Print Quality Analysis

ColorLok Media Evaluation

AiO Printers: Brother MFC-5490CN, Canon PIXMA MX860 & MX7600, Epson WorkForce 600, HP Officejet 6500 & Officejet Pro 8500

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Research Objective

Ascertain benefits and/or limitations of the ColorLok technology

Independent testing and evaluation of the print quality attributes
…of ColorLok and non-ColorLok media on color inkjet All-in-One (AiO) printers

Variety of AiO printers included in the test

- *AiO's from the major manufacturers were utilized*
- *Both Dye- and Pigment-ink based AiO's tested to evaluate any ColorLok advantages*
- *Focus on media, therefore individual printers not identified*

Print Quality Analysis – Methodology

Determination of ColorLok and non-ColorLok test media

Comparable office-grade plain papers (20# bond, 96 Brightness):

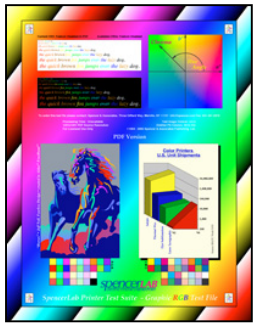
ColorLok Media

- *Domtar Multi-System Ultra with ColorLok Technology*

Non-ColorLok Media

- *Boise X-9 Hi-Brite*

Color Spectrum RGB *Enhanced Black* *Graphic RGB*

Printing of Appropriate Test Files

Test documents from the *SpencerLab* Printer Test Suite

- *Color Spectrum RGB, Enhanced Black* and *Graphic RGB* PDFs

Printed in Default and Draft modes on plain paper

- *Grayscale/Black default mode used for Enhanced Black file*
- *Printed from Windows XP (SP3) using Adobe Reader 9.1.2 with "Let Printer Determine Colors"*

A single printer of each manufacturer was assumed to be representative

- *Color Inkjet AiO's tested*
  - Brother MFC-5490CN, Canon PIXMA MX860 & MX7600, Epson WorkForce 600, and HP Officejet 6500 & Officejet Pro 8500
- *All printers analyzed "blind" with randomly assigned letters*

Printer Maintenance performed prior to testing

- *Print Head Cleaning, Alignment, etc.*

Print Quality analysis on each AiO printer output between ColorLok and non-ColorLok media

Comparative Print quality analysis for the office market

- *Evaluation by a team of experienced SpencerLab analysts*
- *Black and Color TEXT & LINES, TINTS & BLENDS and IMAGES*
- *Black density and color gamut volume and area measured and analyzed*
  - Density (Status T) and Color - L*a*b* (D50/2˚) measurements taken with a calibrated X-Rite 939 spectrodensitometer

Independent testing by *SpencerLab* Digital Color Laboratory, commissioned by Hewlett-Packard Company.

Overall Print Quality Comparative Analysis – Scorecard

On all tested AiO's, printing on ColorLok media provided bolder blacks & more vivid colors

Color Inkjet AiOs	A	B	C	D	E	F
Bold Black*	★★★	★	★★★	★★★	★★	★★
Vivid Color+	★	★	★	★	★★	★★★

Comparative Ratings

ColorLok media was:

✗	★	★★	★★★
Not higher	0-10% higher	10-20% higher	>20% higher

*Bold Black is quantified in terms of Maximum Black Density on respective media

+Vivid Color is quantified in terms of Color Gamut Volume on respective media

Independent testing by *SpencerLab* Digital Color Laboratory, commissioned by Hewlett-Packard Company.

