

Printing Comparison Study

Adobe LeanPrint

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Executive Summary

In December 2012, QualityLogic completed a study for Adobe designed to compare the ability of the Adobe LeanPrint software to reduce toner usage as compared to conventional printing. The Adobe LeanPrint software has the ability to restructure the layout of a document, thereby printing the document on fewer sheets of paper. LeanPrint can also vary the toner intensity, remove unwanted document content, and print color documents in a black and white mode.

QualityLogic tested the LeanPrint software to discover the toner saving potential of the software with the supported Windows applications (Microsoft Office 2010 Word and Excel, Adobe Reader XI, and Internet Explorer 9), a test suite of files created by QualityLogic for each application, and the Hewlett-Packard (HP) LaserJet Enterprise 500 color M551 printer with HP 507A toner cartridges.

Printing was performed in a controlled environment, weighing the toner cartridges after each test to determine toner use.

The results of the study show that the Adobe LeanPrint software provided significant savings in toner compared to conventional printing.

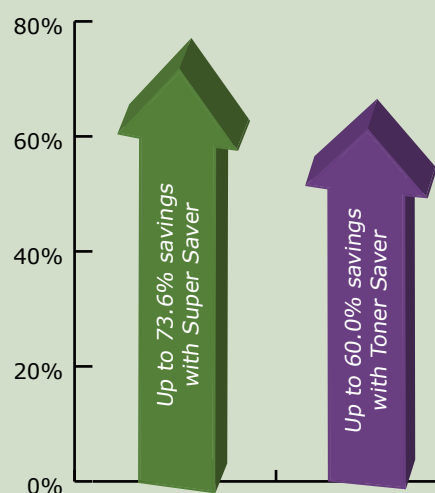
LeanPrint Super Saver

Printing with LeanPrint Super Saver mode provided up to 73.6% savings compared to conventional printing.

LeanPrint Toner Saver

Printing with LeanPrint Toner Saver mode provided up to 60.0% savings compared to conventional printing.

LeanPrint Toner Savings



Note: Web printing with images was included with the color Super Saver and color Toner Saver results, and web printing without images was included with the black and white Super Saver and black and white Toner Saver results.

Test Overview

LeanPrint Overview

Adobe describes LeanPrint as “an enterprise-class, software-only printing solution that helps keep expenses in check without adversely affecting print volume. The solution uses an innovative method to reformat the layout of documents while printing from popular business productivity applications and web browsers... Adobe LeanPrint can substantially reduce paper and toner use, dramatically lowering costs and environmental impact without enforcing restrictions on employees that can stifle productivity.”

QualityLogic tested LeanPrint in various printing modes to verify the toner saving potential of the software using a suite of test files created by QualityLogic. The test suite included 51 test files (17 for each of the applications tested) and 46 web sites totaling 4,076 pages as follows:

Test Application	Number of Files	Total Pages
Microsoft Word	17	1,121
Microsoft Excel	17	770
Adobe Reader	17	1,570
Internet Explorer	46	615

The detailed results of the QualityLogic tests are shown in the Detailed Results section below.

LeanPrint Super Saver

LeanPrint Super Saver mode is available in Microsoft Word, Microsoft Excel and Adobe Reader. The Super Saver option dynamically transforms longer, full-color documents into shorter, more resource-friendly documents by automatically altering the layout to be more space efficient.

LeanPrint Toner Saver

LeanPrint Toner Saver mode is also available in Microsoft Word, Microsoft Excel and Adobe Reader. Toner Saver applies intelligent printing techniques to significantly reduce toner consumption in color and grayscale printing without impacting the layout of the document. Toner Saver mode fully maintains the structure and layout of visible content.

LeanPrint Web Printing

LeanPrint Web Printing is available with Microsoft Internet Explorer, Firefox and Chrome web browsers. QualityLogic tested LeanPrint with Microsoft Internet Explorer.

LeanPrint web printing removes unwanted content from web pages and offers the user the choice to print with or without the images shown on the web page.

Detailed Results

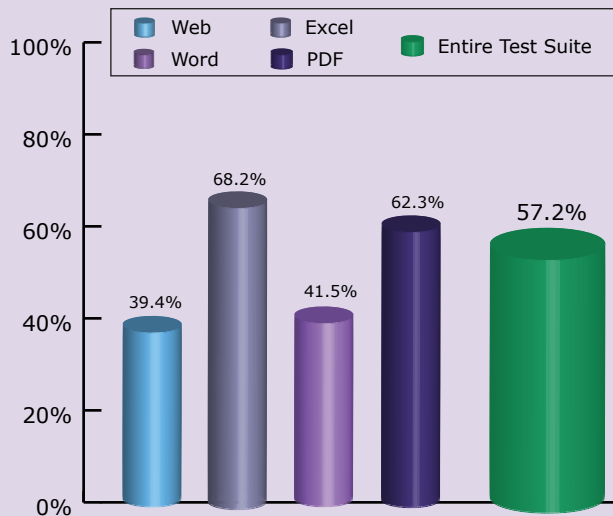
LeanPrint Super Saver

QualityLogic tested LeanPrint in Super Saver color and black and white modes, recording the following results:

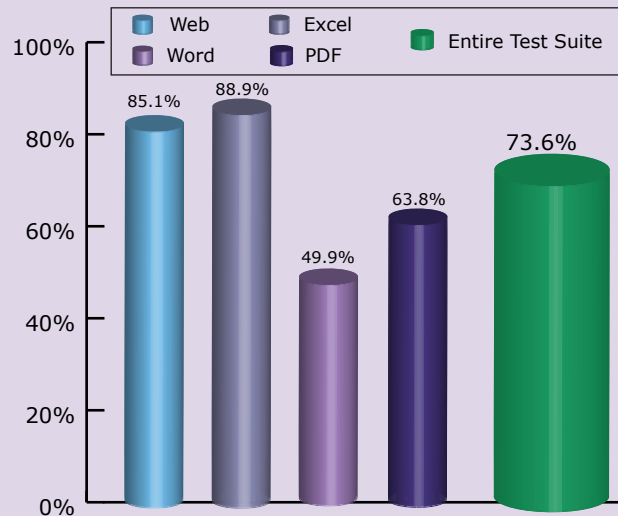
LeanPrint Mode	Result Description	Web	Excel	Word	Adobe Reader	Full Test Suite
Super Saver Color Result	Conventional Printing - Toner Consumed (g)	20.08	49.93	25.49	40.27	135.76
	Super Saver Color - Toner Consumed (g)	12.17	15.86	14.90	15.18	58.11
	LeanPrint Toner Savings (g)	7.92	34.07	10.59	25.08	77.66
	LeanPrint Toner Savings (%)	39.4%	68.2%	41.5%	62.3%	57.2%
Super Saver Black and White Result	Conventional Printing - Toner Consumed (g)	20.08	49.93	25.49	40.27	135.76
	Super Saver Black and White - Toner Consumed (g)	2.99	5.53	12.77	14.57	35.86
	LeanPrint Toner Savings (g)	17.09	44.40	12.73	25.70	99.91
	LeanPrint Toner Savings (%)	85.1%	88.9%	49.9%	63.8%	73.6%

Note: Web printing with images was included with the color Super Saver and color Toner Saver results, and web printing without images was included with the black and white Super Saver and black and white Toner Saver results.

LeanPrint Color Super Saver Results
Percent Savings Over Conventional Printing



LeanPrint Black & White Super Saver Results
Percent Savings Over Conventional Printing



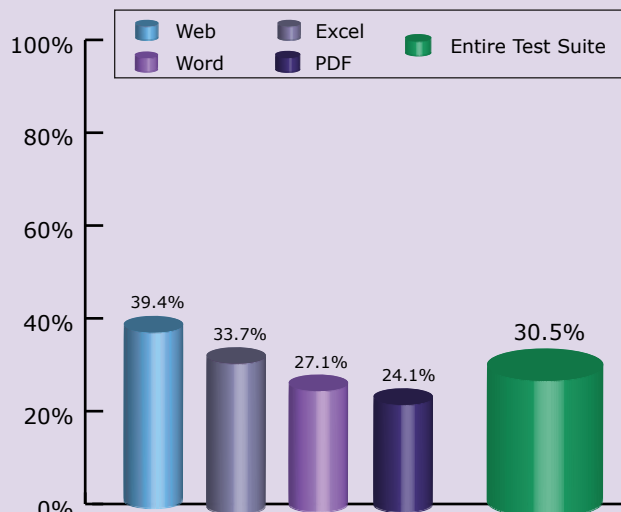
LeanPrint Toner Saver

QualityLogic tested LeanPrint in Toner Saver color and black and white modes, recording the following results:

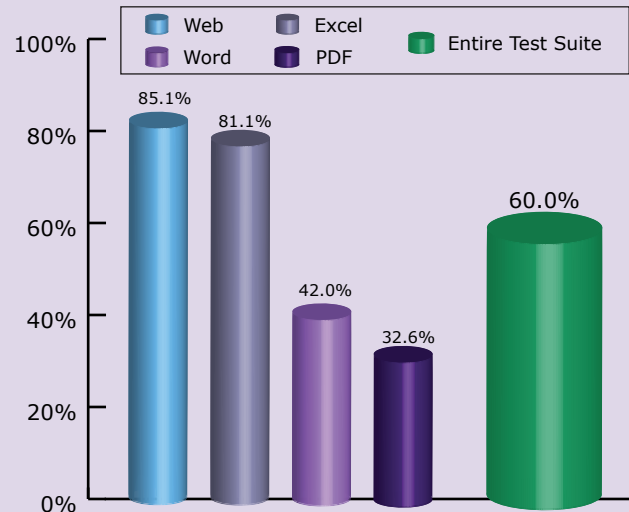
LeanPrint Mode	Result Description	Web	Excel	Word	Adobe Reader	Full Test Suite
Toner Saver Color Result	Conventional Printing - Toner Consumed (g)	20.08	49.93	25.49	40.27	135.76
	Toner Saver Color - Toner Consumed (g)	12.17	33.09	18.59	30.55	94.39
	LeanPrint Toner Savings (g)	7.92	16.84	6.90	9.72	41.38
	LeanPrint Toner Savings (%)	39.4%	33.7%	27.1%	24.1%	30.5%
Toner Saver Black and White Result	Conventional Printing - Toner Consumed (g)	20.08	49.93	25.49	40.27	135.76
	Toner Saver Black and White - Toner Consumed (g)	2.99	9.45	14.78	27.15	54.36
	LeanPrint Toner Savings (g)	17.09	40.48	10.71	13.12	81.41
	LeanPrint Toner Savings (%)	85.1%	81.1%	42.0%	32.6%	60.0%

Note: Web printing with images was included with the Super Saver and Toner Saver color results, and web printing without images was included with the Super Saver and Toner Saver mono results.

LeanPrint Color Toner Saver Results
Percent Savings Over Conventional Printing



LeanPrint Black & White Toner Saver Results
Percent Savings Over Conventional Printing



**Appendix 1:
Test Methodology**

The following is a summary of the methodology for this study:

The printer and print cartridges selected for this study are shown at right.

QualityLogic procured all testing materials through standard retail channels in North America.

Printer	Cartridges
HP LaserJet Enterprise 500 color Printer M551n (CF081A)	HP 507A (CMYK)

QualityLogic tested the Adobe LeanPrint software by printing directly from the software using a test suite for each supported application under test, and measuring the toner consumed for each test session. Printing was performed in a continuous manner with weight measurements taken before and after each printing session. Each printing session was repeated four times, twice on each of two separate test systems and printers. The result from each of those four printing sessions were averaged to create the final result in this report.

QualityLogic tested Adobe LeanPrint with the Windows 7 operating system using the most recent HP PCL6 driver, leaving all printer and driver settings at factory default. Normal office conditions of temperature (23C ±2C) and relative humidity (50% ±10% RH) were maintained for the duration of the test. All printers, cartridges and paper consumables were stabilized in these conditions for a minimum of 12 hours prior to use, tested in the same environment, and were subject to the same fluctuations.

All test pages were printed using standard 8 ½" x 11" office paper (20 lb, 92 brightness) from Xerox (Business 4200).

Toner weight measurements were taken to an accuracy of 1/100 (.01) of a gram using a high quality, commercial scale with a recent calibration.

All Adobe LeanPrint settings were left at their default state, changing only the software Super Saver or Toner Saver mode and color or black and white setting for the appropriate test session.

The test suite for this study was created by QualityLogic. The test suite consisted of a combination of existing QualityLogic ATS-IF files and test files created specifically for this study. The web sites were suggested by Adobe, and reviewed and approved for inclusion to the study by QualityLogic. The test files were categorized into five classifications: files that were text only, files that had rich text and tables, files that had rich text and graphics, files that had rich text, tables and graphics, and rich graphics files. The full test suite was 97 files and 4,076 pages. The following table shows additional detail for the test suite.

Test Application	Number of Files	Total Pages
Microsoft Word 2010	17	1,121
Microsoft Excel 2010	17	770
Adobe Reader XI	17	1,570
Windows Internet Explorer 9	46	615

The web sites chosen for this test suite provide a wide range of page content and layout, and they include a fair amount of dynamic content. To ensure that testing could be performed in a repeatable manner, the web sites were captured to PDF files for conventional printing, printing with images and printing without images. The testing for web sites was then performed using those PDF files. This prevented dynamic content changes from interfering with the accuracy of the test.

Test sessions were conducted for web printing with and without images, and with Word, Excel and Adobe Reader for LeanPrint Super Saver (color and black and white), and LeanPrint Toner Saver (color and black and white). The web printing with images results are included in the average result for color Super Saver and color Toner Saver, and the web printing without images results are included in the average result for black and white Super Saver and black and white Toner Saver.

The test methodology for this comparison study was developed and implemented by QualityLogic.