

KODAK VISION Color Intermediate Film 5242 / 2242 / 3242

Kodak

TECHNICAL DATA / COLOR INTERMEDIATE FILM

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KODAK VISION Color Intermediate Film 5242 and KODAK VISION Color Intermediate Film 2242 / 3242 / ESTAR Base are color intermediate films for the preparation of color master positives from color negative originals for release printing, and for mastering videocassette, DVD, and digital cinema releases, and for color duplicate negatives from the master positives. VISION Color Intermediate Film can be used for the preparation of color duplicate negatives from black-and-white silver separation positives. It can also be used as a recording film on laser recorders and CRT film recorders.

It contains an integral mask similar to the mask in KODAK color negative films, but red in color. It has excellent image structure, tonal scale, and reproduction contrast near unity when printed and processed as recommended. It features micro-fine grain, high sharpness, and high resolving power.

These films replace—and improve upon—Kodak's Academy Award-winning intermediate films EASTMAN EXR Color Intermediate Film 5244 / 7244 and EASTMAN EXR Color Intermediate Film 2244 / 3244 / ESTAR Base. Like all Kodak films, they are a result of listening—and responding to—the needs of the industry.

Advances in these products bring benefits to everyone involved in the process of telling stories on film—laboratories, post houses, archivists, distributors, studios, creatives and viewers.

The benefits of KODAK VISION Color Intermediate Film include:

- VISION Color Intermediate Film 2242 / 3242 has a polyester base without rem-jet (no carbon black or prebath-soluble binder) containing a patented process-surviving antistatic layer which results in higher quality prints with fewer dirt spots.
- Improved sharpness for laser and CRT recording.
- Excellent media to protect assets of production.
- Same tone scale and color as EASTMAN EXR Color Intermediate Film 5244 / 2244.
- VISION Color Intermediate Film 2242 / 3242 will yield higher quality, cleaner prints and transfers.
- Using VISION Color Intermediate Film 2242 / 3242 with KODAK VISION Color Print Film / 2383 or KODAK VISION Premier Color Print Film / 2393 will yield the highest quality, cleanest prints available.
- World-wide consistency of product with reliable supply.
- Same quality and service associated with VISION brand.

FILM STRUCTURE

KODAK VISION Color Intermediate Film 5242 has a clear acetate safety base with rem-jet backing.

KODAK VISION Color Intermediate Film 2242 / 3242 / ESTAR Base is coated on a 120 micrometre (0.0047-inch) ESTAR Base featuring a patented electrically conductive anti-static layer, a polymeric scratch-resistant backing layer, and a process-surviving back-side lubricant. Unlike rem-jet, the anti-static layer remains with the film after processing, eliminating the electrostatic attraction of dirt particles to the processed film, even at relatively low humidity. A very thin polymeric backing layer coated on top of the anti-static layer provides improved resistance to back-side scratches, cinch marks, and abrasion of both raw stock and processed film. The backing layer also contains process-surviving lubricant and matte to optimize winding and transport characteristics.

PHOTOGRAPHIC PROPERTIES

Sensitometry -

The sensitometry (characteristic curve) of KODAK VISION Color Intermediate Film 5242 / 2242 / 3242 is similar to EASTMAN EXR Color Intermediate Film 5244 / 2244.

Spectral Sensitivity -

Spectral sensitivity measures the sensitivity of the film as a function of the wavelength of the exposing light. The spectral sensitivity of KODAK VISION Color Intermediate Film 5242 / 2242 / 3242 closely matches the sensitivity of EASTMAN EXR Color Intermediate Film 5244 / 2244 and the spectral sensitivity of KODAK VISION Color Print Film 2383.

Spectral Dye Density -

The spectral dye density measures the density of each imaging dye (cyan, magenta, and yellow) in the processed film as a function of wavelength. The spectral dye densities of KODAK VISION Color Intermediate Film 5242 / 2242 / 3242 closely match that of EASTMAN EXR Color Intermediate Film 5244 / 2244.

