Custom Test Report

BLI Comparative Lab Test Report

Canon imagePROGRAF iPF850
vs. HP DesignJet T1530

Canon imagePROGRAF iPF850

HP DesignJet T1530

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
Colour Image Quality	✔	
Black Image Quality	=	=
Colour Print Productivity	✔	
Black Print Productivity	✔	
Banner Printing	✔	
Poster Printing	✔	
Direct Print Submission Functionality	=	=
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 iPF850 and the HP DesignJet T1530, and produce a report comparing the relative strengths and weaknesses of the two products in terms of image quality, productivity, ink consumption, direct print submission, device and driver feature sets, and banner and poster printing. All testing was performed in BLI's test facility in Wokingham, UK.

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Executive Summary

A sterling performance from the Canon imagePROGRAF iPF850, the model outperformed the HP Design-Jet T1530 in the majority of test categories in BLI's evaluation. Specifically, the iPF850 demonstrated higher productivity, superior colour image quality, richer device and driver feature sets and lower ink consumption. Although both models' productivity was comparable in Fast mode and in the dual-roll job stream test, the Canon model was much faster at delivering colour and black output than the HP unit in

Standard/Normal mode and more than twice as fast in High/Best Quality mode; the iPF850 also excelled with its productivity performance when printing BLI's job stream, designed to simulate a typical mixed workflow for a large-format unit. BLI analysts observed that the speed advantage of the Canon model over the HP unit became more pronounced as the quality level was increased, which enables Canon users to achieve optimum image quality without sacrificing productivity. A significant productivity-boosting advantage for the Canon model is its hot-swap ink tank design, which lets users replace empty inks while the device is still actively printing. In contrast, when the HP T1530 runs out of ink, printing has to stop for the cartridge to be replaced, which leads to some operator downtime.

Both models delivered high-quality results when printing Architectural, Engineering and Construction (AEC) and Geographical Information Systems (GIS) graphics—results that would easily satisfy customer requirements. Yet, the Canon model had the overall edge for colour image quality. It delivered a much larger colour gamut in all modes tested when printing on plain paper. On matte coated paper, the iPF850 really excelled, with a CIE volume of 607,470 compared with just 276,864 for the HP unit. In addition, the iPF850 produced higher optical densities for cyan and magenta; more distinct detailing in colour business graphics; more vibrant, saturated colours in photographic output; and more natural-looking skin tones than those produced by the HP T1530. The HP model's colour halftones displayed 'truer' neutral greys aided by its grey ink, and its black image output scored very well with darker solids and better fine detailing in light contrast areas on photographic output. Poster output produced by the HP and Canon models exhibited some banding in dark areas in every mode except Best. However, the Canon iPF850 had a key advantage in the option of using its unidirectional printing feature to eliminate any banding, even in Fast mode.

In terms of device and driver feature sets, the Canon iPF850 has plenty to offer over its rival HP model. In addition to the aforementioned hot-swap ink tanks, it has higher cartridge capacities, a higher capacity stacker, smaller ink drop sizes, more media profiles, and a flexible layout nesting option to save on paper (the HP model offers a similar feature but it doesn't offer the user the same flexibility and control over image placement). Canon users can integrate the iPF850 device with a smaller-format MFP to produce enlarged, poster-size copies via the free Color imageRUNNER Enlargement Copy Mode, which is not available with the HP T1530.

That said, the HP DesignJet T1530 has numerous advantages of its own; BLI analysts were impressed with the design and build quality of the HP T1530's rear-mounted 50-sheet capacity stacker assembly, which is integrated with the main unit, giving it a more compact office footprint (which could be a critical factor where space is constrained). It holds printed sheets in perfect alignment, while a paper sensor detects when the stacker is full and halts operation, which prevents paper spillage or paper jamming issues. Whilst the Canon model's stacker is capable of holding twice as many (up to 100) printed sheets very neatly, it has no equivalent automatic sensor, which means that operators may have to be more vigilant in order to prevent jams or paper spillage when the stacker capacity is reached. The HP DesignJet T1530 offers a 96-GB RAM (compared with Canon's 32-GB) and a 500-GB hard drive (compared with the iPF850's 320-GB). The T1530 is a much lighter (88 kg vs 213 kg) model; plus, it consumes less energy while printing—120 watts compared with 200 watts for the Canon model. Both models allow files to be retrieved from cloud storage for printing. The Canon model supports direct PDF printing; however, the HP's Mobile Printing service offers additional functionality not available with the Canon unit, including support for easy printing from Apple or Android mobile devices via a wireless network connection or Wi-Fi Direct, while users can also submit PDF, TIFF and JPEG files remotely via email to the T1530 for printing. Canon offers an app which enables PDF printing from Apple iPads.

With this feature set advantage overall, together with its superior colour image quality, faster productivity (particularly in Standard/Normal and High/Best Quality modes) and lower ink consumption, BLI judges the Canon imagePROGRAF iPF850 to have the edge over the HP model.

Colour Image Quality

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
Text	✔	
Fine Lines	✔	
Halftone Range	=	=
Halftone Fill		✔
Solid Density	✔	
AEC Graphics	=	=
GIS Graphics	=	=
Business Graphics	✔	
Photographic Images	✔	
Colour Gamut (plain paper, Fast)	✔	
Colour Gamut (plain paper, Standard/Normal)	✔	
Colour Gamut (plain paper, High/Best)	✔	
Colour Gamut (gloss paper, High/Best)	✔	

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

+ The Canon iPF850 delivered superior optical densities on plain paper in all modes for cyan and magenta.

○ The HP T1530 produced the higher optical density for yellow in High/Best mode; in Fast and Standard/Normal modes, the two models produced comparable optical densities for yellow. The HP device produced higher optical densities for composite black in Fast and Standard/Normal settings, while the Canon delivered higher optical density for composite black in High/Best mode.

+ When printing on plain paper in Fast mode, the Canon model delivered a 51.9% larger colour gamut with a CIE volume of 238,781 versus a CIE volume of 157,245 for the HP model.

+ The Canon model also produced a 78.1% larger colour gamut when printing on plain paper using Standard/Normal settings—with a CIE volume of 285,581 versus a CIE volume of 160,331 for the HP device.

+ When printing on plain paper in High/Best Quality settings, the Canon iPF850 delivered a 62.4% larger colour gamut than the HP T1530, with a CIE volume of 299,268 versus a CIE volume of 184,281 for the HP model.

+ When printing on matte coated paper using Canon's High quality setting and the HP T1530's Best quality setting, the Canon model delivered a far larger (117.1%) colour gamut than that of the HP unit, with an impressive CIE volume of 607,470 compared with 279,864 for the HP T1530.

+ The Canon iPF850 delivered excellent text quality in colour in Standard/Normal and High/Best modes, with crisp and clear serif and sans serif fonts that were legible down to the smallest (3-pt.) size with no breakup. In Fast mode, the Canon device produced characters legible down to the 4-pt. size, with some bleed into

the plain paper. In contrast, the HP T1530 produced Arial text that was legible down to the 3-pt size level for all modes, but characters exhibited some ink bleed, while Times New Roman text was legible at the 4-pt size in Standard/Normal mode (with no bleed) and 3-pt size for Best and Fast modes (with bleed).

