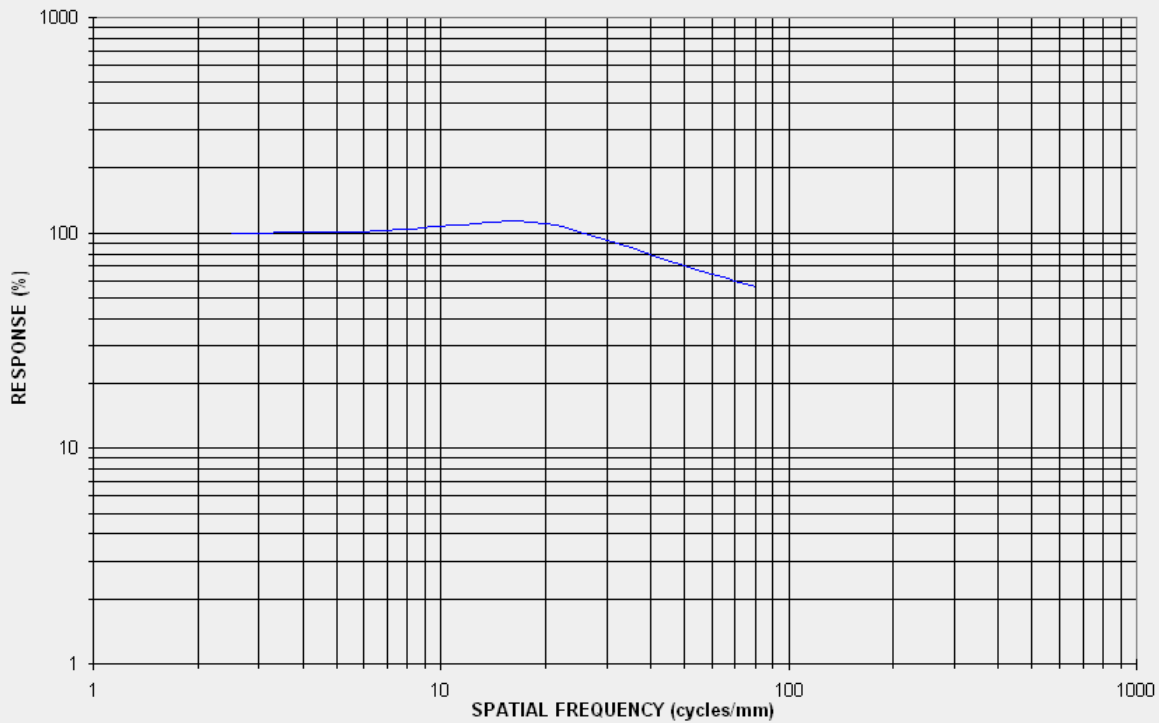
Kodak, Eastman, 2238, 2244, 5235, 5244, 7244, and Wratten are trademarks.

