BLI Comparative Performance Evaluation

JANUARY 2014

Canon imagePROGRAF iPF8400SE vs. Epson SureColor T7000

Canon imagePROGRAF iPF8400SE

Epson SureColor T7000

	Canon imagePROGRAF iPF8400SE	Epson SureColorT7000
Advantage ✔		
Colour and Black Print Quality	✔	
Print Productivity	✔	
Direct PDF Print Submission Functionality	✔	
Banner Printing	✔	
Ink Consumption	✔	
Device Feature Set		✔
Print Driver Feature Set	✔	
Printhead Reliability / Cleaning Routines	✔	

TEST OBJECTIVE

Buyers Laboratory LLC (BLI) was commissioned by Canon Europe to conduct confidential document imaging device performance testing on the Canon imagePROGRAF iPF8400SE and the Epson SureColor T7000, and produce a report comparing the relative strengths and weaknesses of the two products in terms of image quality, productivity, direct PDF print functionality, banner and poster printing, ink consumption, device feature set, driver functionality, printhead reliability and cleaning routines. All testing was performed in BLI's test facility in Wokingham, UK.

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Executive Summary

The Canon imagePROGRAF8400SE gave an outstanding performance across the board in BLI's testing, outperforming the Epson SureColor T7000 in virtually all aspects of testing. Aimed at the poster/signage market, both models deliver exceptional image quality, highly accurate colour reproduction and excellent colour stability. While the Epson model features a higher print resolution and smaller (variable) ink drop size, the Canon model produced superior image quality overall. It offers a larger colour gamut, a higher optical density for cyan, less colour drift, better skin tone light/dark contrast definition and better colour saturation than the Epson device. Furthermore, the Canon iPF8400SE produced crisper fonts and better fine lines and smooth circles than did the Epson unit, which displayed stair-stepping. However, Epson delivered higher optical densities for black and yellow.

In BLI's productivity tests, the Canon iPF8400SE delivered a clear speed advantage over the Epson model, with faster times across all but one of the settings. Particularly noteworthy was its performance in the Fast/Speed setting, taking 2 minutes and 12.16 seconds to print a single A1 high-resolution portrait, compared with 5 minutes and 29.92 seconds for the Epson model to print the same document (the Canon model was 59.9% faster).

The Canon model also performed better in the area of ink consumption, using significantly less ink in terms of net weight than the Epson SC-T7000 when printing 50-page runs of two different test documents in Standard/Quality mode on matte coated and glossy photo stocks. Further contributing to the Canon model's more efficient use of ink is the reliability of its printhead, which did not suffer any problems with nozzle clogging when powered off over a weekend. Conversely, the Epson model required two cleaning cycles to rectify the problem, which leads to further ink consumption and user intervention. Another plus for the Canon model is that it offers hot-swap ink tanks, enabling users to replace empty ink cartridges while actively printing, thus reducing operator downtime. The Epson device does not offer this feature.

As Canon is positioning this 6-colour model as delivering a low TCO via a product design that focuses on essential features, the iFP8400SE's device feature set is not quite as strong as the Epson model's. The Epson SC-T7000 uses less energy while printing (72 W as opposed to 190 W), and in standby mode (3W compared with 5W for the Canon device), in which the device will spend most of its time. In addition, the Epson device offers 512 MB of RAM (as opposed to 384 MB with the Canon model) and an optional 250-GB hard drive is available to Epson users, but not for Canon users.

Both the Epson driver and the Canon GARO driver offer a largely comparable feature-rich driver set, but the Canon has a slight advantage with its greater number of media profiles, speed settings and security watermark options. ICC profile settings and built-in colour adjustment settings are available with both drivers. Both devices also allow users to integrate with a smaller-format MFP to produce enlarged, poster-size copies—the Canon unit via its free Color imageRUNNER Enlargement Copy Mode, and the Epson unit via its extra cost CopyFactory Utility.

Colour and Black Image Quality

	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Advantage ✔		
Text	✔	
Fine Lines	✔	
1x1 pixel grid	✔	
Halftone Range	=	=
Halftone Fill	=	=
Solid Density	=	=
Colour Drift across FOGRA39	✔	
Consistency of three skin tones	✔	
Consistency of neutral grey	=	=
Business Graphics	=	=
Photographic Images	=	=
Colour Gamut	✔	

+, – and ○ represent positive, negative and neutral attributes, respectively.

○ All image quality testing, with the exception of colour gamut measurement, was done with Canon's own Matte Coated Paper 140-gsm, and Epson's own Double Weight Matte media; quality was set to Highest on the Canon model (2400 x 1200 dpi), and Max. Quality (2880 x 1440 dpi) on the Epson model.

○ Both models performed excellently under test conditions and delivered an exceptionally high standard of colour output appropriate for their poster printing target market.

+ Each model produced clearly formed fonts in colour mode down to 3-point type size. There was a minimal amount of ink overspray visible with Canon's fonts, but only when viewed under magnification. Viewed with the unaided eye, the results were very good, with fine lines and serifs judged to be well formed with no breakup. The Epson fonts displayed no overspray and no breakup, however stair-stepping was clearly visible on serifs, which were judged to be poor.

+ The Canon iPF8400SE produced the 1x1 pixel grid in CMY with no quality issues, and produced consistent coverage in black across all 1x1 and 2x2 pixel grids. Conversely, the Epson SC-T7000 delivered inconsistent coverage across all grids.

○ Both devices delivered excellent vertical and horizontal fine lines down to the 0.1 size, and diagonal lines displayed no stair-stepping. The Canon device produced finer lines in comparison to the Epson model, but they displayed a slight thick bias at one end (in the direction of the feed), while the Epson model's lines were of a uniform thickness throughout.

+ Circles produced by the Canon model were excellent and well formed, while those produced by the Epson device exhibited stair-stepping to the unaided eye.

