

KODAK VISION Color Print Film / 2383

Kodak

TECHNICAL DATA / COLOR PRINT FILM

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Clear, rich images on the theatre screen.

The colors you love, the rich blacks, and the "look" you're used to. . . That's KODAK VISION Color Print Film / 2383.

The VISION Color Print Film from Kodak has the great look you associate with Kodak films, with rich blacks and neutral highlights. The film is durable and resistant to scratches and dirt. This color print film is worthy of the KODAK VISION Film family name.

With the excellent tonal scale, cinematographers can be more creative with lighting and exposure, and still see excellent results.

BENEFITS FOR LABS	BENEFITS FOR DISTRIBUTORS/ EXHIBITORS
<ul style="list-style-type: none"> • Polyester base provides greater tear strength, durability, dimensional stability, and archival keeping • Elimination of rem-jet (no carbon black or prebath-soluble binder) • Potential for reduced chemical and water usage in processing • Improved cleanliness on high-speed printers (less white dirt) • Protection from static marks prior to printing • Reduced dirt attraction to processed prints and static protection prior to processing • Better transport characteristics for processed film • Superior halation protection (no colored fringes in titles) • Improved safelight edgefog protection for digital sound track area • Improved fades and dissolves, and less propensity to safelight fog • Improved blacks and more neutral highlights on projection • Improved laser subtitling 	<ul style="list-style-type: none"> • Polyester base allows cleaner, more durable prints • No colored fringes in titles, and improved safelight edgefog protection for digital sound track • Improved fades and dissolves, and less propensity to safelight fog • Improved blacks, and more neutral highlights on projection • Improved laser subtitling

Like its counterpart KODAK VISION Premier Color Print Film, VISION Color Print Film is coated on a polyester base without rem-jet, for a cleaner process and cleaner screen images. We've incorporated a process-surviving, antistatic layer to reduce dirt attraction, and a scratch-resistant backing layer for long projection life. And there are no color shifts during fades and dissolves. So from set to lab to screen, day to day, you'll have more consistent performance.

With VISION Color Print Film, you'll have the high quality motion picture color print film you expect from Kodak.

STORAGE

Unexposed print film is not adversely affected by short-term storage at room temperature (less than 25°C (77°F)). Store unexposed film at 13°C (55°F) or lower when storage exceeds 1 month. If refrigerated, allow the sealed can or foil bag to equilibrate to room temperature before opening to avoid condensation. Rebag unused raw stock and seal it in film cans before returning it to refrigeration.

Process exposed film promptly. This film exhibits excellent latent image keeping. When exposed film must be kept several days before processing, the tone scale of VISION Color Print Film / 2383 shows little change. Depending on the storage temperature, labs can compensate for the small latent image speed loss by increasing printer TRIMS slightly (a neutral increase of 1 to 2 printer points) if there is a long delay between printing and processing. You can slow changes in latent image by storing exposed film at lower temperatures. For critical applications, such as sensitometric exposures used for process control, keep exposed film strips at 0°C (32°F) or lower.

For short-term "active" storage and projection of processed prints (e.g., commercial film exchanges and theatres), store at room temperature of 20 to 25°C (68 to 77°F) at 50 to 60 percent relative humidity. 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. Molecular Sieves¹ in a sealed can will provide additional benefit.

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

Processed prints made on this film will show less than 10-percent image dye loss, even after several decades of storage at room temperature and 50-percent relative humidity.

1. Available from FPC, 6677 Santa Monica Boulevard, Hollywood, California 90038, 218-468-5774.

COLOR BALANCE

Color print film is balanced to be printed from a color negative, duplicate negative, or internegative, using either an additive or subtractive printer. Black-and-white (silver image) negatives can be printed to yield a fairly neutral image, although slight coloration may be seen in highlights or shadows.