Professional Motion Imaging
EASTMAN KODAK COMPANY - Rochester, NY 14650

End of Data Sheet

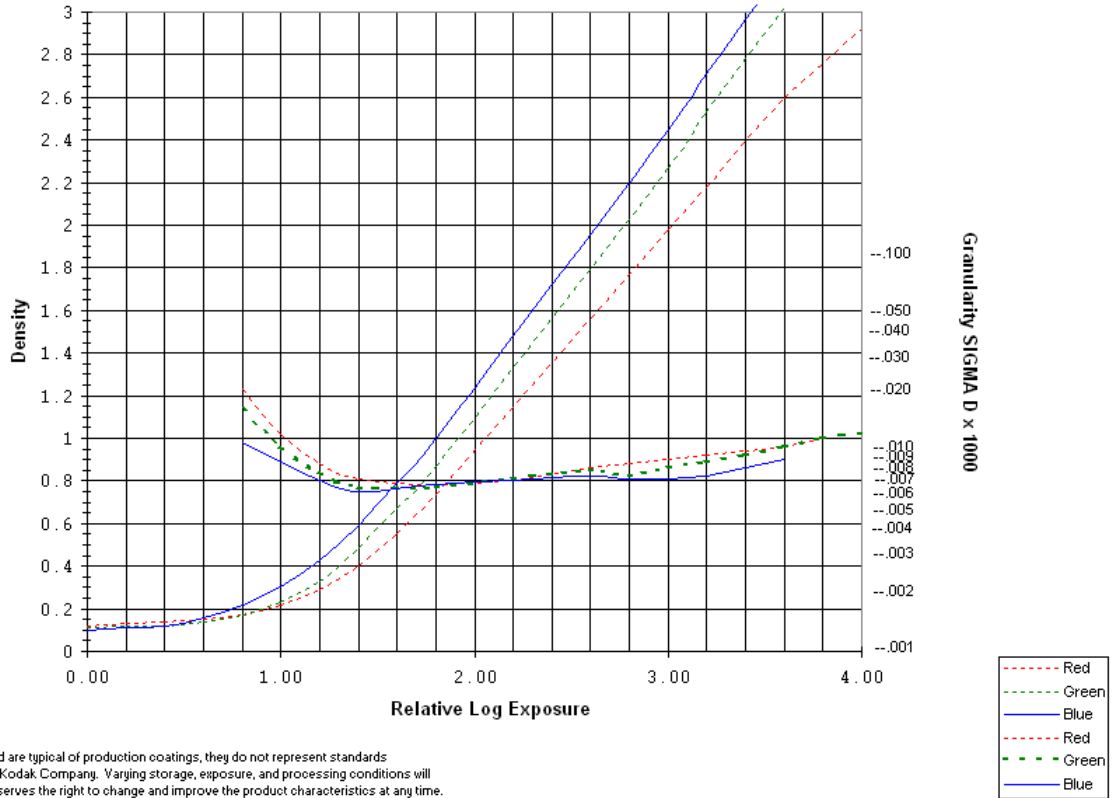
TI2404A 12-98
MTF, For Publication

KODAK Panchromatic Separation Film 2238
Tungsten, Process D-96, 6 1/2 mins, 21C (70F),
Diffuse Visual



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TI2404B 1-99
 DIFFUSE rms GRANULARITY, For Publication
 KODAK Panchromatic Separation Film 2238
 Process D-96, 6 mins, 21C (75F); Status M;
 KODAK WRATTEN Filters: No.98-Blue,No.99-Green,No.70-Red .



TI2404C 1-99
SPECTRAL SENSITIVITY, For Publication
KODAK Panchromatic Separation Film 2238
Process D-96, 6 1/2 mins, 21°C (70°F);
Status M; D=0.3>D-min



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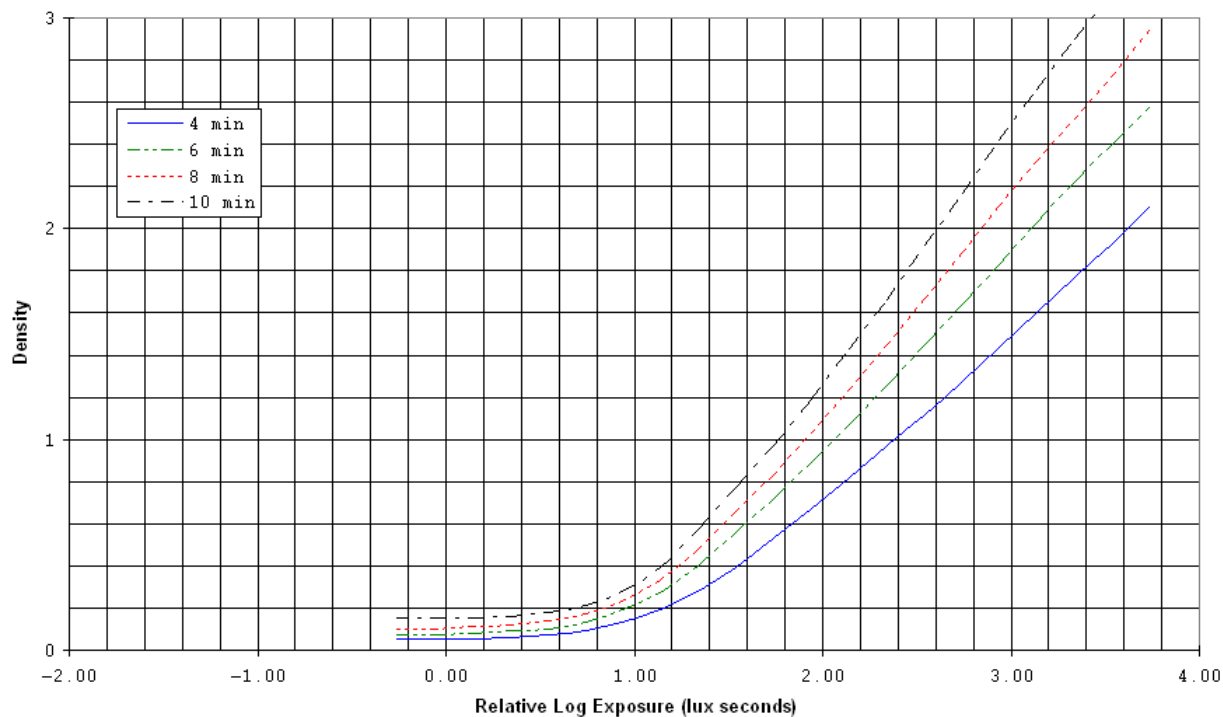
TI2404D 1-99

