WHITE PAPER

spencerLAB DIGITAL COLOR LABORATORY

KODAK NEXPRESS SX3300 Press Achieves Highest Photographic Image Print Quality Rating — An All-Round Performer

Yesterday's best becomes today's expectation. With relentless application of the latest technologies, digital presses are evolving in perhaps the most important aspect – Photographic Image Print Quality. The KODAK NEXPRESS SX3300 Digital Production Color Press reached the highest overall print quality level among its tested peers.

In this study of Photographic Image Print Quality, *spencerLAB* performed comparative evaluation of high quality output from the KODAK NEXPRESS SX3300 Press, the HP INDIGO 7500 Digital Press, the XEROX iGen4 Press, and the XEROX Color 1000 Press. While achieving excellent print image quality, additional capability options such as print finishes, coating, paper sizes, colors, etc., are enabling the presses to be more versatile for a broad variety of applications. *SpencerLAB*, therefore, evaluated output from the respective presses in several different configurations: CMYK (Standard Finish), CMYK with Matte Finish, and CMYK with Clear Dry Ink. In order to minimize non-representative output from any of the presses, *spencerLAB* tested all of the printing devices at in-house sites, each press run conducted by well-trained technicians.

Applying the knowledge of consumer photo preferences (gained from thousands of participants in dozens of focus group events in three continents over more than half a decade), *spencerLAB* evaluated seven different consumer attributes and determined an overall weighted average. This was a difficult task, in that all of the digital press prints evaluated in our current study were of very high quality–each quite acceptable for most high quality print applications; however, a side-by-side comparison revealed some differences that set them marginally apart. We did note variations in print quality from some presses tested previously, perhaps due to changes in workflow, image processing, etc.

The KODAK NEXPRESS SX3300 Digital Production Color Press achieved a highest overall rating in photographic print quality, and demonstrated the best performance across the majority of attributes evaluated among the several high quality digital press configurations tested.

Executive Summary

The *spencerLAB* DIGITAL COLOR LABORATORY was commissioned by Eastman Kodak Company to perform an independent Comparative Photographic Image Print Quality Analysis of printed output from various configurations of the KODAK NEXPRESS SX3300 Press, HP INDIGO 7500 Digital Press, XEROX iGen4, and XEROX Color 1000 Press.

The KODAK NEXPRESS SX3300 Press achieved an overall highest rating, and demonstrated the best all-round performance across a majority of attributes evaluated. *SpencerLAB* evaluated respective digital press output in CMYK, CMYK with Matte Finish, and CMYK with Clear Dry Ink configurations. The KODAK NEXPRESS SX3300 Press output was rated overall highest in all tested configurations.

In order to avoid any non-representative output, all digital press output was printed by the press-manufacturers at an in-house facility by well trained technicians. Each manufacturer selected appropriate print settings with the intent to produce best photographic image quality on each press. All print runs were supervised on-site by *spencerLAB* personnel.

Digital press prints were imaged on *spencerLAB* supplied glossy and dull media–NewPage Sterling Ultra Digital Gloss 80# Cover and NewPage Futura Laser Dull 80# Cover. Glossy HP INDIGO 7500 prints used for analysis were imaged on NewPage Sterling Ultra Digital for HP Indigo Gloss 80# Cover. Drawing on our *spencerLAB* PRINTER TEST SUITE experience, over five dozen test images, both sRGB and Adobe RGB, were carefully selected to provide a comprehensive and representative set for photo print quality evaluation, and provided as 12x18" embedded PDF test files and printed at each site.

A comparative Photographic Image Print Quality analysis was performed by a team of experienced *spencerLAB* staff, applying consumer photo preferences and relative emphasis on the attributes of color Realism (Foliage, Sky & Water, and Fleshtones), Neutral Grays, Vividness, Sharpness, and Smoothness. Our analyses focussed on the modest differences among the range of test prints.

Key Findings

Our summary finding is that ***the KODAK NEXPRESS SX3300 Digital Production Color Press achieved a highest overall rating in photographic print quality, and demonstrated the best performance across the majority of attributes evaluated among the several high quality digital press configurations tested.***

The KODAK NEXPRESS SX3300 Press output in respective configurations was rated overall highest or comparable in all tested comparisons:

- In CMYK configuration on Glossy and Dull media, KODAK NEXPRESS SX3300 Press print quality was overall comparable to that of the HP INDIGO 7500 and better than that of the XEROX iGen4 and the XEROX Color 1000 Press
- In CMYK with Matte Finish configuration on Dull media, KODAK NEXPRESS SX3300 Press print quality was slightly better overall than the XEROX iGen4 Matte Dry Ink output
- In CMYK with Clear Dry Ink configuration on Glossy media, KODAK NEXPRESS SX3300 Press print quality was better than that of the XEROX Color 1000 Press

