Editorial Background:

Kodak Scientists Discuss Why and How the New Intermediate Film was Developed

Kodak has introduced a color intermediate film optimized for digital intermediate (DI) postproduction applications. KODAK VISION3 Color Digital Intermediate Film 5254/2254 is designed for use with contemporary film recorders, with the objective of faithfully retaining nuances in colors, contrast and other characteristics of digitally manipulated images. After the film-out, the new intermediate film is used as a master for generating high-quality release prints for projection on cinema screens. In the following conversation, Kodak scientists David Niklewicz and Ana Castro discuss the emulsion science behind the new film:

When you began to design and develop a new color intermediate film specifically for digital intermediate postproduction applications, how did you determine the characteristics of the new film?

NIKLEWICZ: From the earliest days of the motion picture industry, Kodak scientists have listened to filmmakers who share their thoughts and experiences about real-world production situations. Filmmakers who are choosing to follow a DI postproduction path suggested there was a need for a color intermediate film optimized for use with contemporary film recorders. KODAK VISION 2242 Color Intermediate Film remains the industry standard for high-quality traditional release printing processes.

How does the new color intermediate film fit into the DI workflow?

NIKLEWICZ: The vast majority of motion pictures produced for the cinema originate on color negative film. The negative is often scanned and converted to digital files for color grading and other DI image manipulation. The timed DI is recorded onto a color intermediate stock that is used as a digital original negative or as a duplication element for release printing. There are several variations on this process, but that's the basic recipe.

What are the main improvements in the new intermediate film?

NIKLEWICZ: The main improvements result in enhanced sharpness and increased speed and efficiency for these procedures. The new film enables postproduction facilities to generate high-quality intermediates that are faithful to the intentions of the filmmakers who timed the DIs.

Will the new color intermediate film replace 2242?

NIKLEWICZ: No. Many of our customers prefer to follow the traditional optical postproduction path. We are committed to providing them with a color intermediate film that is optimized for

that purpose. KODAK VISION 2242 is still the best product to make the interpositive and dupe negatives. The advances made in color negative technology have given filmmakers more creative freedom. Color intermediate is the gateway for bringing those images to the screen.

What advances in technology enabled Kodak scientists to develop a color intermediate film that is optimized for a DI workflow?

NIKLEWICZ: It began with a commitment to design an intermediate film that is optimized for a DI workflow. Kodak scientists developed a new set of sensitizing dyes that allowed us to move the peak sensitivity of the silver halide emulsions to more closely match the wavelengths generated by CRT, laser, and LED light sources used in contemporary film recorders. Film recorders used in DI workflow applications use one of those three types of light sources to render digital master files onto color intermediate film. The new spectral sensitizing dyes allowed us to enhance spectral sensitivity to all three types of light sources, despite the fact that each of them produces somewhat different wavelengths. As a result, this new intermediate film improves performance for all brands and types of film recorders.

Were there other advances in technology?

NIKLEWICZ: Yes. We also tailored the sensitometric response to generate a full-range, longer, straighter and higher-density curve, which is a graphic representation of how the film responds to light. That higher maximum density results in increased efficiency. We also enhanced the sharpness or resolving power of the new intermediate film.

Why is that important?

NIKLEWICZ: These new sensitizing dyes allowed us to use a smaller emulsion size, which results in enhanced sharpness, acutance and resolution. Another area where the new film shows improved performance is color purity. That has been improved by reducing punch-through.

CASTRO: We reduced punch-through, which is unwanted light passing through and exposing the layer underneath it, for example, blue light exposing the green channel. We achieved this reduction through the use of inter-grain filter dyes. These are very fine particle dyes that have a very tight, narrow distribution and a specific wavelength. They are placed between the color layers and they suck up all the light of that particular wavelength before they get to the underlying record. That results in improved color purity.

What is short-term latent image keeping, and how does it help the filmmaker?

CASTRO: With some film recorders, it can take as long as 30 hours to expose a 2,000-foot roll of film. During that time, the film can heat up and cool down. There can be subtle changes in the emulsion, resulting in slight differences in color balance. Adjustments can be made, but that takes additional time. For example, the film can be held for 10 or 20 hours until it stabilizes. However, time costs money. The new film has been designed to minimize those differences.

What is the bottom line for labs and other owners of film recorders?

NIKLEWICZ: By increasing the speed of output, this new intermediate film provides the opportunity for labs to be more efficient and potentially reduce costs. The new film also allows labs to do a better job of assuring that information on the digital intermediate file is reflected on the print film. The bottom line is that you gain efficiency while providing improved image quality, and intermediates that faithfully reflect the intentions of the filmmakers.

Is the new intermediate film coated on an Estar base?

NIKLEWICZ: Yes. It is on the same polyester base as the 2242 intermediate film, which has an anti-stat coating that minimizes dust and is optimal for high-speed printing.

What differentiates this film?

NIKLEWICZ: The new intermediate is part of the KODAK VISION3 family of films. It is designed for compatibility with current and future VISION3 negative films. It is also designed to satisfy Kodak's high standards for physical quality and sensitometric consistency, which is important for labs and postproduction facilities.

As with all Kodak motion picture products, there is also a talented technical support team on call to address any questions. The bottom line is that it allows our customers to choose to follow a DI postproduction path and retain the unique film look when prints are projected on cinema screens.

CASTRO: The spectral sensitizing dyes that are integral to some of the major improvements in this new motion picture stock were originally designed for consumer film. That's an example of the strength of our research capabilities and our ongoing, long-term commitment to responding to the needs of our customers. Radical advances have been made in both consumer and motion picture films during the past 10 years. We are constantly improving our products. The message is that film technology is a moving target that will continue to advance.

It's ironic that the evolution of digital postproduction technology resulted in a radical advance in film technology. We will keep listening to filmmakers and do what it takes to leverage our deep pool of technology to help them tell their stories.

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