



TECHNICAL DATA / BLACK-AND-WHITE INTERMEDIATE FILM

MARCH 2022 H-1-2234

EASTMAN Fine Grain Duplicating Panchromatic Negative Film 2234 is a panchromatic film characterized by very high sharpness. This low-speed, black-and-white film is designed for making duplicate negatives from master positives, or internegatives from reversal originals. When used with KODAK Fine Grain Duplicating Positive Film 2366, it produces negatives nearly equal to the original negative in tone rendering and printing detail.

BASE

2234 Film has a gray ESTAR Base (polyester). The backside of the base contains a process-surviving anti-static layer.

DARKROOM RECOMMENDATIONS

Use a KODAK No. 3 Safelight Filter / dark green, with a 15-watt bulb, no closer to the film than 1.2 meters (4 feet).

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. After usage, the film should be returned to the appropriate medium- or long-term storage conditions as soon as possible.

EXPOSURE

For traditional printing, the maximum negative density of the master positive should produce a density of 0.50 in the duplicate negative, i.e., just above the toe and at the beginning of the straight-line portion of the sensitometric curve.

PROCESSING

The following process recommendations should be used as starting points for most conventional continuous-immersion processors with solutions prepared according to the formulas in [KODAK Publication No.H-24.15, Manual for Processing KODAK Motion Picture Films, Module 15](#). The processing times may require modification for a particular machine.

Note: Observe precautionary information on product labels and on the Material Safety Data Sheets.

Processing Step	Temperature	Time	Replenishment Rate (mL per 100 ft)
KODAK Developer D-96 ^[1]	70 +/-1/2°F (21 +/-0.3°C)	^[2]	1250 (D-96R)
Stop Rinse ^[3]	70 +/-2°F (21 +/-1°C)	50 sec	12,000
KODAK Fixing Bath F-5 ^[1]	70 +/-2°F (21 +/-1°C)	11 min	850
Wash (counter-current)	75 +/-2°F (24 +/-1°C)	10 min	12,000
Dry	95°F (35°C)	- ^[4]	

^[1] Provide agitation in the developer and fixing bath by recirculation through submerged spray jets that impinge on the film strands.

^[2] Develop to recommended control gamma.

^[3] Use a countercurrent flow of fixer-laden water overflow from the wash tank, pH about 6.

^[4] Drying depends on many factors such as air temperature, relative 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 95°F (35°C) and 40 to 50 percent RH, satisfactory drying will require 15 to 20 minutes. Film leaving the drying cabinet when it has reached room temperature should be in equilibrium with room air at approximately 50 percent RH.

IDENTIFICATION

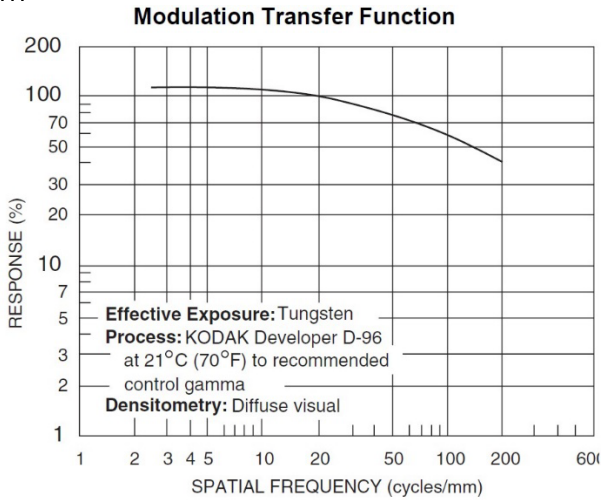
After processing, the product code number 2234, emulsion, and roll identification, and KEYCODE product identifier (KD) are visible along the length of the film.

IMAGE STRUCTURE

The modulation-transfer curves and the diffuse rms granularity were generated from samples of 2234 Film exposed with tungsten light and processed as recommended in Process D-96 at 70F (21C) to the recommended control gamma.