Developer Time Series, For Publication

KODAK Panchromatic Separation Film 2238

Process D-96, 21°C (70°F); Status M

KODAK WRATTEN Filter No.70-Red



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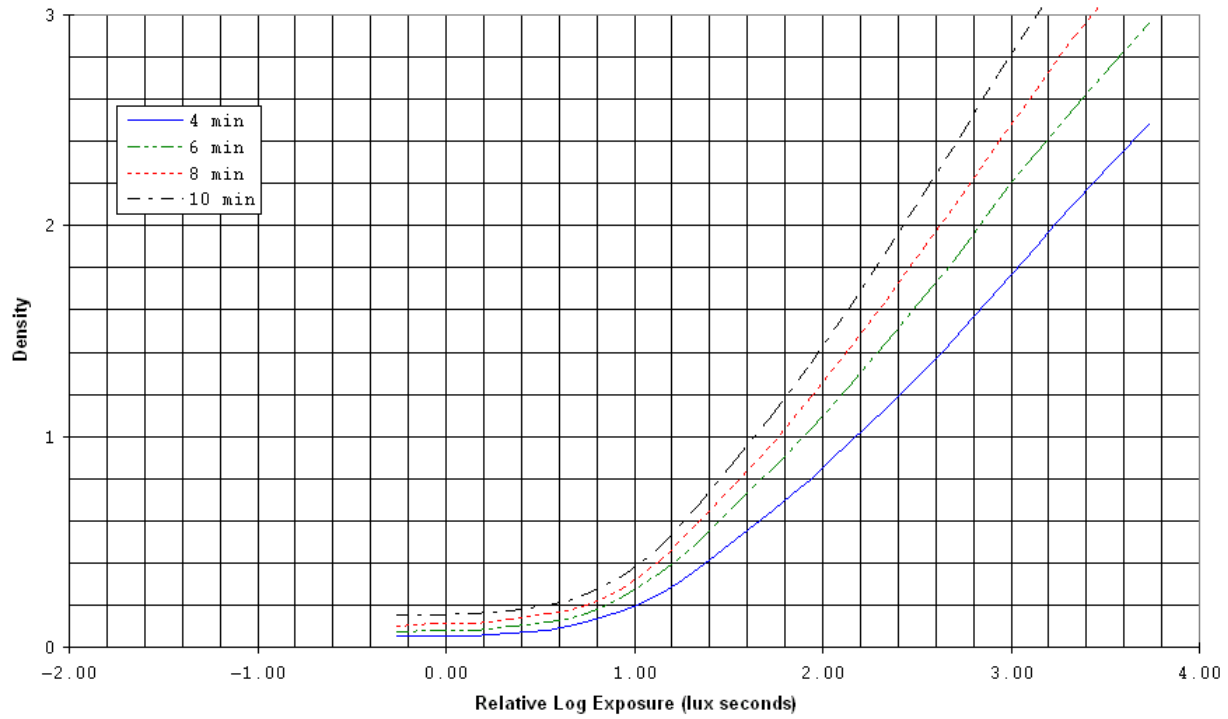
TI2404E 1-99