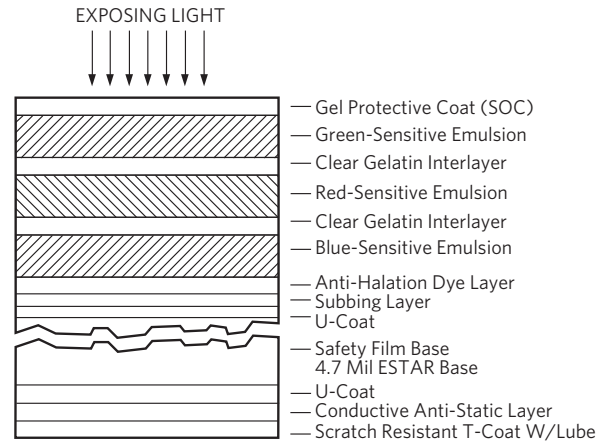
Overall filtration should include a UV-absorbing filter, such as a KODAK WRATTEN Gelatin Filter No. 2B.

FILM STRUCTURE

KODAK VISION Color Print Film / 2383 is coated on a 120 micrometre (0.0047-inch) ESTAR Base featuring a proprietary electrically conductive anti-static layer, a polymeric scratch-resistant backing layer, and a process-surviving backside lubricant. Unlike rem-jet, the anti-static layer remains with the film after processing, eliminating the electrostatic attraction of dirt particles to the processed print, even at very low relative humidity. A very thin polymeric backing layer coated on top of the anti-static layer provides superior resistance to 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.

An antihalation layer containing proprietary solid particle dyes is coated under the normal emulsion. These dyes offer superior protection against exposure by light reflected back from the support surfaces, minimizing color fringing in critical scenes like white titles and night scenes with automobile headlights. The antihalation layer also provides improved resistance to safelight edgefog, since it is coated between the support and the emulsion layers, and absorbs any support light-piping from the edge of the roll.

The imaging layers are coated on top of the antihalation layer and they contain new patented emulsion and coupler technology. The bottom layer is sensitive to blue light, and produces the yellow dye image. An interlayer controls diffusion of developer and development by-products. The next layer is sensitized to red light, and yields the cyan dye image. Another interlayer is coated on top of it. The top image-forming layer is sensitized to green light, and produces magenta dye. The very thin topmost layer (SOC) provides protection from scratches. Process-surviving lubricant and matte are used in the SOC to optimize winding and transport characteristics. The emulsion layers also contain absorber dyes to precisely control film speed and reduce intragrain light scatter, increasing sharpness and further reducing halation. These soluble absorber dyes, which give the raw stock emulsion its familiar purple-blue color, are washed out during processing.



This drawing illustrates only the relative layer arrangement of the film and is not drawn to scale.

F002_0698AC

IDENTIFICATION

KODAK VISION Color Print Film / 2383 raw stock has the typical blue-purple emulsion color of print film. Slight batch-to-batch variations in raw stock color are normal. The back side of the raw stock has no rem-jet, appears dark blue to slate-gray, and has a slight iridescence.

This film has slightly less surface gloss than processed 2386 / E / 3386 / E Film. When viewed by reflected light, the back side exhibits a slight iridescence, with subtle color bands due to the dichroic nature of the very thin back-side coatings.

After processing, "2383 KODAK" is visible along the length of the film, along with strip number and date codes.

This film is available on ESTAR Base *only*. Most 35 mm applications use KS-1870 (ISO type "P") print perforations.

DARKROOM RECOMMENDATIONS

You can use sodium-vapor lamps with a KODAK No. 13 Safelight Filter / dark yellow in safelights providing general darkroom illumination. The filtered sodium-vapor lamp provides the best visual efficiency with the least visual effect on the film.

If you are using a low-wattage tungsten bulb for task-lighting, filter it with a KODAK 13 Safelight Filter / dark yellow. You can use amber Light Emitting Diodes (LEDs) (590 nm peak wavelength) for minimal task or path lighting; however, do not use them for prolonged or general darkroom illumination.

PROCESSING CONDITIONS

Process this film in Process ECP-2D. No change in process sequence is required.

Because there is no rem-jet to remove, VISION Color Print Film offers the potential for eliminating the current prebath chemicals and reducing water usage. However, exercise care if the rem-jet removal steps are eliminated, as replenishment rates will change dramatically if dry film enters the developer directly. Soluble dye buildup in the seasoned developer will also increase. Greatly reducing water flow will lead 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 Print Film are decolorized and removed during processing. Although most of the dye is removed in the developer, complete removal is also dependent on the "tail end" solutions, such as the bleach.

