BLI Comparative Performance Evaluation

JANUARY 2015

Canon imagePROGRAF iPF670 vs.

Epson SureColor SC-T3200

Canon imagePROGRAF iPF670

Epson SureColor SC-T3200

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Colour Image Quality	✔	
Black Image Quality	✔	
Colour Print Productivity	✔	
Black Print Productivity	✔	
Direct PDF Submission Functionality	✔	
Banner Printing	=	=
Poster Printing	✔	
Ink Consumption	=	=
Device Feature Set		✔
Print Driver Feature Set	✔	

TEST OBJECTIVE

Buyers Laboratory LLC (BLI) was commissioned by Canon Europe to conduct confidential document imaging device performance testing on the Canon imagePROGRAF iPF670 and the Epson SureColor SC-T3200, and produce a report comparing the relative strengths and weaknesses of the two products in terms of image quality, productivity, ink consumption, direct PDF submission, device feature set, driver functionality, and banner and poster printing. All testing was performed in BLI's test facility in Wokingham, UK.

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Executive Summary

The Canon imagePROGRAF iPF670 gave an outstanding overall performance in BLI's evaluation, outshining the Epson SureColor SC-T3200 in most aspects of performance tested. For one, it offers superior productivi-ty to that of the Epson model in all modes tested. Notably, in High quality mode it delivered output in less than half the time required for the Epson device. While both models delivered excellent results when printing Archi-tectural, Engineering and Construction (AEC), Computer-Aided Design (CAD) and Geographical Information Systems (GIS) graphics, the Canon model also has the advantage overall for image quality in both colour and black modes. It was superb overall, with crisp, dark fonts; distinct fine lines; smooth gradations and natural skin tones in photographic images; and a larger colour gamut in all modes on plain paper. Although the Epson model had a slightly larger colour gamut on photo quality paper in its Max Quality setting, the higher optical density for yellow and better colour halftone fills, the Canon model produced finer details in colour business graphics and its serif and sans serif fonts were clearly legible down to a smaller size (3-pt. font size) with no blurring, while Epson's fonts were fully legible only down to 4-pt. size. The Canon model also produced out-put with higher densities for black, cyan and magenta in all modes, and unlike with the Epson unit, its output did not suffer from any ink bleed in colour text and line art when viewed under magnification. Another plus for the Canon model is its unidirectional print driver option. When selected, this option eliminated banding on the Canon iPF670's poster output in Fast mode; whilst it should be noted that BLI analysts observed less banding on the Epson device's output compared with Canon's when printing posters in Fast/Speed mode, the Epson device does not offer a unidirectional feature which can rectify banding issues.

Offering a clear speed advantage over its Epson rival across BLI's productivity tests, the iPF670 delivered the faster first-page-out times from ready state in all modes and excelled with its performance when printing BLI's job stream, designed to simulate a typical mixed workflow for a large-format unit, where it outperformed the Epson device in all modes, particularly in High/Max Quality where it was 50.1% faster. Another significant advantage is that Canon's hot-swap ink tanks enable users to replace empty inks while actively printing, without having a negative impact on productivity.

BLI's testing showed that the two models are comparably matched for ink consumption and performance in the banner printing tests. In terms of feature set, the models are also close, with the Epson model having the advantage for device feature set and the Canon model having the advantage for print driver feature set. How-ever, the Canon model offers several useful features over the Epson. These include its unique unidirectional print capabilities and its free utility, Canon Direct Print & Share, that allows files to be retrieved from cloud storage services such as Google Drive for printing and supports direct PDF submission without the need to open an application (only available for the Epson model with the extra-cost PostScript option). The Canon model also supports an app which enables PDF printing from Apple iPad devices to facilitate workflows for mobile workers.

Colour Image Quality

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Text	✔	
Fine Lines	✔	
Halftone Range	=	=
Halftone Fill	=	=
Solid Density	✔	
AEC Graphics	=	=
GIS Graphics	=	=
Business Graphics	✔	
Photographic Images	=	=
Colour Gamut (plain paper, Fast/Speed settings)	✔	
Colour Gamut (plain paper, Standard/Quality settings)	✔	
Colour Gamut (plain paper, High/Max Quality settings)	✔	
Colour Gamut (photo paper, High/Max Quality settings)		✔

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

○ Both models performed very well under BLI test conditions and delivered an exceptionally high standard of co-lour output. There was no banding evident in output produced by either model.

+ The Epson SureColor SC-T3200 delivered a higher optical density for yellow on plain paper across all quality modes, while the Canon iPF670 had a higher optical density for magenta and cyan in all modes.

+ When printing on plain paper in High/Max Quality settings, the Canon iPF670 delivered a 2.3% larger colour gamut than did the Epson SureColor SC-T3200, with a CIE volume of 231,389 versus a CIE volume of 226,135 for the Epson model.

+ When printing on plain paper using Standard/Quality mode, the Canon model delivered a larger (13.0%) colour gamut, with a CIE volume of 224,444 compared with a CIE volume of 198,506 for the Epson device.

+ In Fast/Speed mode, the Canon unit also delivered the larger colour gamut (12.2% larger), with a CIE volume of 192,660 compared with 171,742 for the Epson unit.

− When printing on photo-quality paper using Canon's High quality setting and the Epson SureColor SC-T3200's Max Quality setting, the Epson model delivered a colour gamut slightly (2.5%) larger than that of the Canon unit, with a CIE volume of 652,492 compared with 636,679 with the Canon unit.

+ When evaluating text in colour mode, there were a few significant differences between the two models. In all modes, both serif and sans serif fonts were legible down to 3-pt. size with the Canon model, and text was bold and crisp, with no breakup. In contrast, virtually all fonts produced by the Epson model were legible only down to the 4-pt. level in Speed, Quality and Max Quality modes except for serif fonts in Speed mode, which were legible only down to the 5-pt. level.

+ Notably, text and line art produced by the Canon model exhibited no ink bleed, whereas ink bleed was visible (under magnification) on the text and fine lines produced by the Epson model, even after BLI analysts had run full alignment checks.

+ Fine lines produced by both devices (with the Canon unit using its CAD [Colour Line Drawing] setting and the Epson unit using the equivalent setting) remained distinct down to the 0.1-pt. level in all modes; white-on-black fine lines were rated poor with the Epson device in Speed and Quality modes, but marginally improved in Max Quality mode, while the Canon device delivered clearly defined white-on-black fine lines at the 0.25-pt. level in all modes.

+ The Canon unit produced smooth circles in all modes, while the Epson unit had more jagged circles.

O Halftone fills in BLI's test charts were rated good in all quality modes for both models.

+ The Canon model produced the 1x1 pixel grid in CMY with no quality issues, but the dot fills produced by the Epson unit were poor by comparison, exhibiting incomplete coverage.

O Colour halftone range produced by both models was excellent, with distinct transitions between all levels.

O In Architectural, Engineering and Construction (AEC) graphics in Standard/Quality and High/Max Quality modes, both the Canon and the Epson units produced an excellent level of detail and very distinct fine lines.

O In Geographic Information Systems (GIS) graphics in High/Max Quality mode on plain paper, both units exhibited a fine level of detail and excellent depth of field.

+ Colour business graphics produced by the Canon iPF670 in High/Max Quality mode exhibited sharper details and better colour saturation when compared with the Epson device.

O When evaluating photographic images, BLI technicians observed very little difference in the output of the two models. Whilst the Epson unit delivered the finer detailing in light contrast areas, the Canon model produced better detailing in dark contrast areas.

+ Skin tones produced by the Canon model were more natural-looking than those produced by the Epson device, which were distinctly reddish in all modes.