Color Reproduction -

The color reproduction characteristics of EASTMAN EXR Color Intermediate Film 5244 / 2244 are maintained in KODAK VISION Color Intermediate Film 5242 / 2242 / 3242. There is an excellent match between direct prints and prints made from duplicate negatives on 5242 / 2242 / 3242 Film.

IMAGE STRUCTURE

KODAK VISION Color Intermediate Film 5242 / 2242 / 3242 has excellent image structure.

Modulation Transfer Function (MTF) is an objective measure of film sharpness. The film is exposed with a spatially varying sinusoidal test pattern having 60 percent modulation. After processing, the MTF target images are measured with a microdensitometer. The response of the film (percent) for each color record is plotted as a function of the spatial frequency (cycles per millimetre) of the original exposure. The sharpness of KODAK VISION Color Intermediate Film is improved for laser and CRT recording and similar to 5244 / 2244 Film for traditional printing.

The "perceived" sharpness of any film depends on various components of the motion picture production system. The camera and projector lenses, film printers, and other factors play a role, but specific sharpness of the film can be measured and charted in the modulation transfer function curve.

RMS Granularity is measured by scanning a series of uniformly exposed density steps using a microdensitometer having a 48 micrometer diameter aperture, and measuring the relative "noise" caused by the grain structure of the film at each density. The Granularity (Sigma D x 1000) is plotted as a function of the Relative Log Exposure, along with a plot of the densities (sensitometric curve) of the film. The emulsion granularity of KODAK VISION Color Intermediate Film 5242 / 2242 / 3242 is similar to that of 5244, 2244 Film.

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

DARKROOM RECOMMENDATIONS

Make careful safelight tests before proceeding with production work. You can use low-intensity tungsten illumination or a sodium vapor lamp with a KODAK 8 safelight filter (dark yellow). The sodium-vapor lamp provides the best visual efficiency with the least effect on the film.

Note: Certain films (i.e., camera-speed and internegative) that are used in the same printing/processing room as KODAK VISION Color Intermediate Film 5242 / 2242 / 3242 are NOT recommended for use with safelights. In these instances, where illumination must be provided for dials, meters, etc., during printing or color development, a fixture fitted with a KODAK 3 Safelight Filter / Dark Green, may be used provided that such illumination is not allowed to be incident upon the film itself. For a general discussion on safelights, see the paper "Considerations in the Illumination of Photographic Darkrooms," by Mr. C. B. Hunt, SMPTE Journal, Vol 91, March 1982, pp 266-276.

STORAGE OF RAW STOCK

Film is perishable and changes with prolonged storage or adverse storage conditions. Photographic material should generally be kept in equilibrium with 40 percent to 60 percent relative humidity. Containers should be kept sealed until the material is used.¹ After packaging, Kodak stores print film raw stock at 13°C (55°F) or lower. Transportation and distribution warehousing are refrigerated. Intermediate film is not adversely affected by short-term storage at room temperatures (less than 25°C / 77°F). For extended-term storage, store at -18°C (0°F) or lower. Avoid unconditioned storage, as sensitometric and physical changes occur more rapidly at high temperatures, and may degrade film quality. If refrigerated storage is used, allow the sealed can or foil bag to equilibrate to room temperature before opening to avoid moisture condensation. Unused raw stock should be rebagged and put into sealed film cans before being put back in refrigerated storage. Process exposed film promptly.

COLOR BALANCE

Color intermediate film is balanced for printing from all color negative films using tungsten quality illumination on either an additive or subtractive printer.

Overall filtration should include a UV-absorbing filter such as a KODAK WRATTEN Gelatin filter No. 2E.

RECIPROCITY CHARACTERISTICS

You do not need to make any filter corrections or exposure adjustments for exposure times from 1/250 to 1 second.

PROCESSING

Most commercial motion-picture laboratories provide a processing service for these films. This film should be processed in Process ECN-2. No change in the process sequence is required.

