

KODAK PROFESSIONAL ENDURA Premier Paper for the Premium Photo Book Market

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Abstract

There are a wide range of digital print technologies available today for use in photo books. This includes Inkjet, Electro Photographic, Dye Sublimation and Silver Halide. Silver halide paper, incorporates imaging technology and image quality that allows print providers to exceed consumer expectations for photo book image quality and the ability to offer a premium product in this growing, but crowded category. KODAK PROFESSIONAL ENDURA Premier Paper is a silver halide photographic paper which incorporates new technology specifically for digital printing and continues to advance the state of the art of silver halide technology. Within the growing photo book market, the use of ENDURA Premier Paper provides the optimal balance of high image quality, long-term permanence, high productivity, and low cost, a combination that is sure to delight consumers.

This paper will discuss the use of silver halide technology in the production of photo books, and specifically how KODAK PROFESSIONAL ENDURA Premier Paper, meets the needs of the premium photo book market. In addition, the paper will discuss the critical attributes for longevity and the performance that KODAK PROFESSIONAL ENDURA Premier Paper provides when used in the creation of photo books. With premium photo books becoming the photo album of the 21st century, consumer needs for long-term preservation of digital image files have never been more important than they are today.

Introduction

Professional print labs and consumers alike have a wide choice of digital print technologies available today. For the consumer, this includes inkjet as well as thermal dye transfer media. For the high volume professional lab, choices also include silver halide and electrophotography (EP) technologies. It is true that each technology has its own specific benefits, for example instant prints from thermal media at retail kiosks and duplex printing for photo books using EP. Silver halide paper provides the broadest range of benefits over the widest range of applications. Specifically, KODAK PROFESSIONAL ENDURA Premier Paper incorporates imaging technology that provides an optimal balance of lab- and consumer-preferred characteristics regarding image quality, high productivity, low cost and long-term permanence. This paper will discuss technologies that provide superior image quality benefits for premium photo books. In addition, the tremendous growth in digital photography by both consumer and professional photographers is accompanied by a general lack of awareness of the long-term image storage and accessibility limitations associated with digital files. The paper will also discuss the solution that photo books can provide for long term preservation of digital files for multiple generations.

Image Quality That Exceeds Expectations

A key attribute contributing to pleasing image quality in silver halide papers is the “smooth continuous tone” delivered in an image formed from dye clouds as opposed an image printed using half-tone dots. With silver halide the imaging science technology is delivered from dye-forming couplers encapsulated within layers of the paper, not from dyes or pigments applied on top. The resulting continuous curve shape is ideal for portraiture and end-consumer applications where flesh tones are common, making silver halide technology the gold standard for professional portraiture and premium photo books. There continues to be significant growth of consumer photo books stemming from the tremendous increase of digital photography. By compiling images into an album or a photo book, the organization of content allows consumers to relive and retell stories of an event or experience in a way that is far more meaningful than merely looking at a stack of loose prints. The perceived value of a photo book is much higher for consumers and the organization and convenience of the finished photo book are a big part of the reason. Publishing a premium photo book using silver halide technology provides the opportunity to deliver greater value than a standard photo book and further exceed consumer expectations. Image quality attributes such as flesh tone reproduction, color reproduction, highlight and shadow detail, and optimal (pleasing) sharpness are all derived from the unique curve shape, tone scale, and continuous tone dye cloud formation resulting from silver halide technology. Including this quality level within a photo book is a powerful value driver for most consumers.

KODAK PROFESSIONAL ENDURA Premier Paper – State of the Art Silver Halide Technology

KODAK PROFESSIONAL ENDURA Premier Paper provides all the general advantages of silver halide papers for the fulfillment of premium photo books. ENDURA Premier paper offers its own unique attributes, owing it to its strategy of continuous improvement, providing superior benefits of image quality, image permanence, productivity, and cost. Whether the photo book will be used as the bride and groom’s wedding album or as a premium photo book that a consumer will purchase, these overall quality standards and consistency are extremely important.