+ Overall, the Canon iPF670 delivered the stronger performance in the colour image quality assessment. Whilst the Epson model offers a higher optical density for yellow and a (slightly) larger colour gamut on photo paper in High/Max Quality mode, the Canon model delivered higher optical densities for cyan and magenta, more natural-looking skin tones, as well as a larger colour gamut in all modes when printing on plain paper. Both models produced distinct fine lines in AEC drawings and an excellent level of detail and depth of field in GIS graphics. The Epson model suffered from some ink bleed in text and line art when viewed under magnification, whereas the Canon iPF670 did not.

Black Image Quality

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Text	✔	
Fine Lines	=	=
Halftone Range	=	=
Halftone Fill	✔	
Solid density	✔	
AEC Graphics	=	=
Business Graphics	✔	
Photographic Images	✔	

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

+ The Canon model delivered higher optical densities for black in all modes tested—Fast, Standard and High.

+ There was a slight difference in the text output of the two models. In all modes, both serif and sans serif fonts produced by the Canon device were legible down to the 3-pt. level with no breakup. Serif fonts produced by the Epson model in Speed and Quality modes were also legible down to the 3-pt. level, but only to the 4-pt. level in Max Quality mode, while sans serif fonts were legible down to the 4-pt. level in Speed and Max Quality modes and to the 3-pt. level in Quality mode.

+ The Canon unit produced superior results for fine lines and text when the CAD (Monochrome Line Drawing) settings (and equivalent Epson settings) were used, with no overspray.

○ Fine lines in BLI's line art test target remained distinct down to the 0.1-pt. level in all modes in the output of both devices; both devices also produced equally good white-on-black fine lines.

+ Circles produced by the Canon model were fully formed; some stair-stepping was evident in circles produced by the Epson model.

+ The Canon model produced the 1x1 pixel grid in black with no quality issues, but the Epson unit failed to deliver complete coverage, resulting in a poor rating.

○ Both models delivered very good halftones over the whole range—from the 10% to 100% dot-fill levels—in all modes.

+ Halftone fill in all modes was rated good for the Canon device, while that produced by the Epson unit was rated only fair, as some graininess was visible across all output, even without magnification.

+ The Canon unit delivered darker solids with higher optical density than did the Epson model.

○ When producing AEC graphics in Standard/Quality and High/Max Quality modes in black, both models delivered very good detail and distinct fine lines.

+ Monochrome business graphics in High/Max Quality mode on plain paper were produced more accurately by

the Canon model, with smooth halftone gradations and crisp text, while there was some slight graininess evident on the Epson's output.

+ Both models produced photographic images in High/Max Quality mode on plain paper with smooth gradations, however the Canon's output exhibited better definition in dark contrast areas.

+ While both models delivered excellent AEC graphics, GIS graphics and excellent halftone range, overall, the Canon unit produced superior black image quality; it delivered superior halftone fills, excellent 1 x 1 pixel grid coverage (which the Epson unit could not produce), smoother circles, higher optical density in all modes, darker solids and text that was legible down to the smallest (3-pt.) size, with no ink bleed.

Print Productivity

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
First Page Out From Ready State	✔	
First Page Out From Weekend Non-Use	✔	
Throughput Speed (fastest mode)	✔	
Throughput Speed (default mode)	✔	
Throughput Speed (highest-quality mode)	✔	
Job Stream (multiple jobs submitted to device in fast succession simulating busy network environment)	✔	

+ The Canon iPF670 delivered a faster first-page-out time of 84.74 seconds after a weekend of non-use, compared with 157.96 seconds for the Epson device. Start-up time before printing commenced was 36.99 seconds for the Canon model, which is 56.1% faster than the 84.24 seconds for the Epson unit.

+ Similarly, the Canon iPF670 delivered a faster first-page-out time of just 58.89 seconds from its ready state, compared with 87.13 seconds for the Epson device. Start-up time before printing commenced was 10.81 seconds for the Canon model, compared with 12.38 seconds for the Epson unit.

+ When printing BLI's job stream, designed to simulate a typical mixed workflow for a large-format unit, the Canon iPF670 was 10.5% faster than the Epson model in Fast/Speed mode, 28.1% faster in Standard/Quality mode, and 50.1% faster in High/Max Quality mode.

+ When printing BLI's 12-page DWF test file in colour, the Canon unit was 16.2% faster in Fast/Speed mode, 30.8% faster in Standard/Quality mode, and 55.1% faster in High/Max Quality mode when compared with the Epson unit.

+ When printing BLI's 12-page DWF test file in monochrome, the Canon unit was 16.6% faster than the Epson model in Fast/Speed mode, 32.7% faster in Standard/Quality mode, and 55.1% faster in High/Max Quality mode than the Epson device.

O When the Epson SC-T3200 model's ink cartridges are replaced, printing resumes seamlessly from the same

point in the page, with no discernible line or break in output and no difference in image quality, so no ink or paper is wasted. The same applies with the Canon device.

+ One factor affecting productivity is that when the Epson SC-T3200 model runs out of ink, printing has to stop for the cartridge to be replaced, leading to operator downtime. In contrast, the Canon model continues to print (drawing ink from its sub-tank) when ink needs replacing, while its control panel conveniently alerts the user to replace ink and provides ink purchasing information.

Direct PDF Print Submission Functionality

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Functionality / Cost	✔	*

*BLI did not test Epson's optional, extra-cost PS module, therefore is unable to assess its functionality.

+ A free download from Canon's website, the iPF Direct Print & Share utility enables PDFs to be printed without opening Adobe Acrobat.

+ iPF Direct Print & Share also allows users to retrieve files from Google cloud storage for printing.

+ The latest version (v2.0) of iPF Direct Print & Share supports "Shortcut Print" functionality, which enables users to set up several print settings represented by a desktop icon. Files are automatically printed with the predefined settings when users drag-and-drop them on to the icon. Multiple desktop icons, each with different settings, can be created for various different jobs.
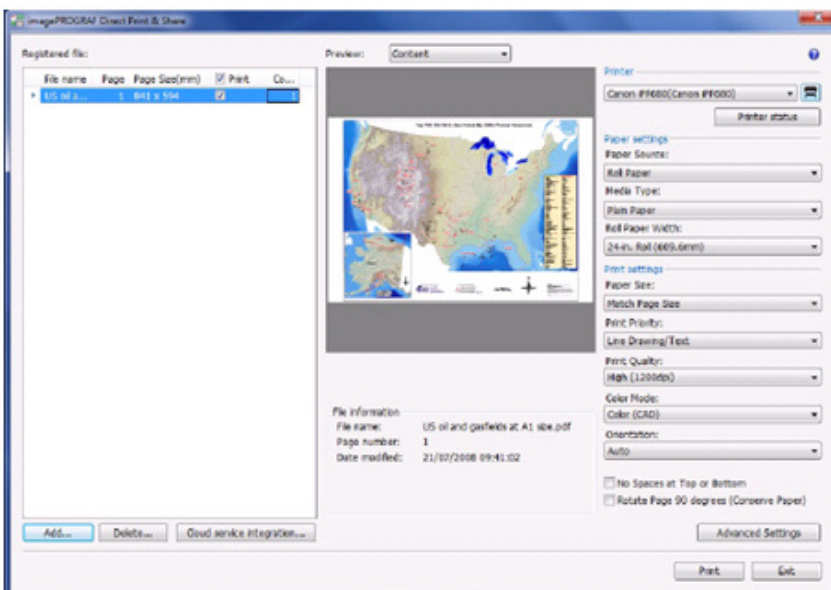
Canon's iPF Direct Print & Share utility

O An optional (extra-cost) PostScript module enables Epson users to print PDFs without the need for additional drivers via hot-folder 'drag-and-drop' functionality with configurable job processing options.