Because it has no rem-jet to be removed, 2242 / 3242 Film offers the potential for eliminating the current prebath

¹Per ISO/CD 18928 - Imaging material—Unprocessed photographic films and papers—Storage practices, 1999.

and reducing water usage. However, care must be exercised if the rem-jet removal steps are eliminated, as replenishment rates will change if dry film enters the developer directly. Soluble dye build-up in the seasoned developer will also increase. Reducing water usage during processing leads to increased concentrations of total process effluent from the laboratory, which may have regulatory implications. For further assistance, contact your Kodak engineering representative.

The antihalation dyes used in VISION Color Intermediate Films are decolorized and removed during processing. Although most of the dyes are removed in the developer, complete removal is also dependent upon the "tail end" solutions, such as bleach.

See KODAK Publication No. H-24.07, *Processing KODAK Motion Picture Films, Process ECN-2 Specifications, Module 7*, for more information on the solution formulas and the procedures for machine processing these films. There are also pre-packaged kits available for preparing the processing solutions. For more information on the EASTMAN ECN-2 Kit Chemicals, check the *KODAK Motion Picture Film Product Catalog*.

STORAGE OF PROCESSED INTERMEDIATE FILM

Store processed film according to the recommendations in ISO 18911:2010, *Imaging Materials - Processed Safety Photographic Films - Storage Practices*.

For short-term "active" storage and projection (e.g., commercial film exchanges and theatres), room temperature of 20 to 25°C (68 to 77°F) at 50 to 60 percent relative humidity is recommended. Avoid prolonged unconditioned storage at high temperatures or excessive humidity. For medium-term storage, store at 10°C (50°F) or lower, at a relative humidity of 20 to 30 percent. For extended-term storage (for preservation of material having permanent value), store at 2°C (36°F) or lower, at a relative humidity of 20 to 30 percent. Enclosed long-term storage (i.e., sealed cans) will benefit by the use of Molecular Sieves in the storage container. Molecular Sieves are available from FPC (A Kodak Company), 6677 Santa Monica Boulevard, Hollywood, CA, 90038, Telephone (213) 468-5774.

SPLICING

KODAK VISION Color Intermediate Film 5242 is manufactured on acetate base that can be spliced with solvent-based cements.

Adhesive tape splicing is often used in splicing rolls of printed raw stock prior to processing. Current splicing procedures using high-quality splicing tapes will work well on 5242 Film.

KODAK VISION Color Intermediate Film 2242 / 3242 is manufactured on ESTAR Base. Since ESTAR Base is impervious to most solvents, solvent-based "cement" splicing CANNOT be used.

Thermal-weld ultrasonic splicers may be used on both raw stock and processed film. After cutting, the two pieces of film are overlapped slightly and brought into contact with a horn that focuses acoustic energy from an ultrasonic transducer to the film overlap. A pressure roller brings the film into intimate contact with the horn, causing a localized heating and fusion of the polyester support, creating a strong weld and reliable splice. Key splicing parameters are the acoustic frequency and power output, roller pressure, and roller transit time. Although the emulsion and back-side layers become part of the polyester weld, there is usually no need to scrape them off prior to ultrasonic splicing. Splicing parameters and splicer setup for 2242 / 3242 Film are very similar to those used for 2244 / 3244 Film.

Adhesive tape splicing is often used in splicing rolls of printed raw stock prior to processing. Current splicing procedures using high-quality splicing tapes will work equally well on 2242 / 3242 Film.

IDENTIFICATION

After processing, the product code numbers 2242 (ESTAR Base/35 mm), 3242 (ESTAR Base/16 mm), 5242 (acetate base/35 mm); emulsion and roll number identification; KEYCODE numbers; and internal product symbol EV are visible along the length of the film.

LABORATORY AIM DENSITIES (LAD)

To maintain optimum quality and consistency in the final prints, the laboratory must carefully control the color timing, printing, and duplicating procedures. The Laboratory Aim Density (LAD) Control Film supplied by Eastman Kodak Company² provides a simple, effective and easily implemented control method for the production of master positives and duplicate negatives from negative originals. The LAD Control Film provides both objective sensitometric control and subjective verification of the duplicating procedures used by the laboratory. The use of the LAD control method is described in the paper "A Simplified Motion-Picture Laboratory Control Method for Improved Color Duplication" by John P. Pytlak and Alfred W. Fleischer, published in the October 1976 SMPTE Journal. A simplified description of the LAD method is outlined in KODAK Publication No. H-61A, "Using LAD to Set Up an Electronic Color Analyzer and Control Duplicating".