○ Both models delivered an impressive range of halftone fills in all colour and black modes, with distinct transitions between all levels.

○ The Canon device produced higher optical densities for cyan, while the Epson model produced higher optical densities for black and yellow; density readings for magenta were comparable.

+ Both Canon and Epson models exhibited very good, natural-looking skin tones in photographic images, but the Canon unit produced colours with slightly more depth and its output showed better definition in the light contrast areas.

+ In the skin tone evaluation, output produced by the Canon model displayed less variance in all of the three skin shades than output produced by Epson, when compared with the original target.

○ Neutral grey consistency was comparable, with both models producing a Delta E value of 0.4.

+ During BLI's colour drift analysis, in which the FOGRA39 media wedge is submitted to print before and after productivity and ink consumption tests, and measured using EFI Colour Verifier software, the Canon model displayed a lower mean Delta E drift (0.8) than the Epson model (1.8).

+ The Canon iPF8400SE delivered a slightly larger colour gamut when printing on 140-gsm matte coated paper in the highest quality settings—6.3% larger than the Epson model's, with a CIE volume of 375,337 versus 353,152 with the Epson device.

○ BLI analysed a wide range of colour and greyscale output in business graphics and photographic images output by both devices and found them to be comparable overall, with excellent fine details in light and dark contrast areas.

○ In the poster evaluation, both models printed the image equally well, with no banding issues.

Print Productivity

	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Advantage ✔		
First Page Out From Ready State (Fast/Speed)	✔	
First Page Out From Ready State (Standard/Quality)	✔	
First Page Out From Ready State (High/Max Quality)	✔	
Throughput Speed Photo Portrait (Fast/Speed)	✔	
Throughput Speed Photo Portrait (Standard/Quality)	✔	
Throughput Speed Photo Portrait (High/Max Quality)	✔	
Throughput Speed Retail Sale Poster (Fast/Speed)	✔	
Throughput Speed Retail Sale Poster (Standard/Quality)		✔
Throughput Speed Retail Sale Poster (High/Max Quality)	✔	

+ When printing a single A1 portrait, the Canon model easily surpassed the Epson model in terms of speed of the first-page-out from ready state across all three modes, particularly in Fast/Speed setting, where it was 59.9% faster—132.16 seconds compared with 329.92 seconds—than the Epson SC-T7000.

+ The Canon iPF8400SE also outperformed the Epson model with faster first-page-out times from ready state across all three modes when printing a single A1 retail sale poster on matte coated paper. In Fast/Speed mode, the Canon model was 23.6% faster, delivering in 66.94 seconds compared with 87.65 seconds for the Epson device.

+ When printing five copies of a single-page A1-size portrait test document in three different modes, the Canon model displayed a clear speed advantage over the Epson model, with speeds that were 56.1% (Fast/Speed), 43.9% (Standard/Quality) and 27.2% (High/Max Quality) faster than the Epson device.

○ When printing five copies of a single-page A1-size retail poster test document in three different modes, the Canon model was 12.1% faster in Fast/Speed mode than the Epson model; in High/Max Quality mode, the two models delivered the job in comparable times (227.76 seconds for the Canon device versus 231.12 seconds for the Epson device), while the Epson model was 12.4% faster in Standard/Quality mode.

+ In the A0-size portrait test, the Canon model displayed a clear speed advantage over the Epson model across all modes, delivering five copies of a single-page test document with speeds that were 45.2% (Fast/Speed), 48.4% (Standard/Quality) and 26.2% (High/Max Quality) faster than the Epson device.

+ In the A0-size retail poster test, the Canon iPF8400SE displayed a speed advantage over the Epson model in two of the three modes, delivering five copies of a single-page test document with speeds that were 26.6% (Fast/Speed) and 8.4% (High/Max Quality) faster than the Epson device; in Standard/Quality mode, speeds were comparable.

Direct PDF Print Submission Functionality

	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Advantage ✔		
Ease of Use	✔	
Functionality	✔	

+ A free download from Canon's website, the iPF Direct Print & Share utility enables PDFs to be printed without users having to open Adobe Acrobat. iPF Direct Print & Share also allows users to retrieve files from cloud storage for printing.

+ There is no direct PDF submission functionality for the Epson device.

Canon's iPF Direct Print & Share utility

Banner Printing

	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Advantage ✔		
Ease of Use	=	=
Productivity	✔	

+ The Canon iPF8400SE successfully printed BLI's 40" x 117" banner (originally a 4,955-KB PDF file) in standard mode, taking just 21.74 seconds to generate a preview, and a further 10 minutes, 52.24 seconds from preview to final paper cut. In comparison, the Epson SureColour T7000—in quality mode—took 33.90 seconds to generate a preview; however, an additional 12 minutes, 53.50 seconds were required from the file preview until the banner completed printing and was cut.

+ The Epson unit could not successfully handle BLI's banner file; after printing three quarters of the banner without fault, the rest of the banner was printed with a loss of background detail.

Ink Consumption

BLI analysts observed that, owing to the vagaries of inkjet technology (for example, head flushing and calibration routines can occur at any time during testing), the same test can produce different results at different times. Although BLI makes every effort to ensure that devices are tested on a level playing field, the test results should be regarded as an indicator of likely performance and not as a prediction of actual ink consumption in a real-world environment.

RESULTS		
Results averaged across three 50-set A1 printing in Standard/Quality Mode	**Canon imagePROGRAF iPF8400SE**	**Epson SureColor T7000**
SALE POSTER (Standard/Quality Mode)		
Average weight of ink used (grams)	105.0 g	109.3 g
STUDIO PORTRAIT (Standard/Quality Mode)		
Average weight of ink used (grams)	104.0 g	128.4 g

+ In the BLI Retail Poster ink consumption print runs using Standard/Quality mode on 140-gsm matte coated media, the Canon imagePROGRAF iPF8400SE used slightly (4.0%) less ink in terms of net weight than the Epson SureColor T7000. In the BLI Studio Portrait print runs on glossy media, the Canon model used significantly (19.0%) less ink than the Epson device.

