EASTMAN DOUBLE-X

NEGATIVE FILM 5222 / 7222

TECHNICAL DATA / BLACK-AND-WHITE NEGATIVE FILM

MARCH 2022 H-1-5222

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 DOULBLE-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.

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.

	Short Term (less than 6 months)	Long Term (more than 6 months)
Unexposed film in original, sealed package	13 C (55 F) RH below 60%	-18 C (0 F) RH below 50%
Exposed film, unprocessed	-18 C (0 F) RH below 20%	Not recommended. Process film promptly.
Process film	21 C (70 F) RH 20 to 50%	2 C (36 F) RH 20 to 30%

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.

Warm-up Times

To prevent film telescoping, moisture condensation, and spotting, allow your film to warm to room temperature (21C/70F) before use:

Film Package	Recommended Warm-up Time (Hours)	
	8 C (15 F) Rise	39 C (70 F) Rise
8 mm	1	1 ½
16 mm	1	1 ½
35 mm	3	5

For more information about film storage and handling, see ANSI/PIMA ISO-18911, SMPTE RP131-2002, and KODAK Publication No. H-845, The Essential Reference Guide for Filmmakers, available online at www.kodak.com/go/referenceguide.

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 meters) to the film.

Exposure

Exposure Indexes

(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-Tungsten Illumination

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

EXPOSURE TABLE FOR TUNGSTEN LIGHT							
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 Change to KODAK WRATTEN2 Filter No								
KODAK WRATTEN 2 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

You do not need to make any filter corrections or exposure adjustments for exposure times from 1/10,000 of a second to 1 second.

Processing

The following starting-point recommendations are for a typical continuous-immersion processing machine. For more information see KODAK Publication No.H-24.15 Manual for Processing KODAK Motion Picture Films, Module 15, http://www.kodak.com/go/h24

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 squeegeeing, 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, or 7222 emulsion, roll, and strip number identification, KEYKODE Numbers, and manufacturer/film identification code (KE) are visible along the length of the film.

Image Structure

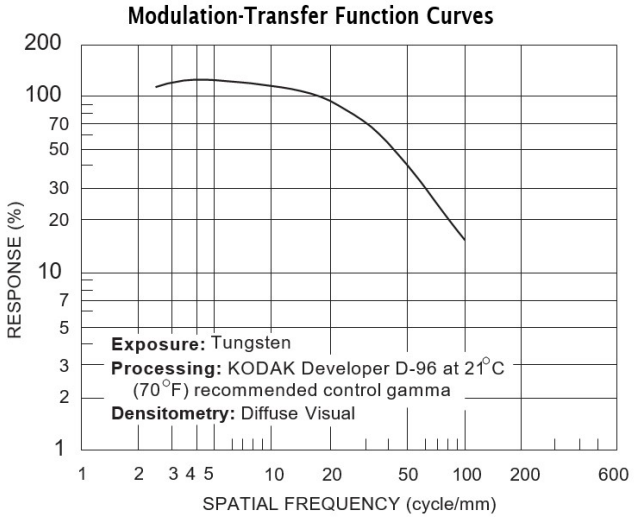
The modulation-transfer curves, diffuse rms granularity, and the resolving power data were generated from samples of EASTMAN DOUBLE-X Negative Film exposed to tungsten light and processed as recommended in D-96 Developer at 21 C (70 F) to the recommended control gamma. For more information on image-structure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

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

Modulation Transfer Function

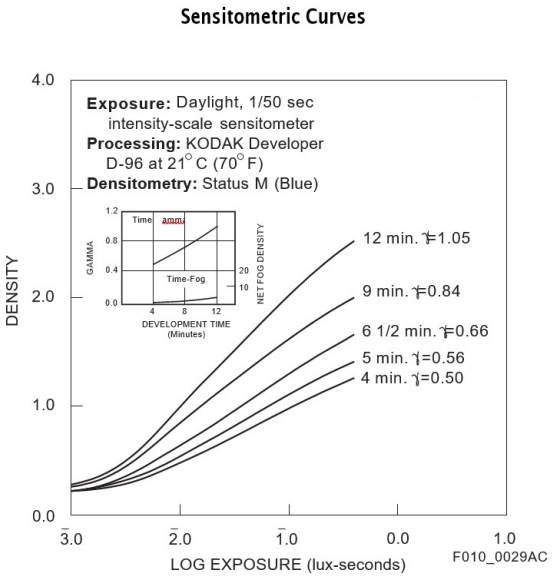
The "perceived" sharpness of any film depends on various components of the motion picture production system. The camera and projector lenses and film printers, among other factors, all play a role. But the specific sharpness of a film can be measured and is charted in the Modulation Transfer Function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

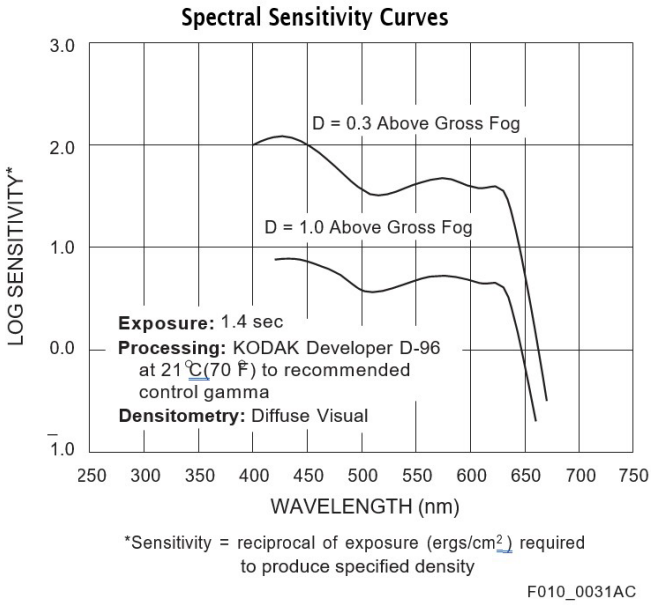
Sensitometry

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



Spectral Sensitivity

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



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.

Available Roll Lengths and Formats

See Kodak Motion Picture Products Catalog at www.kodak.com/go/mpcatalog
To order film in the United States and Canada, call 1- 800-356-3259, prompt 3.
Worldwide customers can find the nearest sales office at www.kodak.com/go/salesoffices

KODAK Publication No. H-1-5222

EASTMAN DOUBLE-X Negative Film 5222 / 7222

Revised 3-22