All film in the printing original should be color timed relative to LAD Control Film. The LAD Control Film is printed at the center of the printer range, usually TAPE 25-25-25. Printer setup (speed, bulb voltage, TRIM, filtration, etc.) is determined by printing the large gray patch in the LAD Control Film to the specified Laboratory Aim Density values on the duplicating film, chosen to be at the center of the usable straight-line portion of the duplicating film's characteristic curves. The Status M Laboratory Aim Density values for KODAK VISION Color

²Direct any inquiries to one of the regional sales offices.

Intermediate Film are as follows. For the Master Positive LAD Aim:

Red	Green	Blue	Tolerance
1.15	1.60	1.70	±0.10 density

For the Duplicate Negative LAD Aim:

Red	Green	Blue	Tolerance
1.00	1.45	1.55	±0.10 density

The LAD control method assumes that the film and process sensitometry are within specification.

FILM-TO-VIDEO TRANSFERS

When you transfer the film directly to video, you can set up the telecine with Telecine Analysis Film (TAF) produced on EASTMAN EXR Color Intermediate Film / 5244 or KODAK VISION Color Intermediate Film / 5242. The TAF consists of a neutral density scale and an eight-bar color test pattern with a LAD gray surround.

The TAF gray scale provides the telecine operator (colorist) with an effective way to adjust subcarrier balance and to center the telecine controls before timing and transferring a film. The TAF color bars provide the utility of electronic color bars, even though they do not precisely match the electronically generated color bars. Using the TAF will help obtain optimum quality and consistency in the film-to-video transfer.

PRINTER CONDITIONS

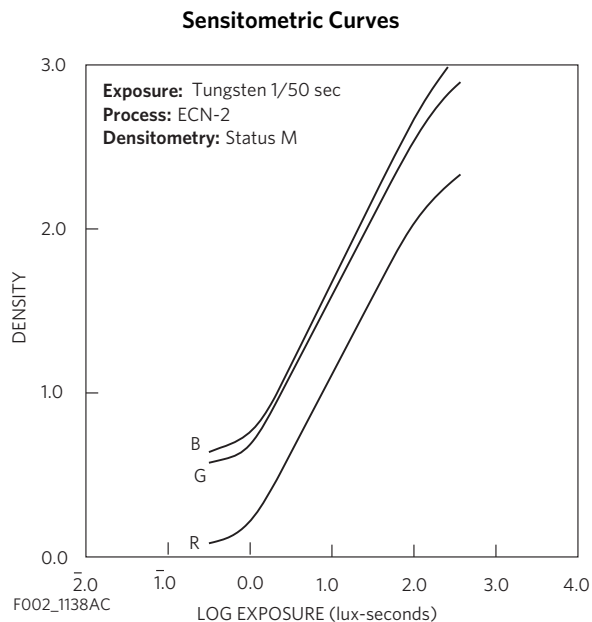
In all printer setups for printing onto 5242 / 2242 / 3242 Film, include a heat-absorbing (infrared) filter such as a KODAK Heat Absorbing Glass, No. 2043, and a KODAK WRATTEN Gelatin Filter No. 2E to absorb ultraviolet (UV) light. For high light output with very long bulb life, operate the printer bulb at approximately 80 percent of rated voltage. Use a well-regulated constant-current DC power supply. Print LAD control film at the center of the printer balance range, usually TAPE 25-25-25 on an additive printer. Print other scenes in the original as determined by color timing relative to the LAD control film. Choose the printer speed and filtration to normalize the additive TRIM settings near the center of their range, to allow for slight variations in film and printer.

On subtractive printers, choose the filter pack and diaphragm to allow for both the removal and addition of filters for color correction. In addition to the heat-absorbing filter and KODAK WRATTEN Gelatin Filter, No. 2E, it is recommended that the EASTMAN Lamphouse Modification Filters be used in subtractive printers to more closely balance the spectral characteristics of subtractive lamphouses with additive lamphouses so that prints made on a subtractive printer more closely match those made on additive printers.