One key image quality attribute is flesh reproduction. KODAK PROFESSIONAL ENDURA Premier Papers set the standard long ago and continue to lead in this aspect of overall image quality today. Kodak Alaris scientists, in conjunction with key professional labs and photographers, recognized the importance of flesh reproduction. When

balanced for pleasing flesh, the proper ratio of colors in the highlights and shadows must be balanced and optimized. Doing so will keep flesh tones, highlights, and shadows looking natural, without too much “ruddiness” or “beefiness” in the flesh, while maintaining a natural look in facial highlights. Just like individual professional portrait prints, pleasing flesh reproduction is equally as important for premium photo books.

Details in both highlights and shadows are also critical for premium photo books. With standard photo books, on a single stimulus basis, the end consumer may not recognize the lack of highlight and shadow details. However when these attributes are present in a premium photo book, the image quality is visibly and noticeably enhanced. With digital capture, photography has to be good. However, the output medium must also have the necessary dynamic range to reproduce the details. The special curve shape of KODAK PROFESSIONAL ENDURA Premier Paper provides a softer, lower contrast lower scale to preserve highlight details combined with a higher contrast upper scale and maximum density (D-max) to provide the digital printer with the ability to reproduce subtle details in the shadow areas to provide the enhancement for premium photo books.

Accurate color reproduction with a large color gamut provides important benefits to both professionally produced wedding albums and consumer premium photo books. For example, accurate color reproduction is needed so that subtle pastel colors of bridesmaids’ gowns are the correct color. Color reproduction was enhanced with a dye set change for KODAK PROFESSIONAL ENDURA Premier Paper. See Figure 1.

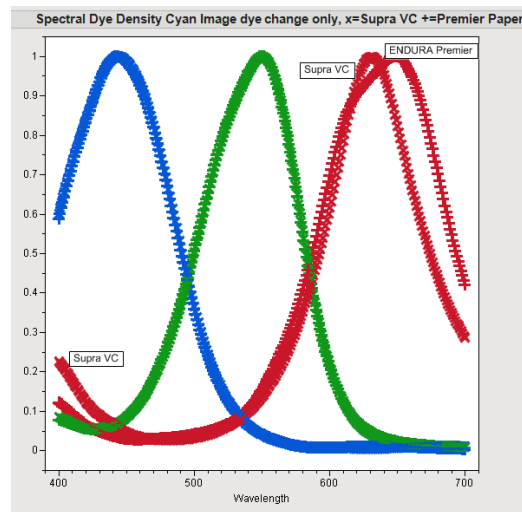


Figure 1 – Spectral dye density comparison of ENDURA Premier Paper.

Sharpness is an important image quality attribute that is often overlooked in standard photo books. Many times images are too sharp which can negatively impact the smoothness of a flesh tone making faces appearing

somewhat un-natural, with enhanced wrinkles and blemishes. The continuous tone of silver halide technology provides the smoothness that results in the natural look and is an expected benefit from premium photo books produced by silver halide technology.

Image Permanence for Premium Photo Book Longevity

Image permanence is equally critical, because consumers want high quality images to continue to look their best now and well into the future. Digital images stored on smart phones, computer hard drives or the cloud can be and in many unfortunate cases have been lost. Premium photo books are one of the best ways for the consumer to preserve these memories for many generations. KODAK PROFESSIONAL ENDURA Premier Papers have held leadership positions in image permanence since their introduction in 2002 with double the stability performance against ambient temperature conditions (heat) of its next best silver halide competitor. Heat is but one dimension of image permanence performance in dark storage, which also encompasses heat, ozone, and humidity. Dark stability is critical because over the long term, over 90% of all professional and consumer prints and photo books are stored in the dark. Silver halide technology is extremely robust against ozone and humidity compared to certain other digital printing systems such as ink jet.