Developer Time Series, For Publication

KODAK Panchromatic Separation Film 2238

Process D-96, 21°C (70°F); Status M

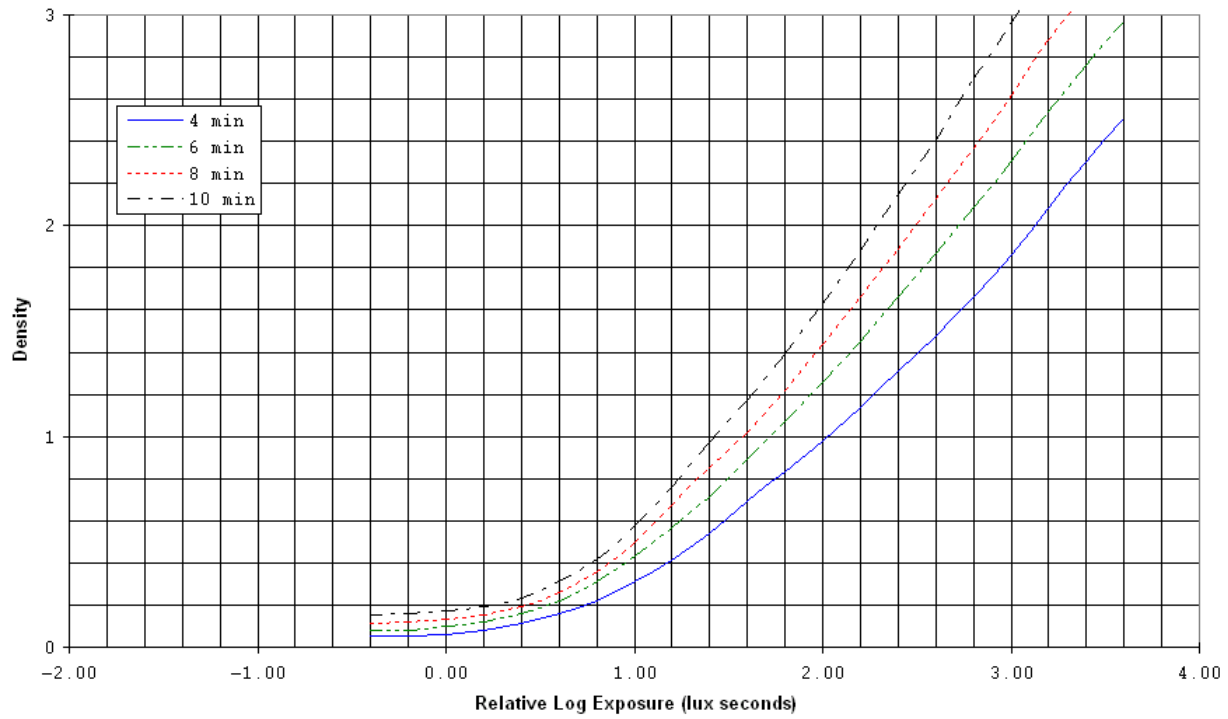
KODAK WRATTEN Filter No.99-Green



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TI2404F 1-99
Developer Time Series, For Publication

KODAK Panchromatic Separation Film 2238
Process D-96, 21C (70F); Status M
KODAK WRATTEN Filter No. 98-Blue



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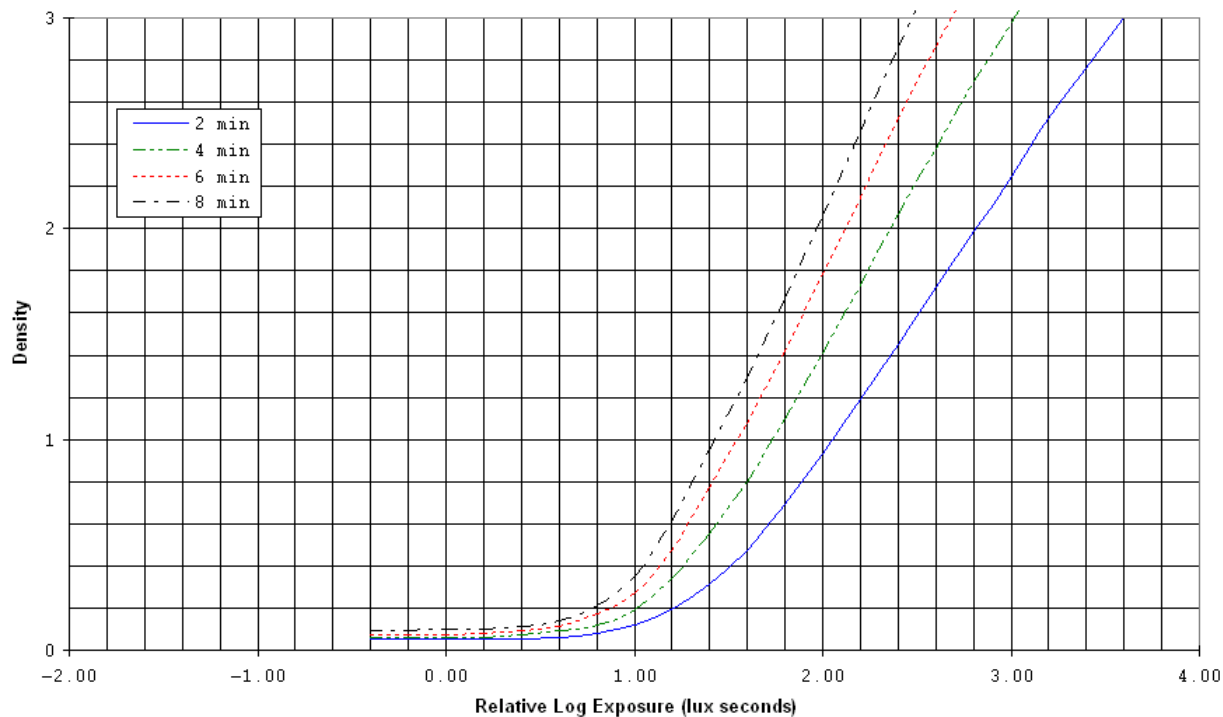
TI2404G 12-98