Overall Print Quality Comparative Analysis Summary

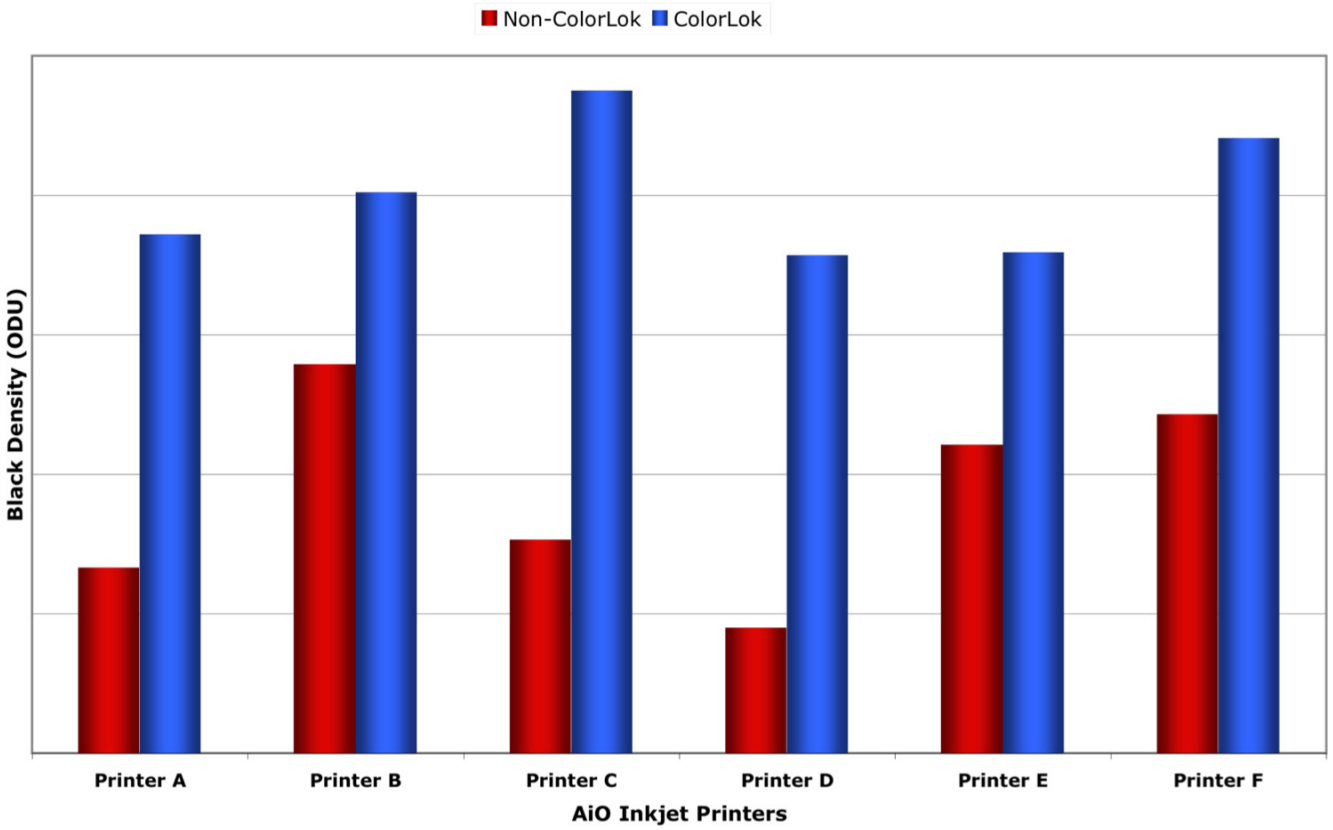
Key Findings

- Noticeable improvement in print quality with ColorLok technology media
  - *…for all tested AiO printers*
  - *Bolder blacks and more vivid colors, especially on pigment-based inkjet printers*
  - *ColorLok's smaller ink spread minimized wicking*
- Primary benefits of ColorLok media:
  - *Greater Black Density and thereby Richer Blacks*
  - *Increased Sharpness*
    - An associated limitation: increased appearance of graininess in pastel tints
  - *Greater Color Gamut Volume and thereby Higher Saturation*

Comparison in default and draft modes for Plain paper.
Independent testing by *SpencerLab* Digital Color Laboratory, commissioned by Hewlett-Packard Company.

Print Quality Test Analysis and Findings

Black Density



All tested AiO printers recorded higher maximum Black Density on the ColorLok media, providing richer and bolder Text & Lines and better depth on graphics and Images

Comparison in default and draft modes for Plain paper.