Banner Printing

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Image Quality	=	=
Productivity	=	=

O The Canon iPF670 successfully printed BLI's 24" x 70" banner (originally a 4,955-KB PDF file) in Fast mode using its Poster settings, taking 22.76 seconds to generate a preview, and a further 1 minute, 50.60 seconds from preview to final paper cut.

− In the Epson model's equivalent Speed mode using its Poster settings, the SureColor SC-T3200 successfully printed BLI's banner, taking 24.66 seconds to generate a preview; only an additional 1 minute, 18.35 seconds were required from the file preview until the banner completed printing and was cut.

+ However, when BLI analysts printed the same poster using the CAD settings which might be selected, for example, for printing an oil well plot, the times taken for the Epson device were identical but it failed to deliver a complete banner with over 50% of the background being incomplete.

Poster Printing

Advantage ✔	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Image Quality (Fast/Speed mode)	=	=
Image Quality (Standard/Quality mode)	=	=
Image Quality (High/Max Quality mode)	=	=
Productivity (Fast/Speed mode)	=	=
Productivity (Standard/Quality mode)	✔	
Productivity (High/Max Quality mode)	✔	

+ When printing a poster in Fast/Speed mode at 300 dpi, the Canon model took 33.60 seconds to complete the job and the Epson unit took 38.97 seconds, although banding was evident in the output of both models across the full width of the poster (less so on the Epson). When the Canon model was switched to unidirectional printing, which eliminated the banding, it took 59.94 seconds to print.

+ When printing a poster in Standard/Quality mode at 600 dpi, the Canon model took 57.68 seconds and the Epson unit took 77.56 seconds, with no visible banding evident with either model in this mode.

+ Printing a poster in High quality (600 dpi) mode on the Canon model took 1 minute, 40.65 seconds, while the printing the same poster in Max Quality (720 x 1440 dpi) mode took the Epson model 3 minutes, 4.34 seconds— an 83.1% longer print time for the Epson model.

O At these High/Max Quality settings, image quality was equally good on output from both models with vibrant saturated reds and good definition.

Ink Consumption

RESULTS		
Results averaged across three sets of 50-page A1 printing in various modes (specified below)	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
COTTAGE ARCHITECTURAL PLAN (Fast/Speed mode)		
Average weight of ink used (grams)	22.5 g	15.8 g
COTTAGE ARCHITECTURAL PLAN (Standard/Quality mode)		
Average weight of ink used (grams)	24.4 g	23.4 g
RETAIL POSTER (Standard/Quality mode)		
Average weight of ink used	67.1 g	70.8 g
GIS MAP (Standard/Quality mode)		
Average weight of ink used	38.9 g	62.1 g

— When producing 50 prints of a Cottage Architectural Plan in Fast/Speed mode, the Canon unit used 42.4% more ink than did the Epson SC-T3200.

— When producing 50 prints of a Cottage Architectural Plan in Standard/Quality mode, the Canon unit used slightly (4.3%) more ink than did the Epson SC-T3200.

+ When printing a Retail Poster in Standard/Quality mode, the Canon unit used slightly (5.2%) less ink than did the Epson device.

+ When printing a GIS Map in Standard/Quality mode, the Canon iPF670 used 37.4% less ink compared with the Epson device.

Device Feature Set

— The capacities of the Canon cartridges (130 ml for black, cyan, magenta and yellow) are lower than those of the Epson model (110 ml/350 ml/700 ml available for all colours), and as a consequence they will need to be replaced more frequently than with the Epson device.

+ If the Canon device detects that printhead nozzles are in danger of clogging, it automatically starts a cleaning routine. This task would have to be done manually with the Epson unit, although BLI analysts did not encounter any nozzle clogging issues during testing.

+ 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 914 mm for the Epson unit.

O Both models offer both high-speed USB 2.0 and Gigabit Ethernet connectivity.

O Both models offer easy and quick roll paper set with auto paper feed—once the user loads paper, alignment and width adjustments are carried out automatically by the device without further user intervention.

O The catch trays of both models enable printed sheets to be stacked neatly (and in the correct sequence), making collating output much easier.

— The Canon model offers a standard non-upgradable RAM of 256 MB, while the Epson unit has a standard non-upgradable RAM of 1GB, plus an optional 320-GB hard drive, which this Canon model doesn't offer.

O The Epson model is a heavier (67.0 kg versus 53.7 kg) device than the Canon unit.

— The Epson model includes a colour LCD, while the Canon model has a monochrome LCD display.

— The Epson SureColor SC-T3200's rated power consumption is much lower than that of the Canon model while printing (52 watts versus Canon's 140 watts).

+ However, in standby mode (where the devices are likely to spend more of their time) the Canon model's power consumption (0.5 W) is lower than that of the Epson device (3 W).

+ Rated noise emissions are lower with the Canon model (47 dB versus 50 dB).

Driver Feature Set

+ The Canon iPF670 has five speed settings (Fast 300, Standard 600, Draft 600, High 600 and 1200), which compares to three settings for the Epson device (Speed, Quality and Max Quality), although not all speed settings are available with all media types.

O Both the Canon GARO driver and the Epson ESC/P driver provide a useful overview of the settings for pre-defined profiles.

— The Canon driver offers a comparable range of seven predefined profiles compared with eight 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.

— However, the Epson driver has a poster mode which allows up to 4 by 4 posters, whereas the Canon GARO driver only offers 2 by 2 posters.

— The Canon driver enables page stamping (Date, Time, Name and Page Number), but the Epson driver offers a wider range of stamping options, including a wide range of image quality attributes.

O 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 Epson (but not the Canon) driver provides a useful thumbnail preview for users to check the effects on the image as they make colour adjustments.

+ The Canon driver includes the Color imageRUNNER Enlargement Copy Mode utility, which enables users to integrate a Canon small-format MFP device with the iPF670. Documents scanned by the Canon MFP are automatically routed to a hot folder that is monitored by the driver of the iPF670. The image is then resized and printed, offering a fast, easy-to-use poster creation tool for office users. Epson users can obtain comparable functionality via the extra-cost CopyFactory Utility.

O 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. The Epson driver offers comparable functionality via its Layout Manager utility.

O The Canon model 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.
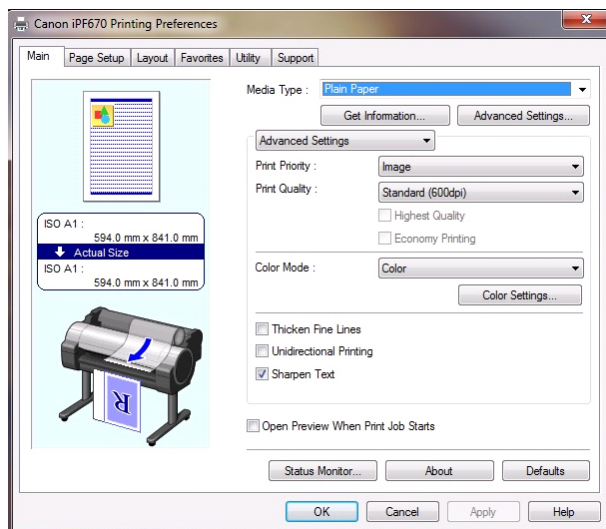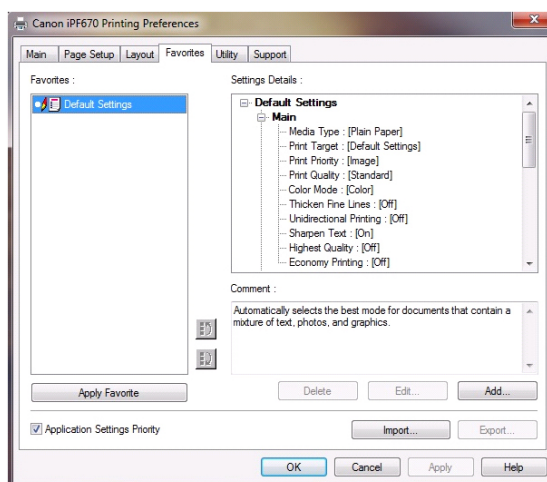