On optical printers, set the lens aperture considering sharpness, depth of focus, and light transmittance

characteristics. Use ground glass or other diffusers to improve uniformity of illumination, at a cost of printer light output. Clean and align printer optics for optimum light output and uniformity.

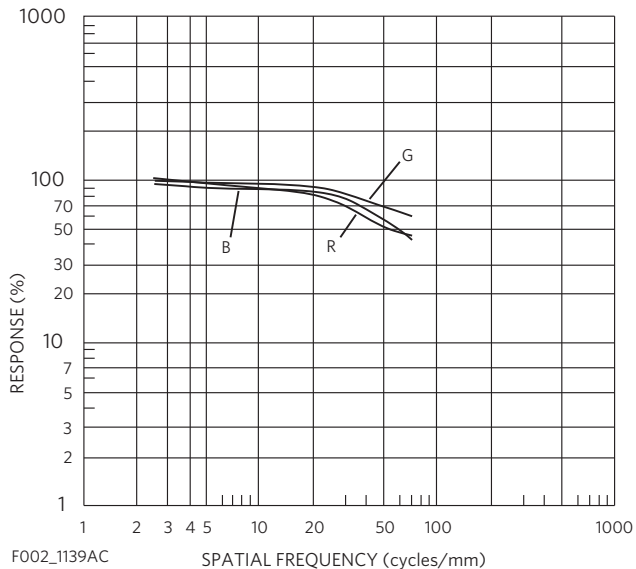
CURVES



These curves depict the response of the film to light exposure. Because the curves are straight over most of the long density range, all of the information in the original negative can be retained in the intermediate, assuming the LAD control method is followed. The curves demonstrate the effectiveness of the LAD control method, as the middle gray is printed near the middle of the intermediate film density range and the intermediate film has ample dynamic range to capture the highlights and shadows captured by the original negative.

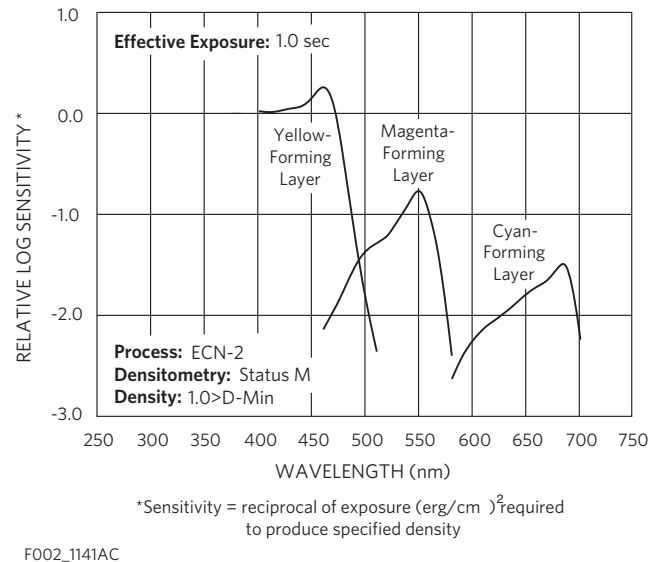
NOTICE: The sensitometric curves and data in this publication represent product tested under the conditions of exposure and processing specified. They are representative of production coatings, and therefore do not apply directly to a particular box or roll of photographic material. They do not represent 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.

