BLI BUYERS LAB

# Comparative Energy Consumption and Speed Evaluation

## HP Officejet Pro 8000 & HP Officejet 6000 vs. Samsung CLP-315 and Dell 1320c

FEBRUARY 2009

HP Officejet Pro 8000

HP Officejet 6000

Samsung CLP-315

Dell 1320c

| Specifications | HP Officejet Pro 8000 | HP Officejet 6000 | Samsung CLP-315 | Dell 1320c |
|---|---|---|---|---|
| Price (US $) | $149 | $99 | $194 | $249 |
| Technology | Inkjet printer (4 individual ink tanks) | Inkjet printer (4 individual ink tanks) | Four-pass color laser printer | Single-pass color laser printer |
| Color Speed | 11 ppm | 7 ppm | 4 ppm | 12 ppm |
| Black Speed | 15 ppm | 7 ppm | 16 ppm | 16 ppm |
| Input Capacity | 250 sheets | 250 sheets | 150 sheets | 250 sheets |
| Duty Cycle | 15,000 pages per month | 7,000 pages per month | 20,000 pages per month | 35,000 pages per month |

## Executive Summary

In BLI's testing of the four entry-level color models—the inkjet HP Officejet Pro 8000 and Officejet 6000 and the Samsung CLP-315 and Dell 1320c laser models—the HP models had a definite advantage in the electricity consumption evaluation, with both devices consuming about 65 percent less electricity than the Samsung model and about 40 percent less electricity than the Dell model. The Dell 1320c had the advantage in speed testing, providing the best overall first-page-out times and the best speed in color, though the inkjet HP models fared better than the laser Samsung model in the color speed test.

## TEC Energy Consumption

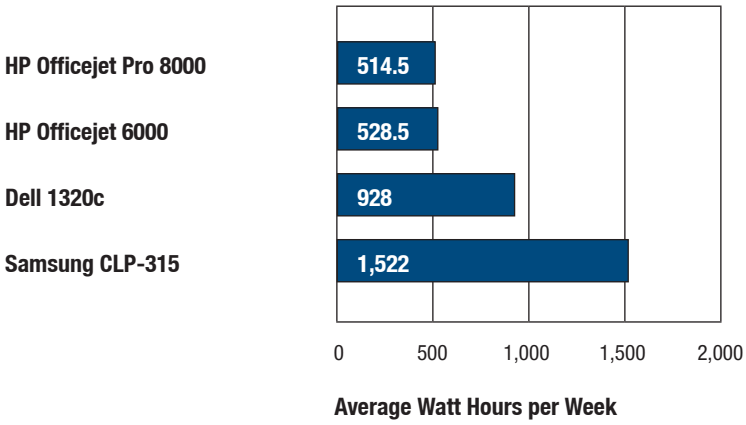
BLI conducted a comparative energy-consumption evaluation using the Energy Star Typical Electricity Consumption (TEC) method, with energy consumed recorded as watt-hours (Wh). The test is designed to replicate real world usage and measures energy consumed over a specified period, during which each device is in sleep mode, warm-up mode, ready mode and printing multiple single-sided sets of a 12-page black document. In this procedure, measurements are taken using a Yokogawa WT210 watt meter. For this competitive group, typical usage is assumed as being 288 pages per day, and the numbers reported are based on an average of two tests

- In BLI's electricity consumption testing, the HP Officejet Pro 8000 proved to be the most energy efficient device, followed by the HP Officejet 6000 and then the Dell 1320c; the Samsung CLP-315 used the most electricity in BLI's testing.
- Based on this testing, BLI projects that the HP Officejet Pro 8000 would consume an average of 514.5 Wh during a week of typical usage, while the HP Officejet 6000 would consume an average of 528.5 Wh. It is also estimated that the Dell 1320c would consume an average of 928 Wh, while the Samsung CLP-315 would consume an average of 1,522 Wh in a week of typical usage.

### TYPICAL WEEKLY ELECTRICITY CONSUMPTION

| MODEL | TOTAL TEC |
|---|---|
| HP Officejet Pro 8000 | 514.5 Wh |
| HP Officejet 6000 | 528.5 Wh |
| Dell 1320c | 928 Wh |
| Samsung CLP-315 | 1,522 Wh |

### TYPICAL ELECTRICITY CONSUMPTION




Typical Electricity Consumption is calculated based on each device printing 288 pages per day, with the device spending the remainder of the time in sleep mode after printing is completed. A watt meter is used to determine power used during printing and in sleep mode for each device.

## Speed Testing (Color Mode)

BLI subjected each device to comparative print speed testing, using the ISO 24734 test suite with the devices in default mode, using the PCL driver. Each four-page file (PDF, Word and Excel) is printed three times and the time to completion indicates the time it takes to print the second and third sets (for a total of eight pages). Times for each of the three tests were added together to get a total time to print 24 pages, which is reported in the chart below.