+ Fine lines produced by both devices remained distinct at the 0.1-pt. level across all modes. While fine lines were consistently good and distinct from the Canon model, some bleed was evident in output produced by the HP model in Fast mode, and in Standard/Normal mode its fine lines were only rated fair. White-on-black fine lines were visible at the 0.25-pt. level in all modes and rated fair across the board for both models.

+ In Standard/Normal and High/Best modes, the Canon model produced 0.1-pt. circles that were smooth and unbroken, and rated as good and very good, respectively, in the two modes. Circles produced by the HP model were rated good in the two modes. In Fast mode, the Canon model delivered good 0.1-pt. circles, whilst the HP model's circles suffered from some slight blurring in this mode.

+ The Canon iPF850 produced the 1x1 pixel grid in CMY with no quality issues, and coverage was consistently good (Fast mode) and very good (Standard/High modes) across all colours. In contrast, the HP model could only deliver good coverage on the CMY 2x2 pixel grid in Fast mode; in Normal and Best modes, the HP model delivered the 1x1 pixel grid in CMY with no quality issues and with good coverage.

○ Both devices delivered colour halftone output across the full range—from the 10% to 100% dot-fill levels—in all modes with distinct transitions between all levels.

— The Canon iPF850 delivered good colour halftone fills in all modes, as did the HP model. However, the HP model had a slight advantage overall, due to its superior greyscales, with neutral greys aided by its grey ink. In contrast, greyscales on the Canon unit did exhibit a slight cyan bias due to their composite make-up.

○ When evaluating Architectural, Engineering and Construction (AEC) graphics in Standard/Normal mode, both the Canon and HP units' output exhibited an excellent level of detail and very distinct fine lines. The HP model delivered the better character definition (when viewed under magnification) while the Canon device's lines were bolder.

○ When evaluating Geographic Information Systems (GIS) graphics in Standard/Normal mode on plain paper, both units delivered very good detail and showed an equally good depth of field—a critical factor in delivering a realistic three-dimensional rendering of topographical features.

+ Colour business graphics produced by the Canon iPF850 exhibited slightly smoother transitions from light to dark areas and sharper fine details than did those produced by the HP device. On output delivered by the HP model, cyan exhibited a clear green bias in Fast and Normal models.

+ When comparing photographic images in Fast, Standard/Normal and High/Best Quality modes, the Canon model delivered richer saturated colours—and brighter reds in particular—in all modes when compared with the HP unit. In Standard/Normal mode, there was little difference in the output from the two models, with both delivering excellent detailing in dark and light contrast areas and good saturation, although colours were consistently brighter in output from the Canon model. In High/Best mode, the Canon unit delivered slightly better detailing in dark contrast areas; both models delivered excellent detailing in light contrast areas.

+ Skin tones produced by the Canon iPF850 models were natural-looking, while those produced by the HP model were pale in Fast mode and slightly yellowish in Normal and Best modes.

+ Overall, the Canon model was the superior performer in BLI's colour image quality evaluation. It produced higher cyan and magenta densities; far larger colour gamut sizes across the board on both plain and (especially) matte coated paper; brighter, more saturated colours; smoother circles; and a sharper level of detail in colour business graphics and dark contrast areas. The HP model, however, delivered very good colour halftone fills, with better neutral grey halftones, and crisper text in AEC graphics. Importantly, as befitting the needs of their target market, both models produced distinct fine lines in AEC drawings and an excellent level of detail in GIS graphics, with very good depth of field even on plain paper.

Black Image Quality

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
Text	✔	
Fine Lines	=	=
Halftone Range	=	=
Halftone Fill	=	=
Solid density		✔
AEC Graphics	=	=
Business Graphics	✔	
Photographic Images		✔

— When printing in monochrome, the HP model delivered darker solids with higher optical densities in Fast and Standard/Normal settings, whilst its optical density for High/Best modes was comparable to that of the Canon unit.

+ Black text reproduction from the Canon iPF850 unit displayed clear character definition in Standard/Normal and High/Best modes and fonts were legible down to the smallest (3-pt.) size with no breakup. In Fast mode, the Canon device produced characters legible down to the 3-pt. size but some bleed was evident. Serif and sans serif fonts produced by the HP T1530 were legible down to the 3-pt size level for all modes but characters exhibited some bleed across the board.

○ Fine lines in BLI's line art test remained distinct at the 0.1-pt. level in all modes in the output of both devices, and were rated as good for the Canon unit and fair for the HP model in Standard/Normal mode and good in High/Best mode for both models. In Fast mode, the Canon iPF850's fine lines exhibited slight blurring whilst the HP T1530's black fine lines were rated good. White-on-black fine lines produced by both models remained distinct only at the 0.25-pt. level in all quality modes and were rated fair across the board, except in Fast mode where the HP model's white-on-black lines were rated poor.

+ Circles produced by both models were fully formed, but the iPF850 delivered slightly smoother circles than those produced by the HP unit in Standard/Normal and High/Best modes.

+ Both models produced the 1x1 pixel grid in black with no quality issues; coverage was good (in Fast mode) and, for the Canon model, very good in Standard/High modes while coverage remained consistently good for the HP device.

○ Both models delivered halftones across the full range—from the 10% to 100% dot-fill levels in all modes.

○ Halftone fill results in all modes were equally good for the Canon and HP devices.

○ When evaluating AEC graphics in Standard/Normal mode in black, both models delivered distinct fine lines.

+ Monochrome business graphics were produced more accurately by the Canon model, whereas some fine lines and circles were slightly less distinct in the output produced by the HP unit, but only when viewed under magnification.

— Photographic images produced in Fast and Standard/Normal modes on plain paper by the HP T1530 exhibited smoother gradations and better detail in light and dark contrast areas than did those produced by the Canon model, which were slightly grainy in comparison. There was some banding evident on output

from both models in Fast mode, which was eliminated on the Canon unit when its unidirectional feature was utilised. The HP model, again, had a slight edge with photographic images produced in High/Best Quality mode, with better fine detailing in light contrast areas.

○ Results were more mixed in BLI's monochrome image quality assessment. Whilst the Canon device delivered superior business graphics and smoother circles, the HP unit produced superior fine detailing in light contrast areas on photographic output as well as a higher black optical density in two of the three tested modes. The two models delivered fine lines of comparable quality and text that was legible down to a very small size with no breakup, although there was ink bleed evident in the HP model's text output. In addition, the two devices delivered distinct fine lines in AEC graphics and a full halftone range.

Print Productivity

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
First Page Out From Weekend Non-Use	✔	
First Page Out From Ready State	✔	
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)	✔	
Dual-roll Job Stream	=	=

+ The Canon iPF850 delivered a 27.5% faster first-page-out time of 124.71 seconds after a weekend of non-use, compared with 172.01 seconds for the HP device. Start-up time before printing commenced was, again, faster for the Canon model at 61.35 seconds, compared with 101.19 seconds for the HP unit.

+ The Canon device delivered a 37.3% faster first-page-out time of 54.41 seconds from its ready state, compared with 86.72 seconds for the HP T1530. Start-up time before printing commenced was fractionally faster for the Canon model—12.38 seconds for the Canon model, compared with 15.83 seconds for the HP model.