Device Feature Set

+ The capacity of the standard ink cartridge for the Canon model is larger than that of the Epson model, but both offer the same capacity (700 ml) for the higher-capacity cartridges.
+ Canon's ink cartridges are replaceable during operation, which helps to reduce downtime for Canon users.
+ The Canon unit supports a higher maximum cut-sheet media length of 1.6 m compared with 1.5 m for the Epson unit.
— Both models offer USB 2.0; the Epson model also supports Gigabit Ethernet connectivity.
— The Canon model offers a standard and maximum RAM of 384 MB, while the Epson unit has a standard and maximum RAM of 512 MB, plus an optional 250-GB hard drive, which the Canon model doesn't offer.
— The Epson model includes a colour LCD, while the Canon model has a monochrome LCD display.
— The Epson SC-T7000's power consumption is slightly lower than that of the Canon model in standby mode (3 watts versus 5 watts) and far lower—72 watts versus 190 watts—while active.
○ Noise emissions while in use are comparable for the two models (50 dB).

○ The Canon and Epson models both offer 2" and 3" core adaptors, which help to avoid excessive paper curling towards the end of the life of a roll.

○ The Canon model includes a plug-in for Microsoft Office, which provides a wizard that walks users through the process of creating posters for Word, Excel or Powerpoint, avoiding the need for complex resizing. A similar feature (LFP Print Plug-in for Office) is offered with the Epson device.

+ The Canon model includes PosterArtist Lite, Canon's software for creating posters and signage in simple steps. The full version of Canon PosterArtist, available as an option, offers more advanced features such as auto design, variable data printing, in-application editing features, plus additional templates, photos and clip art.

+ The Canon device includes a media mismatch option, which places on hold jobs that can't be printed due to incorrect media being loaded, while jobs that can be completed are printed; the queued jobs are printed once the required paper is loaded. The Epson device does not offer this capability, and continues printing on the mismatched media, which results in ink and media waste.

○ Canon's Accounting Manager, accessed via the Status Monitor, offers comprehensive accounting management for all print jobs. Users enter the actual costs for individual inks and media types, and the cost per job is calculated automatically and displayed. For each job, the media type, area, ink used and total print time are listed, and more detailed cost and consumption information can be obtained by double-clicking on an individual job name or by highlighting a range of different jobs. Job cost information can then be saved in .CSV format and opened in Excel. Epson's LFP Accounting Tool, a free download from Epson's website, offers the same accounting features.

○ The Canon model includes a plug-in for Microsoft Office, which provides a wizard that walks users through the process of creating posters for Word, Excel or Powerpoint, avoiding the need for complex resizing. A similar feature (LFP Print Plug-in for Office) is offered with the Epson device.

Driver Feature Set

+ The Canon iPF8400SE has five speed settings (Draft 300, Standard 600, Draft 600, High 600 and 1200), which are matched by three settings with the Epson device (Speed, Quality and Max Quality), although not all speed settings are available with all media types.

○ Both the Canon GARO driver and the Epson ESC/P driver provide a useful overview of the settings for predefined profiles.

— The Epson driver offers a wider range of seven predefined profiles than the Canon unit, which has only three predefined profiles.

+ However, the Canon model offers 42 media profiles compared with 20 for the Epson unit.

+ The Canon driver supports multi-up (2 to 16) printing, while the Epson driver supports only 2 to 4 multi-up printing.

— Although both devices offer a poster mode, the Canon GARO driver offers a 2 by 2 poster mode, while the Epson model supports 4 by 4.

— The Canon driver offers page stamping (date, time, name and page number), but the Epson driver offers a wider range of options, including all the image quality attributes.

— The Epson model provides a handy thumbnail preview for users to check the effects on the image as they make colour adjustments. In addition, the Epson driver displays a list of all the current settings on each tab window, providing users with a quick, at-a-glance summary.

○ The Canon model's device status monitor can be accessed directly from the front tab of the driver, whereas users of the Epson model must access device status via an icon on the utility tab, which requires an additional click.

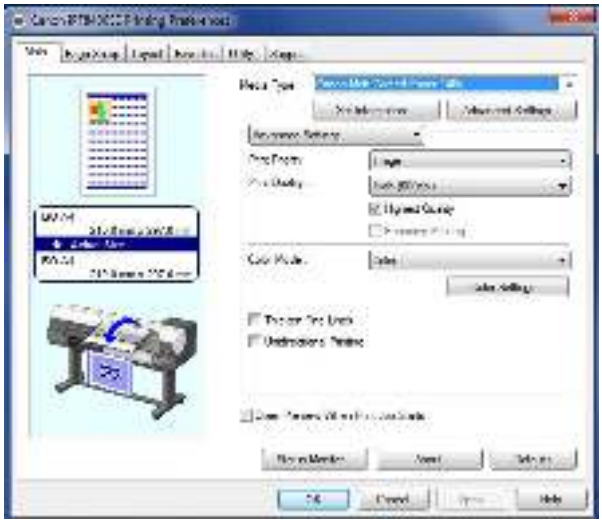
○ Both the Epson driver and the Canon GARO driver offer a wide range of built-in adjustments for CMYK balance, brightness, contrast and saturation. ICC profile settings are also available with both drivers—in the case of Canon's GARO driver in its matching tab under Advanced Settings. Canon operators can select four matching modes (driver, ICC, driver ICM and host ICM matching) and choose one of four rendering methods (auto, perceptual, colorimetric or saturation).

+ The Canon driver offers unidirectional print selection which helps to avoid any banding across output, whereas the Epson driver does not.