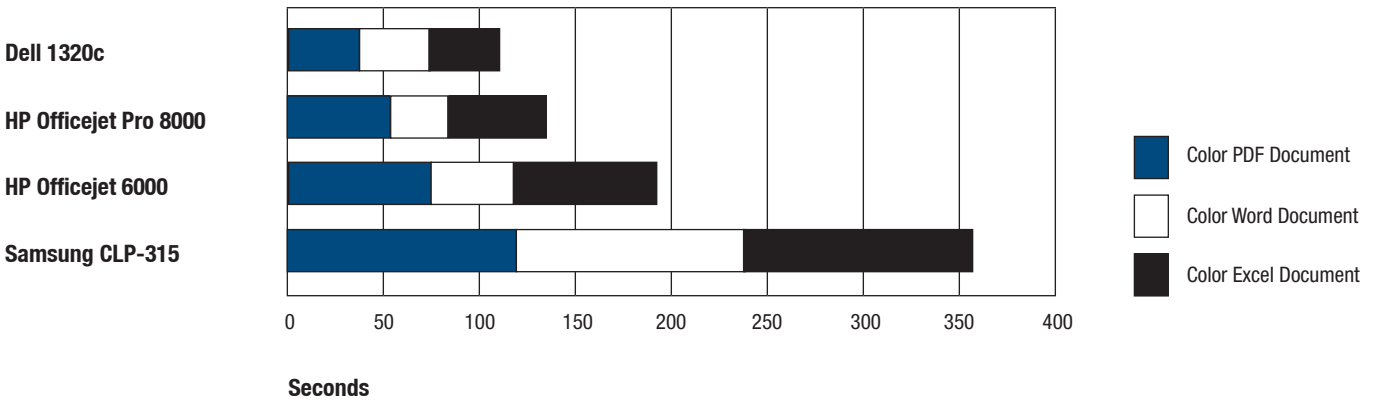
- When combining the time to print all three color documents, the Dell 1320c was the fastest, followed by the HP Officejet Pro 8000. The Officejet 6000 was third fastest, while the Samsung CLP-315 was slowest taking more than twice as long to print the files compared to the Dell 1320c.
- When printing two sets of a three-page PDF document in color mode, the Dell 1320c was the fastest, at 37.74 seconds, while the Officejet Pro 8000 was the second fastest, completing the test in 54.33 seconds. The Officejet 6000 was third, completing the test in 74.72 seconds. The Samsung CLP-315 was by far the slowest, taking just over two minutes to complete the test.
- When printing two sets of a three-page Word document in color mode, the Officejet Pro 8000 was the fastest, at 30.53 seconds, while the Dell 1320c was the second fastest, completing the test in 37.76 seconds. The Officejet 6000 was third, completing the test in 43.95 seconds. The Samsung CLP-315 was by far the slowest, taking just under two minutes to complete the test.
- When printing two sets of a three-page Excel document in color mode, the Dell 1320c was the fastest, at 37.47 seconds, while the Officejet Pro 8000 was the second fastest, completing the test in 51.54 seconds. The Officejet 6000 was third, completing the test in 74.81 seconds. The Samsung CLP-315 was by far the slowest, taking just over two minutes to complete the test.

### TIME TO PRINT ISO 24734 TEST SUITE (IN SECONDS)

| | Color PDF Document (8 Pages) | Color Word Document (8 Pages) | Color Excel Document (8 Pages) | Total Time to Print All Three Files (24 Pages) |
|---|---|---|---|---|
| Dell 1320c | **37.74** | 37.76 | **37.47** | **112.97** |
| HP Officejet Pro 8000 | 54.33 | **30.53** | 51.54 | 136.40 |
| HP Officejet 6000 | 74.72 | 43.95 | 74.81 | 193.48 |
| Samsung CLP-315 | 120.21 | 119.99 | 120.26 | 360.45 |

In this test, three sets of each four-page document is printed. Timing begins when the last page of the first set exits the device and ends when the last page of the third document set completely exits the device. This methods eliminates the time required for job processing and for the device to get up to speed, effectively demonstrating the time to print eight pages (two sets of the document).

Note: Numbers in red indicate the fastest results.




Results above indicate time to print two sets of three four-page documents, for a total of 24 pages. Three sets of each four-page document are printed and the time to print the first set of each document is eliminated. Timing begins when the last page of the first set exits the device and ends when the last page of the third document set completely exits the device.

## First-Page-Out Times (Color Mode)

BLI subjected each device to comparative raster testing to determine which device had the fastest first-page-out times in color, using the ISO 24734 test suite with the devices in default mode, using the PCL driver.