To prevent static during projection, maintain a relative humidity of 50 to 60 percent in the projection room.

It is important that you maintain a "clean" process: proper solution mix and storage procedures to minimize "tar" formation, process machine and recirculation designed to minimize aeration (e.g., submerged racks), periodic cleaning of racks and tanks, proper maintenance of squeegees and wiper blades, and efficient filtration.

For more information, see KODAK Publication No. H-24.09, *Manual for Processing KODAK Motion Picture Films, Process ECP-2D Specifications, Module 9*.

LABORATORY AIM DENSITIES (LAD)

To control your process, use Process ECP-2 control strips for this product available through your local sales representative.

To aid in color timing and curve placement, negative originals should be timed relative to the Laboratory Aim Density (LAD) Control Film supplied by Eastman Kodak Company. The LAD Control Film provides both objective sensitometric control and subjective verification of the duplicating procedures used by the laboratory.

For print films, the LAD patch is printed to a neutral gray of 1.0 visual density (1.00 Equivalent Neutral Density) on the processed print at the setup lights.

The Status A densities are:

	R	G	B
Density	1.09	1.06	1.03

For more information, see KODAK Publication No. H-61, *LAD—Laboratory Aim Density*.

RECIPROCITY

You can print this film on a variety of printers, ranging from slow step-optical printers to very high-speed continuous contact printers used for release printing. Exposure times may range from 1/10 of a second to almost 1/3000 of a second, with little or no change in tone scale. For printers that change exposure time during printing, new speed reciprocity correction should be used. KODAK VISION Color Print Film / 2383 has improved fade and dissolve characteristics. Printers with mechanical fader cams will no longer need to use filter correction to achieve neutral color balance with fades and dissolves. Printers with programmable light valves will need to reprogram the fade and dissolve algorithm in the printer to obtain neutral color balance with fades and dissolves. Consult the printer manufacturer for the proper test procedure to obtain the appropriate corrections.

PRINTER RECOMMENDATIONS

Pictorial Printing

The printer setup for KODAK VISION Color Print Film / 2383 is similar to EASTMAN Color Print Film 2386 / E / 3386 / E, with little or no change required.

For example, if you use an additive-type printer, such as a Bell and Howell Printer, Model 6123, to print originals, you can use a 90 V dc lamp, a KODAK WRATTEN Gelatin Filter No. 2B, a KODAK Heat Absorbing Glass, No. 2043, a printer speed of 240 feet per minute, and the printer settings in the table below:

Beam	TRIM	Neutral-Density Filter	TAPE
Red	14	0.40	25
Green	14	0.50	25
Blue	11	0.60	25

You can also expose this film with a subtractive printer with a KODAK WRATTEN Gelatin Filter No. 2B, a KODAK Heat Absorbing Glass, No. 2043, and suitable color-balancing filters (KODAK WRATTEN Color Compensating Filters).

Sound-Track Printing

Analog and digital sound-track printer setup and control procedures for KODAK VISION Color Print Film / 2383 are similar to Film 2386 / E / 3386 / E, with little or no change required.

Analog variable area positive sound tracks of silver plus dye usually restrict the exposure to the top two emulsion layers by inserting KODAK WRATTEN Gelatin Filters No. 12 and No. 2B² in the light beam. The optimum variable-area sound-track density for the print is between 1.1 and 1.8 (read at 800 nm). You can achieve excellent frequency response and a high signal-to-noise ratio in this density range.

For a variable area positive sound track of silver plus magenta dye only, printed from a negative sound track, restrict the exposure to the top two emulsion layers by inserting KODAK WRATTEN Gelatin Filter No.12 and KODAK Color Compensating Filter 110 Cyan in the light beam. The optimum variable-area sound-track density for the print is between 0.8 and 1.1 (read at 800 nm). This print density will provide a good compromise between signal-to-noise ratio and frequency response.

Use cross-modulation test procedures to determine the density of the sound-track negative required to produce minimum cross-modulation distortion at the optimum print density.

Digital sound-on-film soundtracks (e.g., Dolby Digital and Sony SDDS) are dye only. Consult the system vendor for performance recommendations.

2. You can omit the No. 2B Filter without affecting the sound quality. Using this filter is an operational convenience to conform with printer setup for other products that require it.

