

# EASTMAN DOUBLE-X Negative Film 5222/7222

Kodak

## TECHNICAL DATA / BLACK-AND-WHITE NEGATIVE FILM

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This black-and-white negative camera film is designed for general production use both outdoors and in the studio. You can also use this film for photography under dim lighting conditions and where you need greater depth of field without an increase in the illumination level.

EASTMAN DOUBLE-X Negative Film 5222 (35 mm) and 7222 (16 mm) is a high-speed, panchromatic material that has good image-structure characteristics and excellent sharpness.

### BASE

This film has a grey acetate safety base.

### DARKROOM RECOMMENDATIONS

Handle unprocessed film in total darkness. If necessary, the film can be examined *for a few seconds only* after developing is 50 percent complete, using the following safelight combination: a 15-watt bulb and KODAK Safelight Filter No. 3 / dark green, no closer than 4 feet (1.2 metres) to the film.

### 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 7°C (45°F) or lower at a relative humidity of 20 to 30 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. After usage, the film should be returned to the appropriate medium-or long-term storage conditions as soon as possible.

### EXPOSURE

#### Exposure Index

(For development to gamma of 0.65)

Tungsten (3200K) - 200

Daylight - 250

Use these indexes with incident- or reflected-light exposure meters and cameras marked for ISO or ASA speeds or exposure indexes. These indexes apply for meter readings of average subjects made from the camera position or for readings made from a gray card of 18-percent reflectance (such as one of the *KODAK Gray Cards*, KODAK Publication No. R-27) held close to and in front of the subject. For unusually light- or dark-colored subjects, decrease or increase the exposure indicated by the meter accordingly.

#### Exposure Table for Tungsten Light

At 24 frames per second (fps), 170-degree shutter opening:

Lens Aperture	f/1.4	f/2	f/2.8	f/4	f/5.6	f/8	f/11
Footcandles Required *	13	25	50	100	200	400	800

\* At 18 frames per second, use 3/4 of the footcandles (fc) shown.

#### Filter Factors

KODAK WRATTEN Gelatin Filter No.	3	8	12	15	21	25	29	96*
Filter Factor for Daylight	1.5	1.5	2	3	3	8	20	8

\* For use in bright sunlight to reduce the exposure without modifying color rendering or depth of field. This filter which has a neutral density of 0.90 provides a reduction in exposure equivalent of 3 full stops.

### RECIPROCITY CHARACTERISTICS

No exposure or filter compensation is required for exposure times from 1/10,000 second to 1 second.

## PROCESSING

The following starting-point recommendations are for a typical continuous-immersion processing machine. See KODAK Publication No.H-24.15 *Manual for Processing KODAK Motion Picture Films, Module 15*, for more information on solution formulas and procedures for machine processing.

Processing Step	Temperature	Time	Replenishment Rate (mL per 100 ft)	
			35 mm	16 mm
KODAK D-96 Developer*	21 ±0.3°C (70 ±1/2°F)	Approx. 7 min.†	1250 (D-96R)	625 (D-96R)
Stop Rinse‡	21 ±1°C (70 ±2°F)	50 sec	12,000	6000
KODAK Fixer F-5*	21 ±1°C (70 ±2°F)	11 min	850	425
Wash (counter-current)	21 ±1°C (70 ±2°F)	10 min	12,000	6000
Dry§	35°C (95°F)	—	—	—

\* Agitation in the developer and fixer should be by recirculation through submerged spray jets that impinge on the film strands.

† Develop to recommended control gamma of 0.65 to 0.70 calculated using Status M densitometry (blue)..

‡ Fixer-laden water from wash tank, pH about 6.

§ Drying depends on many factors such as air temperature, humidity, volume and rate of air flow, flow distribution pattern, final squeezeing, etc. In a typical motion-picture film drying cabinet with air at about 35°C (95°F) and 40 to 50% relative humidity (RH), satisfactory drying will require 15 to 20 minutes. Film leaving the drying cabinet when it has reached room temperature should be at equilibrium with room air at approximately 50% RH.

## IDENTIFICATION

After processing, the product code numbers 5222 (35 mm) or 7222 (16 mm), emulsion and roll number identification, KEYCODE numbers, and internal product symbol (KE) are visible along the length of film.

## IMAGE STRUCTURE

The modulation-transfer curves, diffuse rms granularity, and the resolving power data were generated from samples of EASTMAN DOUBLE-X Negative Film exposed to tungsten light and processed as recommended in D-96 Developer at 21°C (70°F) to the recommended control gamma. For more information on image-structure characteristics, see KODAK Publication No H-845, *The Essential Reference Guide for Filmmakers*.