Canon Print Driver Main Tab
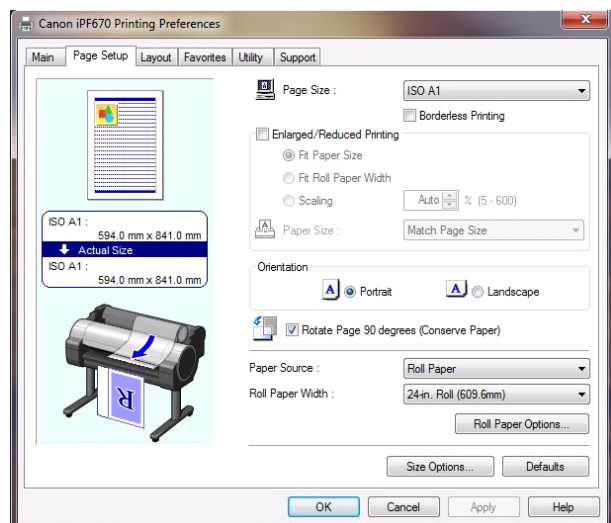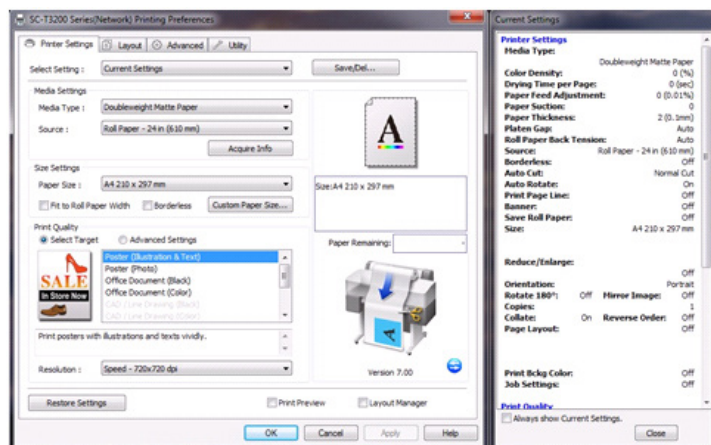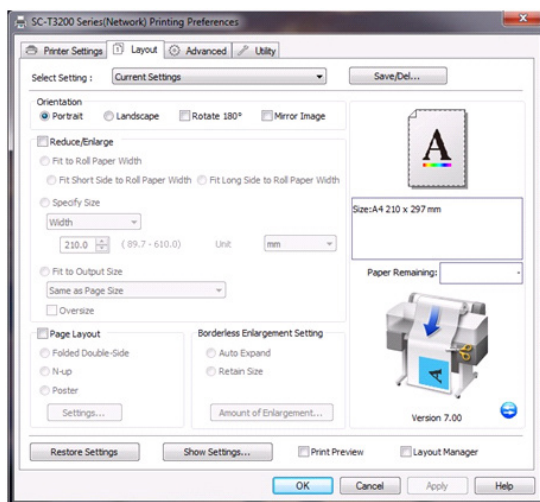

Canon Print Driver Page Setup Tab
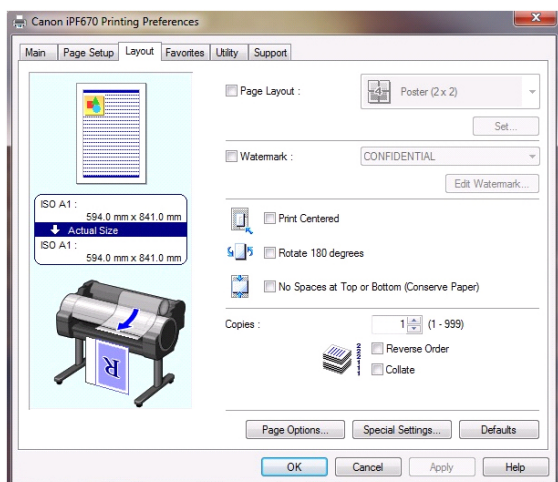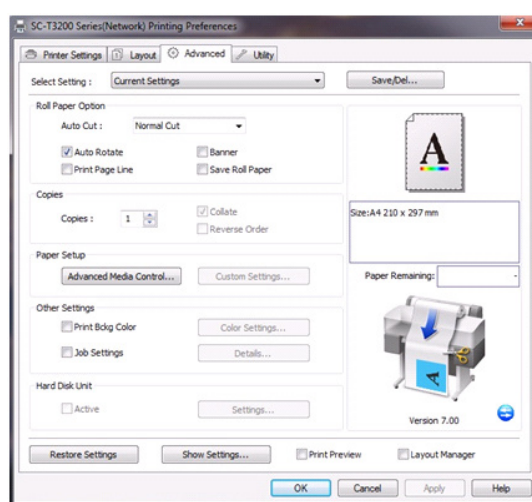
Canon Print Driver Layout Tab

Canon Print Driver Favourites Tab
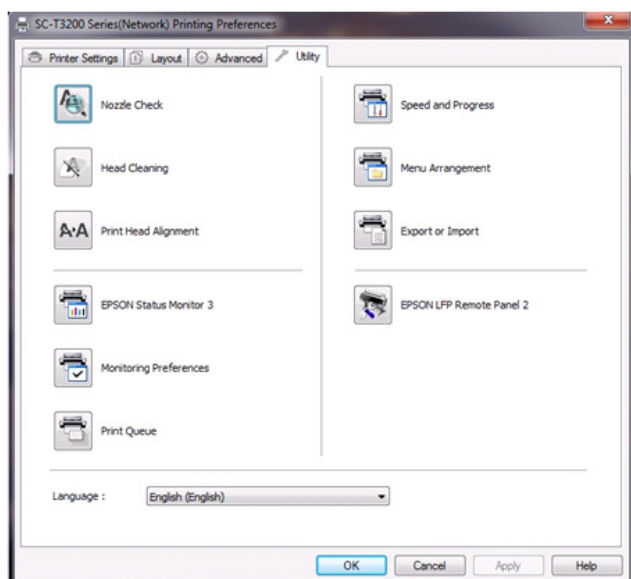

Epson Print Driver Printer Settings Tab

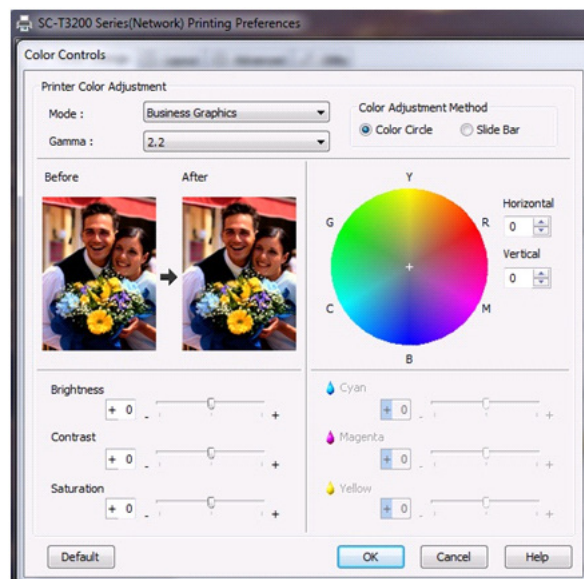**Epson Print Driver Layout Tab**

Epson Print Driver Advanced Settings Tab

Epson Print Driver Utility Tab

Epson Print Driver Colour Controls

SUPPORTING TEST DATA

Job Stream Productivity

Mixed File Types, Same Size

Canon imagePROGRAF iPF670 (time in seconds)			Epson SureColor SC-T3200 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
742.62	1,041.77	1,847.17	829.47	1,448.28	3,704.44

BLI's job stream consists of nine files, including PDF, TIFF and DWF files totalling 19 pages, all at Arch D-size, ensuring that DWF and PLT files are set to fit to page. This test replicates the type of traffic a typical wide-format device might experience in a real-world, multi-user environment. All of the files are submitted to the controller in a specific order and sent to the printer as a group, at which time the stopwatch begins; timing ends when the last page of the last file exits the device. Both devices were loaded with 42-inch rolls, with each file set to auto-rotate to save media.