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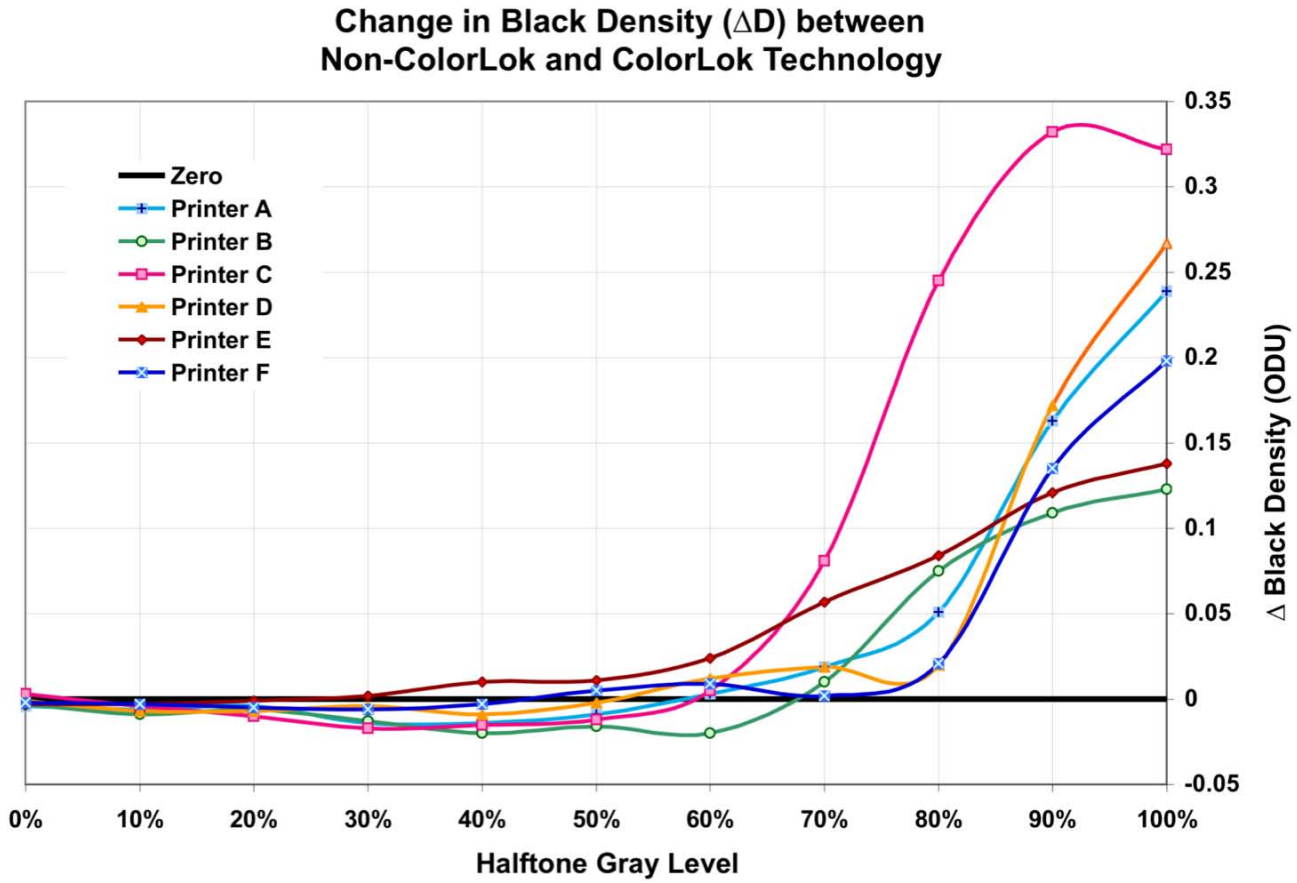
Print Quality Test Analysis and Findings

Change in Black Density



On all tested AiO printers, little change in the black density was noted below 75% between the two media

Comparison in default and draft modes for Plain paper.