+ When printing BLI's job stream, designed to simulate a typical mixed workflow for a large-format unit, the Canon iPF850 was 4.4% faster than the HP model in Fast mode, 29.3% faster in Standard/Normal mode, and 55.6% faster in High/Best Quality mode.

○ As both models offer a dual-roll design, BLI conducted a second job stream test, sending the same files as alternate jobs to different rolls to test both models' efficiency when switching between rolls. The Canon iPF850 completed the dual-roll job stream in Fast mode in 844.31 seconds—a comparable time to that of the HP T1530 model (848.00 seconds).

○ BLI analysts observed that the actual time taken to switch between rolls (around 22 seconds) was similar for both models.

+ When printing BLI's 12-page DWF test file in colour, both models had a comparable time in Fast mode whilst the Canon unit was 41.6% faster in Standard/Normal mode and 58.3% faster in High/Best Quality mode.

+ Similarly, when printing BLI's 12-page DWF test file in monochrome, both the Canon and the HP models' times were comparable in Fast mode; the Canon iPF850 was 42.5% faster in Standard/Normal mode and 58.3% faster in High/Best Quality mode than the HP unit.

+ In BLI's single-page A0-size test with the Cottage Architectural Plan in Standard/Normal mode, the Canon iPF850 delivered a first-page-out time (94.38 seconds) that was 37.2% faster than that of the HP unit (150.17 seconds). The time to print five A0-size pages was 37.8% faster for the Canon iPF850 than for the HP device (445.91 seconds versus 716.64 seconds).

+ The Canon model's unique sub ink tank system provides a further boost to productivity. When the HP T1530 model runs out of ink, printing has to stop for the cartridge to be replaced, which leads to operator downtime. In contrast, when ink needs replacing on the Canon model, it continues to print (drawing ink from its sub tank). In addition, its control panel conveniently alerts the user to replace ink and provides purchasing information. Inks can be replaced while printing is in progress, so no ink or paper is wasted and there is no operator downtime.

○ Both the Canon and HP models will pause and alert the operator when they run out of paper. After a new roll is installed, each device resumes printing at the beginning of the interrupted page, rather than printing the portion of the page that remained before running out of paper, so less ink and paper is wasted.

Banner Printing

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
Productivity	✔	

+ In Fast mode, the HP DesignJet T1530 took more time than the Canon iPF850 to print BLI's 36" x 105" banner (a 4,955-KB PDF file) banner—no preview was available, and it took 5 minutes, 25.96 seconds from PC release to final paper cut, compared with 41.06 seconds to generate a preview, and a further 4 minutes, 0.93 seconds from preview to final paper cut for the Canon model. Overall, with a total preview and print time of 4 minutes, 41.99 seconds versus 5 minutes, 25.96 seconds for the HP unit, the Canon iPF850 is clearly the faster model.

Poster Printing

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
Image Quality	✔	
Productivity (Fast/Speed mode)		✔
Productivity (Standard/Normal mode)	✔	
Productivity (High/Best mode)	✔	

— When printing a poster in Fast mode at 300 dpi, the Canon model took 48.21 seconds to complete the job, while the HP unit took 36.77 seconds.

+ Some banding was evident in Fast mode with both models (across the whole image with the HP unit, but only in dark areas with the Canon model), while colours on the HP poster were slightly pale compared with the much brighter colours in the poster produced by the Canon model. When unidirectional printing was selected in the Canon print driver, banding was eliminated but the time to print the banner increased to 53.30 seconds.

+ When printing a poster in Standard/Normal mode at 600 dpi, the Canon model took 1 minute, 7.05 seconds. The HP unit took slightly longer with a time of 1 minute, 18.38 seconds, and there was still some visible banding on its output, in both light and dark areas; colours delivered by the HP device were much brighter in Standard mode (compared with Fast mode) but again, BLI noted that its colours were not as bright as in the output of the Canon model.

+ Printing a poster in High quality (600 dpi) mode on the Canon model took 1 minute, 40.62 seconds, while printing the same poster on the HP model in Best mode took 2 minutes, 54.53 seconds, which represents a 42.3% faster print time for the Canon model.

+ At the High/Best Quality settings, there was no observable banding and definition of fine details was equally good on output from both models, but the Canon model produced the more vibrant, saturated colours overall.

Direct Print Submission Functionality

	Canon imagePROGRAF iPF850	HP DesignJet T1530
Advantage ✔		
Ease of Use	=	=
Functionality	=	=

○ Available as a free download from Canon's website, the iPF Direct Print & Share utility enables the direct printing of PDF, JPEG, TIFF and HPGL/2 files without the need for native applications or print drivers. The utility allows the user to preview print layouts and choose print settings without opening up the driver properties. It also lets the user print multiple files simultaneously.
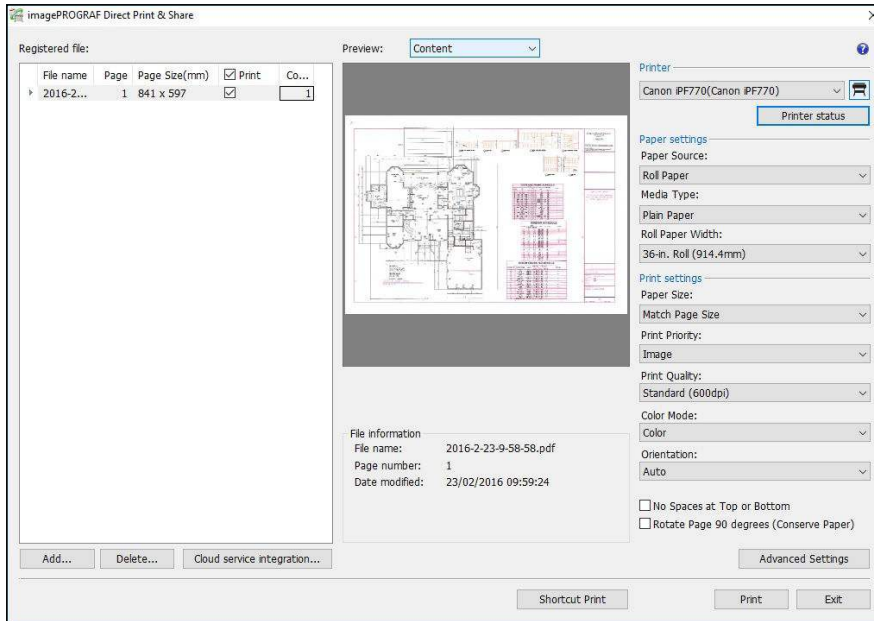
Canon's iPF Direct Print & Share utility gives users an image preview.