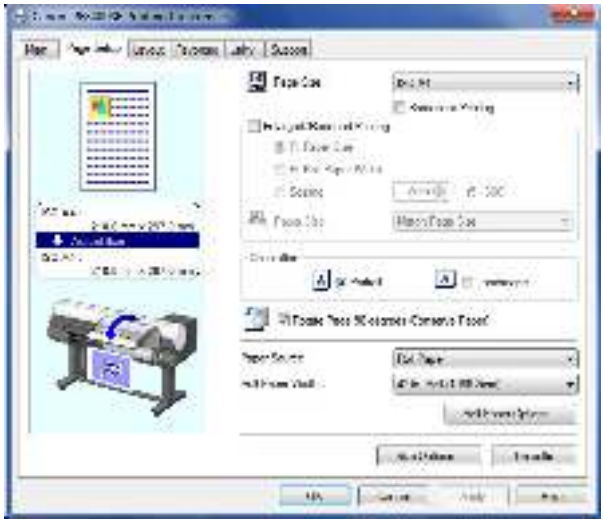
+ The Canon driver includes the Color imageRUNNER Enlargement Copy Mode utility, which enables users to integrate a Canon small-format MFP device with the iPF8400SE. Documents scanned by the Canon MFP are automatically routed to a hot folder that is monitored by the driver of the iPF8400SE. The image is then resized and printed, offering a fast, easy-to-use poster creation tool for office users. Epson users can choose comparable functionality via the extra-cost CopyFactory Utility.

+ The Canon driver also includes a Free Layout nesting tool that enables files—even files created with different applications—to be scaled, resized, or grouped together as a single job from the printer driver. Images can be dragged and dropped to their desired locations and printed together on a single page, helping to save on paper. Epson offers resizing functionality via the Layout Manager utility.

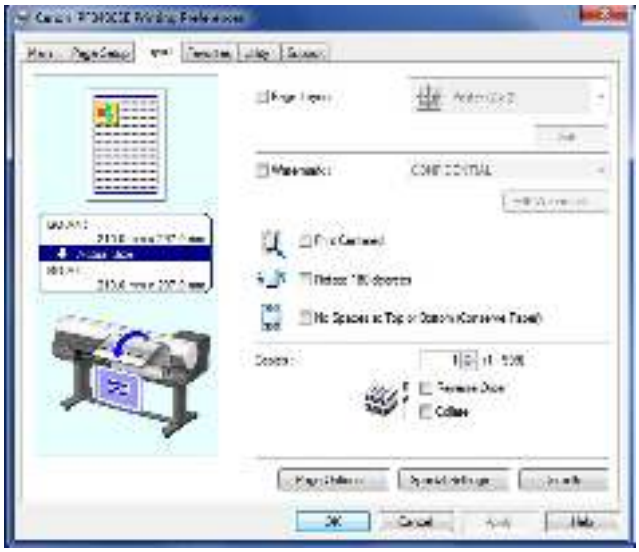
○ The Canon model also offers a plug-in for printing from Microsoft Office applications, which includes useful tools for automatic media resizing, nesting and borderless printing. Epson offers similar software, LFP Print Plug-in for Office, to its users.