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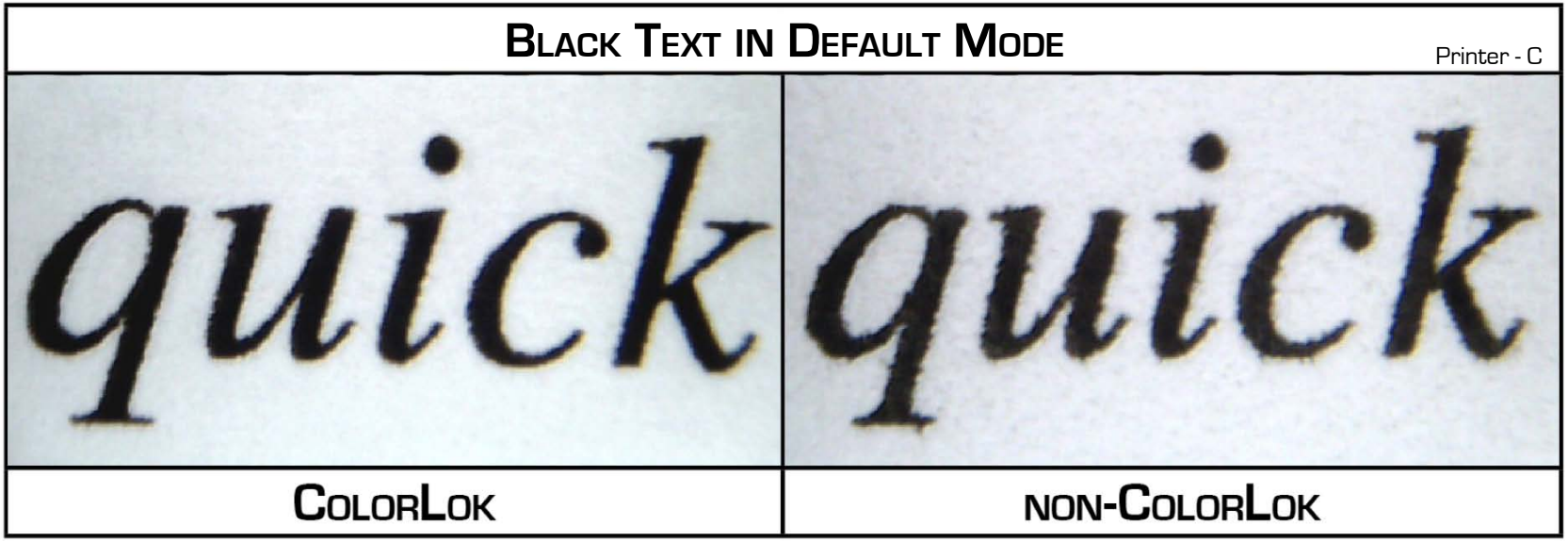
Print Quality Test Analysis and Findings

Black Text & Lines



Default mode

- *Slightly sharper and cleaner with less edge noise than on non-ColorLok media, due to comparatively less wicking and spreading of ink on dye- as well as pigment-based output*
- *On Printer E output, apparent noise was slightly increased by the additional sharpness and density of ColorLok media*

Draft Mode

- *Slightly sharper and darker rendition on ColorLok output*
- *Printer D Draft output was extremely washed out and broken, causing any difference in quality between the two media to be insignificant*

Comparison in default and draft modes for Plain paper.