Developer Time Series, For Publication

KODAK Panchromatic Separation Film 2238

Process D-97, 21°C (70°F); Status M

KODAK WRATTEN Filter No.70-Red



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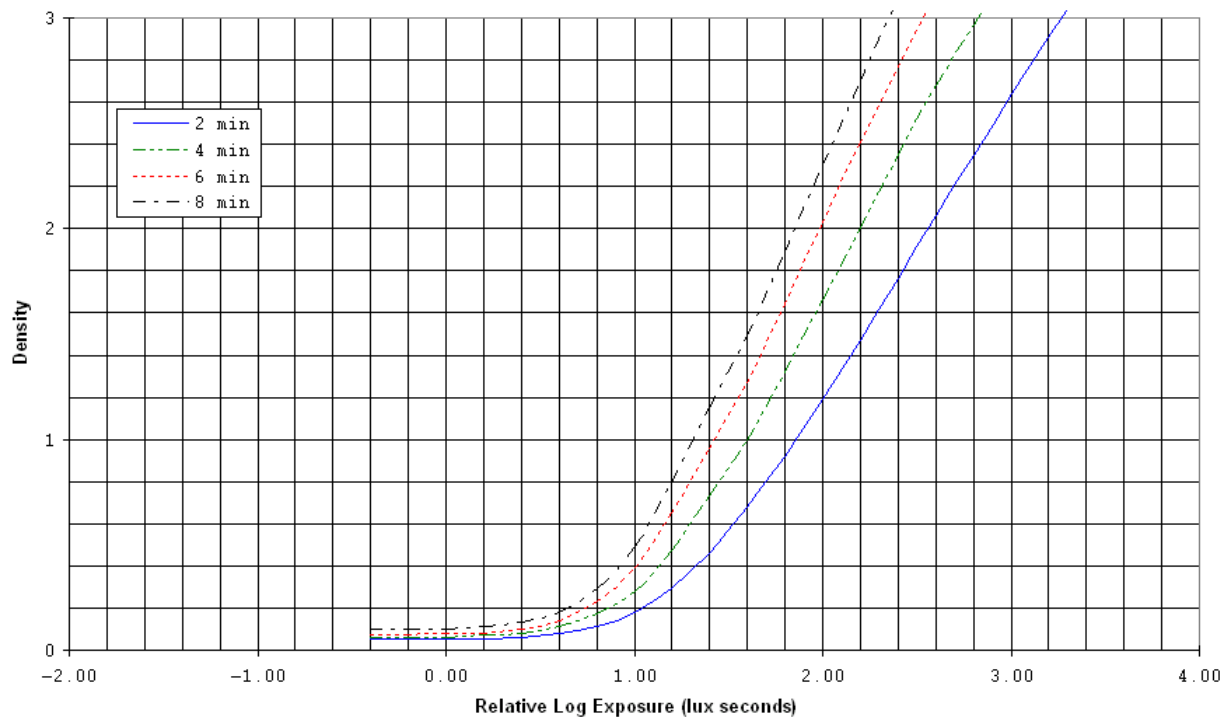
TI2404H 12-98