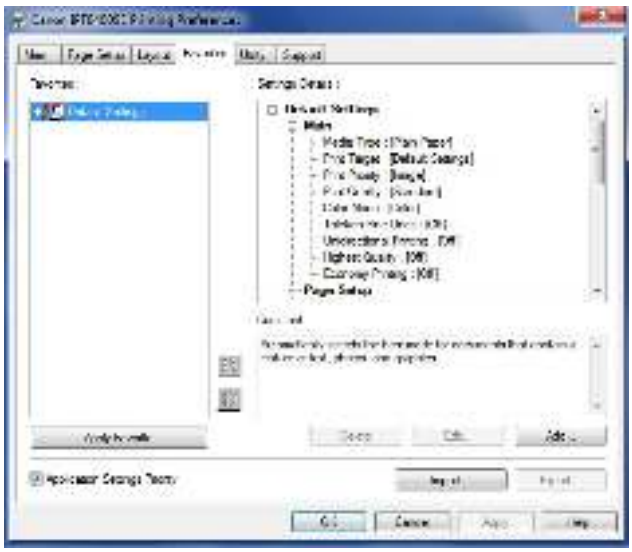
Canon iPF8400SE Print Driver Main Tab



Canon iPF8400SE Print Driver Page Setup Tab

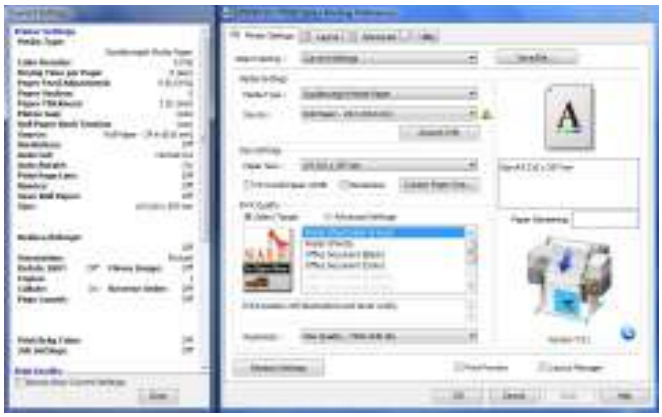


Canon iPF8400SE Print Driver Layout Tab

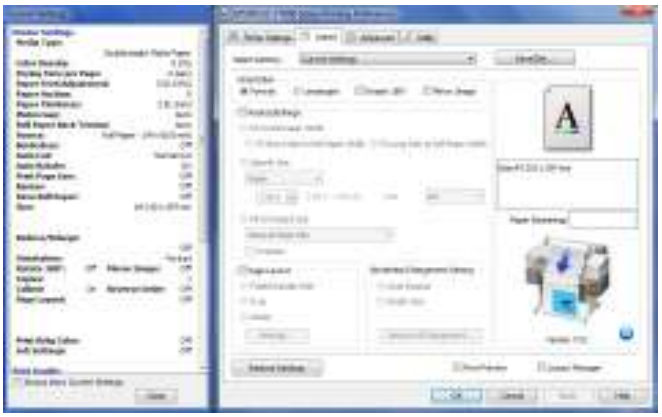


Canon iPF8400SE Print Driver Favourites Tab

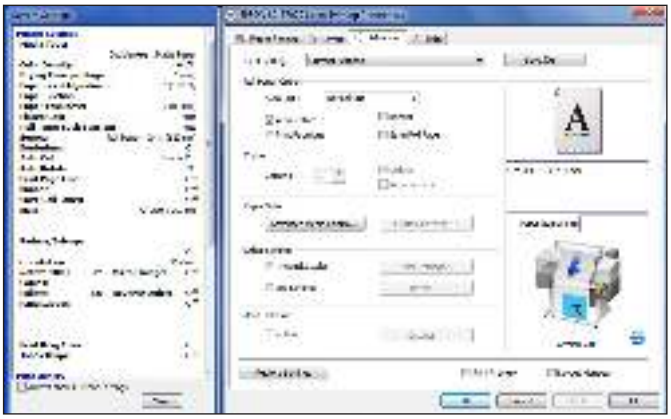
Canon iPF8400SE Colour Adjustment Settings



Epson SC-T7000 Print Driver Printer Settings Tab



Epson SC-T7000 Print Driver Layout Tab



Epson SC-T7000 Print Driver Advanced Settings Tab

Epson SC-T7000 Print Driver Utility Tab

Epson Print Driver Colour Controls

Printhead Reliability / Cleaning Routines

○ Both models offer three nozzle check settings at the control panel. The Canon iPF8400SE offers four fail-safe nozzle check settings at the control panel—Off, 1 page, 10 pages or Standard (the default setting), while the Epson SC-T7000 has settings for Periodic (the default mode), On (Per Job) or Off.

+ When it comes to replacing the printhead, the Canon model offers more flexibility with its user-friendly replacement procedure; the Epson model requires a service technician installation, which would have an impact on operator downtime and costs.

+ As soon as a clogged nozzle is detected on the Canon unit, an automatic cleaning cycle is triggered to maintain image quality and consistency; this takes place in the background, requiring no user intervention. The Epson model does require user intervention: the control panel alerts users that a cleaning cycle is required, and that they can either opt to wait until a print run has finished, or cancel a print job and run the cleaning cycle immediately.

+ With both devices shut down completely over the course of a weekend, the Canon model had no problems with nozzles clogging. When a nozzle check pattern was requested by BLI analysts, it printed with perfect accuracy every time. In contrast, the nozzles of the Epson unit became clogged and two cleaning cycles were required to resolve the issue. This would result in a good deal of operator downtime for Epson users and also incur more ink (about 15 grams in this case) and paper waste.

○ The Canon model performs a cleaning cycle in the background while the device is in operation so the BLI analyst was unable to determine the grams of ink per cartridge used to run and complete the cleaning process.

○ The Epson model uses an average of 7.5 grams of ink per cartridge during a cleaning cycle, taking approximately four minutes.

SUPPORTING TEST DATA

Productivity

Colour Throughput Time – A1 Portrait Photo Printing

Canon imagePROGRAF iPF8400SE (time in seconds)			Epson SureColor T7000 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
143.38	253.43	355.23	326.76	451.99	488.05

A single-page A1 portrait TIFF file was printed as a 5-page job using the device driver set to the glossy Paper/colour setting. Both devices were loaded with 44" rolls, with each job set to auto-rotate to save media. The time indicated is the average speed per page in seconds (based on timing from the cutting of the first page to the cutting of the final page and dividing by four to exclude the initial processing time).

Colour Throughput Time – A1 Retail Sale Poster Printing

Canon imagePROGRAF iPF8400SE (time in seconds)			Epson SureColor T7000 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
73.03	128.39	227.76	83.12	112.50	231.12

A single-page A1 retail sale JPEG file was printed as a 5-page job using the device driver set to the matte coated paper/colour setting. Both devices were loaded with 24" rolls, with each job set to auto-rotate to save media. The time indicated is the average speed per page in seconds(based on timing the cutting of the first page to the cutting of the final page and dividing by four to exclude the initial processing time).

Colour Throughput Time – A0 Portrait Photo Printing

Canon imagePROGRAF iPF8400SE (time in seconds)			Epson SureColor T7000 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
243.05	474.62	720.40	443.63	919.57	976.37

A single-page A0 portrait TIFF file was printed as a 5-page job using the device driver set to the glossy paper/colour setting. Both devices were loaded with 44" rolls, with each job set to auto-rotate to save media. The time indicated is the average speed per page (based on timing the cutting of the first page to the cutting of the final page and dividing by four to exclude the initial processing time).

olour Throughput Time – A0 Sale Retail Poster Printing

Canon imagePROGRAF iPF8400SE (time in seconds)			Epson SureColor T7000 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
122.25	226.00	426.58	166.63	218.95	465.45

A single-page A0 retail sale JPEG file was printed as a 5-page job using the device driver set to the matte coated paper/colour setting. Both devices were loaded with 44" rolls, with each job set to auto-rotate to save media. The time indicated is the average speed per page (based on timing the cutting of the first page to the cutting of the final page and dividing by four to exclude the initial processing time).

First-Page-Out Time from Ready State – Portrait Photo Printing

	Canon imagePROGRAF iPF8400SE (time in seconds)			Epson SureColor T7000 (time in seconds)		
	Fast	Standard	High	Speed	Quality	Max Quality
Time Before Printing Commences	27.77	30.35	29.94	10.45	10.86	13.42
First Page Out	132.16	247.35	359.00	329.92	453.91	492.64

First-page-out times are determined by sending an A1 portrait TIFF file to print, timed from job release to page out, with the Canon driver set to the plain paper setting and the Epson driver set to plain paper, black mode. Both devices were loaded with 44" rolls, with each job set to auto-rotate to save media.