SPLICING

KODAK VISION Color Print Film / 2383 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 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 2383 Film are very similar to those used for 2386, 3386 Film.

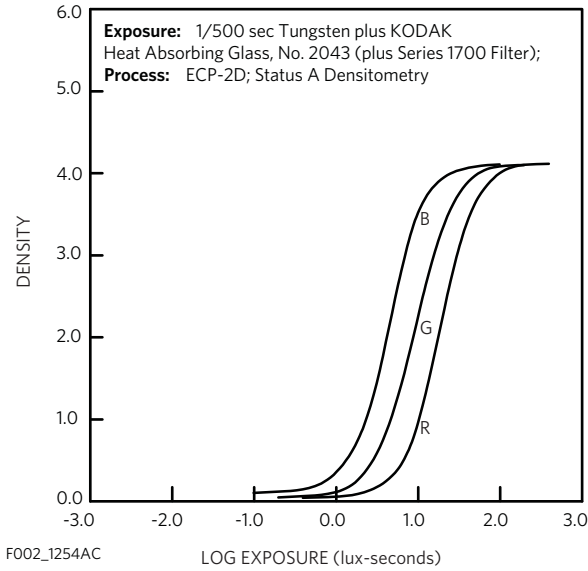
Adhesive tape splicing is often used in splicing rolls of printed raw stock prior to processing. Clear adhesive splicing tape is the most frequently used method of splicing processed prints in theatres, producing reliable splices on relatively inexpensive splicers that are simple to use. Current splicing procedures using high-quality splicing tapes will work equally well on both 2383 Film and 2386, 3386 Film.

IMAGE STRUCTURE

This film's excellent sharpness captures the detail in the printing negative for projection onto the largest of theatre screens. Fine-grained emulsions, an ultra-thin layer structure, intragrain absorbing dyes, and superior halation protection contribute to its performance.

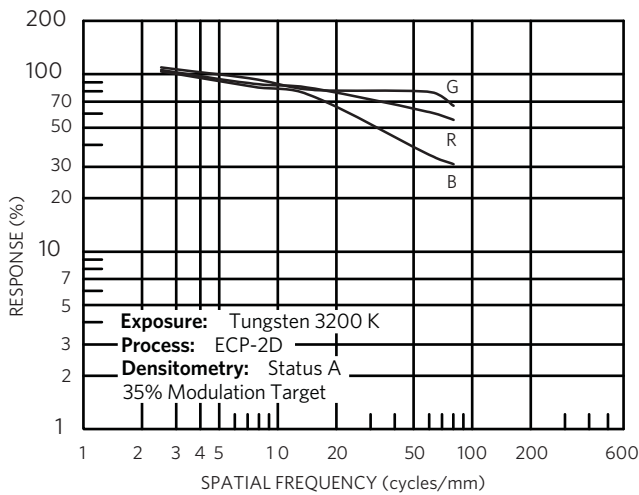
CURVES

Sensitometric Curves



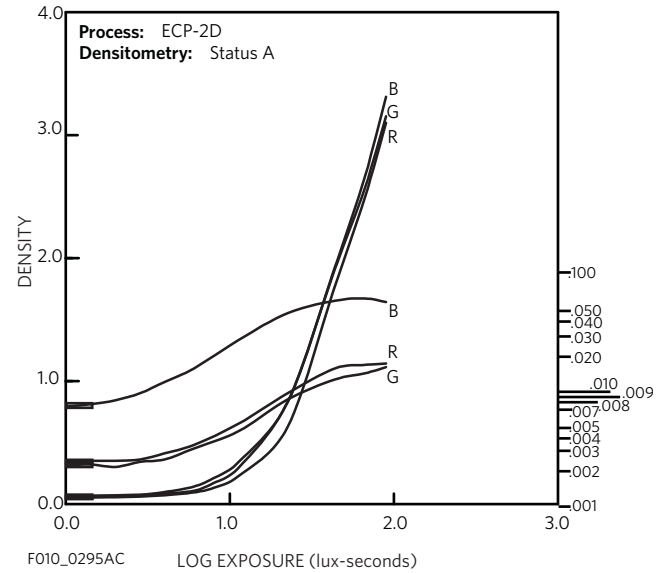
The curves describe this film's response to red, green, and blue light. Sensitometric curves determine the change in density on the film for a given change in log exposure.³

Modulation-Transfer Function Curves



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.