Developer Time Series, For Publication

KODAK Panchromatic Separation Film 2238

Process D-97, 21°C (70°F); Status M

KODAK WRATTEN Filter No. 99-Green



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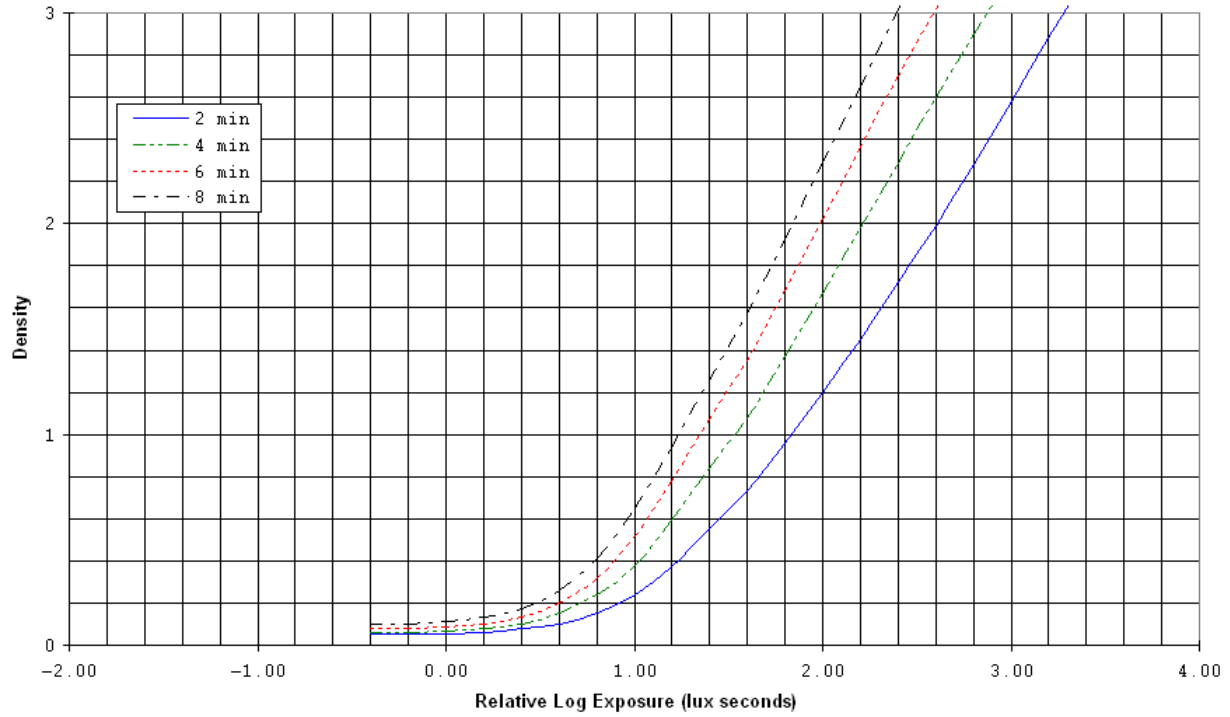
TI2404 12-98