○ iPF Direct Print & Share supports "Shortcut Print" functionality, which enables users to define several print settings that might be commonly used in combination and represent them with a desktop icon. Files are automatically printed with the predefined settings when users drag-and-drop them to the icon. Multiple desktop icons can be created for different print settings or combinations of print settings.
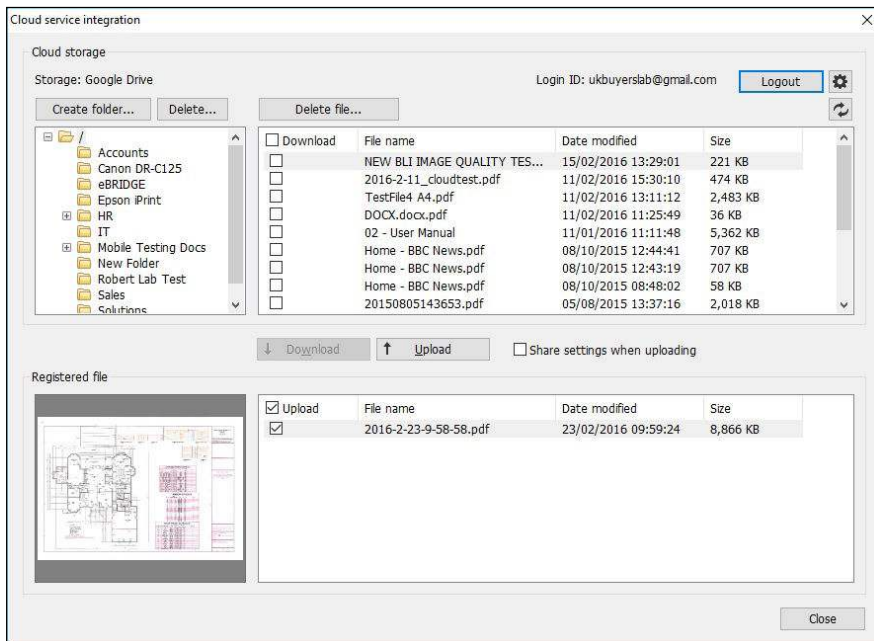
**Retrieving files from Google Cloud using iPF Direct Print & Share.**

○ Users can retrieve files from Google and AutoCAD 360 cloud storage services for printing via iPF Direct Print & Share; the utility lets users upload files to cloud storage while also offering the option of sharing files with other users at the same time (Google Drive only).

○ The HP Mobile Printing service allows users to print directly from an iOS or Android smart device to a compatible HP large-format device. Unlike the previous version (ePrint & Share), users do not need to create an account in order to access direct print functionality, instead, the mobile device quickly pairs with the printer by LAN, via a wireless network connection or by Wi-FI Direct for direct job submission. Android users have the extra step, however, of downloading and enabling the free HP Print Service Plugin app, which is available from Google Play, before being able to access the HP Printing service. Users can print a wide selection of file formats such as Microsoft Office documents, as well as PDF, JPEG and TIFF files; when they wish to print a file either stored locally on their device, an email attachment, or a document stored in a cloud service account, the user just needs to open the file and then selects the Share option, which then allows them to select and send their job to their preferred HP printer.
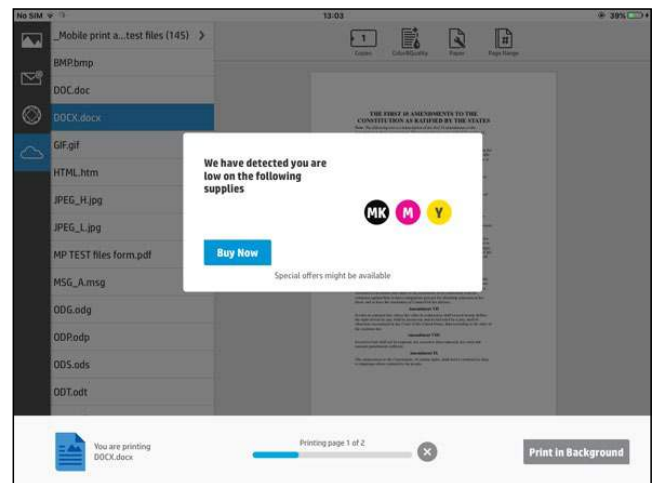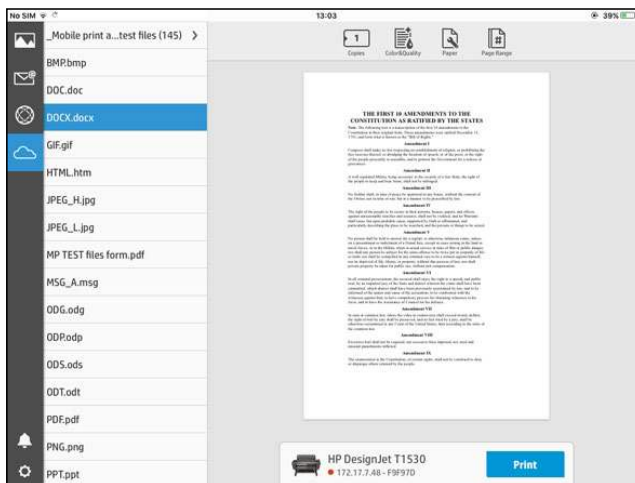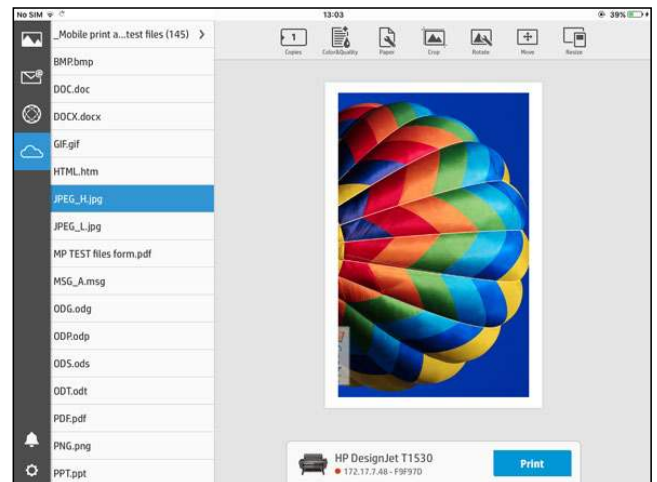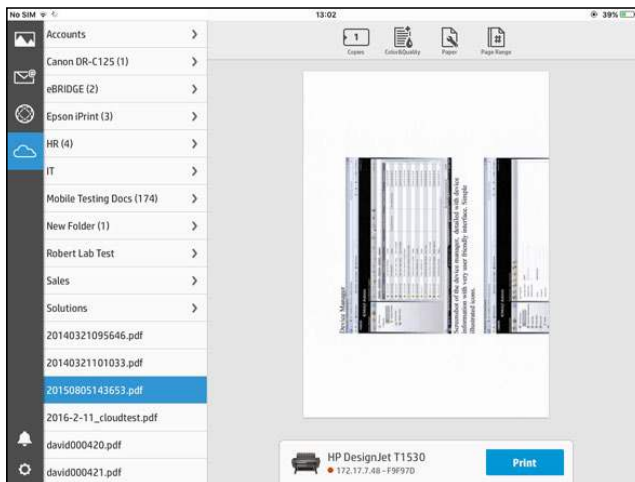
The HP Mobile Printing service enables Android and iOS mobile devices to pair with the T1530 and other compatible HP devices easily. Users can retrieve files from cloud storage, preview images and perform image adjustments.