Modulation-Transfer Function Curves



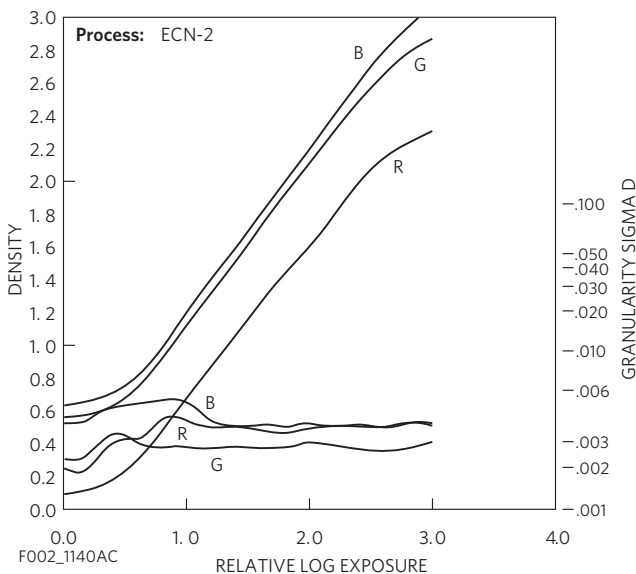
These curves depict the response of the film to image detail, which can be mathematically expressed as a series of frequencies. The ability of the film to reproduce frequencies at or near 100% over a long range means that the film will copy the original negative with little or no loss in sharpness.

Spectral Sensitivity Curves



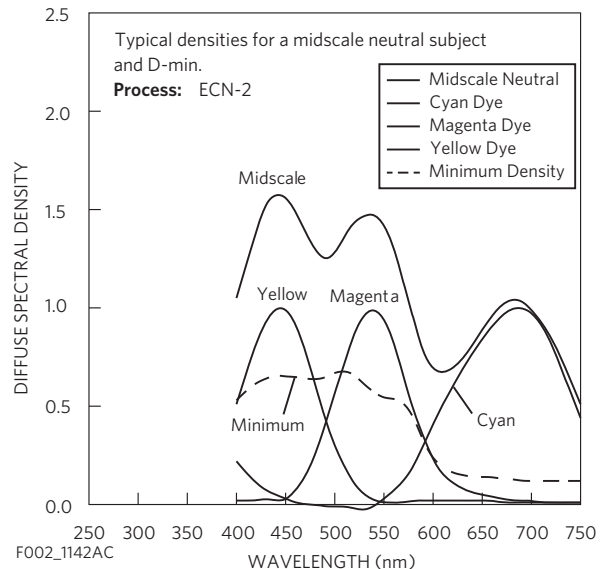
These curves depict the sensitivity of this film to the spectrum of light. They are useful for adjusting optical printers and film recorders and for determining, modifying, and optimizing exposure for blue- and green-screen special-effects work.

Diffuse rms Granularity Curves



These curves depict the Diffuse RMS Granularity as a function of exposure. The sensitometric curves are shown so that the granularity as a function of density can be estimated. Because the granularity of the intermediate film is lower than the granularity of any original negative, the intermediate film will add little or no granularity to the final print.

Spectral Dye Density Curves



These curves depict the spectral absorptions of the dyes formed when the film is processed. They are useful for adjusting or optimizing any device that scans or prints the film.

KODAK VISION Color Intermediate Film 5242 / 2242 / 3242

MORE INFORMATION

For assistance, call the Kodak Information Center in the U.S. at 1-800-242-2424 Monday through Friday between 9 a.m. and 7 p.m. (Eastern time); or in Canada at 1-800-465-6325 between 8:30 a.m. and 5 p.m. (Eastern time).

To order the publications below, call 1-800-233-1650 between 8 a.m. and 7 p.m. Eastern Time.

Outside the United States and Canada, please contact your Kodak representative.

You can also visit our web site at www.kodak.com/go/motion for further information. You may want to bookmark our location so you can find us easily the next time.

Films	<i>Cinematographer's Field Guide</i> KODAK Publication No. H-2
Image Structure	<i>KODAK Motion Picture Film</i> KODAK Publication No. H-1
Specification Numbers	<i>Cinematographer's Field Guide</i> KODAK Publication No. H-2
Storage	<i>KODAK Motion Picture Film</i> KODAK Publication No. H-1 <i>The Book of Film Care</i> KODAK Publication No. H-23
LAD	<i>LAD—Laboratory Aim Density</i> KODAK Publication No. H-61
Transfer	<i>KODAK Telecine Analysis Film User's Guide</i> KODAK Publication No. H-822 <i>KODAK Telecine Exposure Calibration Film User's Guide</i> KODAK Publication No. H-807

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