Developer Time Series, For Publication

KODAK Panchromatic Separation Film 2238

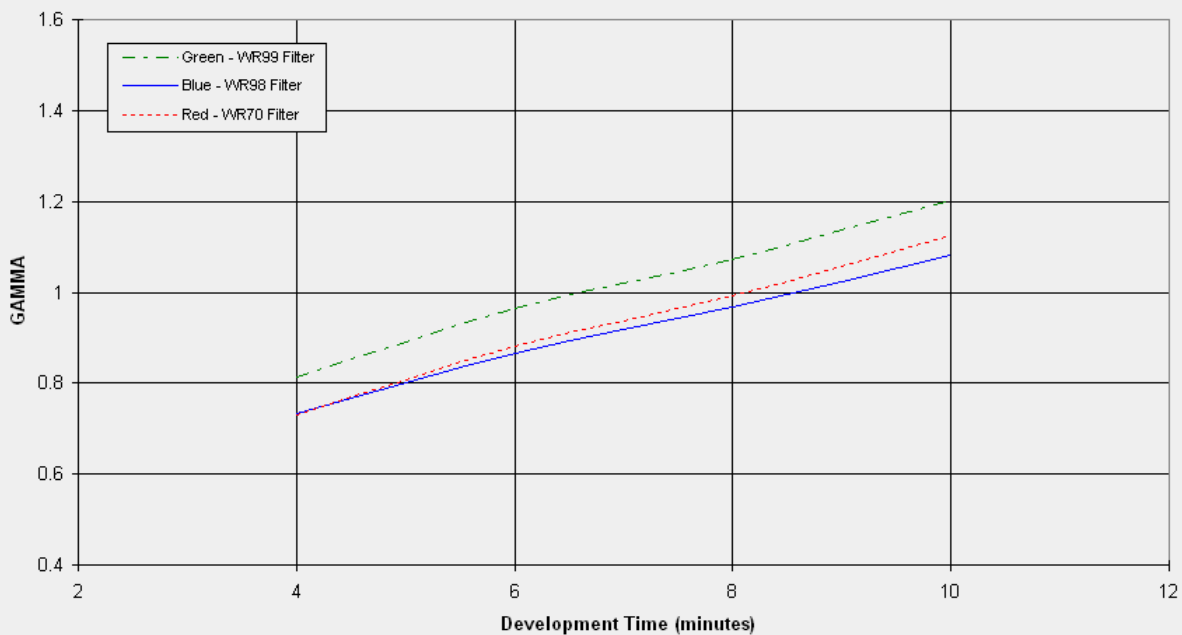
Process D-97, 21°C (70°F); Status M

KODAK WRATTEN Filter No.98-Blue



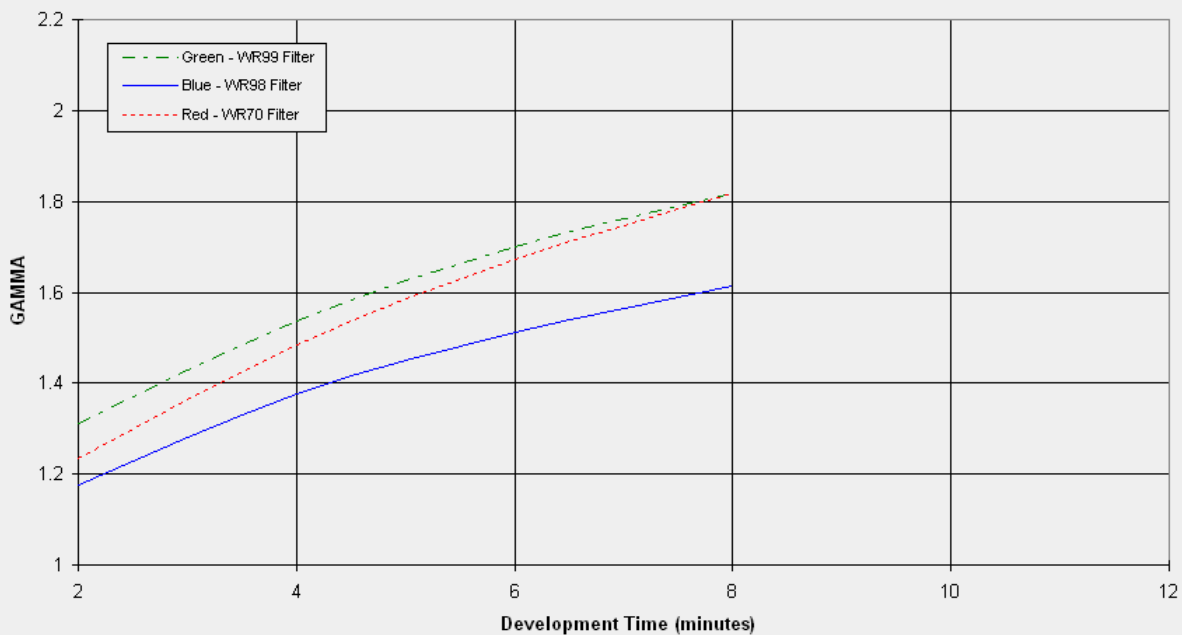
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TI2404J 1-99
GAMMA, For Publication
KODAK Panchromatic Separation Film 2238
Tungsten, Process D-96, 21C (70F)



