

Inkjet Printer Long-Term Storage Test

APRIL 2014

HP Inkjet Printers with Individual Ink Supplies



Test Objective:

Buyers Laboratory LLC (BLI), Hackensack, NJ (USA), was commissioned by the Hewlett-Packard Company to assess the resistance of HP inkjet products against ink drying up. Therefore, a test was conducted on nine HP models (three Officejet Pro 3610 models, three Deskjet Ink Advantage 4615 models and three Officejet Pro 8100 ePrinter models) to evaluate the impact of long-term periods of non-use on the print performance of HP inkjet print cartridges when stored under conditions of high heat and low relative humidity (RH). An extreme temperature of 37°C was chosen, which is the average summer high in New Dehli, India, according to weatherspark.com; and 20%RH was selected as it is the lowest recommended storage humidity of the ink cartridges tested.

Test Methodology:

Following a 24-hour acclimation period, each printer was installed on BLI's lab test network and 100 pages of the ISO 19752 single-page test document were printed and stored for the Officejet Pro 3610, which is a monochrome device, and 10 sets of the ISO 24711 five-page test suite were printed and stored for the Deskjet Ink Advantage 4615 and 20 sets on the Officejet Pro 8100 ePrinter, which are color models. The printers, with the cartridges installed, were allowed to completely power down before they were unplugged and were then stored in a Thermatron WP-446 Walk-in Environmental Chamber for 12 weeks with conditions set at 37°C/20%RH. Following the 12-week period of non-use, the printers were reinstalled on BLI's lab test network and, after a 24-hour acclimation period, five pages of the ISO 19752 single-page test document were printed for Officejet Pro 3610 models one set of the ISO 24711 five-page test suite was printed on each Deskjet Ink Advantage 4615 and Officejet Pro 8100 ePrinter model for comparison with the initial print samples.

Conclusion:

Absolutely no print quality degradation or reliability issues were observed by BLI with the nine devices tested after the 12 weeks of printer storage, clearly demonstrating that extended storage of HP models even under these extreme conditions of high heat and very low relative humidity does not have an ink dry-out effect on these HP print systems. Although light streaking was observed in the samples printed on all but one of the models following 12 weeks of storage, this was quickly resolved by using the printhead cleaning function as necessary.

Test Observations:

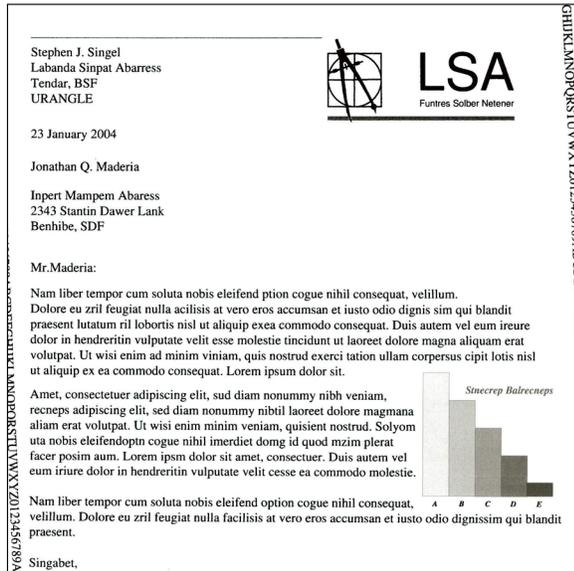
As can be seen from the “before and after” print samples below, there are no discernible differences in the print quality of the Exhibit A and Exhibit B prints produced by each device, indicating that the quality of the HP ink cartridges was unaffected by the 12-week period of idle time under the extreme conditions of 37°C/20%RH.

HP Officejet Pro 3610 (HP 960 Ink)

Device A

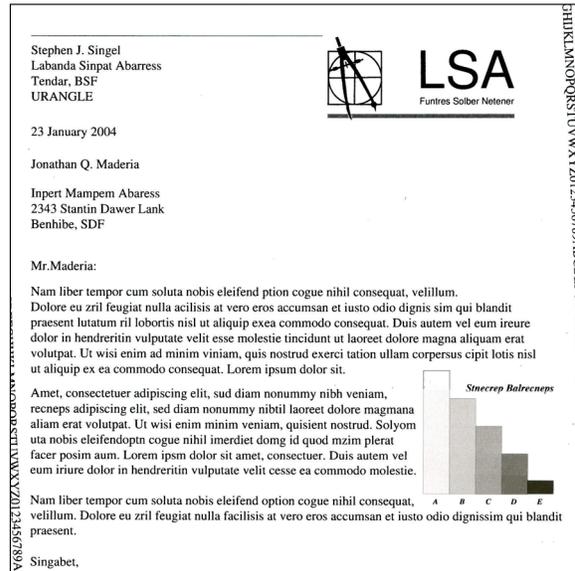
Test Print Samples Before Storage:

Exhibit A



Test Print Samples After 12 Weeks of Storage:

Exhibit B



Device B

Test Print Samples Before Storage:

Exhibit A

Stephen J. Singel
Labanda Sinpat Abarress
Tendar, BSF
URANGLE

23 January 2004

Jonathan Q. Maderia

Inpert Mampem Abarress
2343 Stantin Dawer Lank
Benhibe, SDF

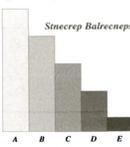
Mr.Maderia:

Nam liber tempor cum soluta nobis eleifend ptiom cogue nihil consequat, velillum. Dolore eu zril feugiat nulla acilisis at vero eros accumsan et iusto odio dignis sim qui blandit praesent lutatum ril lobortis nisl ut aliquip exea commodo consequat. Duis autem vel eum ireure dolor in hendreritin vulputate velit esse molestie tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim viniam, quis nostrud exerci tation ullam corporsus cipit lotis nisl ut aliquip ex ea commodo consequat. Lorem ipsum dolor sit.