○ In addition, the T1530 supports HP ePrint functionality, whereby users are able to send print jobs remotely by email either from their workstation PC or from their mobile device to the device; PDF, TIFF and JPEG files (up to 10 MB) are supported.

○ The Canon model also supports a free mobile print app, the Canon imagePROGRAF Print Utility, which enables PDF printing from Apple iPads to facilitate workflows for mobile workers.
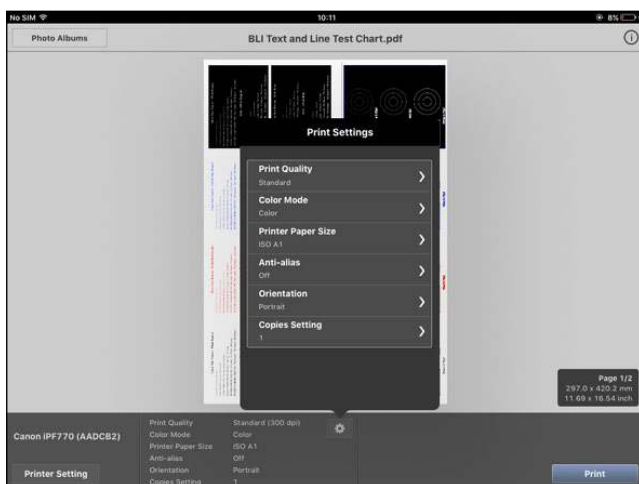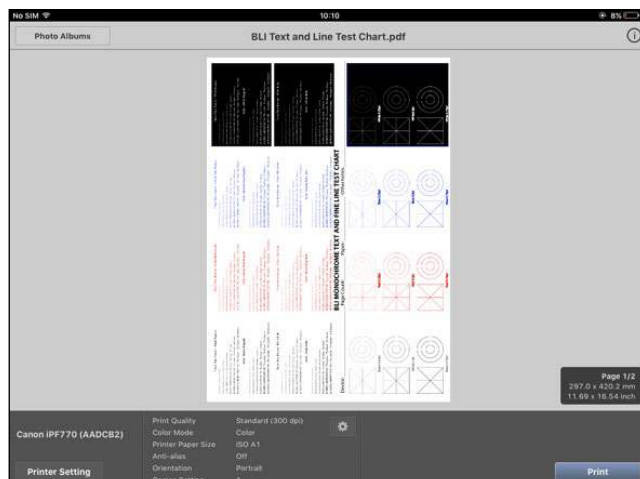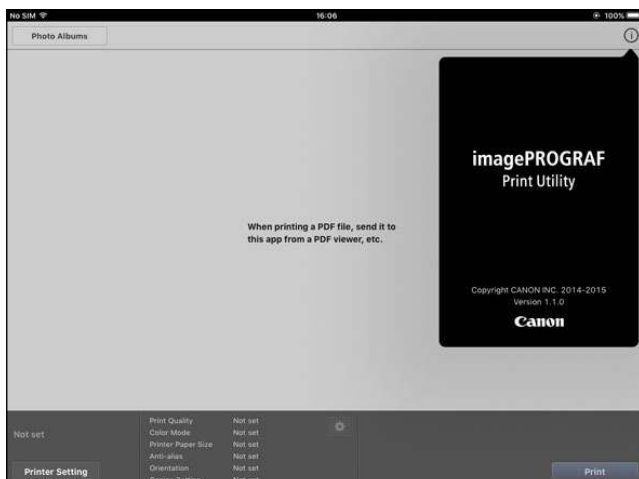
Canon imagePROGRAF Print Utility app is available for iPad users; it offers an image preview and users have the ability to select printer options, such as orientation and colour mode.

Ink Consumption

Results—Overall weight of ink used (grams)

Results averaged across three tests of 50-set A1 printing in Standard/Normal mode	Canon imagePROGRAF iPF850	HP DesignJet T1530
COTTAGE ARCHITECTURAL PLAN	40.4	42.8
OFFICE POSTER	89.7	105.3
GIS MAP	93.2	108.4

+ When producing 50 prints of a Cottage Architectural Plan in Standard/Normal Mode, the Canon unit used 5.6% less ink than did the HP T1530.

+ When printing an ISO Poster in Standard/Normal Mode, the Canon unit used 14.8% less ink compared with the HP device.

+ In the GIS Map ink consumption test conducted in Standard/Normal Mode, the Canon iPF850 used 14.0% less ink compared with the HP device.

Device Feature Set

+ Canon supplies its standard-yield cartridges with the unit, making the Canon unit's total starter ink capacity, at 1,650 ml (330 ml x 5), more than six times the total volume of the HP model's starter ink capacity of 240 ml (40 ml x 6).

+ The capacities of the Canon replacement cartridges (330 ml and 700 ml for all colours) is much higher than those of the HP model (130 ml for CMY, Photo Black and Grey, 300 ml for Matte Black only), and as a consequence they will need replacing less frequently than with the HP device.

+ If the Canon device detects that printhead nozzles are becoming clogged, it automatically starts a cleaning routine when there are no more nozzles available to compensate for the clogged ones. This task would have to be done manually with the HP unit, although BLI analysts did not encounter any nozzle clogging issues with either model during testing.

○ Both units utilise one user-replaceable printhead, taking less than five minutes to insert on both models.

+ 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 1.2 m for the HP unit.

○ Both models offer USB 2.0 and Gigabit Ethernet connectivity.

○ For maximum convenience and minimum downtime, both models offer the advantage of a dual-roll design, giving users the added flexibility of switching between different media types or sizes without having to reload the media each time. Both models also provide excellent ease of access when loading or unloading the second roll.

+ The Canon model accommodates both 2" and 3" core adaptors, which help to avoid excessive paper curling towards the end of the life of a roll. The HP model supports 3" core adaptors for use with 3" core media only as an option.

○ The Canon device includes a media mismatch option, which places on hold jobs that can't be printed due to required media not being loaded, while jobs that can be completed are automatically printed; the queued jobs are printed once the required paper is loaded. In the event of a media mismatch on the HP device, users are provided with a warning directly in the print driver before the job is submitted and a control panel warning after it is submitted. The control panel's "Paper mismatch action" allows users either to put the job on hold or print it; all jobs which are slated for the paper types that are already loaded will be printed without delay.

— The Canon model offers a standard, non-upgradable RAM capacity of 32 GB, while the HP unit has a standard non-upgradeable RAM capacity of 96 GB.

— The Canon model has a 320-GB hard drive as standard, but the HP unit comes with a 500-GB hard drive.

+ The Canon iPF850 supports borderless printing regardless of what media type is being used, whilst the HP T1530 only supports this feature when photo paper is selected.

+ The Canon iPF850 supports up to 0.8mm media thickness for roll paper and 150mm as the outside diam-

eter of the roll, while the HP T1530 only supports up to 0.5mm in thickness and 140mm in diameter.

— The Canon model is a much heavier (213 kg versus 88 kg), less compact device than the HP unit.

— The HP model includes a colour LCD while the Canon model has a monochrome LCD display. While the Canon unit's hard key control panel is straightforward to use and responsive to key presses, BLI analysts preferred the simple and clean user interface of the HP model's touchscreen.