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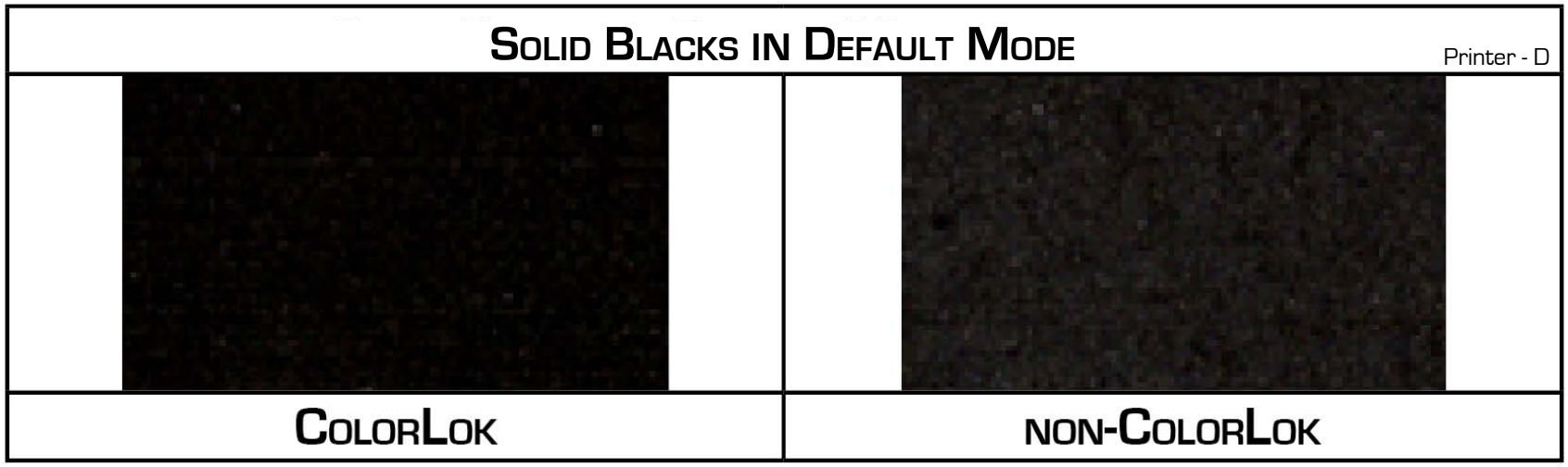
Print Quality Test Analysis and Findings

Solid Blacks



- Default mode
  - *All tested non-ColorLok output exhibited some mottling on solid Blacks as well as saturated colors, most severe on Printer E output*
  - *All tested AiO printer output, except Printer E, were slightly smoother overall on non-ColorLok, appearing less grainy, perhaps due to greater ink spread*
- Draft mode
  - *Comparatively more grainy than Default, making smoothness differences marginal*

Comparison in default and draft modes for Plain paper.

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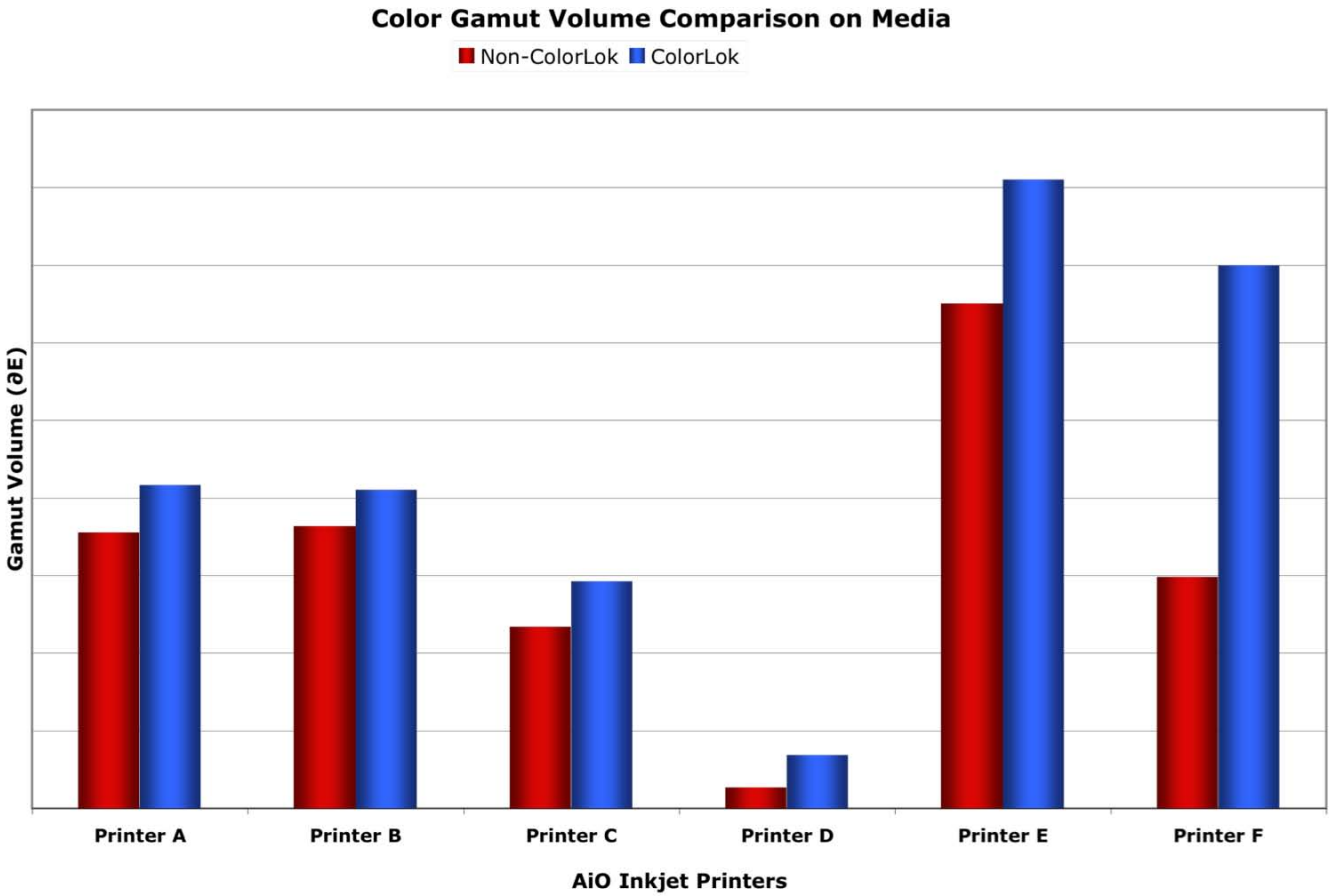
Print Quality Test Analysis and Findings