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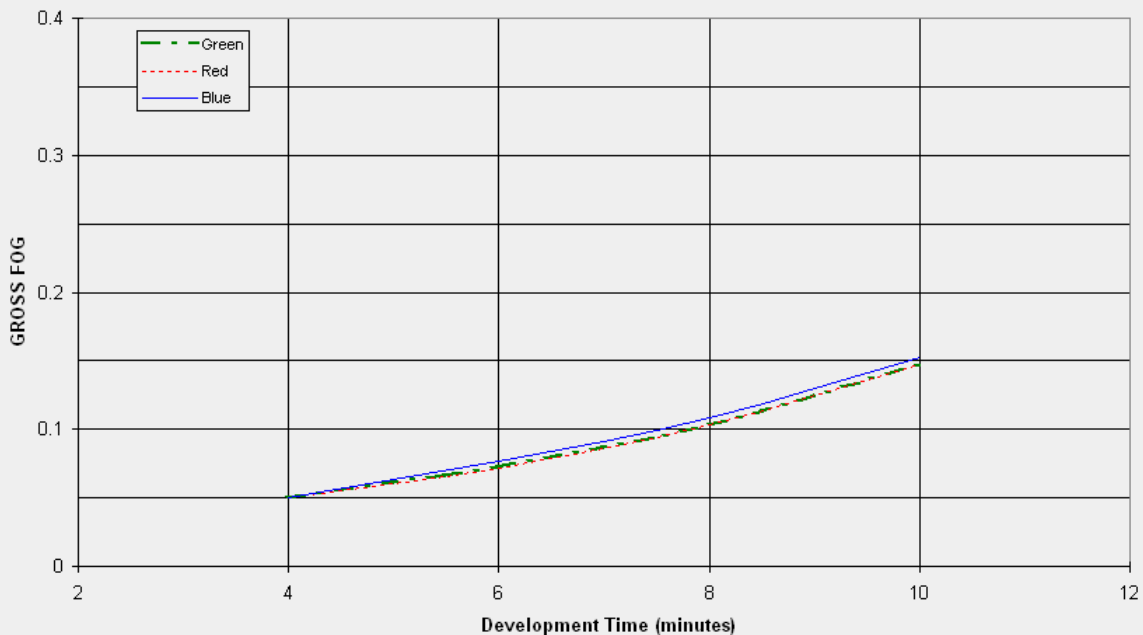
TI2404K 1-99
GAMMA, For Publication
KODAK Panchromatic Separation Film 2238
Tungsten, Process D-97, 21C (70F)



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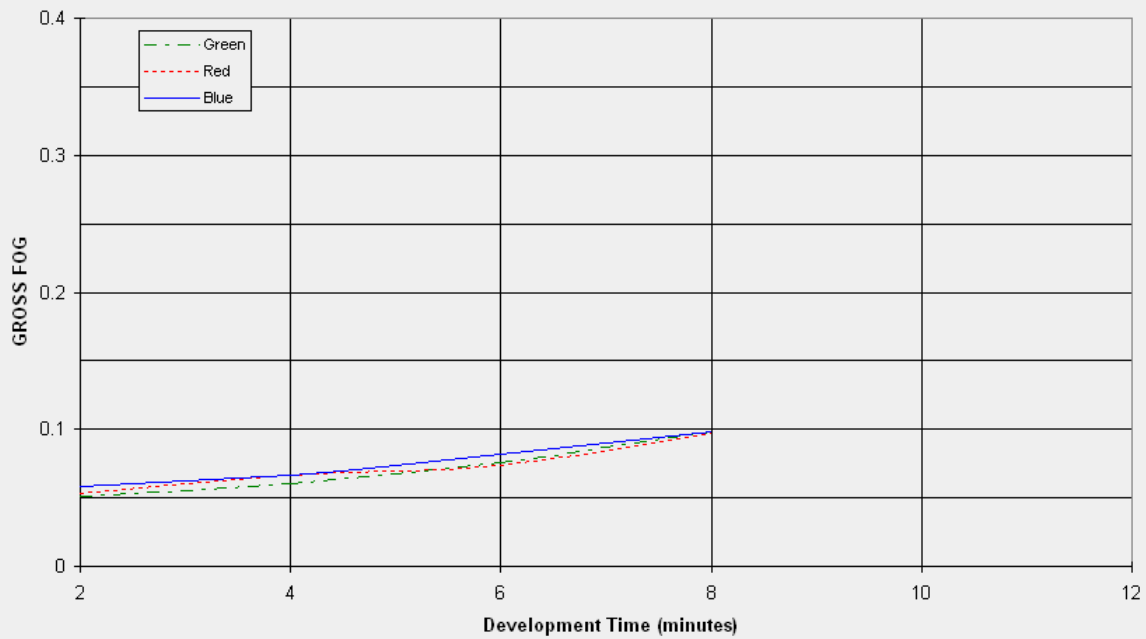
TI2404L 1-99
GROSS FOG, For Publication

KODAK Panchromatic Separation Film 2238
KODAK Developer D-96 at 21 C (70F)



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TI2404M 1-99
GROSS FOG, For Publication
KODAK Panchromatic Separation Film 2238
KODAK Developer D-97 at 21 C (70F)



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