Amet, consectetuer adipiscing elit, sud diam nonummy nibh veniam, recneps adipiscing elit, sed diam nonummy nibtil laoreet dolore magna aliam erat volutpat. Ut wisi enim minim veniam, quisient nostrud. Solyom uta nobis eleifendoptn cogue nihil imerdiet domg id quod mzim plerat facer posim aum. Lorem ipsm dolor sit amet, consectuer. Duis autem vel eum iriure dolor in hendreritin vulputate velit cesse ea commodo molestie.

Nam liber tempor cum soluta nobis eleifend option cogue nihil consequat, velillum. Dolore eu zril feugiat nulla facilisis at vero eros accumsan et iusto odio dignissim qui blandit praesent.

Singabet,

Test Print Samples After 12 Weeks of Storage:

Exhibit B

Stephen J. Singel
Labanda Sinpat Abarress
Tendar, BSF
URANGLE

23 January 2004

Jonathan Q. Maderia

Inpert Mampem Abarress
2343 Stantin Dawer Lank
Benhibe, SDF

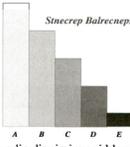
Mr.Maderia:

Nam liber tempor cum soluta nobis eleifend ptiom cogue nihil consequat, velillum. Dolore eu zril feugiat nulla acilisis at vero eros accumsan et iusto odio dignis sim qui blandit praesent lutatum ril lobortis nisl ut aliquip exea commodo consequat. Duis autem vel eum ireure dolor in hendreritin vulputate velit esse molestie tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim viniam, quis nostrud exerci tation ullam corporsus cipit lotis nisl ut aliquip ex ea commodo consequat. Lorem ipsum dolor sit.

Amet, consectetuer adipiscing elit, sud diam nonummy nibh veniam, recneps adipiscing elit, sed diam nonummy nibtil laoreet dolore magna aliam erat volutpat. Ut wisi enim minim veniam, quisient nostrud. Solyom uta nobis eleifendoptn cogue nihil imerdiet domg id quod mzim plerat facer posim aum. Lorem ipsm dolor sit amet, consectuer. Duis autem vel eum iriure dolor in hendreritin vulputate velit cesse ea commodo molestie.

Nam liber tempor cum soluta nobis eleifend option cogue nihil consequat, velillum. Dolore eu zril feugiat nulla facilisis at vero eros accumsan et iusto odio dignissim qui blandit praesent.

Singabet,

Device C

Test Print Samples Before Storage:

Exhibit A

Stephen J. Singel
Labanda Sinpat Abarress
Tendar, BSF
URANGLE

23 January 2004

Jonathan Q. Maderia

Inpert Mampem Abarress
2343 Stantin Dawer Lank
Benhibe, SDF

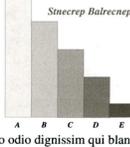
Mr.Maderia:

Nam liber tempor cum soluta nobis eleifend ptiom cogue nihil consequat, velillum. Dolore eu zril feugiat nulla acilisis at vero eros accumsan et iusto odio dignis sim qui blandit praesent lutatum ril lobortis nisl ut aliquip exea commodo consequat. Duis autem vel eum ireure dolor in hendreritin vulputate velit esse molestie tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim viniam, quis nostrud exerci tation ullam corporsus cipit lotis nisl ut aliquip ex ea commodo consequat. Lorem ipsum dolor sit.

Amet, consectetuer adipiscing elit, sud diam nonummy nibh veniam, recneps adipiscing elit, sed diam nonummy nibtil laoreet dolore magna aliam erat volutpat. Ut wisi enim minim veniam, quisient nostrud. Solyom uta nobis eleifendoptn cogue nihil imerdiet domg id quod mzim plerat facer posim aum. Lorem ipsm dolor sit amet, consectuer. Duis autem vel eum iriure dolor in hendreritin vulputate velit cesse ea commodo molestie.

Nam liber tempor cum soluta nobis eleifend option cogue nihil consequat, velillum. Dolore eu zril feugiat nulla facilisis at vero eros accumsan et iusto odio dignissim qui blandit praesent.

Singabet,

Test Print Samples After 12 Weeks of Storage:

Exhibit B

Stephen J. Singel
Labanda Sinpat Abarress
Tendar, BSF
URANGLE

23 January 2004

Jonathan Q. Maderia

Inpert Mampem Abarress
2343 Stantin Dawer Lank
Benhibe, SDF

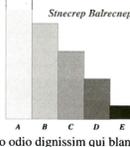
Mr.Maderia:

Nam liber tempor cum soluta nobis eleifend ptiom cogue nihil consequat, velillum. Dolore eu zril feugiat nulla acilisis at vero eros accumsan et iusto odio dignis sim qui blandit praesent lutatum ril lobortis nisl ut aliquip exea commodo consequat. Duis autem vel eum ireure dolor in hendreritin vulputate velit esse molestie tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim viniam, quis nostrud exerci tation ullam corporsus cipit lotis nisl ut aliquip ex ea commodo consequat. Lorem ipsum dolor sit.