Gamut Volume



On all tested AiO printers, the color gamut volumes on the ColorLok prints were larger than on non-ColorLok output, contributing to higher saturation and vibrance of colors

Comparison in default and draft modes for Plain paper.

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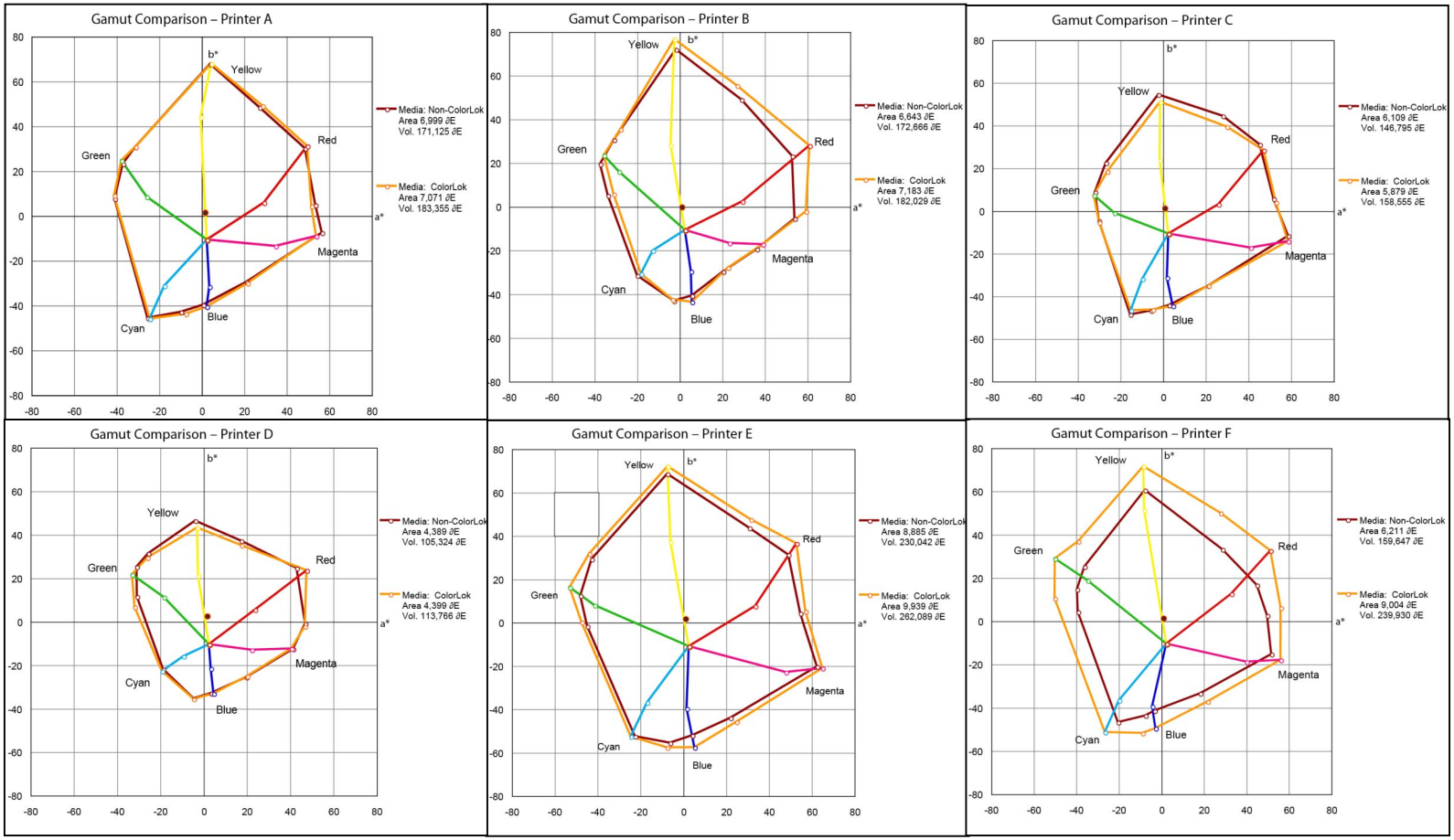
Print Quality Test Analysis and Findings