+ The ability to load media, form feed and cut and pause printing are located a few layers deep in the HP's menu (in the Main menu/Paper menu), while the Canon device has hard keys for these common tasks directly on its control panel, which makes them easier to perform than on the HP T1530.

— The HP T1530's power consumption while active is lower—120 watts versus 200 watts—than that of the Canon model.

+ However, in standby mode (where it may spend more of its time) the HP T1530's power consumption is higher (1.3 watts versus Canon's 0.5 watts).

— Rated noise emissions are higher for the Canon model (60 dB) compared to the HP device (47 dB) while the devices are printing.

+ However, in standby mode, rated noise emissions are slightly lower for the Canon model than the HP unit (35 dB versus 39 dB).

+ The Canon iPF850's high-capacity stacker can accommodate up to 100 printed sheets (depending on paper weight and thickness); the HP T1530's integrated stacker has a lower advertised capacity of up to 50 printed sheets.

○ Both models will accept jobs that are larger than their advertised stacker capacities as BLI technicians noted when they sent a 120-page job and a 60-page job to the Canon and HP devices, respectively. The Canon model completed the 120-page job but the HP model signalled its stacker was full after completing 42 sheets.

○ When printing BLI's test using various sized media (A1, A4 and A0), both models handled the jobs very well and neatly stacked them in the order of jobs sent so no re-sorting or manual intervention was required—a valuable time-saver.

○ Unloading the stacker is an easy and straightforward task on both devices, taking no more than 10 seconds to open or lift the stacker and remove printouts.

+ However, printed sheets cannot be released from HP's stacker assembly while the unit is printing, unlike with the Canon iPF850.

— While the Canon model's high-capacity stacker assembly is easy to wheel up and slide in to attach to the main unit, it does mean the Canon iPF850 requires a much larger office footprint. The HP unit with its integrated rear-mounted stacker is much more compact. Unlike with the HP unit, operators have to remove the stacker assembly from the Canon unit in order to load rolls at the front of the device.

— Notably, the HP unit's stacker has a built-in paper sensor, which detects when the stacker capacity threshold has been reached. The device subsequently stops printing to allow the operator to remove printouts before resuming the job automatically. Conversely, the Canon iPF850 will continue to print when its stacker capacity has been reached, which could lead to potential paper jamming and spillage issues. Therefore, Canon operators will need to be more vigilant to avoid such scenarios, although it's assumed the operator would unload the stacker before it reached this stage.

BLI analysts were impressed with the Canon iPF850's stacker assembly at the front of the device which holds printed sheets in perfect alignment, and A1 sheets are held neatly in the stacker. It has twice the capacity of the HP stacker.


The HP T1530's stacker assembly, located at the rear of the device, also holds printed sheets in perfect alignment. As it is a smaller stacker, A1 printouts hang over the edge but as they are held firmly in place, there were no issues experienced.

When printing 120 A1-sized sheets on 90gsm paper, the Canon unit managed to output the whole job successfully. However, at the 118-page mark the stacker assembly could not accommodate the pages and began to push out pages to the floor. The device continued to output despite the capacity of the assembly reaching its limit (because it lacks a paper sensor).
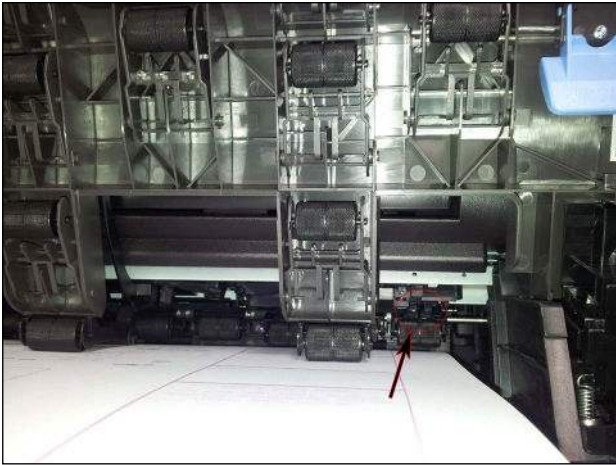
A plus in the HP stacker's favour is its built-in paper sensor (circled) which detects when the stacker basket has reached its limit and will pause the job, allowing the operator to unload the stacker, after which it resumes automatically.

Driver Feature Set

+ The Canon iPF850 has five speed settings (Fast 300, Standard 600, Fast 600, High 600 and 1200), while the HP device offers three—Fast, Normal and Best.

+ The Canon GARO driver provides an overview of the settings for predefined profiles, unlike HP's HP-GL/2 driver.

+ Seven predefined profiles are available with the Canon driver, while the HP driver offers a smaller range of four settings.

+ The Canon driver supports multi-up (2 to 16) printing, while the HP driver does not support multi-up printing.

+ The Canon GARO driver offers a 2 by 2 poster mode, while the HP model does not offer support for poster printing.

○ The Canon driver offers page stamping (Date, Time, Name and Page Number); the HP driver also supports custom stamps.

○ The Canon GARO driver offers a wider range of built-in adjustments for CMYK balance, brightness, contrast and saturation than the HP-GL/2 driver. ICC profile settings are also available in the GARO driver's 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). Note that a wide range of colour management profiles are available when the HP driver and colour management tools (from the Printing Preferences menu) are downloaded from HP's website, plus the ability to preview images before printing—features which were not included in the Startup driver disk supplied to BLI with the device.

+ The Canon driver offers unidirectional printing, even in Fast mode, which helps to avoid banding across output because the printhead travels in only one direction to create the desired image. The HP driver does not offer this feature.

+ The Canon driver includes the Color imageRUNNER Enlargement Copy Mode utility, which is standard with the 32-bit version of the driver and is available as a download for the 64-bit version of the driver via the Printer Driver Extra Kit. This enables users to integrate a Canon small-format MFP device with the iPF850. Documents scanned by the Canon MFP are automatically routed to a hot folder that is monitored by the driver of the iPF850. The image is then resized and printed, offering a fast, easy-to-use poster creation tool for office users.

+ The Canon driver also includes a Free Layout nesting tool (also available for free download via the Printer Driver Extra Kit) 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 HP unit offers a similar nesting feature, which can be activated directly on the control panel and from the print driver utility. However, unlike the Canon tool, it does not allow users to have precise control over the positioning of jobs, rather it will randomly position jobs to print across the width of a page, either in job order sent or in 'optimized' layout order.