Amet, consectetuer adipiscing elit, sud diam nonummy nibh veniam, recneps adipiscing elit, sed diam nonummy nibtil laoreet dolore magna aliam erat volutpat. Ut wisi enim minim veniam, quisient nostrud. Solyom uta nobis eleifendoptn cogue nihil imerdiet domg id quod mzim plerat facer posim aum. Lorem ipsm dolor sit amet, consectuer. Duis autem vel eum iriure dolor in hendreritin vulputate velit cesse ea commodo molestie.

Nam liber tempor cum soluta nobis eleifend option cogue nihil consequat, velillum. Dolore eu zril feugiat nulla facilisis at vero eros accumsan et iusto odio dignissim qui blandit praesent.

Singabet,

HP Deskjet Ink Advantage 4615 (HP 685 Ink)

Device A

Test Print Samples Before Storage:

Exhibit A1



Test Print Samples After 12 Weeks of Storage:

Exhibit A2



Exhibit B1

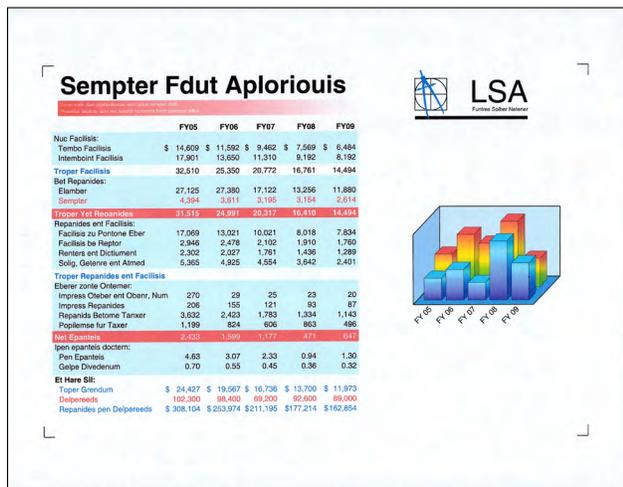
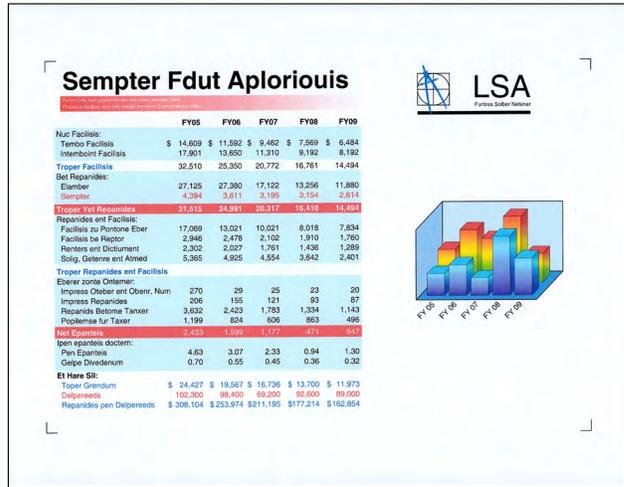


Exhibit B2



Test Print Samples Before Storage:

Exhibit C1

14 December 2004
MCLXXVII

Ve Emerirre Et Tum Ober

Lorem
 Nullam ut lorem. Sed vehicula leo sit amet elit. Maurisquam mi, dapibus nec, pharetra a sollicitud vel, risus. Donec urna. Morbi sit amet tortor. In nulla. Ut sodales volutpat erat. Morbi dictum nibh quis est.

In cursor. Quisque ac dui. Maecenas vehicula. Nam imperdiet risus eget elit. Fusce dictum. Vivamus ut eros. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque rhoncus, est in rutrum faucibus, velit leo volutpat purus, a blandit wisi velit quis est. Donec dolor augue, suscipit nec, nonummy eget, scelerisque in, est. Integer nisi. Aliquam et lacus eget magna scelerisque blandit. Nullam sapien neque, vulputate non, porttitor nec, faucibus et, est. Ut fringilla turpis ut magna porttitor tempor. Praesent erat. Donec sed erat consequat ligula pulvinar dapibus. Etiam sapien. Donec a risus ut augue in condimentum. Fusce laoreet, risus nec euismod suscipit, orci ligula tempor massa, et ultrices nulla quam ut enim. Quisque in nunc.

Carbitur
 Fusce feugiat metus sed augue. Nunc ligula. Aenean lectus elit, pellentesque sit amet, gravida eget, fringilla non, massa. Vestibulum metus neque, feugiat a, imperdiet id, elementum ac, nunc. Suspendisse tempor. Aliquam vitae arcu. Nunc mauris nunc, cursus at, sollicitudin eget, pellentesque et, massa. Nulla vulputate, wisi at consequat gravida, wisi tellus lacinia ante, aliquam consequat lectus eros at nibh. Donec porttitor. libero at laculis sodales, dui tellus rutrum elit, eu pulvinar neque lorem condimentum dui. Nam vel quam quis lacus egestas lobortis. Pellentesque purus magna, cuben sed, trisodant blandit, accumsan ac, orci. In fringilla. Pellentesque rhoncus euismod risus. Nunc nec nisi. Etiam rhoncus, felis et pellentesque consequat, diam ante congue leo, ac vulputate tella purus id ipsum. Proin vestibulum diam quis mauris. Nullam ornare metus in odio. Duis nisi. Curabitur ullamcorper. Cras elit velit, dictum eget, pharetra ac, cursus id, arcu. Mauris mauris justo, vol utpat non, varius. Aliquam vitae arcu. Nunc mauris nunc, cursus at, solli ctitudin dictum eget.