Diffuse rms Granularity Curves

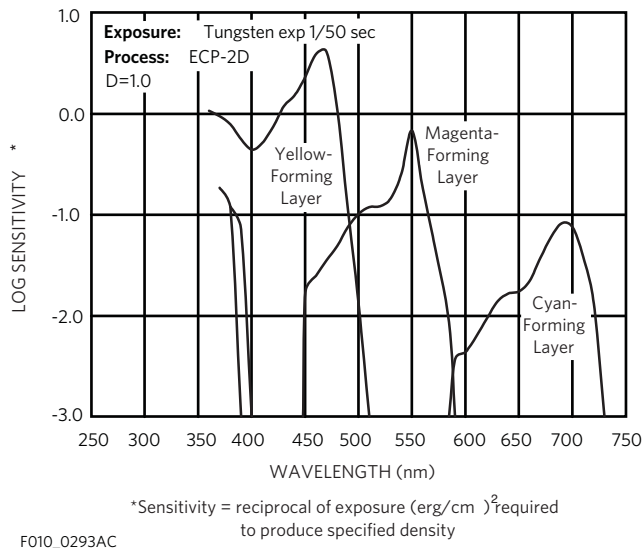


To find the rms Granularity value for a given density, find the density on the left vertical scale and follow horizontally to the characteristic curve and then go vertically (up or down) to the granularity curve. At that point, follow horizontally to the Granularity Sigma D scale on the right. Read the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

Note: This curve represents granularity based on modified measuring techniques.³

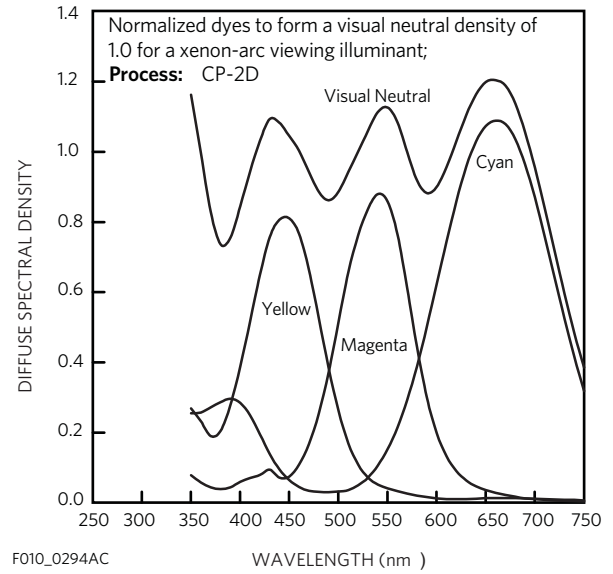
3.NOTE: Sensitometric and Diffuse RMS Granularity curves are produced on different equipment. A slight variation in curve shape may be noticed.

Spectral Sensitivity Curves



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

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.

Note: Cyan, Magenta, and Yellow Dye Curves are peak-normalized.

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

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SIZES AVAILABLE

Standard Products Available

Format and Specification No.	Length Meters (Feet)	Core	Description	Perforation/Pitch Metric (Imperial)
35 mm VCP242	610 (2000)	Y		BH-4740 (BH-1866)
35 mm VCP666	610 (2000)	Y		KS-4750 (KS-1870)
35 mm VCP701	610 (2000)	Y		BH-4750 (BH-1870)
35 mm VCP779	610 (2000)	Y		KS-4750 (KS-1870)
35 mm VCP779	915 (3000)	Y		KS-4750 (KS-1870)
35 mm VCP779	1220 (4000)	Y		KS-4750 (KS-1870)
35 mm VCP789	1830 (6000)	Y		KS-4750 (KS-1870)
16 mm VCP618	915 (3000)	Z	Winding A	1R-7620 (1R-3000)
16 mm VCP452	915 (3000)	Z		2R-7620 (2R-3000)
70 mm VCP542	760 (2500)	S		KS-4750 (KS-1870)

Note: For availability of non-standard products, contact your Kodak location.

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 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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