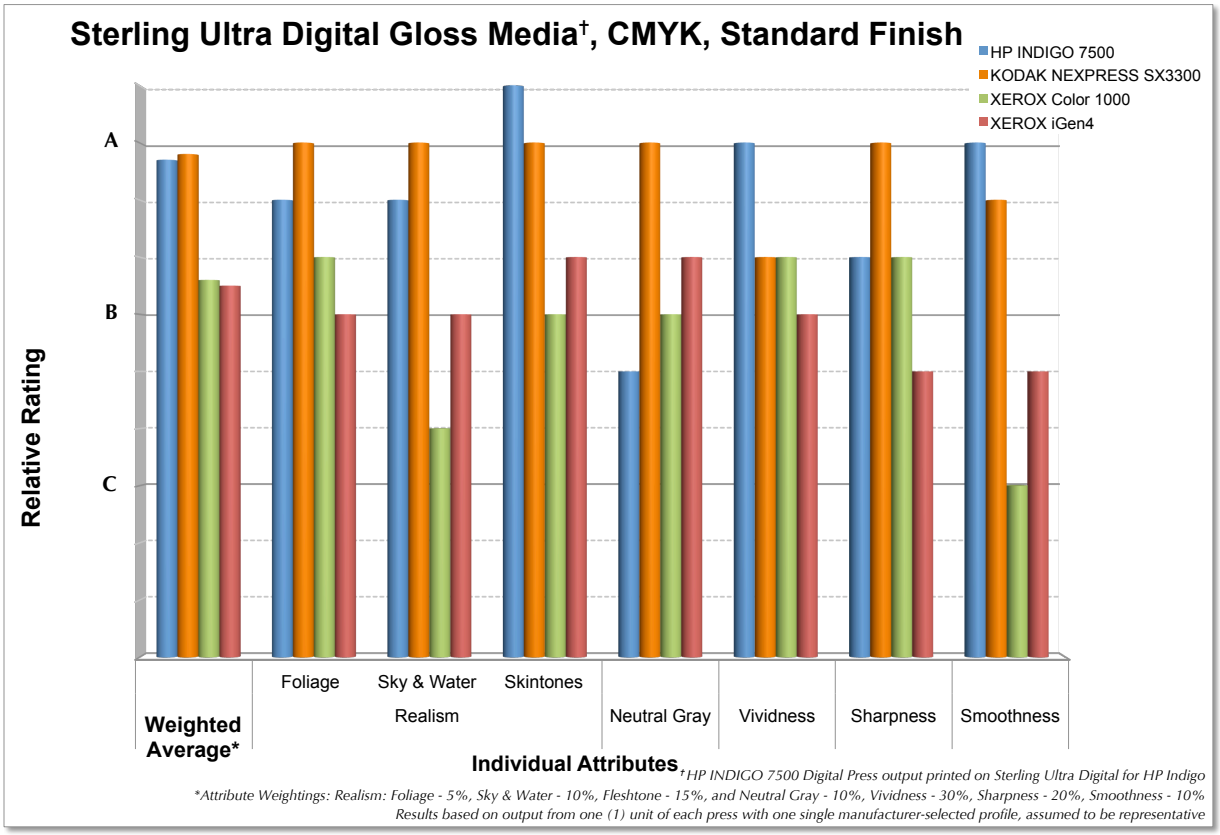
The KODAK NEXPRESS SX3300 Press provided the best all-round performance, proving to be a highly versatile digital press among the tested print systems. The same NEXPRESS SX3300 Press unit was able to provide standard CMYK, Matte Finish, and Clear Dry Ink output; the XEROX iGen4 requires two separate presses to produce standard CMYK and Matte output; whereas, the HP INDIGO 7500 and the XEROX Color 1000 Press do not offer Matte finish output, regardless of media, directly on the press without the use of additional finishing equipment. The XEROX iGen4 and the HP INDIGO 7500 do not offer a Clear Dry Ink option directly on the press without the use of additional finishing equipment. With minor changes to the machine settings/hardware configuration on the same press, the NEXPRESS SX3300 Press was able to produce Best-in-Class output.

On the KODAK NEXPRESS SX3300 Press output, opportunity for improvement was noted in shadow depth (black density), and differential gloss on Matte output.

All the digital presses evaluated in this study were capable of very high quality and with minor optimization in either technology or RIP/workflow or both, they have the potential to show substantial improvement in Print Quality.

Print System Comparison Matrix

Configuration	Print Systems	Media Type
CMYK (Standard Finish)	• KODAK NEXPRESS SX3300 Press • HP INDIGO 7500 Digital Press • XEROX iGen4 Press • XEROX Color 1000 Press	• Glossy • Dull
CMYK with Matte Finish	• KODAK NEXPRESS SX3300 Press Matte Finish • XEROX iGen4 Press Matte Dry Ink	• Dull
CMYK with Clear Dry Ink	• KODAK NEXPRESS SX3300 Press Clear Dry Ink • XEROX Color 1000 Press Clear Dry Ink	• Glossy



†HP INDIGO 7500 Digital Press output printed on Sterling Ultra Digital for HP Indigo

**Attribute Weightings: Realism: Foliage - 5%, Sky & Water - 10%, Fleshtone - 15%, and Neutral Gray - 10%, Vividness - 30%, Sharpness - 20%, Smoothness - 10%*
Results based on output from one (1) unit of each press with one single manufacturer-selected profile, assumed to be representative

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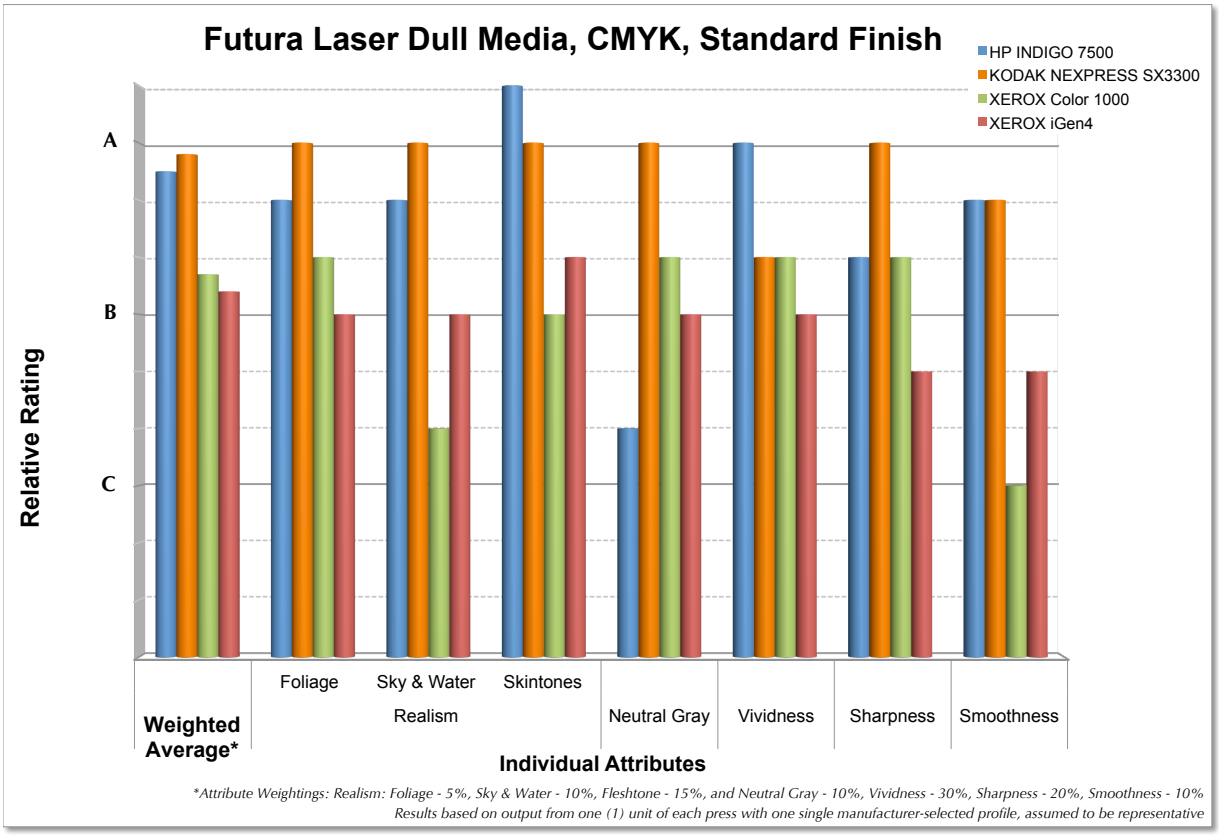
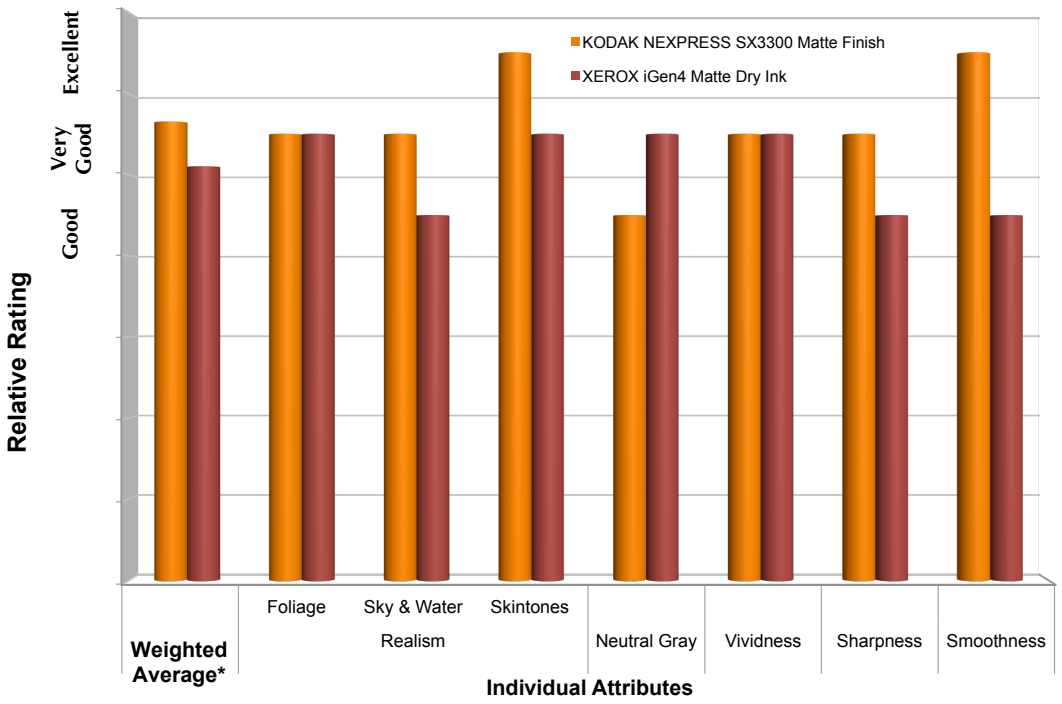