Diffuse rms granularity*	14	
Resolving Power†	TOC 1.6:1	32 lines/mm
	TOC 1000:1	100 lines/mm

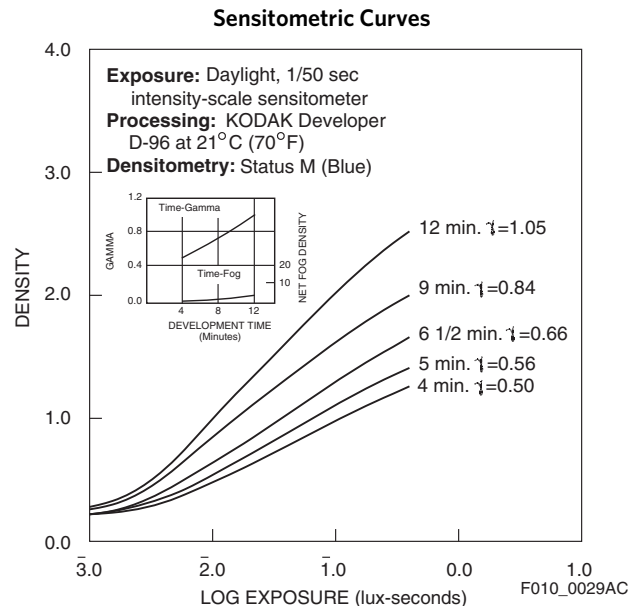
\* Read at a net diffuse visual density of 1.0, using a 48-micrometer aperture.

† Determined according to a method similar to the one described in ISO 6328-1982, *Photography—Photographic Materials—Determination of ISO Resolving Power*.

**Note:** 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.

## Sensitometry

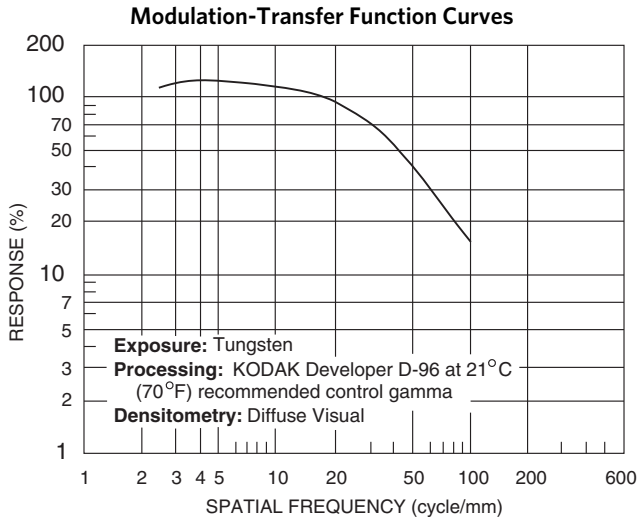
Sensitometric curves determine the change in density on the film for a given change in log exposure.



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## Modulation Transfer Function

The "perceived" sharpness of any film depends on various components of the motion picture production system. The camera and projector lenses and film printers, among other factors, all play a role. But the specific sharpness of a film can be measured and is charted in the Modulation Transfer Function Curve.

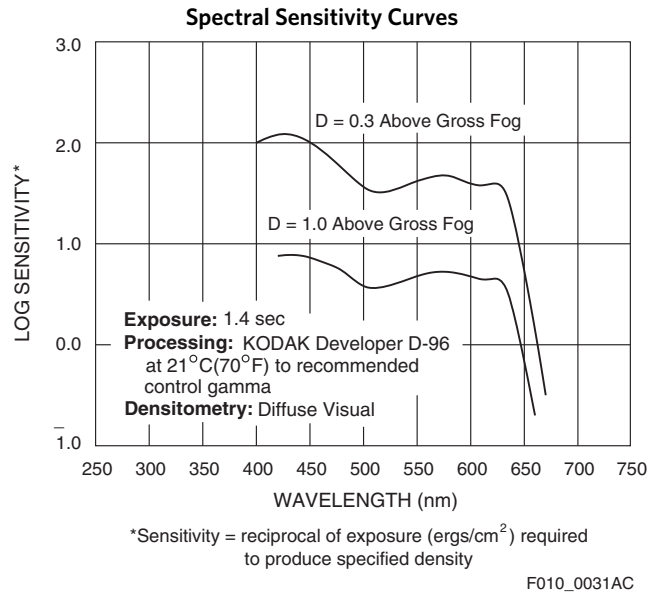


This graph shows a measure of the visual sharpness of this film. The x-axis, "Spatial Frequency," refers to the number of sine waves per millimeter that can be resolved. The y-axis, "Response," corresponds to film sharpness. The longer and flatter the line, the more sine waves per millimeter that can be resolved with a high degree of sharpness—and, the sharper the film.

**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 60 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.

## Spectral Sensitivity

These curves depict the sensitivity of this film to the spectrum of light.



## MORE INFORMATION

Outside the United States and Canada, please contact your Kodak representative. You can also visit our web site at [www.kodak.com/go/motion](http://www.kodak.com/go/motion) for further information. You may want to bookmark our location so you can find us easily the next time.

<b>H-2</b>	<i>Cinematographer's Field Guide</i>
<b>H-845</b>	<i>The Essential Reference Guide for Filmmakers</i>
<b>H-24</b>	<i>Manual for Processing KODAK Motion Picture Films, Processing Black-and-White Films, Module 15</i>
<b>H-61</b>	<i>LAD—Laboratory Aim Density</i>
<b>H-606</b>	<i>KODAK Telecine Tool Kit and Reference Manual</i>

## AVAILABLE ROLL LENGTHS

For information on film roll lengths, check *KODAK Motion Picture Camera Films Price Catalog* or see a Kodak sales representative in your country.

**Note:** The Kodak materials described in this publication for use with EASTMAN DOUBLE-X Negative Film 5222 / 7222 are available from dealers who supply Kodak products. You can use other materials, but you may not obtain similar results.

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