Colour Productivity

Canon imagePROGRAF iPF670 (time in seconds)			Epson SureColor SC-T3200 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
431.87	630.66	1,151.17	515.34	911.18	2,566.31

The 12-page DWF test file was printed using the device driver set to the plain paper/colour setting. Both devices were loaded with 610-mm rolls. The actual time indicated is the time it took to RIP, image and deliver all pages of the test document to the collection bin.

Monochrome Productivity

Canon imagePROGRAF iPF670 (time in seconds)			Epson SureColor SC-T3200 (time in seconds)		
Fast	Standard	High	Speed	Quality	Max Quality
431.51	614.30	1,150.35	517.41	912.31	2,562.91

The 12-page DWF test file was printed with the Canon driver set to the plain paper/monochrome setting and the Epson driver set to plain paper, greyscale, black ink only. Both devices were loaded with 610-mm rolls. The actual time indicated is the time it took to RIP, image and deliver all pages of the test document to the collection bin.

First-Page-Out Productivity after a Weekend of Non-Use

	Canon imagePROGRAF iPF670 (time in seconds)	Epson SureColor SC-T3200 (time in seconds)
Time Before Printing Commences	36.99	84.24
First Page Out	84.74	157.96

First-Page-Out Productivity from Ready State

	Canon imagePROGRAF iPF670 (time in seconds)	Epson SureColor SC-T3200 (time in seconds)
Time Before Printing Commences	10.81	12.38
First Page Out	58.89	87.13

First-page-out times are achieved by sending an Arch D-size PDF file to print, timed from release to page out with the Canon driver set to the plain paper/monochrome setting and the Epson driver set to plain paper and black. Both devices were loaded with 610-mm rolls.

Colour Image Quality

Colour Optical Density Evaluation

Canon imagePROGRAF iPF670 Plain Paper						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.54	1.02	0.62	1.12	0.59	1.11
Magenta	0.52	0.96	0.61	1.06	0.60	1.08
Yellow	0.43	0.77	0.50	0.86	0.49	0.86
Black	0.55	1.41	0.65	1.49	0.64	1.46

Epson SureColor SC-T3200 Plain Paper						
	Speed		Quality		Max Quality	
	50%	100%	50%	100%	50%	100%
Cyan	0.39	1.02	0.36	1.04	0.38	1.04
Magenta	0.35	0.86	0.28	0.88	0.29	0.94
Yellow	0.37	0.81	0.38	0.89	0.35	0.93
Black	0.66	1.10	0.65	1.27	0.65	1.30

Note: Colour density readings were assessed by printing a BLI test file on plain paper in default colour settings at all quality settings available and measuring the density of 100% dot fill and 50% dot fill using an XRite 508 densitometer.

Colour Gamut Comparison

Media Type/Settings	Canon imagePROGRAF iPF670	Epson SureColor SC-T3200
Plain Paper Fast	192,660	171,742
Plain Paper Standard	224,444	198,506
Plain Paper High	231,389	226,135
Glossy Photo High	636,679	652,492

Colour Gamut Comparison

Epson SureColor SC-T3200 colour gamut on plain paper in Speed settings (red) versus Canon imagePROGRAF iPF670 colour gamut (shown chromatically) on plain paper in Fast settings.
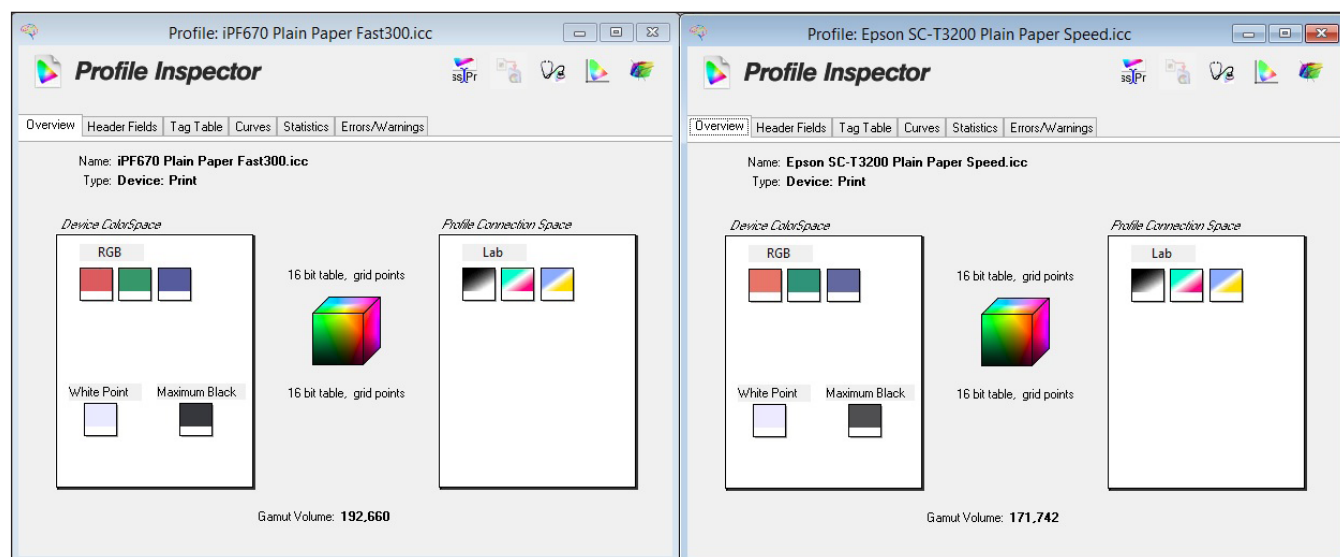
Colour gamut profiles for Canon imagePROGRAF iPF670 (left) and Epson SureColor SC-T3200 (right) on plain paper in Fast/Speed mode.

Colour Gamut Comparison

Epson SureColor SC-T3200 colour gamut on plain paper in Quality settings (red) versus Canon imagePROGRAF iPF670 colour gamut (shown chromatically) on plain paper in Standard settings.