First-Page-Out Time from Ready State – Retail Sale Poster Printing

	Canon imagePROGRAF iPF8400SE (time in seconds)			Epson SureColor T7000 (time in seconds)		
	Fast	Standard	High	Speed	Quality	Max Quality
Time Before Printing Commences	15.91	16.28	16.66	12.12	11.10	12.25
First Page Out	66.94	111.12	205.88	87.65	115.79	233.70

First-page-out times are determined by sending an A1 retail sale poster JPEG file to print, timed from job release to page out with the Canon driver set to the matte coated paper setting and the Epson driver set to plain paper, black mode. Both devices were loaded with 44" rolls, with each job set to auto-rotate to save media.

SUPPORTING TEST DATA

Colour Print Quality

Colour Optical Density Evaluation

Canon imagePROGRAF iPF8400SE Matte coated						
	High (600 dpi)					
	1	2	3	4	Max.	Min.
Cyan	1.19	1.19	1.20	1.20	1.20	1.19
Magenta	0.97	0.98	0.97	0.97	0.98	0.97
Yellow	1.05	1.04	1.05	1.04	1.05	1.04
Black	1.50	1.49	1.50	1.49	1.50	1.49

Epson SureColor T7000 Matte coated						
	Quality (720 x 1440 dpi)					
	1	2	3	4	Max.	Min.
Cyan	1.15	1.15	1.14	1.14	1.15	1.14
Magenta	0.95	0.96	0.96	0.96	0.96	0.95
Yellow	1.14	1.14	1.14	1.13	1.14	1.13
Black	1.59	1.62	1.61	1.61	1.62	1.59

Note: Colour density readings were assessed by printing a BLI test file on matte coated paper in highest-quality colour settings and measuring the density of 100% dot fill using an XRite 508 densitometer.

Skin Tone and Neutral Grey Consistency

	Skin Tone 1 (C=6, M=15,Y=16,K=0)	
	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Colour block		
2	0.3	0.2
3	0.2	0.6
4	0.1	0.2
5	0.3	0.5
6	0.3	0.3
7	0.2	0.4
8	0.1	0.4
9	0.3	0.3
Max. Delta E	**0.3**	**0.6**

	Skin Tone 2 (C=30, M=63,Y=75,K=0)	
	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Colour block		
2	0.1	0.5
3	0.3	0.3
4	0.3	0.2
5	0.4	0.6
6	0.4	0.3
7	0.4	0.6
8	0.4	0.4
9	0.5	0.5
Max. Delta E	**0.5**	**0.6**

	Skin Tone 3 (C=19, M=33,Y=50,K=0)	
	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Colour block		
2	0.1	0.3
3	0.4	0.5
4	0.1	0.3
5	0.1	0.3
6	0.4	0.4
7	0.3	0.4
8	0.3	0.6
9	0.3	0.9
Max. Delta E	**0.4**	**0.9**

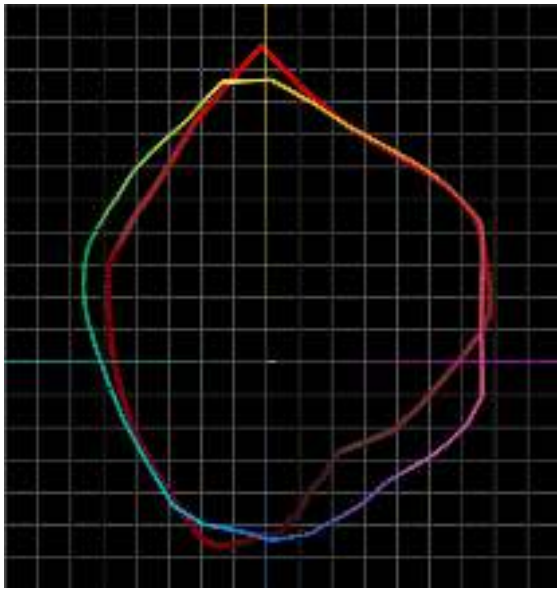
	Neutral Grey	
	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Colour block		
2	0.2	0.2
3	0.3	0.3
4	0.1	0.1
5	0.1	0.4
6	0.4	0.4
7	0.2	0.2
8	0.2	0.3
9	0.4	0.3
Max. Delta E	**0.4**	**0.4**

Note: Skin tone and neutral grey consistency measurements are based on nine readings taken from a BLI proprietary PDF test target file comprising four A1-sized solid coverage documents of three skin tones and a neutral grey, with the High/Quality print quality setting selected in the driver and the target printed on the manufacturer's own brand of matte coated media. Colour differences across the A1 image were measured comparing eight locations to that of the colour measured at the top left of the page, using an EFI ES1000 colour spectrophotometer and Gretag MacBeth EyeOne Share colour comparison software.

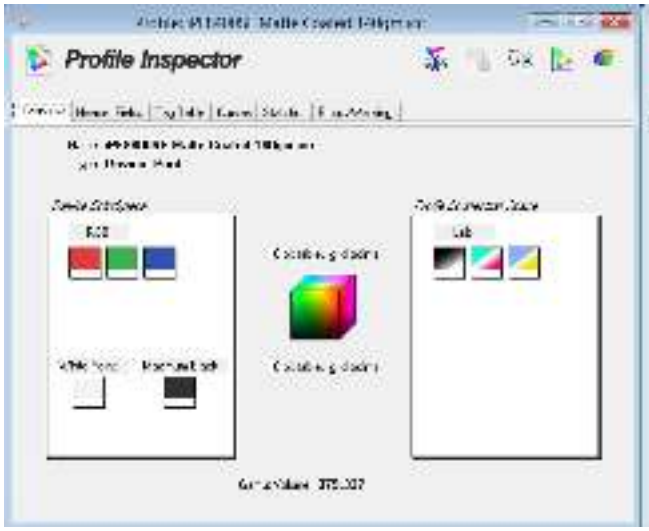
FOGRA 39 DRIFT TEST: Comparison of FOGRA39 colour patches before and after ink consumption test.