**Attribute Weightings: Realism: Foliage - 5%, Sky & Water - 10%, Fleshtone - 15%, and Neutral Gray - 10%, Vividness - 30%, Sharpness - 20%, Smoothness - 10%*
Results based on output from one (1) unit of each press with one single manufacturer-selected profile, assumed to be representative

NOTE: All comparisons are relative to the print systems being compared and should not be cross-compared

Futura Laser Dull Media, CMYK, Matte Finish



*Attribute Weightings: Realism: Foliage - 5%, Sky & Water - 10%, Fleshtone - 15%, and Neutral Gray - 10%, Vividness - 30%, Sharpness - 20%, Smoothness - 10%
Results based on output from one (1) unit of each press with one single manufacturer-selected profile, assumed to be representative

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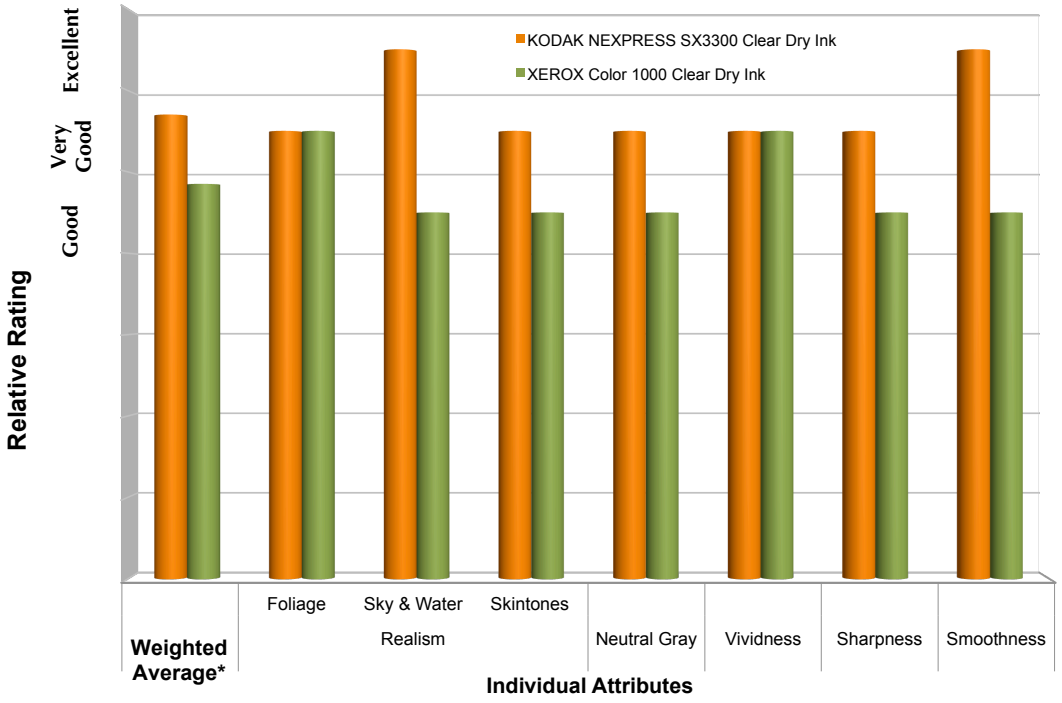
Sterling Ultra Digital Gloss Media, CMYK, Clear Dry Ink



*Attribute Weightings: Realism: Foliage - 5%, Sky & Water - 10%, Fleshtone - 15%, and Neutral Gray - 10%, Vividness - 30%, Sharpness - 20%, Smoothness - 10%
Results based on output from one (1) unit of each press with one single manufacturer-selected profile, assumed to be representative

NOTE: All comparisons are relative to the print systems being compared and should not be cross-compared

Methodology

*Spencer*LAB built on our previous experience with similar digital press print image quality evaluations and implemented our research methodology that provides high print quality representative results, while being equitable to each of the competitive devices from which the output is evaluated.