+ 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.
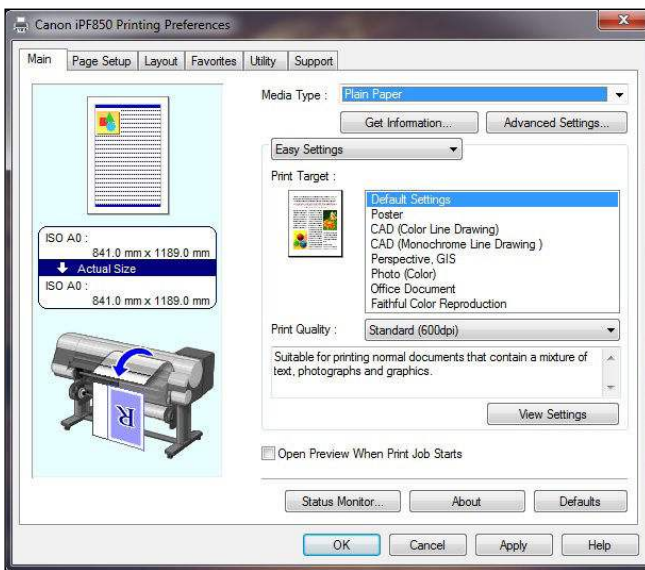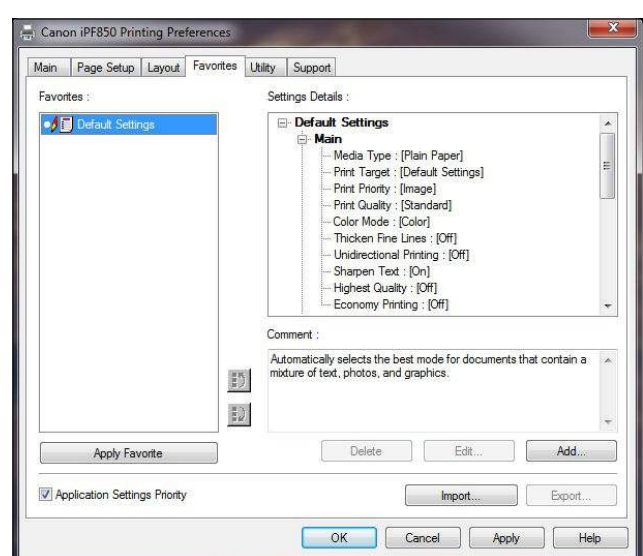

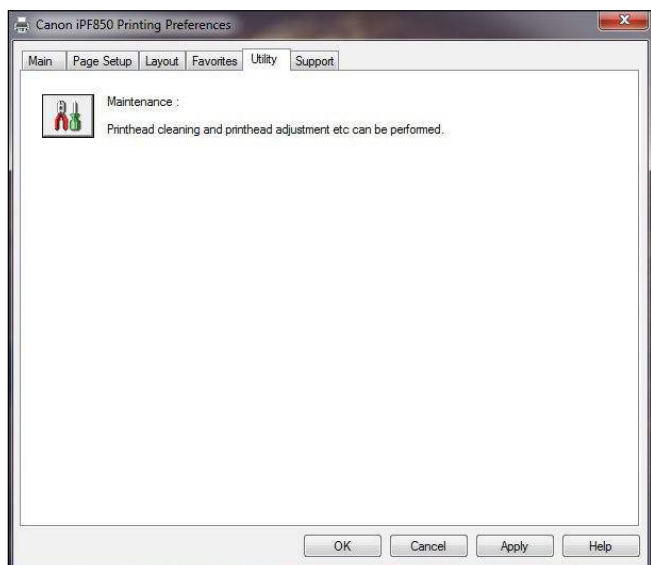Canon imagePROGRAF iPF850 Print Driver Main Tab
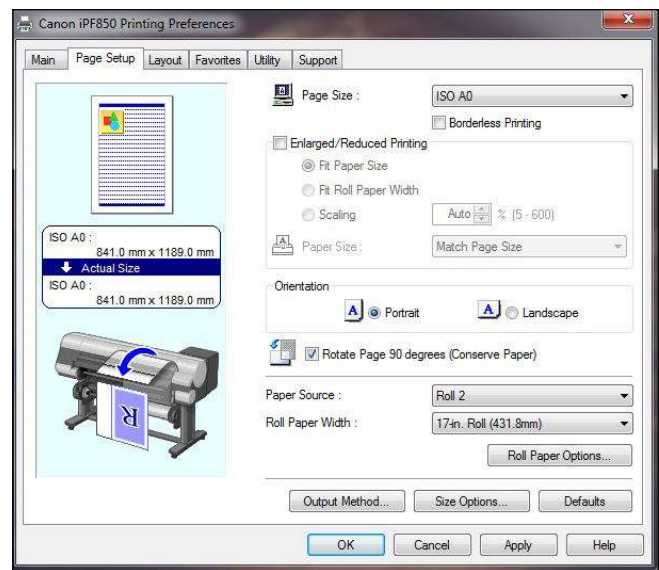
Canon imagePROGRAF iPF850 Print Driver Page Setup Tab
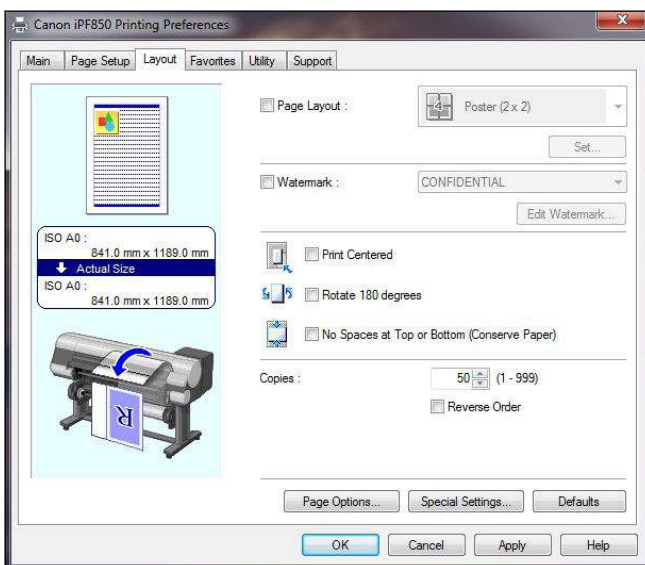
Canon imagePROGRAF iPF850 Print Driver Layout Tab