Properly stored in the dark in typical consumer home environments, ENDURA Premier Paper used in premium photo books will last over 200 years before showing a noticeable change according to the Arrhenius methodology as detailed in ISO 18924 and ISO 18936 on thermal testing [1, 2]. For the remaining critical environmental factors of ozone and humidity, the ENDURA photographic papers are very robust, some might say “bulletproof”, showing virtually no change to these factors. When tested following the protocols of the standards on gas fading, ISO 18941, and humidity degradation, ISO 18946, ENDURA papers show essentially zero change during the course of the test [3, 4]. For detailed discussions on the importance and intricacies of image permanence testing, including all four environmental factors, see Kodak’s White Paper on image permanence testing of ENDURA papers [5] and the consumer guide on image permanence testing from the Image Permanence Institute at Rochester Institute of Technology [6].

Premium photo books are the ideal format for long-term image preservation because these important pictures will be accessible and viewable well into the future. Digital files are great for sharing on electronic devices, However, if a flaw develops in the file, the image is gone forever. More likely, a digital file can easily be lost in the ever-growing sea of a consumer’s digital collection. Over the longer term, digital formats will change, both hardware and software, rendering a digital file virtually useless. A photo book is “future proof” because it requires no digital device or software – just your eyes and a light source. [7, 8]. The best way to preserve important images for the long term is with a premium photo book using the material that has proven itself over the long term – silver halide photographic paper.

Conclusion

There are a wide range of digital print technologies available today for use in photo books and we have shown that silver halide technology offers the best performance for premium photo books. Silver halide technology, being very robust for permanence in environments where photo books would typically be stored, is also a good solution for long term preservation of consumer images. With its optimal image quality and image longevity performance KODAK PROFESSIONAL ENDURA Premier Paper provides a gold standard solution for premium photo books, meets and exceeds the consumer needs for long-term preservation, and results in a delighted customer experience.

References

- [1] ISO 18924:2013 – Test Methods for Arrhenius-Type Predictions
- [2] ISO 18936:2012 – Imaging Materials - Processed Colour Photographs -- Methods for Measuring Thermal Stability
- [3] ISO 18941:2011 – Imaging Materials -- Colour Reflection Prints -- Test Method for Ozone Gas Fading Stability
- [4] ISO 18946:2011 – Imaging Materials -- Reflection Colour Photographic Prints -- Method for Testing Humidity Fastness
- [5] Eastman Kodak Company White Paper: “KODAK PROFESSIONAL ENDURA Papers: Defining Print Life: the Critical Balance of Light and Thermal Stability”; revised March 2013
- [6] Image Permanence Institute at the Rochester Institute of Technology: “A Consumer Guide to Understanding Permanence Testing”; December 2009
- [7] Proceedings of the IS&T Archiving Conference; “Preservation of Documents and Photographic Images: Long Term Strategies for Future Generations”; Joseph E. LaBarca, JEL Imaging Services, LLC (USA); pages 136-143; Salt Lake City, Utah; May 2011
- [8] Proceedings of the AIC & ICOM-CC Photographs Conservation Joint Meeting; “Preservation of Photographs for Future Generations: New Opportunities for Prints and Photo Books”; Joseph E. LaBarca, JEL Imaging Services/Pixel Preservation International (USA); pages 68-69; Wellington, New Zealand; February 2013

Author Biography

Patrick Webber is a principal scientist at Kodak Alaris. He has worked in the industry for over 30 years and has held a variety of positions in silver halide paper including manufacturing, research, and development of color products at Eastman Kodak and now Kodak Alaris. His primary focus for the last 20 years has been the development and commercialization of professional silver halide media products for digital use. He is certified as a six sigma black belt. He has been awarded two U.S. patents and is the author of many technical papers. Pat currently is the world-wide color paper product manager. He also leads the systems team for the design and development of new color output media.

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