Colour gamut profiles for Canon imagePROGRAF iPF670 (left) and Epson SureColor SC-T3200 (right) on plain paper in Standard/Quality mode.
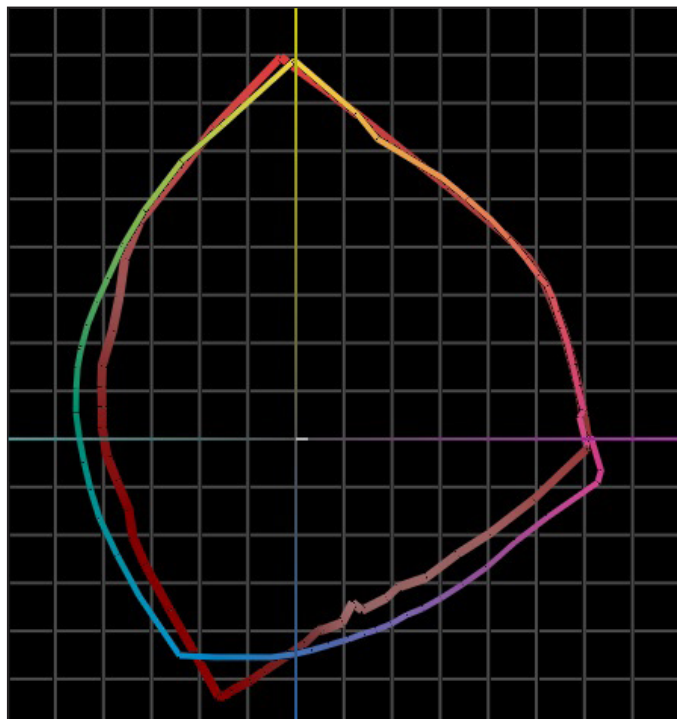
Colour Gamut Comparison

Epson SureColor SC-T3200 colour gamut on plain paper in Max Quality settings (red) versus Canon imagePROGRAF iPF670 colour gamut (shown chromatically) on plain paper in High quality settings.
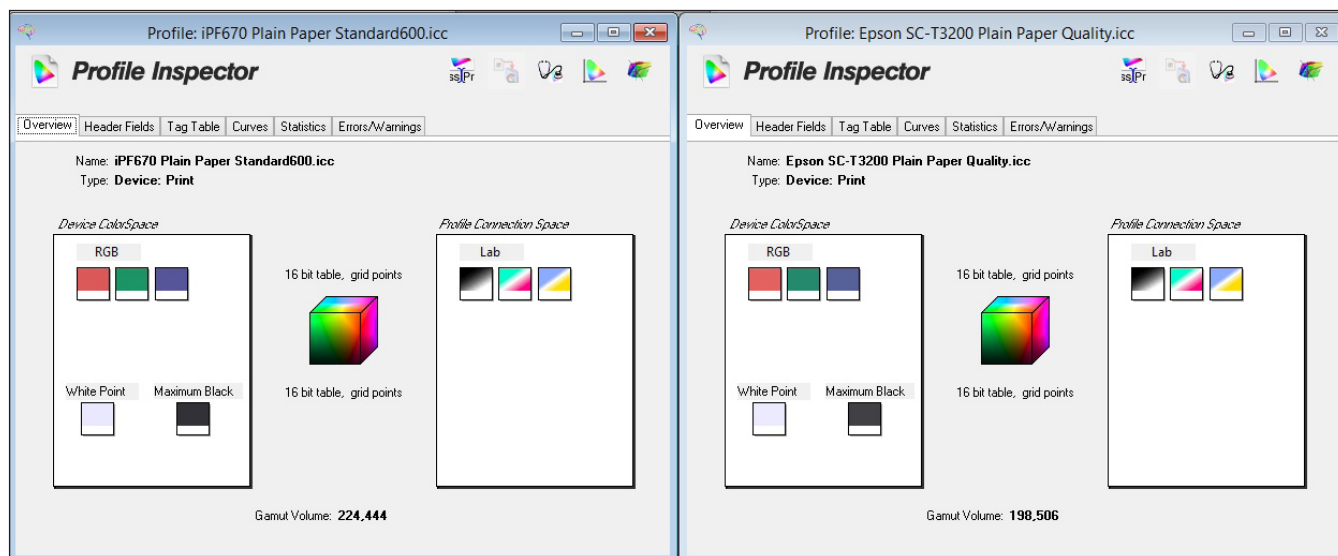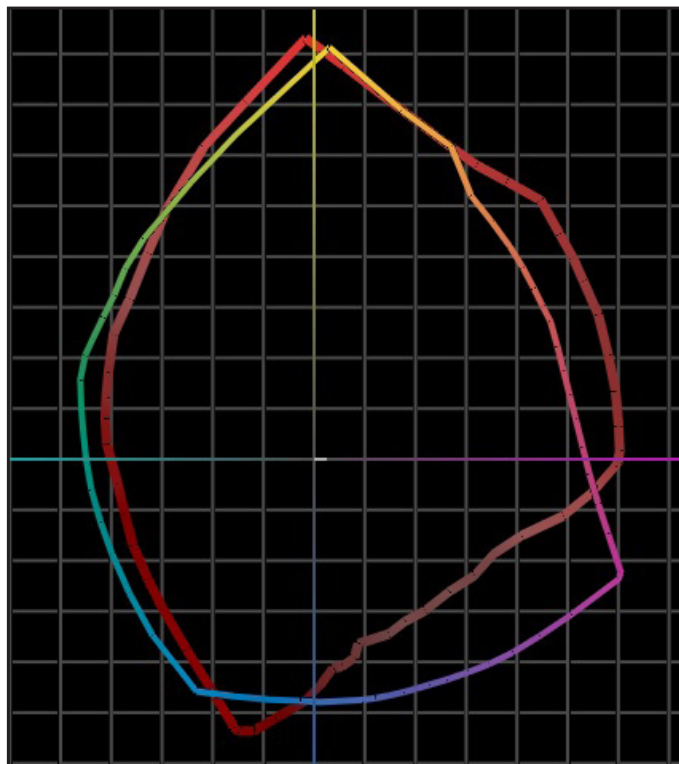

Colour gamut profiles for Canon imagePROGRAF iPF670 (left) and Epson SureColor SC-T3200 (right) on plain paper in High/Max Quality mode.