2-D gamut plot (*a*b**)



Larger color gamut on ColorLok media than non-ColorLok media on all tested AiO printers

Comparison in default and draft modes for Plain paper.

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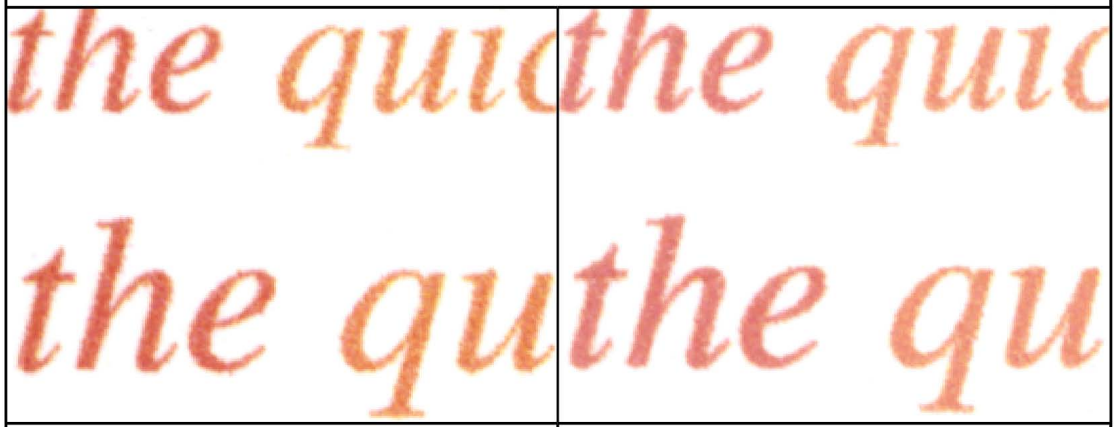
Print Quality Test Analysis and Findings

Color Text & Lines

Color Text in Default Mode	Printer - F
	
ColorLok	non-ColorLok

Default mode

- *Sharper and more saturated output for Printer B and Printer F pigment-ink based machines; Non-ColorLok output on these AiO printers appeared soft in comparison*
- *Printer A, C, and D's dye-based ink output on both media showed negligible differences*

Draft mode

- *Negligible differences between both media due to comparably lower saturation and overall lower quality of output*