Nulla mor nare
 Morbi at sem. Pellentesque risus. Morbi nec neque. Sed fringilla. Donec et leo. Pharetra lacinia blandit mi. Etiam eget leo at enim pretium malesuada. Vivamus in lorem. Nullam semper tempor lorem. Pellentesque et magna. Nunc porta varius leo. Integer elementum, mi eget tempor vestibulum.

Ut
 Hendrent in vulputate velit esse modeste

Printer Make	Model
Brother G460	E460
Canon Pixma	CP4500
Epson Stylus	CX4500
HP Inkjet	HP4500
Lexmark Z4100	Z4100
Minolta Diigo	Diigo
Panasonic	CP4500
Samsung ML4500	ML4500
Xerox Phaser	Phaser

Test Print Samples After 12 Weeks of Storage:

Exhibit C2

14 December 2004
MCLXXVII

Ve Emerirre Et Tum Ober

Lorem
 Nullam ut lorem. Sed vehicula leo sit amet elit. Maurisquam mi, dapibus nec, pharetra a sollicitud vel, risus. Donec urna. Morbi sit amet tortor. In nulla. Ut sodales volutpat erat. Morbi dictum nibh quis est.

In cursor. Quisque ac dui. Maecenas vehicula. Nam imperdiet risus eget elit. Fusce dictum. Vivamus ut eros. Lorem ipsum dolor sit amet, consectetur adipiscing elit. Pellentesque rhoncus, est in rutrum faucibus, velit leo volutpat purus, a blandit wisi velit quis est. Donec dolor augue, suscipit nec, nonummy eget, scelerisque in, est. Integer nisi. Aliquam et lacus eget magna scelerisque blandit. Nullam sapien neque, vulputate non, porttitor nec, faucibus et, est. Ut fringilla turpis ut magna porttitor tempor. Praesent erat. Donec sed erat consequat ligula pulvinar dapibus. Etiam sapien. Donec a risus ut augue in condimentum. Fusce laoreet, risus nec euismod suscipit, orci ligula tempor massa, et ultrices nulla quam ut enim. Quisque in nunc.

Carbitur
 Fusce feugiat metus sed augue. Nunc ligula. Aenean lectus elit, pellentesque sit amet, gravida eget, fringilla non, massa. Vestibulum metus neque, feugiat a, imperdiet id, elementum ac, nunc. Suspendisse tempor. Aliquam vitae arcu. Nunc mauris nunc, cursus at, sollicitudin eget, pellentesque et, massa. Nulla vulputate, wisi at consequat gravida, wisi tellus lacinia ante, aliquam consequat lectus eros at nibh. Donec porttitor. libero at laculis sodales, dui tellus rutrum elit, eu pulvinar neque lorem condimentum dui. Nam vel quam quis lacus egestas lobortis. Pellentesque purus magna, rutrum sed, trisodant blandit, accumsan ac, orci. In fringilla. Pellentesque rhoncus euismod risus. Nunc nec nisi. Etiam rhoncus, felis et pellentesque consequat, diam ante congue leo, ac vulputate tella purus id ipsum. Proin vestibulum diam quis mauris. Nullam ornare metus in odio. Duis nisi. Curabitur ullamcorper. Cras elit velit, dictum eget, pharetra ac, cursus id, arcu. Mauris mauris justo, vol utpat non, varius. Aliquam vitae arcu. Nunc mauris nunc, cursus at, solli ctitudin dictum eget.

Nulla mor nare
 Morbi at sem. Pellentesque risus. Morbi nec neque. Sed fringilla. Donec et leo. Pharetra lacinia blandit mi. Etiam eget leo at enim pretium malesuada. Vivamus in lorem. Nullam semper tempor lorem. Pellentesque et magna. Nunc porta varius leo. Integer elementum, mi eget tempor vestibulum.

Ut
 Hendrent in vulputate velit esse modeste

Printer Make	Model
Brother G460	E460
Canon Pixma	CP4500
Epson Stylus	CX4500
HP Inkjet	HP4500
Lexmark Z4100	Z4100
Minolta Diigo	Diigo
Panasonic	CP4500
Samsung ML4500	ML4500
Xerox Phaser	Phaser

Exhibit D1

14 December 2004
MCLXXVII

Suscipt Lobortis

Adipiscing
 Enim
 Wisi
 Ut
 Hendrent in vulputate velit esse modeste

Smeccp Balreccneps
 Wisi
 Enim
 Pr
 Ut

- Donec citae diam pellenteque sem vitus et ala em luctus semper
- Praesent nulla lacus ultrices quis um toper bine
- Maecenas felis leo posuere quis sagittis pradem
- Pellentesque in dui et sollicitudin dictum etoper

Exhibit D2

14 December 2004
MCLXXVII

Suscipt Lobortis

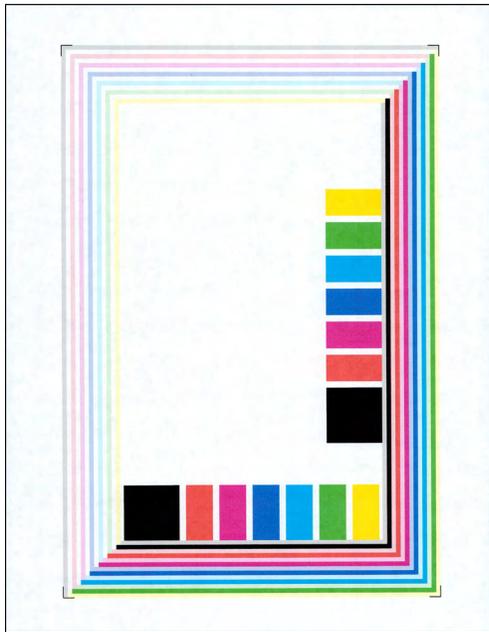
Adipiscing
 Enim
 Wisi
 Ut
 Hendrent in vulputate velit esse modeste