• A suite of test files (shown on right) representing a broad range of consumer photographs, and augmented by test files from the *spencer*LAB PRINTER TEST SUITE, which has been used extensively by many major printer manufacturers under license as well as in our own testing was compiled for use. The test file layout was designed to emulate a typical photo book application. Both sRGB and Adobe RGB images of at least 300 dpi resolution in JPEG and TIFF formats were composed into 12x18" test files and provided in embedded PDF format for digital presses.

• Test files were printed in multiple system configurations (shown in the Print System Comparison Matrix table, pg.2), on each of the digital presses: KODAK NEXPRESS SX3300 Digital Production Color Press [SX3300], HP INDIGO 7500 Digital Press [HP 7500], XEROX iGen4 Press [iGen4], and XEROX Color Press 1000 [Color 1000]. All the print runs were supervised on-site by *spencer*LAB personnel.

• One unit of each press was used by the respective press manufacturers, in conjunction with one single manufacturer-selected profile, to print the output at their in-house facilities. Each manufacturer selected print settings with the intent to produce best photographic image quality.

• Digital front ends (DFE) used for testing included: For the KODAK NEXPRESS SX3300 Press, the KODAK NEXPRESS Front End version 12.0; HP INDIGO 7500, the HP SmartStream Production Pro Print Server version 4.0.47I-Fix2; XEROX iGen4 and XEROX Color 1000 Press, the XEROX FreeFlow Print Server version 8.0 SP-1.

• Digital press prints were imaged on Glossy and Dull media – NewPage Sterling Ultra Digital Gloss 80# Cover and NewPage Futura Laser Dull 80# Cover. HP

A Range of Consumer Photographs augmented by *SpencerLab* Printer Test Suite files

INDIGO 7500 Glossy prints used for analysis were imaged on NewPage Sterling Ultra Digital for HP Indigo Gloss 80# Cover.

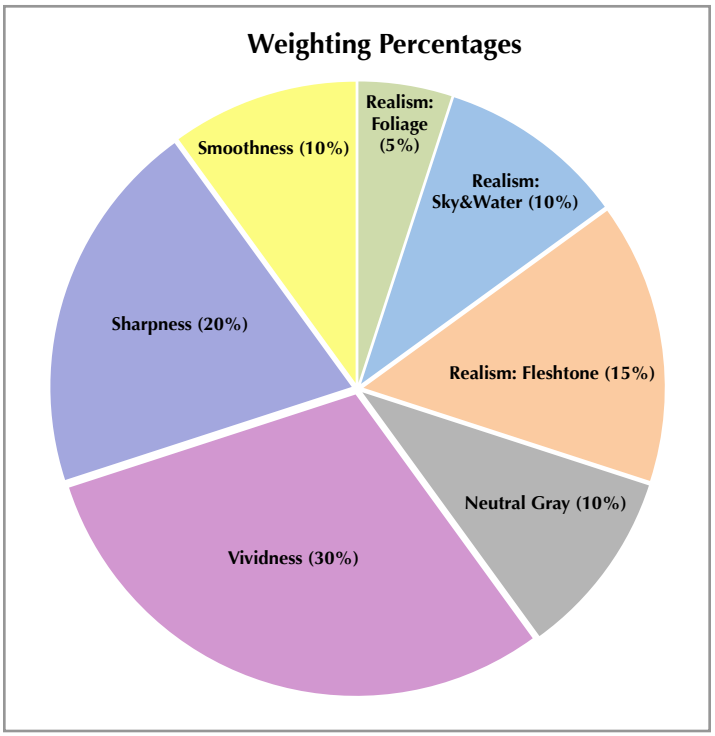
• All vendors ensured that their machines were running at optimal performance and printing was performed by well-trained technicians.

• Attribute analysis was performed for respective Glossy and Dull competitive sets, by an experienced team of *spencer*LAB staff under a controlled viewing environment with 5000°K illumination. As per the scope of Analysis

requested by Kodak, Photographic Print Quality evaluation was segmented into seven attributes: Realism: Foliage, Sky & Water, Fleshtones, and Neutral Gray, Vividness, Sharpness, and Smoothness.

• For the CMYK output analysis, each attribute was comparatively rated, using an A-B-C-D-F grading scale with + and - options. A+ corresponded to 'exceptional' quality, C to 'just acceptable' consumer quality, D to 'needs improvement', and F as 'unacceptable'. For Matte Finish and Clear Dry Ink configuration comparisons, a multi-level quality grading scale was used – Excellent, Very Good, and Good.

• Results were summarized in an overall Weighted Average of these attributes, derived from our experience conducting worldwide consumer focus group activities. The weightings emulate consumer photo preferences with relative emphasis on the areas of color Realism (Foliage, Sky & Water, and Fleshtones), Neutral Gray, Vividness, Sharpness, and Smoothness. A computed weighted average was plotted and converted to its closest corresponding letter/quality level grade.



Detailed Findings

In the following discussion of detailed findings for each comparison, print quality is discussed by attribute–in order of decreasing quality for each. Unless otherwise noted, comparative results for both Glossy and Dull media, and sRGB and Adobe RGB images were similar.

CMYK Comparison

Realism

Realism includes true-to-life reproduction of memory colors – those with which users are heuristically familiar without requiring an original for comparison. Most common memory colors, such as green grass, trees and Foliage, blue Sky & Water, various Fleshtones, etc., test presses' color rendering ability. Some color issues, such as rendering Purple skies, Yellow or Red Fleshtones, Blue or Yellow greens, would produce unrealistic output. A fine balance needs to be maintained between Realism and Vividness, as images that are too saturated and dark can overpower Realism.

Realism was evaluated and rated in the separate categories of Foliage, Sky & Water, and Fleshtones.