	Canon imagePROGRAF iPF8400SE	Epson SureColor T7000
Delta E Drift	0.8	1.8

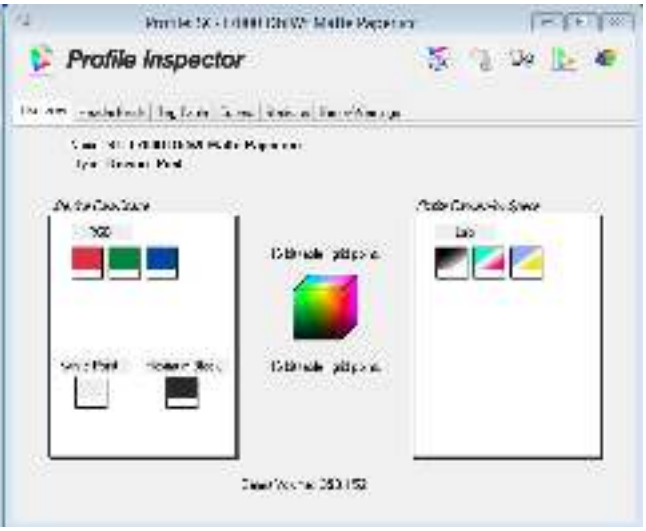
Colour Gamut Comparison



Epson SureColor T7000 colour gamut on matte coated paper in highest quality settings (red) versus Canon imagePROGRAF iPF8400SE colour gamut (shown chromatically) on matte coated paper in highest quality settings.



Canon iPF8400SE Colour Gamut on Matte Coated Paper



Epson SureColor T7000 Colour Gamut on Matte Coated Paper

Device Feature Set

	Canon imagePROGRAF iPF8400SE	Advantage		Epson SureColor T7000
Max. print quality	2400 x 1200 dpi		✔	2880 x 1440 dpi
Number of inks	6	✔		5
Ink tanks replaceable during operation	Yes	✔		No
Ink-drop size	4 picoliter		✔	3.5 picoliter (variable)
Ink cartridge capacity	330 ml (Starter), 700 ml	✔		110 ml (Starter), 350 ml, 700 ml
Number of nozzles	2,560 nozzles each, 15,360 in total	✔		3,600 (720 per colour)
Number of printheads	1			1
Line accuracy	+/-0.1%			+/-0.1%
Minimum line width	0.02 mm			0.02 mm
Minimum print margins	Borderless			Borderless
Maximum outside diameter of roll paper	150 mm			150 mm
Maximum cut-sheet media length	1.6 m	✔		1.5 m
Maximum media thickness	Roll 0.8mm Cut sheet 1.5mm	✔		Roll 0.5mm Cut sheet 1.5mm
Maximum media width	44 inches			44 inches
Media loading	Front			Front
Optional media handling	Roll holder set			Roll media adapter
Standard RAM	384 MB		✔	512 MB
Maximum RAM	384 MB		✔	512 MB
Hard drive	None		✔	Optional 250-GB
Interface	10/100Base-TX, USB 2.0		✔	100Base-TX/1000Base-T Ethernet, USB 2.0
PDL	GARO			HP-GL/2, HP RTL, Epson ESC/P
Net weight (unpacked)	117 kg			87 kg
Power consumption when in standby	5 W		✔	3 W
Power consumption when active	190 W		✔	72 W
Acoustic pressure	Operation: 50 dB (A) or less; Standby: 35 dB (A) or less			Operation: 50 dB (A); Standby: INA
Acoustic power	Operation: 6.8 Bels or less			Operation: 6.8 Bels

INA – Information not available

Driver Feature Set

	Canon imagePROGRAF iPF8400SE	Advantage		Epson SureColor T7000
Speed settings	5 (Draft 300, Standard 600, Draft 600, High 600 and 1200)	✔		3 (Speed, Quality, Max Quality), depending on paper chosen
Economy mode	Yes	✔		No
Predefined profiles	5		✔	7
Overview of profile settings provided	Yes			Yes
Media profiles	42	✔		20
IQ optimized for options	Yes			Yes
Watermark	Yes	✔		No
Sharpen text	Yes			Yes
Thicken fine lines	Yes	✔		No
Mirror image	Yes			Yes
Multi-up printing	Yes, 2 to 16	✔		Yes, 2 and 4
Poster print mode	Yes (2 by 2)		✔	Yes (4 by 4)
Page stamping	Yes (Date, Time, Name, Page Number)		✔	Yes (Date, Time, Document/User/Printer Name, Media Type, Print Quality Level, Resolution, Print Mode, High Speed, Finest Detail, Edge Smoothing, Colour Adjustment and Value, Colour Density)
Image rotation	Yes, auto 180 degrees			Yes, auto 180 degrees
Option to preview before print	Yes			Yes
Link to device Web server from driver	No (there is a link to Status Monitor)		✔	Yes, with optional hard drive (there is also a link to Status Monitor 3)
CMYK balance adjustment	Yes			Yes
Brightness adjustment	Yes			Yes
Contrast adjustment	Yes			Yes
Saturation adjustment	Yes			Yes
Advanced colour management options	Yes			Yes
Disable automatic cutter	Yes	✔		No
Unidirectional printing	Yes	✔		No

Ink Consumption

Table 1

Amount of Ink in Each Canon iPF8400SE Cartridge (grams)

	Yellow	Cyan	Matte Black	Black	Magenta	Matte Black
Weight of cartridge prior to installation	933.1	944.2	946.5	929.1	945.9	939.8
Weight of cartridge at end of life	204.9	204.9	204.9	204.9	204.9	204.9
Net weight of ink	728.2	739.3	741.6	724.2	741.0	734.9
Total ink weight across six cartridges						4,409.2