Colour Gamut Comparison

Epson SureColor SC-T3200 colour gamut on photo quality paper in Max Quality settings (red) versus Canon imagePROGRAF iPF670 colour gamut (shown chromatically) on photo quality paper in High quality settings.
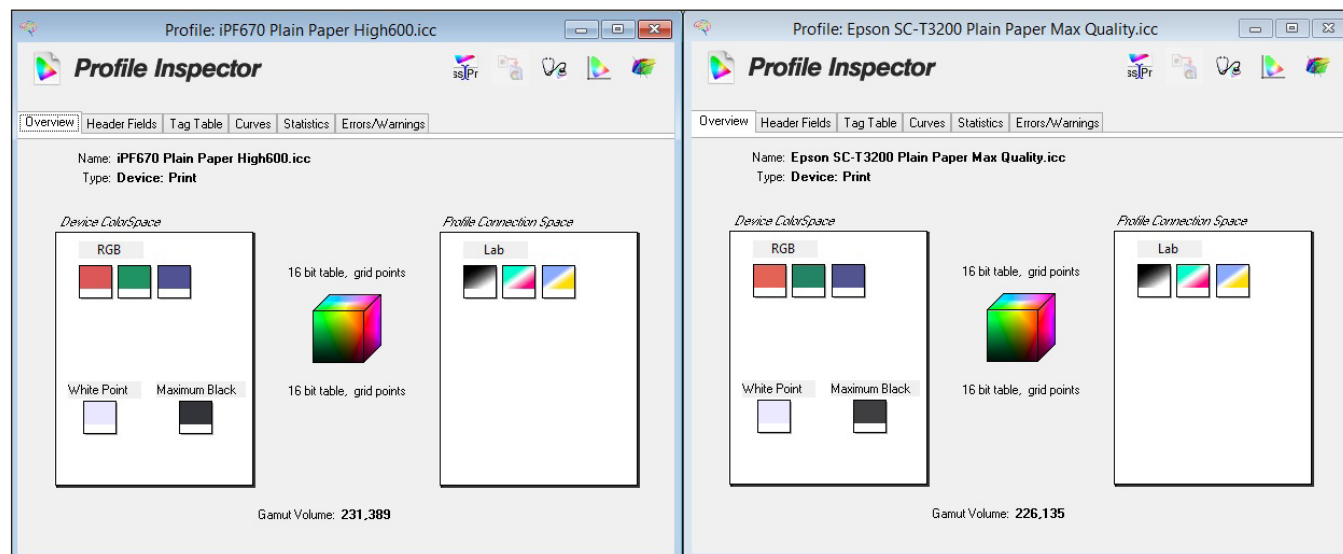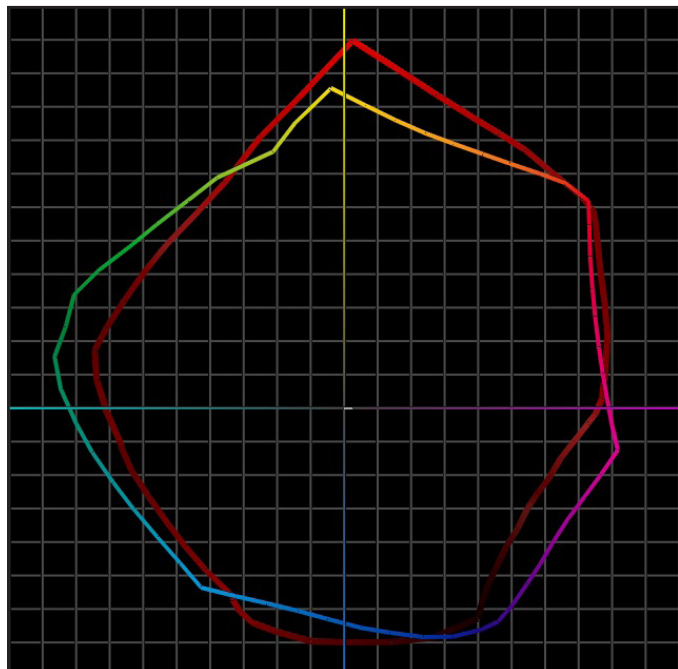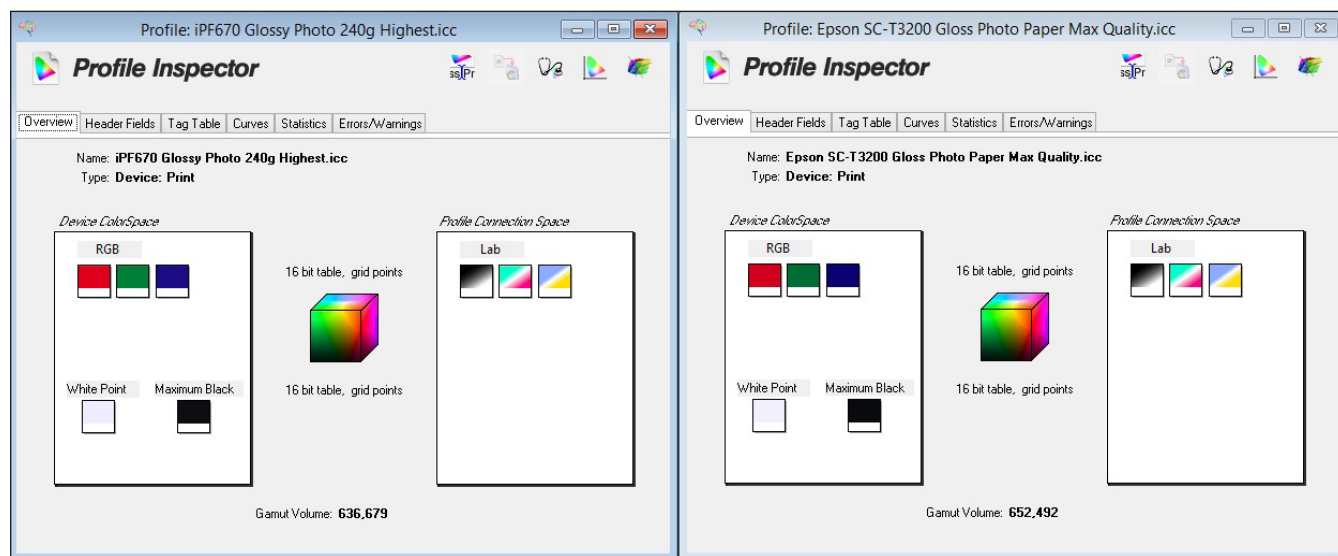

Colour gamut profiles for Canon imagePROGRAF iPF670 (left) and Epson SureColor SC-T3200 (right) on photo quality paper in High/Max Quality mode.

Black Image Quality

Density Block	Canon imagePROGRAF iPF670			Epson SureColor SC-T3200		
	Fast	Standard	High	Speed	Quality	Max Quality
1	1.40	1.48	1.48	1.17	1.35	1.34
2	1.42	1.48	1.47	1.17	1.34	1.35
3	1.42	1.48	1.48	1.17	1.34	1.34
4	1.41	1.46	1.46	1.17	1.33	1.32

Note: Solid black density measurements are based on four readings taken from a BLI proprietary PDF test target file corresponding to four different 100% solid black locations on the output. The output was assessed at all quality settings available, with the Canon driver set to plain paper/monochrome setting and the Epson driver set to plain paper, greyscale, black ink only. Density was measured using an XRite 508 densitometer.

Device Feature Set

	Canon imagePROGRAF iPF670	Advantage		Epson SureColor SC-T3200
Max. print quality	2400 x 1200 dpi		✔	2880 x 1440 dpi
Number of inks	5			5
Ink tanks replaceable during operation	Yes	✔		No
Ink-drop size	4 picoliter		✔	3.5 picoliter (variable)
Ink cartridge capacity	90 ml (Starter) and 130 ml for each colour		✔	110 ml, 350 ml, 700 ml (all sizes available with all colours)
Number of nozzles	15,360 in total (2,560 per colour)	✔		3,600 in total (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	3 mm			3 mm
Maximum outside diameter of roll paper	150 mm			149.86 mm
Maximum cut-sheet media length	1.6 m	✔		914 mm
Maximum media width	24 inches			24 inches
Media loading	Top			Top
Optional media handling	Roll holder set			Roll media adapter
Standard RAM	256 MB		✔	1 GB

	Canon imagePROGRAF iPF670		Advantage		Epson SureColor SC-T3200
Maximum RAM	256 MB		✔		1 GB
Hard drive	None		✔		Optional 320-GB
Interface	10/100/1000Base-T/TX Ethernet, USB 2.0				10/100/1000Base-T/TX Ethernet, USB 2.0
PDL	GARO, HP-GL/2, HP RTL				HP-GL/2, HP RTL, Epson ESC/P-R
Net weight (unpacked)	53.7 kg (with stand)				67.0 kg (with stand)
Rated power consumption when in standby	0.5 W	✔			3 W
Rated power consumption when active	140 W		✔		52 W
Acoustic pressure	Operation: 47 dB (A) or less; Standby: 35 dB (A) or less	✔			Operation: 50 dB (A); Standby: INA
Acoustic power	Operation: 6.4 Bels or less	✔			6.8 Bels

Driver Feature Set

	Canon imagePROGRAF iPF670		Advantage		Epson SureColor SC-T3200
Speed settings	5 (Fast 300, Standard 600, Fast 600, High 600 and 1200)	✔			3 (Speed, Quality, Max Quality), depending on paper chosen
Economy mode	Yes	✔			No
Predefined profiles	7		✔		8
Overview of profile settings provided	Yes				Yes
IQ optimized for print profiles	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