Color Realism: Foliage

• KODAK NEXPRESS SX3300 Press: Prints from the SX3300 exhibited good color Realism on Foliage images. Greens were rendered well balanced with no particular color bias. Glossy & Dull Ratings: A

• HP INDIGO 7500: Foliage images of the 7500 were rendered well, but prints exhibited a slight Blue color cast. Glossy & Dull Ratings: A-

• XEROX Color 1000: Foliage color Realism of the Color 1000 prints was lower than the NEXPRESS SX3300 and HP 7500 prints. Foliage images were rendered overall dark and comparatively unrealistic, with a slight Red color cast resulting in Greens to appear somewhat Orange. Glossy & Dull Ratings: B+

• XEROX iGen4: The colors of green grass, trees, and shrubbery images from the iGen4 were found to be less realistic than the comparative prints from the other presses. Foliage image prints from the iGen4 exhibited a noticeable Yellow color cast. Glossy & Dull Ratings: B

Section Showing Foliage Color Realism sRGB Image Comparison, CMYK, Glossy Media

NEXPRESS SX3300	HP INDIGO 7500	XEROX Color 1000	XEROX iGen4

Color Realism: Sky & Water

• KODAK NEXPRESS SX3300 Press: Prints from the SX3300 had overall the most realistic Sky & Water image color reproduction. Skies were rendered well saturated without any noticeable color cast. Green-blue water images were rendered slightly Cyan, lacking Green component. Glossy & Dull Ratings: A

• HP INDIGO 7500: The 7500 prints had good Sky & Water color Realism, however, the blue skies and green-blue water images were rendered slightly desaturated taking away from overall Realism. Like the NEXPRESS SX3300, HP 7500 green-blue water images were also rendered slightly Cyan, lacking Green component; however, less saturated than the NEXPRESS SX3300 output. Glossy & Dull Ratings: A-

• XEROX iGen4: Prints from the iGen4 had good Sky & Water Realism on sRGB images. However, Adobe RGB images were rendered with a distracting Magenta cast and lacked saturation, making the prints look unrealistic. Glossy & Dull Ratings: B

• XEROX Color 1000: Sky & Water image prints from the Color 1000 exhibited a heavy Magenta cast, rendering Sky & Water as Purple. Distracting artifacts in large solid areas such as skies also took away from Color 1000's realistic rendition. Adobe RGB images had a heavier color cast than the sRGB images. Glossy & Dull Ratings: C+

Color Realism: Fleshtones

• HP INDIGO 7500: The 7500 output had excellent color balance with extremely realistic Fleshtone color reproduction. 7500 prints were judged to have the best visual match to digital reference images for Fleshtone rendition. Glossy & Dull Ratings: A+

Section Showing Sky & Water Color Realism Adobe RGB Image Comparison, CMYK, Dull Media

NEXPRESS SX3300	HP INDIGO 7500	XEROX iGen4	XEROX Color 1000

Section Showing Fleshtone Color Realism Adobe RGB Image Comparison, CMYK, Glossy Media

HP INDIGO 7500	NEXPRESS SX3300	XEROX iGen4	XEROX Color 1000

• KODAK NEXPRESS SX3300 Press: Prints from the SX3300 had overall good Fleshtone color Realism; however, images exhibited a slightly warmer (Reddish) tone, more noticeable on the Glossy media, which took away from a perfect rating. Glossy & Dull Ratings: A

• XEROX iGen4: As noticed on the Sky & Water images, the sRGB Fleshtone images had good Realism; however the Adobe RGB images were rendered flat and desaturated, resulting in the overall Fleshtone Realism being judged comparatively less realistic. Glossy & Dull Ratings: B+

• XEROX Color 1000: The Color 1000 prints exhibited a noticeable Red color cast that made Fleshtones appear Orange, taking away from Realism of images. Noticeable artifacts on the Fleshtones made the images appear slightly blotchy. Glossy & Dull Ratings: B

Neutral Gray Images

Grayscale image rendition is important in photo book type applications where consumers choose to showcase their images with heightened drama or emotion by rendering in Black & White. Quality expectations increase for these photographs, typically nostalgic snapshots, wedding portraits, or textured landscapes. With the elimination of distracting color, the viewer is inclined to focus more closely on the image.

In color images with near-neutral colors, any color bias or lack of realistic rendition is easily noted.

• KODAK NEXPRESS SX3300 Press: Grayscale images produced on the SX3300 were rated overall best of the competitive group. Images had overall good detail rendition. Slightly oversharp rendition caused some harshness on a few images. Glossy & Dull Ratings: A

Section Showing Neutral Gray Image Comparison, CMYK, Dull Media

NEXPRESS SX3300	XEROX Color 1000	XEROX iGen4	HP INDIGO 7500

Section Showing Adobe RGB (Top) and sRGB (Bottom) Image Vividness Comparisons, CMYK, Glossy Media

HP INDIGO 7500 | NEXPRESS SX3300 | XEROX Color 1000 | XEROX iGen4

• XEROX Color 1000: Grayscale images on Color 1000 prints were rendered slightly flat and noisy. Although producing deep solid blacks, the grayscale images were rendered slightly washed out, more so on Glossy media prints. Near-neutral images exhibited Red color cast, reducing overall Gray neutrality. Glossy Rating: B; Dull Rating: B+

• XEROX iGen4: Grayscale and near-neutral images from the iGen4 were rendered with a Red tone. Images were rendered overall flat and comparatively less sharp. Glossy media prints had higher contrast than the Dull media prints. Glossy Rating: B+; Dull Rating: B

• HP INDIGO 7500: Grayscale images from the 7500 were rendered light and appeared washed out in comparison to the competitive set. Dull media prints were more washed out than the Glossy media prints. Grayscale images were rendered noisy and some blotchiness was noticeable on the Dull media, which detracted from overall image quality. Glossy Rating: B-; Dull Rating: C+

Vividness

Vividness is a combination of image saturation, brightness, and depth. In order to appear vivid, an image needs to possess good saturation and balanced contrast without appearing dull or muted. Images should exhibit color vibrance, without appearing overexposed or faded.

• HP INDIGO 7500: Overall, the 7500 prints had good saturation and contrast balance; however, solid Blues were slightly desaturated on intensely colored images. Good image shadow depth and high contrast contributed to bright and vivid image rendition. Glossy & Dull Ratings: A

• KODAK NEXPRESS SX3300 Press: The SX3300 prints were rendered with good saturation; however, lower shadow depth took away from SX3300's overall Vividness. Glossy & Dull Ratings: B+

• XEROX Color 1000: The Color 1000 prints had high image depth and saturation; however, prints were rendered overly dark (lower brightness) and exhibited a noticeable Magenta cast, especially on Blue colors, resulting in less vivid output. Glossy & Dull Ratings: B+

• XEROX iGen4: Images from the iGen4 were comparatively less vivid than the other competitive prints. iGen4 output lacked shadow depth. Although, the saturation on sRGB images was good, Adobe RGB images appeared muted, resulting in overall flat and comparatively less vivid Adobe RGB output. Glossy & Dull Ratings: B

Section Showing sRGB Image Sharpness Comparison, CMYK, Glossy Media

NEXPRESS SX3300	XEROX Color 1000	HP INDIGO 7500	XEROX iGen4

Sharpness

Image Sharpness is the combination of detail rendition, image definition and clarity. Unsharp image rendition can detract from overall quality by reducing image detail, resulting in blurry, unacceptable output. Conversely, overly sharp images can introduce related artifacts that can result in images that appear harsh and unnatural.