Table 2

Amount of Ink in Each Epson SureColor T7000 Cartridge (grams)

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Weight of cartridge prior to installation	510.8	511.5	511.2	515.8	513.1
Weight of cartridge at end of life	129.8	129.8	129.8	129.8	129.8
Net weight of ink	381.0	381.7	381.4	386.0	383.3
Total ink weight across five cartridges					1,913.4

Table 3

Ink Used in Three 50-Page Runs of Retail Poster Test Document on the Canon iPF8400SE (grams) in Standard/Quality Mode

	Yellow	Cyan	Matte Black	Black	Magenta	Matte Black
Test Run 1 Net weight of ink used	14.5	17.5	10.9	4.8	26.2	31.5
Test Run 2 Net weight of ink used	13.4	17.2	13.6	3.5	26.0	31.4
Test Run 3 Net weight of ink used	13.4	16.7	14.0	3.6	26.2	30.6
Average amount of ink used across three runs	13.8	17.1	12.8	4.0	26.1	31.2
Total ink weight across six cartridges for 50-page run (based on averages)						105.0

Table 4

Ink Used in Three 50-Page Runs of Retail Poster Test Document on the Epson SureColor T7000 (grams) in Standard/Quality Mode

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Test Run 1 Net weight of ink used	23.5	22.0	56.0	6.5	1.9
Test Run 2 Net weight of ink used	23.3	21.7	55.8	6.3	1.9
Test Run 3 Net weight of ink used	23.2	21.7	55.9	6.4	2.0
Average amount of ink used across three runs	23.3	21.8	55.9	6.4	1.9
Total ink weight across five cartridges for 50-page run (based on averages)					109.3

Table 5

Ink Used in Three 50-Page Runs of Portrait Photo Test Document on the Canon iPF8400SE (grams) in Standard/Quality Mode

	Yellow	Cyan	Matte Black	Black	Magenta	Matte Black
Test Run 1 Net weight of ink used	23.5	27.5	2.0	23.2	21.6	5.4
Test Run 2 Net weight of ink used	21.4	25.0	3.8	23.8	24.3	5.6
Test Run 3 Net weight of ink used	21.6	25.3	2.4	24.0	26.4	5.1
Average amount of ink used across three runs	22.2	25.9	2.7	23.7	24.1	5.4
Total ink weight across six cartridges for 50-page run (based on averages)						104.0

Table 6

Ink Used in Three 50-Page Runs of Portrait Photo Test Document on the Epson SureColor T7000 (grams) in Standard/Quality Mode

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Test Run 1 Net weight of ink used	35.7	29.9	38.5	8.4	16.2
Test Run 2 Net weight of ink used	35.5	30.0	38.3	8.6	16.0
Test Run 3 Net weight of ink used	35.6	29.8	38.0	8.5	16.1
Average amount of ink used across three runs	35.6	29.9	38.3	8.5	16.1
Total Ink Weight across five cartridges for 50-page run (based on averages)					128.4

Consumption Test Methodology Overview:

Buyers Lab's ink consumption analysis was conducted using two document types (retail sale poster and photo). The retail sale poster was formatted as a JPEG file and the studio portrait was formatted as a TIFF file and both were sized at ISO A1.

The Canon imagePROGRAF iPF8400SE was installed in BLI's lab with the latest level of firmware (as of November 2013) and connected to a Windows 7 workstation using a 1000BaseT TCP/IP connection. The device was left in default configuration throughout testing. The Canon GARO driver was used for all testing and was left in default colour setting configuration. The retail poster was printed on 140gsm matte coated media in standard mode, and the portrait photo was printed on 170gsm Canon glossy media in standard mode.

The Epson SureColor T7000 was installed in BLI's lab with the latest level of firmware (as of November 2013) and connected to a Windows 7 workstation using a 100BaseT TCP/IP connection. The device was left in default configuration throughout testing. The Epson ESC/P driver was used for all testing and was left in default colour setting, with media selection set to plain paper and the image set to print at actual size. The retail poster was printed on Epson double weight matte coated media in quality mode, and the studio portrait photo was printed on 170gsm Epson glossy photo media in quality mode.

Before installing the ink cartridges, BLI technicians weighed and recorded the weight of each with all packaging removed. At the end of each 50-print test run, the cartridges were weighed again and the resulting weight of ink used for the test run calculated for each colour. To ensure that the sub-tank on the Canon model did not affect results, a procedure was followed to ensure that the sub-tank level was at its maximum before the print run commenced and again after the print run was completed, thereby ensuring that ink replenishment of the sub-tanks was taken into account for each print run. Then, for each model, one cartridge was run to exhaustion and the weight of the empty cartridge was recorded.

Test Environment

Testing was conducted in BLI's European test lab, in an atmospherically controlled environment monitored by a 24/7 Extech RH520 Temperature/RH chart recorder, ensuring that typical office conditions were maintained. All paper used in testing was allowed to acclimatize inside the facility for a minimum of 12 hours before being used.

Test Equipment

BLI's dedicated test network in Europe, consisting of Windows 2008 servers, Windows 7 workstations, 10/100/1000BaseTX network switches and CAT5e/6 cabling.

Test Procedures

The test methods and procedures employed by BLI in its lab testing include BLI's proprietary procedures and industry-standard test procedures. In addition to a number of proprietary test documents, BLI uses industry standard files including an IT8 test file and an ASTM monochrome test document for evaluating black image quality. In addition to a visual observation, colour print quality and gamut size are evaluated using a profile software tool from Colour Confidence that was read using an EFI ES-1000 colour spectrophotometer and analysed using Chromix ColorThink Pro 3.0 software. Density of black and colour output was measured using an X-Rite 508 densitometer.

About Buyers Laboratory Inc.

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 more than 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 more than 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.

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