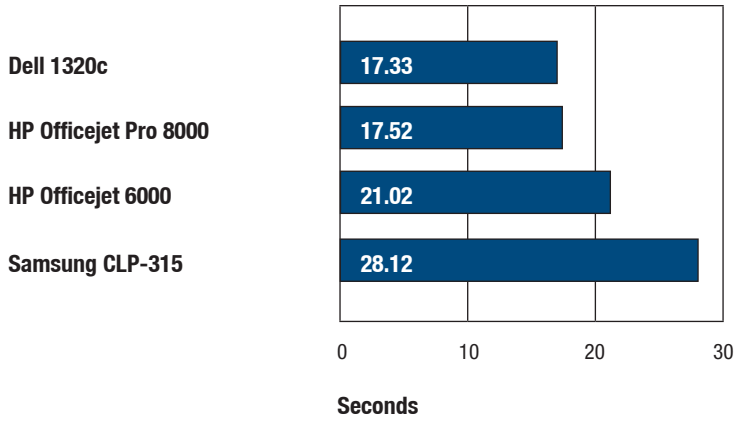
- Based on an average of three documents tested, the Dell 1320c provided the fastest first-page time in color mode, followed by the HP Officejet Pro 8000 and then the HP Officejet 6000. The Samsung CLP-315 had the slowest first-page time in color.
- When printing the ISO 24734 PDF document in color mode, the Dell 1320c had the fastest first-page-out time, at 17.55 seconds, while the Officejet Pro 8000 was the second fastest, printing the first page in 22.43 seconds. The Officejet 6000 was third, outputting the first page in 28.28 seconds. The Samsung CLP-315 was the slowest, taking 28.93 seconds to print the first page.
- When printing the ISO 24734 Word document in color mode, the Officejet Pro 8000 had the fastest first-page-out time, at 14.38 seconds, while the Officejet 6000 was the second fastest, printing the first page in 17.52 seconds. The Dell 1320c was third, outputting the first page in 17.75 seconds. The Samsung CLP-315 was the slowest, taking 27.61 seconds to print the first page.
- When printing the ISO 24734 Excel document in color mode, the Officejet Pro 8000 had the fastest first-page-out time, at 15.76 seconds, while the Dell 1320c was the second fastest, printing the first page in 16.71 seconds. The Officejet 6000 was third, outputting the first page in 17.25 seconds. The Samsung CLP-315 was the slowest, taking 27.82 seconds to print the first page.

### FIRST-PAGE TIMES (COLOR MODE; IN SECONDS)

| | PDF | Word | Excel | Average First-Page Time |
|---|---|---|---|---|
| Dell 1320c | **17.55** | 17.75 | 16.71 | **17.33** |
| HP Officejet Pro 8000 | 22.43 | **14.38** | **15.76** | 17.52 |
| HP Officejet 6000 | 28.28 | 17.52 | 17.25 | 21.02 |
| Samsung CLP-315 | 28.93 | 27.61 | 27.82 | 28.12 |

First-page time indicates the time it took to process the file and deliver the first page of the test document set to the output tray.

Note: Fastest times are indicated in red.




Average first-page time is based on an average of three file types tested (PDF, Word and Excel). Each file is printed twice to get an average first-page time for each file type; the average first-page time is determined by averaging the results for each of the three file types.

## SUPPORTING TEST DATA

### Test Objective

Buyers Laboratory Inc. (BLI) was commissioned by Hewlett-Packard to conduct an independent comparative performance evaluation of the HP Officejet 6000 and HP Officejet Pro 8000 versus the Dell 1320c and Samsung CLP-315. Tests performed include ISO speed testing, first-page-out testing and TEC energy consumption testing.

### Test Environment

This test was conducted in BLI's 10,000-square-foot U.S. test lab, in an environment monitored by an Extech RH S20 RH/Temp recorder and a Honeywell Temp/RH chart recorder, which replicates typical office conditions.

### Test Equipment

BLI's dedicated test network, consisting of Windows NT 4.0, 2000 and Microsoft Exchange servers, Windows 2000 and XP workstations, 10BaseT/100BaseTX network switches and CAT5 cabling.

### Test Duration

Products were tested for 2,500 impressions.

### Tested Models

Eight devices, two of each model (HP Officejet 6000, HP Officejet Pro 8000, Dell 1320c and Samsung CLP-315).

### Test Procedures

The test methods and procedures employed by BLI in its lab testing include a range of BLI and industry-standard test targets. For speed testing, the ISO 24734 test suite is used. For electricity consumption testing, the Energy Star Typical Electricity Consumption (TEC) for laser printers was used to determine typical weekly electricity consumption.



20 Railroad Avenue ■ Hackensack, NJ 07601 ■ (201) 488-0404