• KODAK NEXPRESS SX3300 Press: The SX3300 prints exhibited the best sharpness of the competitive group. SX3300 prints on Glossy and Dull media exhibited very high Sharpness; however, slight oversharpening created artifacts in some images that appeared harsh and unnatural. Minor loss of highlight details was also noticeable. Glossy & Dull Ratings: A

• XEROX Color 1000: Color 1000 prints exhibited comparatively lower Sharpness than the NEXPRESS SX3300 and images were slightly soft, but a fine screening algorithm allowed the images to maintain good clarity. Glossy & Dull Ratings: B+

• HP INDIGO 7500: The prints from the 7500 had lower Sharpness than the NEXPRESS SX3300 prints. The screening algorithm caused noticeable coarse dot patterns that detracted from image definition and clarity. Glossy & Dull Ratings: B+

• XEROX iGen4: The iGen4 prints exhibited the lowest Sharpness and clarity among the competitive group. The iGen4 images displayed a coarse screening pattern, and lacked image clarity. Low shadow depth contributed to lower perceived Sharpness. Glossy & Dull Ratings: B-

Smoothness

Smoothness may be thought of as a lack of artifacts, such as grain, screening, process noise, streaking or banding, gloss differentials, etc. Lack of Smoothness will be especially apparent in images with little image content variation (low spatial frequency) and/or isolated sharp transitions.

• HP INDIGO 7500: The prints produced by the 7500 were smoothest of the competitive group, particularly seen in Fleshtones and tints; however, some screening/dot patterns and mottle were noticeable in dark areas. Glossy media prints were slightly smoother than the prints on Dull media. Glossy Rating: A; Dull Rating: A-

• KODAK NEXPRESS SX3300 Press: The SX3300 prints exhibited overall good Smoothness. Minor screening was noticeable on large solid image areas. Oversharpening artifacts on some images resulted in an artificial look on them. Glossy & Dull Ratings: A-

• XEROX iGen4: iGen4 prints suffered in Smoothness due to its typical cross-hatch screening. Such visible coarse screening patterns detracted from overall print Smoothness. Glossy & Dull Ratings: B-

• XEROX Color 1000: Smoothness on the Color 1000 prints suffered from distracting process noise, with noticeable blotchiness. On Dull media, slight gloss differential between imaged and non-imaged areas was just somewhat slightly distracting. Glossy & Dull Ratings: C

Weighted Average

Weighted Average includes all the attributes of photographic prints: components of Realism (Foliage, Sky & Water, and Fleshtones), Neutral Gray, Vividness, Sharpness, and Smoothness. Our experience with consumer photographic image preference studies is reflected in the relative weights of 5%, 10%, and 15% for Foliage, Sky & Water and Fleshtone Realism, and 10%, 30%, 20%, and 10% for Neutral Gray, Vividness, Sharpness, and Smoothness, respectively. Weighting may reflect the negative aspect of one or more of these characteristics (such as Smoothness) rather than their positive contribution.

Although minor rating differences were noted between media type sets, the overall weighted average ratings of Glossy and Dull media remained overall similar for each print systems' two media sets. The computed Weighted Average was plotted (see page 3) and converted to the closest corresponding letter grade; the following discussion is in order of the computed Weighted Average.

• KODAK NEXPRESS SX3300 Press: The overall quality produced by the SX3300 was judged exceptional and overall comparable to the HP 7500, and better than that of the iGen4 and Color 1000. The SX3300 demonstrated an all-round performance with best Sky & Water Color Realism, high Fleshtone Realism; best Sharpness and high Smoothness; and best Black & White/Neutral Gray output. Comparatively low shadow depth detracted from overall Vividness. Average Glossy and Dull Rating: A

• HP INDIGO 7500: The overall quality of the prints produced by the 7500 was comparable to the NEXPRESS SX3300. The 7500 provided best Vividness, Fleshtone Realism, and high Smoothness; however, Black & White/Neutral Gray output was rated lowest among the tested print systems. Average Glossy and Dull Rating: A

• XEROX Color 1000: The quality of the Color 1000 output was comparatively lower than the NEXPRESS SX3300 and the HP 7500, but overall comparable to that of the XEROX iGen4. Noticeable noise and some color shifts resulted in lower Smoothness and Realism ratings of the Color 1000 prints. Saturated, but overly dark, rendition also detracted from overall Vividness of output. Average Glossy and Dull Rating: B+

• XEROX iGen4: Overall quality of the iGen4 output was comparatively lower than the NEXPRESS SX3300 and the HP 7500, but comparable to that of the XEROX Color 1000. Low Realism and Vividness, due to color shifts and desaturation on Adobe RGB images, resulted in the comparatively lower rating of the iGen4 output. Coarse screening adversely affected Sharpness and Smoothness. Average Glossy Rating: B+; Dull Rating: B

CMYK with Matte Finish Comparison

KODAK NEXPRESS SX3300 Press Matte Finish [MF] output was compared with XEROX iGen4 Press Matte Dry Ink [MDI] output. The KODAK NEXPRESS SX3300 Press provides the operator with the option to switch between Standard and Matte finish output by switching the fuser roller on the same press. This is not an operator changeable option with the XEROX iGen4; the customer must select to use either Matte Dry Ink or the Standard ink for all their jobs at time of install. The HP INDIGO 7500 and the XEROX Color 1000 do not offer Matte finish output, regardless of media, directly on the press without the use of additional finishing equipment. A multi-level quality grading scale – Excellent, Very Good, and Good was used to judge the output on NewPage Futura Laser Dull 80# Cover media.