	Canon imagePROGRAF iPF670	Advantage		Epson SureColor SC-T3200
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			Yes
MS Office Plug-in	Yes			Yes
Disable automatic cutter	Yes			Yes
Unidirectional printing selection option	Yes	✔		No

Ink Consumption

Table 1

Amount of Ink in Each Canon imagePROGRAF iPF670 Cartridge (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Weight of cartridge prior to installation	175.5	173.4	173.6	175.1	171.4	176.3
Weight of cartridge at end of life	45.0	45.0	45.0	45.0	45.0	45.0
Net weight of ink	130.5	128.4	128.6	130.1	126.4	131.3
Total ink weight across six cartridges						775.3

Table 2

Amount of Ink in Each Epson SureColor SC-T3200 Cartridge (grams)

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Weight of cartridge prior to installation	512.5	511.4	510.9	517.7	512.1
Weight of cartridge at end of life	129.8	129.8	129.8	129.8	129.8
Net weight of ink	382.7	381.6	381.1	387.9	382.3
Total ink weight across five cartridges					1,915.6

Table 3

Ink Used in Three 50-Page Runs of Cottage Architectural Drawing Test Document (Fast Mode) on the Canon imagePROGRAF iPF670 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	3.6	2.4	2.2	6.7	6.7	2.0
Test Run 2 Net weight of ink used	3.4	2.1	1.8	6.4	6.5	2.0
Test Run 3 Net weight of ink used	3.6	2.2	1.7	6.3	6.1	1.9
Average amount of ink used across three runs	3.5	2.2	1.9	6.5	6.4	2.0
Total ink weight across six cartridges for 50-page run (based on averages)						22.5

Table 4

Ink Used in Three 50-Page Runs of Cottage Architectural Drawing Test Document (Speed Mode) on the Epson SureColor SC-T3200 (grams)

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Test Run 1 Net weight of ink used	4.5	0.8	3.0	7.4	0.3
Test Run 2 Net weight of ink used	4.2	0.7	2.9	7.5	0.2
Test Run 3 Net weight of ink used	4.3	0.7	3.0	7.6	0.2
Average amount of ink used across three runs	4.3	0.7	3.0	7.5	0.2
Total ink weight across five cartridges for 50-page run (based on averages)					15.7

Table 5

Ink Used in Three 50-Page Runs of Retail Poster Test Document on the Canon iPF825 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	3.9	2.2	1.6	7.0	7.5	1.8
Test Run 2 Net weight of ink used	3.7	2.3	1.5	7.5	7.9	1.6
Test Run 3 Net weight of ink used	4.4	2.4	2.2	7.4	6.9	1.5
Average amount of ink used across three runs	4.0	2.3	1.8	7.3	7.4	1.6
Total ink weight across six cartridges for 50-page run (based on averages)						24.4

Table 6

Ink Used in Three 50-Page Runs of Cottage Architectural Drawing Test Document (Quality Mode) on the Epson SureColor SC-T3200 (grams)

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Test Run 1 Net weight of ink used	5.4	1.5	3.5	11.7	1.1
Test Run 2 Net weight of ink used	5.7	1.5	3.9	11.6	1.0
Test Run 3 Net weight of ink used	5.4	1.5	3.7	11.7	1.1
Average amount of ink used across three runs	5.5	1.5	3.7	11.7	1.1
Total ink weight across five cartridges for 50-page run (based on averages)					23.5

Table 7

Ink Used in Three 50-Page Runs of Retail Poster Test Document (Standard Mode) on the Canon imagePROGRAF iPF670 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	13.1	29.5	13.4	4.4	4.3	1.7
Test Run 2 Net weight of ink used	13.5	30.0	13.8	4.9	4.9	1.8
Test Run 3 Net weight of ink used	12.8	28.9	12.7	5.1	4.9	1.7
Average amount of ink used across three runs	13.1	29.5	13.3	4.8	4.7	1.7
Total ink weight across six cartridges for 50-page run (based on averages)						67.1

Table 8

Ink Used in Three 50-page Runs of GIS Map Test Document on the Epson SureColor SC-T3200 (grams)

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Test Run 1 Net weight of ink used	16.3	13.3	35.5	4.7	1.2
Test Run 2 Net weight of ink used	16.2	13.1	35.4	4.7	1.3
Test Run 3 Net weight of ink used	16.1	13.3	35.3	4.7	1.2
Average amount of ink used across three runs	16.2	13.2	35.4	4.7	1.2
Total Ink Weight across five cartridges for 50-page run (based on averages)					70.7

Table 9

Ink Used in Three 50-Page Runs of GIS Map Test Document (Standard Mode) on the Canon imagePROGRAF iPF670 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	14.2	7.8	7.1	3.0	2.9	1.7
Test Run 2 Net weight of ink used	14.8	8.4	7.9	3.9	3.7	2.0
Test Run 3 Net weight of ink used	14.3	8.2	7.8	3.2	3.4	2.4
Average amount of ink used across three runs	14.4	8.1	7.6	3.4	3.3	2.0
Total ink weight across six cartridges for 50-page run (based on averages)						38.8

Table 10

Ink Used in Three 50-page Runs of GIS Map Test Document (Quality Mode) on the Epson SureColor SC-T3200 (grams)

	Cyan	Yellow	Magenta	Matte Black	Photo Black
Test Run 1 Net weight of ink used	30.7	11.8	14.2	4.0	1.2
Test Run 2 Net weight of ink used	31.1	11.8	14.2	4.1	1.2
Test Run 3 Net weight of ink used	30.8	11.8	14.1	4.1	1.2
Average amount of ink used across three runs	30.9	11.8	14.2	4.1	1.2
Total Ink Weight across five cartridges for 50-page run (based on averages)					62.2

Ink Consumption Test Methodology Overview:

Buyers Lab's ink consumption analysis was conducted using three document types (architectural plan, retail poster and GIS map). Each document was formatted as a PDF and sized at ISO A1, except for the Cottage Architectural Plan, which was formatted as a DWF file.

The Canon imagePROGRAF iPF670 was installed in BLI's lab with the latest "01-00" level of firmware (as of November 2014) and connected to a Windows 7 workstation using a 1000BaseT TCP/IP connection. Default device settings were used throughout testing. The Canon GARO driver was used for all testing and was left in default colour settings with media selection set to plain paper and the image set to print at actual size. For

the Cottage Architectural Drawing, Print Priority settings were set to Line Drawing/Text with Quality set to Fast and Standard (600 dpi). For the Retail Poster and GIS Map, Print Priority settings were set to Image with Quality set to Standard (600 dpi).

The Epson SureColor SC-T3200 was installed in BLI's lab with the latest level of firmware (as of September 2014) and connected to a Windows 7 workstation using a 1000BaseT TCP/IP connection. Default device settings were used throughout testing. The Windows EPSON-GL2 driver was used for all testing and was left in default colour settings, with media selection set to plain paper and the image set to print at actual size. Quality was set to Quality (600 dpi) mode for all document types, with the exception of the Cottage Architectural Plan, which was tested in both Speed and Quality modes.

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.

For both models one cartridge was then run to exhaustion and the weight of the empty cartridge was recorded.

The percentage of ink used per cartridge was calculated by dividing the net weight of ink used in the print run by the overall weight of ink in each cartridge and multiplying by 100.

The percentage of total ink used per printer was calculated by adding the percentages used of each of the cartridges and dividing by the number of cartridges.

Test Environment

Testing was conducted in BLI's European test lab, in an atmospherically controlled environment monitored by a 24/7 Dickson 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 2007 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 a BLI 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 and 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.

For more information on Buyers Laboratory, please call David Sweetnam on +44(0) 118 977 2000, visit www.buyerslab.com, or email david.sweetnam@buyerslab.com.