Comparison in default and draft modes for Plain paper.
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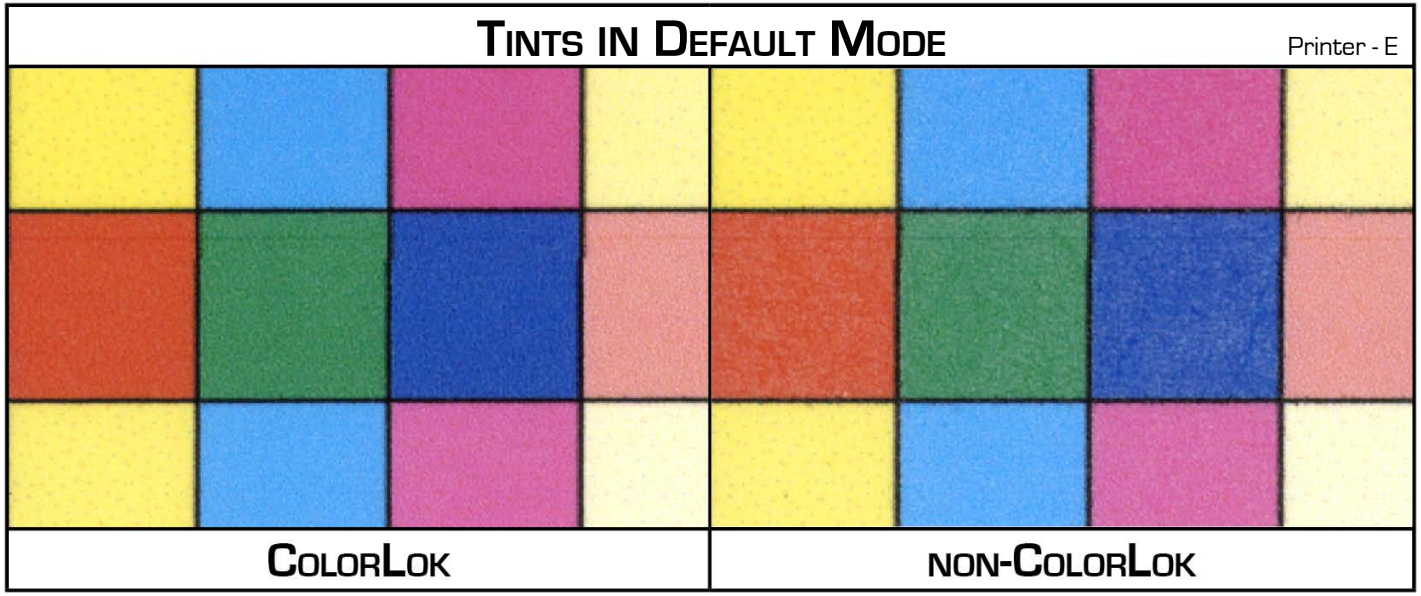
Print Quality Test Analysis and Findings

Tints & Blends



Default mode

- *Printer B, Printer E, and Printer F output had noticeably higher saturation than non-ColorLok output, which appeared muted in comparison*
- *All tested AiO printer output, except Printer E, were slightly smoother overall on non-ColorLok, appearing less grainy, perhaps due to greater ink spread*

Draft mode

- *Comparatively lower saturation and appeared more grainy than Default mode, making saturation and smoothness differences marginal between both media*

Comparison in default and draft modes for Plain paper.

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Print Quality Test Analysis and Findings

Images

- Default mode
  - *On all tested AiO printers, Images were rendered sharper, with higher contrast than non-ColorLok output*
  - *Images from the Printer B, E, and F (pigment-based AiO's) exhibited more vibrant colors on ColorLok media, along with increased color casts*
  - *Printer A, C, and D Images had comparable color rendition on both media*
- Draft mode
  - *Images on Printer A, C, E, and F, were marginally sharper than on non-ColorLok media*

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  - *…for all tested AiO printers*
  - ° *Bolder blacks and more vivid colors, especially on pigment-based inkjet printers*
  - ° *ColorLok's smaller ink spread minimized wicking*
- Primary benefits of ColorLok media:
  - ° *Greater Black Density*
    and thereby Richer Blacks
  - ° *Increased Sharpness*
    - An associated limitation: increased appearance of graininess in pastel tints
  - ° *Greater Color Gamut Volume*
    and thereby Higher Saturation

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Full Report available on:
www.spencerlab.com

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