Realism

Color Realism: Foliage

• KODAK NEXPRESS SX3300 Press MF: Matte Finish prints from the SX3300 exhibited very high color Realism on Foliage images; however, Greens were rendered with a slight Blue bias. Rating: Very Good

• XEROX iGen4 MDI: The color of green grass, tree, and shrubbery images from iGen4 were also found to be very realistic; however, a slight Yellow bias was noticeable on Greens. Rating: Very Good

Color Realism: Sky & Water

• KODAK NEXPRESS SX3300 Press MF: Prints from the SX3300 had overall very high Sky & Water color Realism; however, blue Sky & Water images were rendered slightly muted with a minor Purple shift. Rating: Very Good

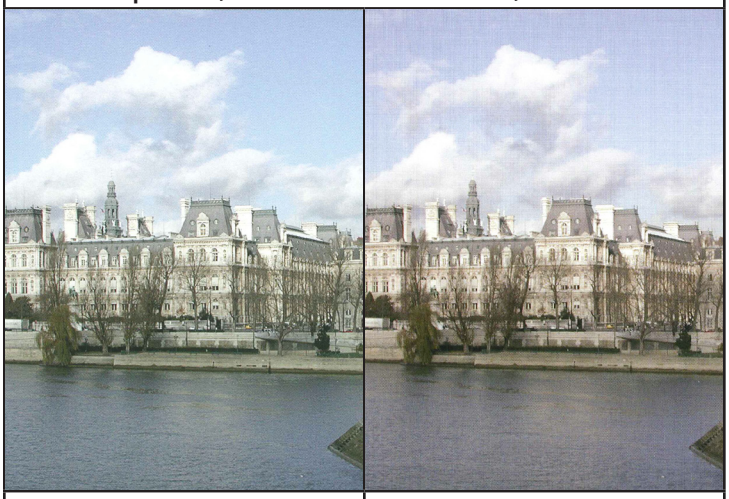
• XEROX iGen4 MDI: Prints from the iGen4 had high Sky & Water Realism on sRGB images; however, a Magenta color cast was noticeable on Adobe RGB images, rendering blue Sky & Water images as Purple. Rating: Good

Color Realism: Fleshtones

• KODAK NEXPRESS SX3300 Press MF: Prints from the SX3300 had overall excellent Fleshtone color Realism, without any noticeable color cast. SX3300 Fleshtones were a close visual match to the digital reference. Rating: Excellent

• XEROX iGen4 MDI: As noticed on the Sky & Water images, the iGen4 sRGB Fleshtone images had better color Realism compared to its Adobe RGB images. Overall, the Fleshtone images were rendered warmer compared to the NEXPRESS SX3300 output, detracting from overall Fleshtone Realism. Rating: Very Good

Section Showing Adobe RGB Sky & Water Realism Comparison, CMYK with Matte Finish, Dull Media



NEXPRESS SX3300 MF | XEROX iGen4 MDI

Neutral Gray Images

• XEROX iGen4 MDI: Grayscale and near-neutral images from the iGen4 were rendered with a warmer tone, lowering gray neutrality; however, iGen4 output had overall better contrast than the NEXPRESS SX3300 grayscale output. Rating: Very Good

• KODAK NEXPRESS SX3300 Press MF: Grayscale prints produced on the SX3300 were slightly washed out in comparison to XEROX iGen4 prints. Some loss of highlight and shadow details was noticeable, detracting

Section Showing sRGB Fleshtone Color Realism and Black & White Comparison, CMYK with Matte Finish, Dull Media

NEXPRESS SX3300 MF | XEROX iGen4 MDI | XEROX iGen4 MDI | NEXPRESS SX3300 MF

from overall grayscale image quality. Near-neutral images were rendered without any noticeable color bias. Rating: Good

Vividness

• KODAK NEXPRESS SX3300 Press MF: The SX3300 prints were rendered overall saturated but lacked vibrance. Lower shadow depth took away from the SX3300's overall Vividness. Rating: Very Good

• XEROX iGen4 MDI: sRGB images from the iGen4 exhibited slightly higher vibrance than the NEXPRESS SX3300 images; however, Adobe RGB images appeared muted, resulting in overall flat and comparatively less vivid Adobe RGB image output. Rating: Very Good

Sharpness

• KODAK NEXPRESS SX3300 Press MF: The SX3300 prints exhibited very high Sharpness with good image definition. Sharpness on images was well balanced without any major oversharpening issues. Minor loss of shadow and highlight details was noticeable. Rating: Very Good

• XEROX iGen4 MDI: The iGen4 prints exhibited low Sharpness and definition compared to the NEXPRESS SX3300 output. The iGen4 images exhibited a noticeable coarse screening pattern that detracted from image clarity. Rating: Good

Smoothness

• KODAK NEXPRESS SX3300 Press MF: The SX3300 prints exhibited overall excellent Smoothness with a finer screening algorithm than the iGen4. Lack of artifacts, such as differential gloss, resulted in the SX3300's "true Matte" looking output. Rating: Excellent

• XEROX iGen4 MDI: iGen4 prints once again suffered in Smoothness, as in CMYK comparisons, due to its typical cross-hatch screening. Distracting differential gloss on the iGen4 matte prints took away from the overall print Smoothness and overall "Matte" look. Rating: Good

Weighted Average

• KODAK NEXPRESS SX3300 Press MF: The quality of the SX3300 MF prints was found to be slightly better overall than the XEROX iGen4 MDI prints. The SX3300 MF prints were rated either comparable or higher than the XEROX iGen4 MDI prints on all attributes evaluated except on Neutral Grays. The SX3300 provided "true Matte" prints, without any noticeable differential gloss; however, lack of shadow details on Black & White/Neutral Gray images contributed to a lower rating of grayscale images than XEROX iGen4. Average Rating: Very Good

• XEROX iGen4 MDI: Photographic image print quality of the iGen4 MDI was slightly lower overall than the NEXPRESS SX3300 prints. As in the CMYK comparisons, lower Realism and Vividness due to color shifts and desaturation on Adobe RGB images resulted in a comparatively lower rating of iGen4 output. Coarse screening adversely affected Sharpness and Smoothness. Distracting differential gloss on the prints also detracted from the overall Smoothness of the Matte prints. Average Rating: Very Good

In summary, the KODAK NEXPRESS SX3300 Press provided very high quality photographic output with Matte Finish. High Sharpness, Vividness, and Smoothness, along with "true Matte" finish without any differential gloss give the SX3300 great potential in offering competitive print quality for various high quality print applications.

CMYK with Clear Dry Ink Comparison

KODAK NEXPRESS SX3300 Press Clear Dry Ink output was compared with XEROX Color 1000 Press Clear Dry Ink output. The XEROX iGen4 and the HP INDIGO 7500 do not offer a Clear Dry Ink option directly on the press without the use of additional finishing equipment. A multi-level quality grading scale – Excellent, Very Good, and Good was used to judge the output on NewPage Sterling Ultra Gloss 80# Cover media.