CURVES

MTF



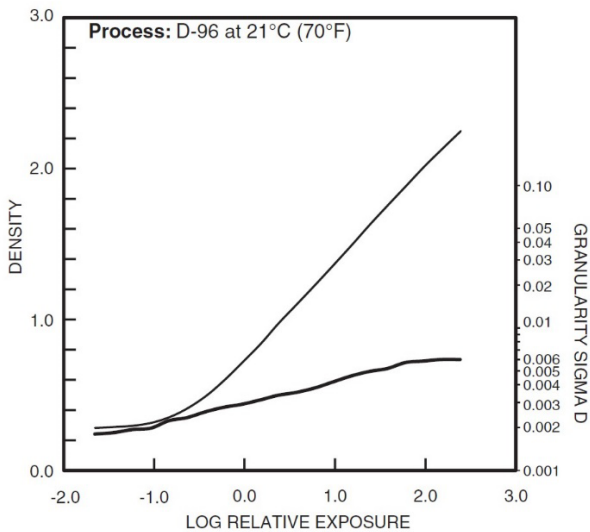
F010_0022AC

RMS GRANULARITY

Read with a microdensitometer, using a 48-micrometer aperture.

The "perception" of the graininess of any film is highly dependent on scene content, complexity, and density. Other factors, such as film age, processing, exposure conditions, and telecine transfer may also have significant effects.

Diffuse rms Granularity Curves

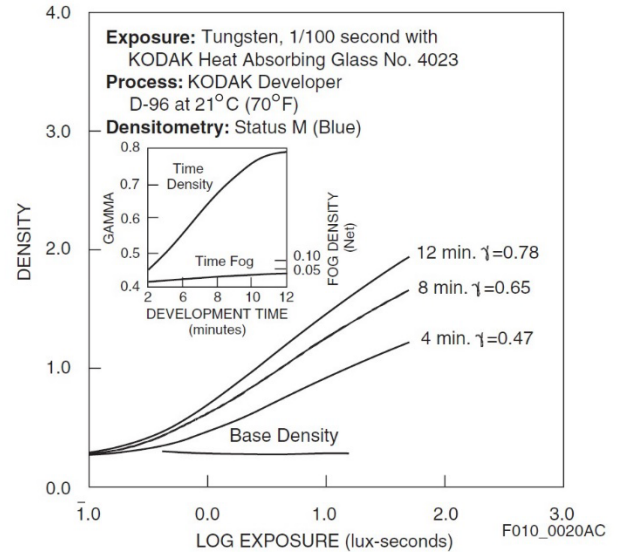


To find the rms Granularity value for a given density, find the density on the left vertical scale and follow horizontally to the characteristic curve and then go vertically (up or down) to the granularity curve. At that point, follow horizontally to the Granularity Sigma D scale on the right. Read the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

Note: This curve represents granularity based on modified measuring techniques. Sensitometric and Diffuse RMS Granularity curves are produced on different equipment. A slight variation in curve shape may be noticed.

CHARACTERISTIC

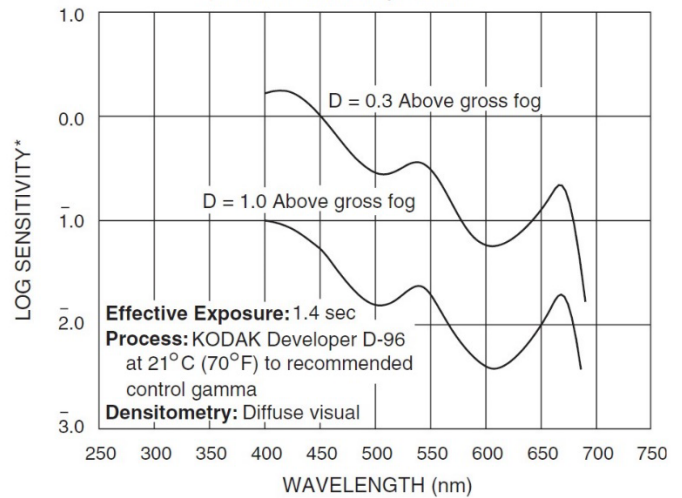
Characteristic Curves



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SPECTRAL SENSITIVITY

Spectral Sensitivity Curves



*Sensitivity = reciprocal of exposure (ergs/cm²) required to produce specified density

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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.

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