Smeccp Balreccneps
 Wisi
 Enim
 Pr
 Ut

- Donec citae diam pellenteque sem vitus et ala em luctus semper
- Praesent nulla lacus ultrices quis um toper bine
- Maecenas felis leo posuere quis sagittis pradem
- Pellentesque in dui et sollicitudin dictum etoper

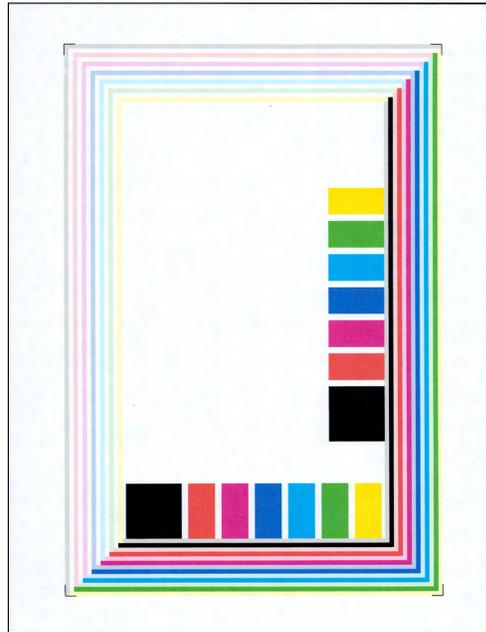
Test Print Samples Before Storage:

Exhibit E1



Test Print Samples After 12 Weeks of Storage:

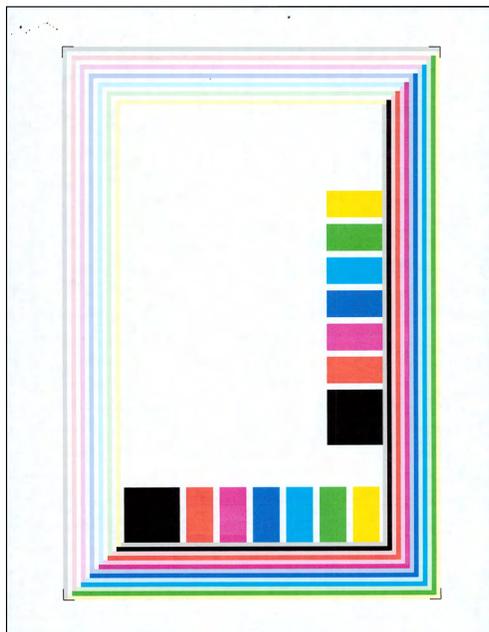
Exhibit E2



Device B

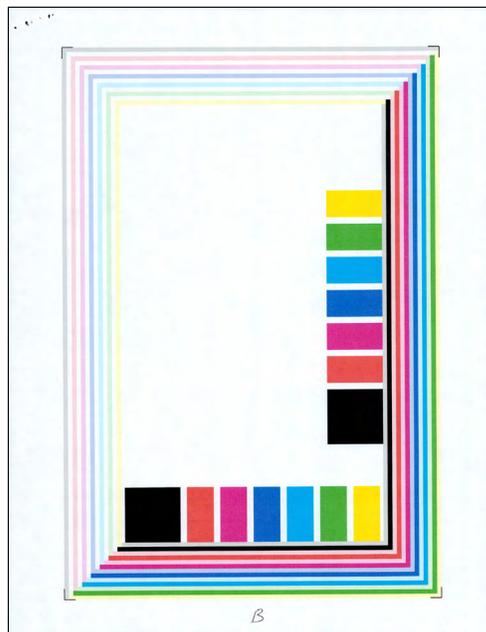
Test Print Samples Before Storage:

Exhibit A



Test Print Samples After 12 Weeks of Storage:

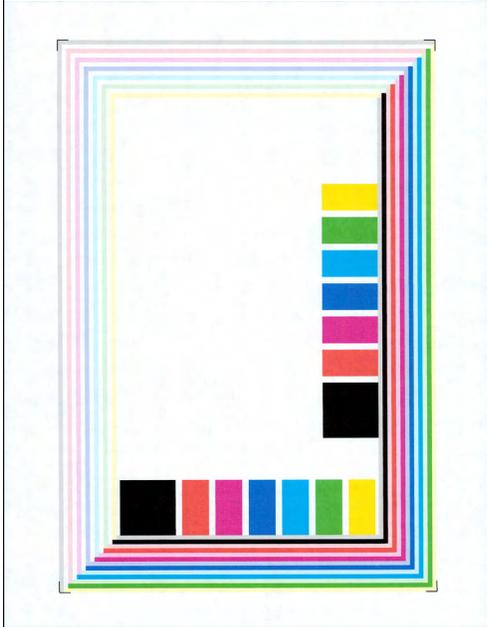
Exhibit B



Device C

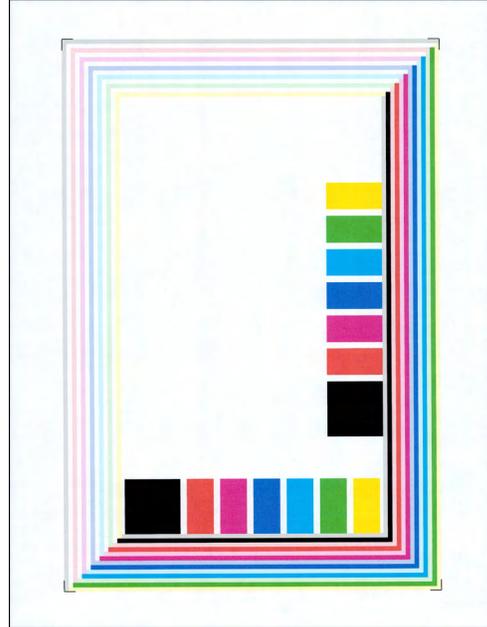
Test Print Samples Before Storage:

Exhibit A



Test Print Samples After 12 Weeks of Storage:

Exhibit B



HP Officejet Pro 8100 ePrinter (HP 950/951 Ink)

Device A

Test Print Samples Before Storage:

Exhibit A1



Test Print Samples After 12 Weeks of Storage:

Exhibit A2



Exhibit B1

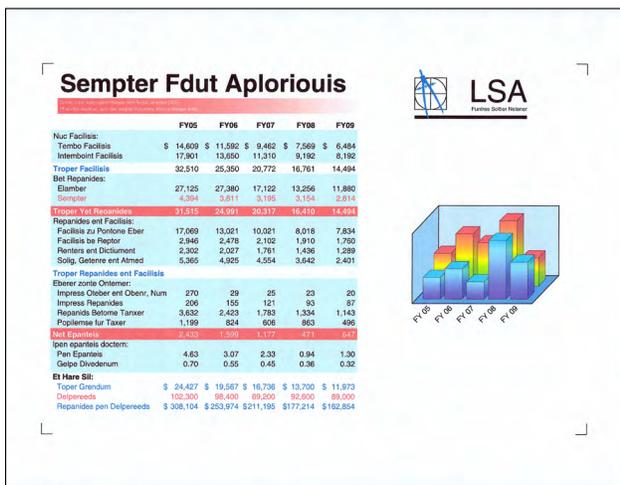
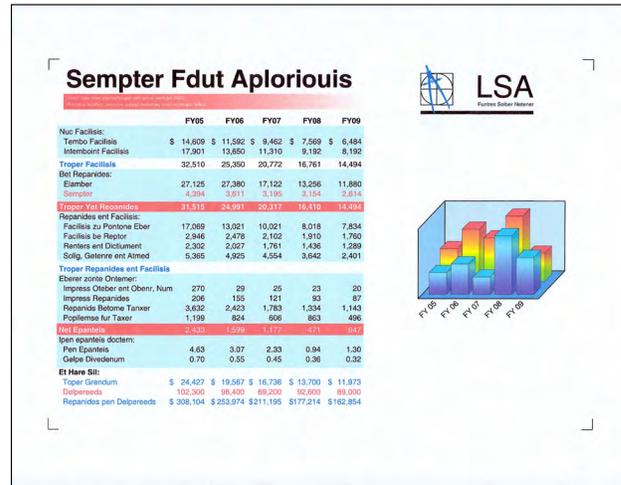


Exhibit B2



Test Print Samples Before Storage:

Exhibit C1



Test Print Samples After 12 Weeks of Storage:

Exhibit C2

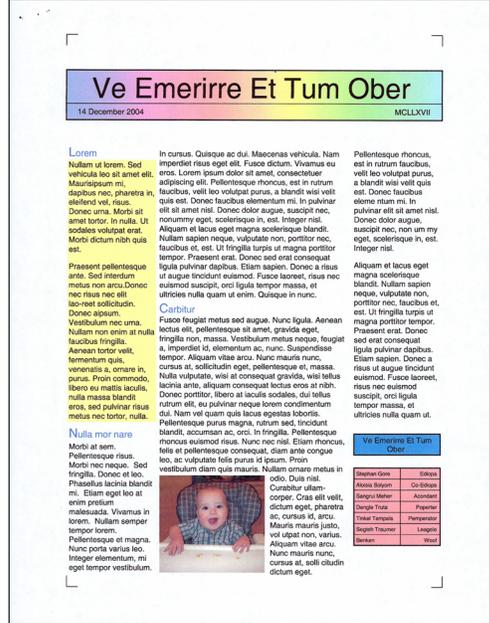


Exhibit D1

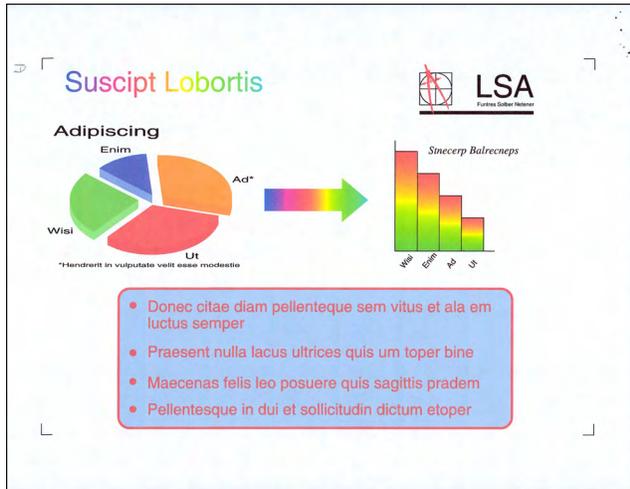
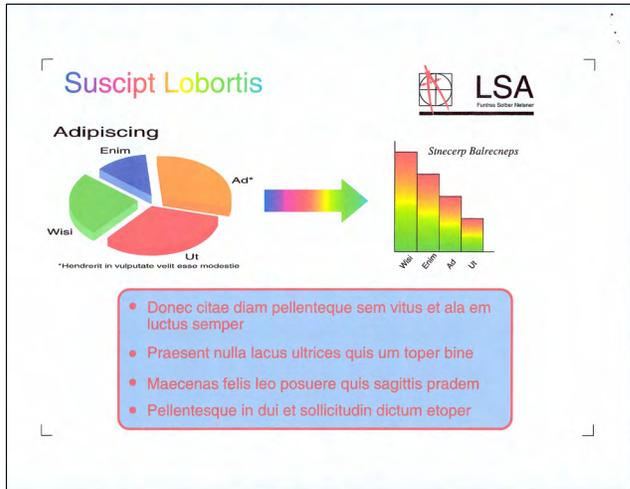
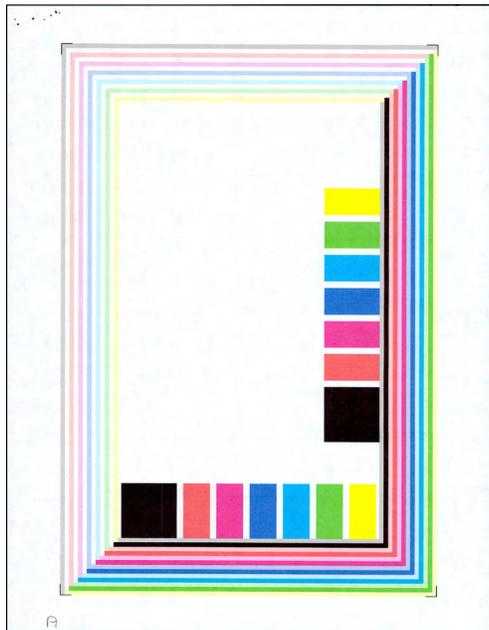


Exhibit D2



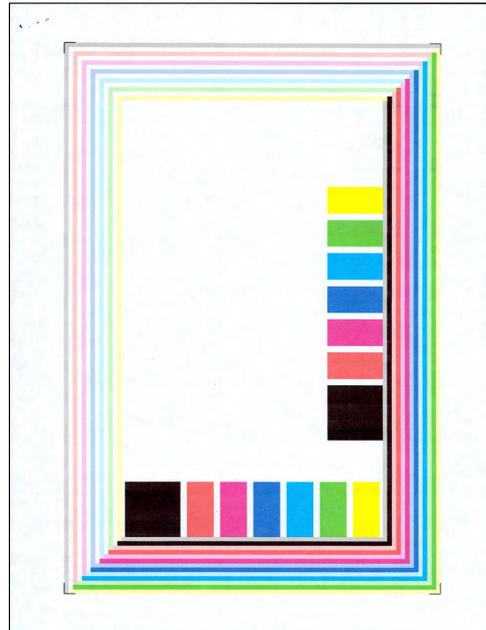
Test Print Samples Before Storage:

Exhibit E1



Test Print Samples After 12 Weeks of Storage:

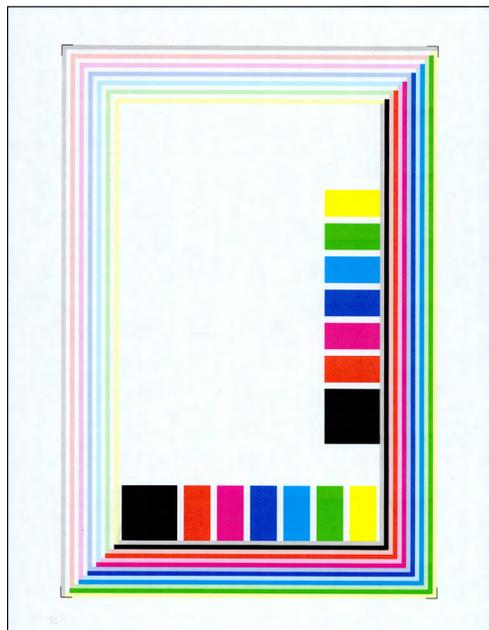
Exhibit E2



Device B

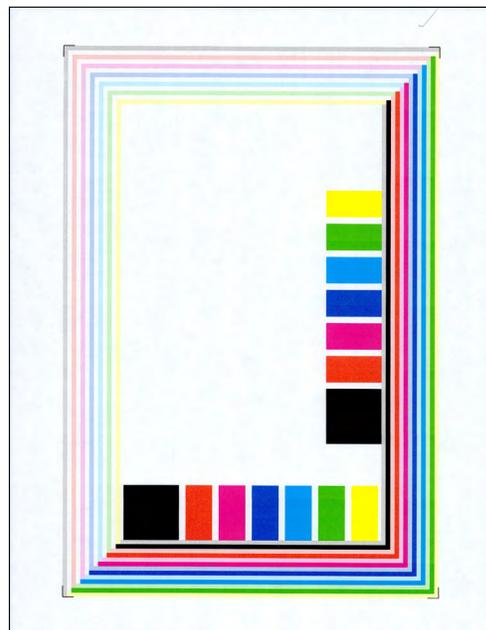
Test Print Samples Before Storage:

Exhibit A



Test Print Samples After 12 Weeks of Storage:

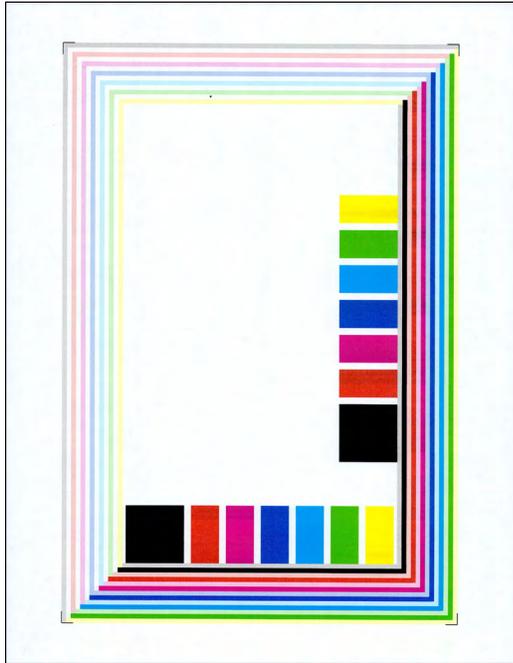
Exhibit B



Device C

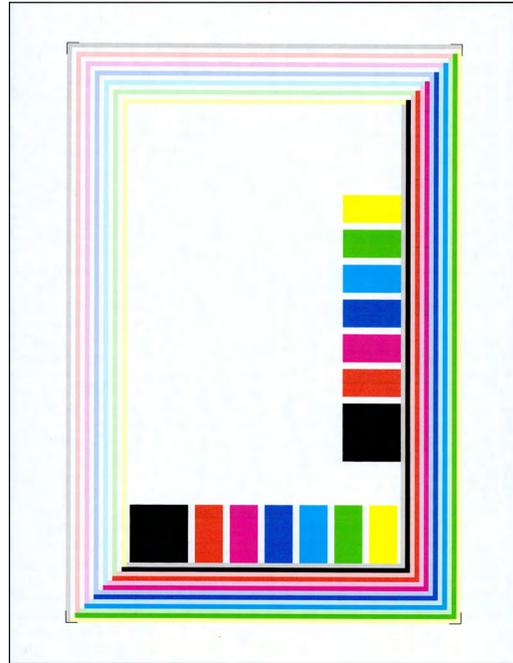
Test Print Samples Before Storage:

Exhibit A



Test Print Samples After 12 Weeks of Storage:

Exhibit B



Supporting Test Data

Test Equipment:

BLI's dedicated test network, consisting of Windows 2003 and Microsoft Exchange 2003 servers, Windows XP and 7 Professional workstations, 10BaseT/100BaseTX network switches and CAT5 cabling. Thermotron WP-446 Walk-in Environmental Chamber.

Lab Test Environment:

Print testing was conducted in BLI's test facility located at 20 Railroad Avenue, Hackensack, NJ, and under ambient conditions of 20°C to 22°C and 45% RH (+/-10%), with daily conditions monitored by an Extech RH520 temperature/humidity digital recorder and Honeywell Model 61 Seven-Day Temperature/Humidity Chart Recorder. During the 12-week period of non-use, all printers were stored in a Thermatron WP-446 Walk-in Environmental Chamber with conditions set at 37°C/20%RH.

Compatible Printers

The following cartridges used in testing are compatible with these printers and the results from testing will also apply to these models.

HP 685 ink	HP 950/951 ink	HP 960 ink
<p>HP Deskjet Ink Advantage 3525 e-All-in-One Printer</p> <p>HP Deskjet Ink Advantage 4615 All-in-One Printer</p> <p>HP Deskjet Ink Advantage 4625 e-All-in-One Printer</p> <p>HP Deskjet Ink Advantage 5525 e-All-in-One Printer</p> <p>HP Deskjet Ink Advantage 6525 e-All-in-One Printer</p>	<p>HP Officejet Pro 251dw Printer</p> <p>HP Officejet Pro 276dw Multifunction Printer</p> <p>HP Officejet Pro 8100 ePrinter</p> <p>HP Officejet Pro 8600 e-All-in-One Printer</p> <p>HP Officejet Pro 8600 Plus e-All-in-One Printer</p> <p>HP Officejet Pro 8600 Premium e-All-in-One</p>	<p>HP Officejet Pro 3610 Black & White e-All-in-One Printer</p> <p>HP Officejet Pro 3620 Black & White e-All-in-One Printer</p>

About Buyers Laboratory LLC

Buyers Laboratory LLC (BLI) is the world's leading independent provider of analytical information and services to the digital imaging and document management industry. For over 50 years, buyers have relied on BLI to help them differentiate products' strengths and weaknesses and make the best purchasing decisions, while industry sales, marketing and product professionals have turned to BLI for insightful competitive intelligence and valued guidance on product development, competitive positioning and sales channel and marketing support. Using BLI's web-based bliQ and Solutions Center services, 40,000 professionals worldwide create extensive side-by-side comparisons of hardware and software solutions for over 15,000 products globally, including comprehensive specifications and the performance results and ratings from BLI's unparalleled Lab, Solutions and Environmental Test Reports, the result of months of hands-on evaluation in its US and UK labs. The services, also available via mobile devices, include a comprehensive library of BLI's test reports, an image gallery, hard to find manufacturers' literature and valuable tools for configuring products, calculating total cost of ownership (TCO) and annual power usage. BLI also offers consulting and private, for-hire testing services that help manufacturers develop and market better products and consumables.

For more information on Buyers Laboratory LLC, please call 201-488-0404, visit www.buyerslab.com, or email info@buyerslab.com.