Realism

Color Realism: Foliage

• KODAK NEXPRESS SX3300 Press: Clear Dry Ink prints of Foliage images from the SX3300 were very realistic; however, the greens had a slight Yellow cast, appearing light in comparison to the XEROX Color 1000. Rating: Very Good

• XEROX Color 1000: Color 1000 Clear Dry Ink green grass, trees, and shrubbery images were judged to be very realistic, but had a slight Orange cast. Rating: Very Good

Color Realism: Sky & Water

• KODAK NEXPRESS SX3300 Press: Prints from the SX3300 had overall excellent Sky & Water image color reproduction. Skies were rendered well saturated without any noticeable color cast. Green-blue water images lacked the Green component and were rendered too Cyan. Rating: Excellent

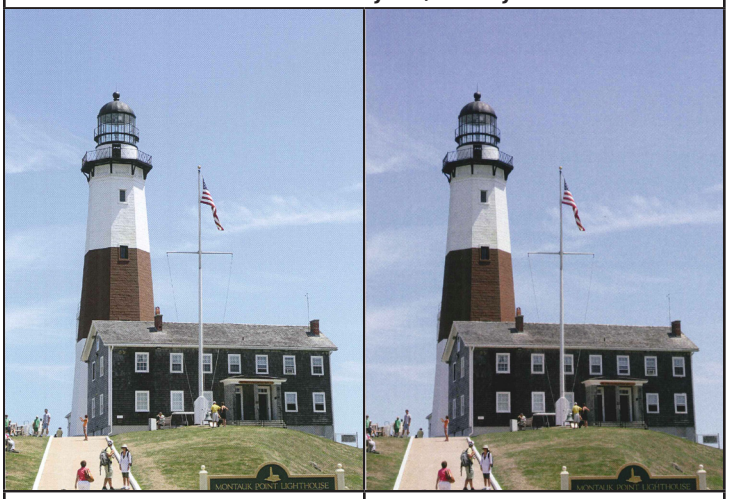
• XEROX Color 1000: Prints from the Color 1000 were less realistic than the NEXPRESS SX3300 and exhibited a Magenta color cast, rendering blue Sky & Water images noticeably Purple. Color cast on Adobe RGB images was more apparent than on sRGB images. Rating: Good

Color Realism: Fleshtones

• KODAK NEXPRESS SX3300 Press: Prints from the SX3300 were very realistic in Fleshtone color rendition; however, images exhibited a slight Yellow color cast, resulting in slightly pale looking Fleshtones. Rating: Very Good

• XEROX Color 1000: Fleshtone images from the Color 1000 had less realistic Fleshtone rendition than the NEXPRESS SX3300. Color 1000 Fleshtone images were rendered too warm and overall dark. Rating: Good

Section Showing sRGB Sky & Water Realism Comparison, CMYK with Clear Dry Ink, Glossy Media



NEXPRESS SX3300 Clear Dry Ink | XEROX Color 1000 Clear Dry Ink

Neutral Gray Images

• KODAK NEXPRESS SX3300 Press: Grayscale images produced on the SX3300 had very high image definition. Minor oversharpening caused some harshness on images. Grayscale images had a slight Red tone, but near-neutrals were rendered without a noticeable color bias. Rating: Very Good

• XEROX Color 1000: Grayscale prints from the Color 1000 were rendered with a slight Yellow tone. Images were rendered overall flat and less sharp. Near-neutrals were rendered with a slight Red bias. Rating: Good

Vividness

• KODAK NEXPRESS SX3300 Press: The SX3300 prints were rendered with very high saturation and brightness. As seen in CMYK and Matte Finish comparisons, lower shadow depth decreased contrast, detracting from SX3300's overall Vividness. Rating: Very Good

• XEROX Color 1000: Images from the Color 1000 were rendered with very high saturation, but overly dark rendition resulted in loss of some vibrance. Rating: Very Good

Sharpness

• KODAK NEXPRESS SX3300 Press: The SX3300 prints exhibited very high Sharpness and image definition. Highlights were slightly blown out, causing minor loss of highlight details. Rating: Very Good

Section Showing Adobe RGB Fleshtone Color Realism/Smoothness and sRGB Image Sharpness Comparison, CMYK with Clear Dry Ink, Glossy Media

NEXPRESS SX3300 Clear Dry Ink | XEROX Color 1000 Clear Dry Ink | NEXPRESS SX3300 Clear Dry Ink | XEROX Color 1000 Clear Dry Ink

• XEROX Color 1000: The Color 1000 prints exhibited lower Sharpness than the NEXPRESS SX3300. The Color 1000 images had good image clarity, but lacked definition and appeared soft in comparison. Rating: Good

Smoothness

• KODAK NEXPRESS SX3300 Press: The SX3300 prints exhibited excellent Smoothness. The Clear Dry Ink coating provided superior Smoothness to the SX3300 prints, by decreasing any screening or noise visible on the printed output. Rating: Excellent

• XEROX Color 1000: As seen in CMYK comparisons, Color 1000 prints suffered in Smoothness due to distracting blotchiness on the output, most noticeable on large solid image areas. Rating: Good

Weighted Average

• KODAK NEXPRESS SX3300 Press: The overall quality produced by the SX3300 with Clear Dry Ink was found to be better than the Color 1000 Clear Dry Ink prints. Better color Realism, Neutral Grays, Sharpness, and Smoothness on the SX3300 prints resulted in its overall higher rating than the XEROX Color 1000. The Clear Dry Ink coating helped the SX3300's Smoothness, as well as Sharpness, by reducing visibility of any minor surface or print artifacts. Average Rating: Very Good

• XEROX Color 1000: Overall photographic image print quality of the Color 1000 Clear Dry Ink prints was lower than the NEXPRESS SX3300. Color 1000 Clear Dry Ink prints were rated overall comparable to the NEXPRESS SX3300 prints in Foliage Realism and Vividness, but lower in all other attributes evaluated. Distracting noise and overly dark rendition detracted from overall image quality. Average Rating: Good

The *spencerLAB* Digital Color Laboratory

The *spencerLAB* DIGITAL COLOR LABORATORY is an independent printer evaluation laboratory that provides services to vendors and corporations for whom digital color printing is mission-critical. The Laboratory follows strict guidelines in the integrity of both methodology and reporting; vendor-sponsored studies do not guarantee favorable results. *SpencerLAB* has developed industry-standard test software, and performs print quality, cost-per-page, speed, and ease-of-use analyses in all technology classes, from desktop printers to digital presses.

SpencerLAB is operated by Spencer & Associates Publishing, Ltd., a premier IT consulting boutique specializing in Digital Color Imaging. Since 1989, Spencer & Associates has provided strategic support in product planning, development, and launch to manufacturers, and workflow analysis, usage optimization and print system selection to corporate users.