Canon imagePROGRAF iPF850 Print Driver Favourites Tab
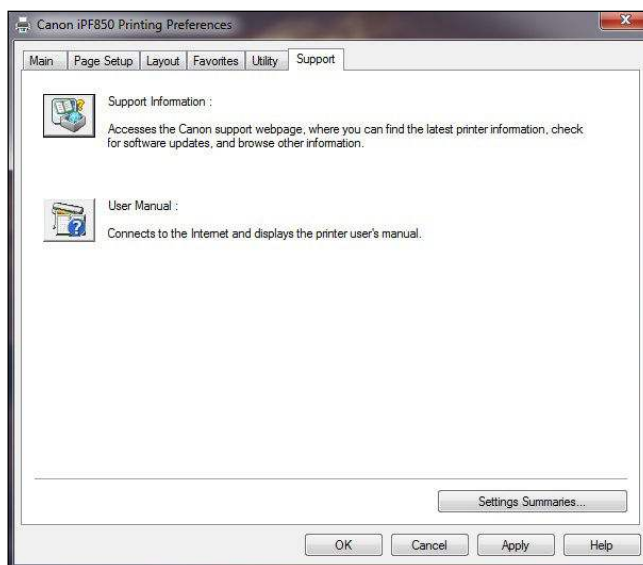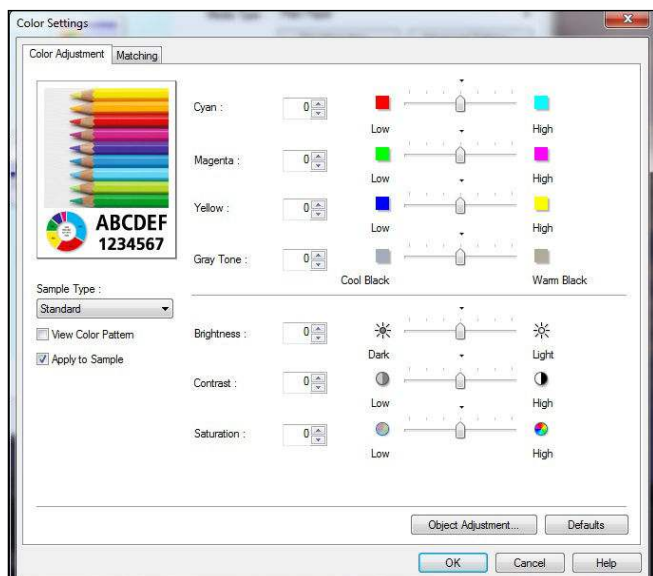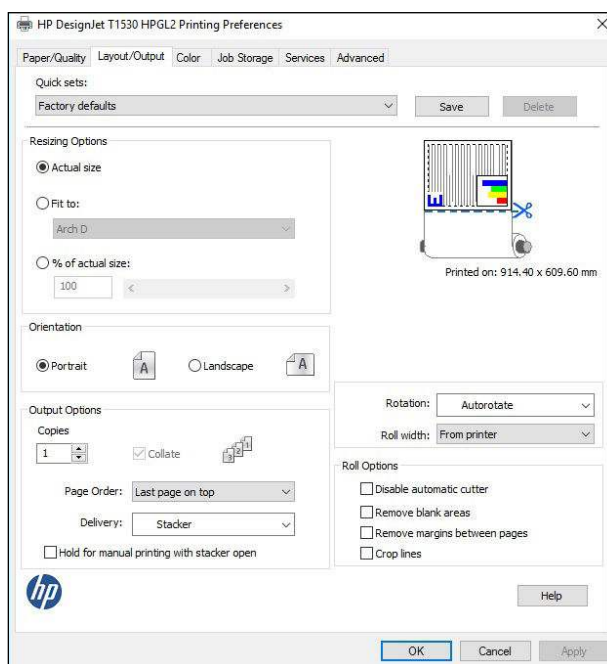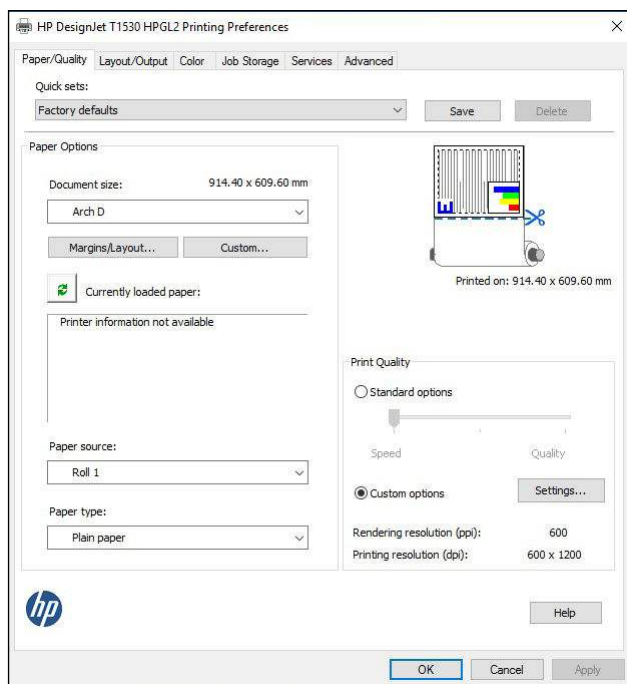
Canon imagePROGRAF iPF850 Print Driver Utility Tab

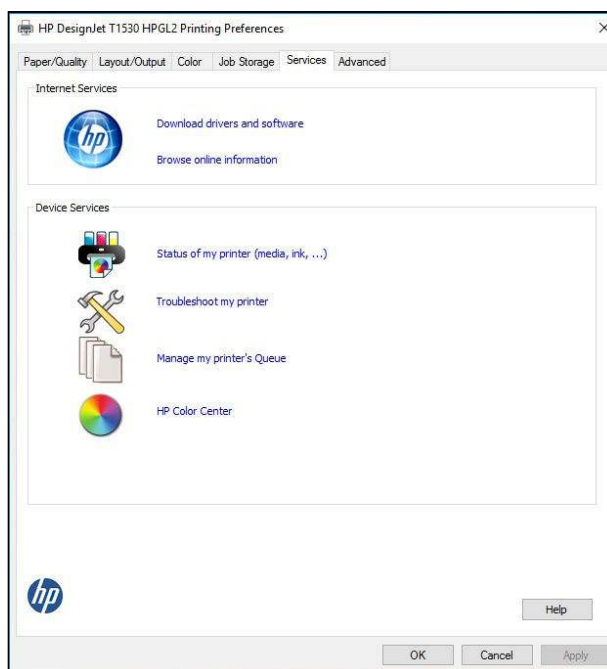Canon imagePROGRAF iPF850 Print Driver Support Tab

Canon imagePROGRAF iPF850 Print Driver Colour
Adjustment Tab

HP DesignJet T1530 Print Driver Paper/Quality Tab

HP DesignJet T1530 Print Driver Layout/Output Tab
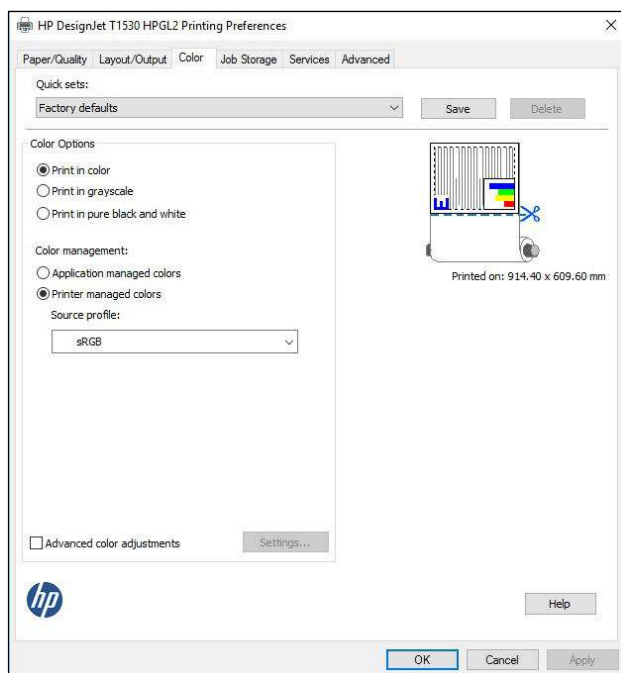
HP DesignJet T1530 Print Driver Colour Tab

HP DesignJet T1530 Print Driver Services Tab
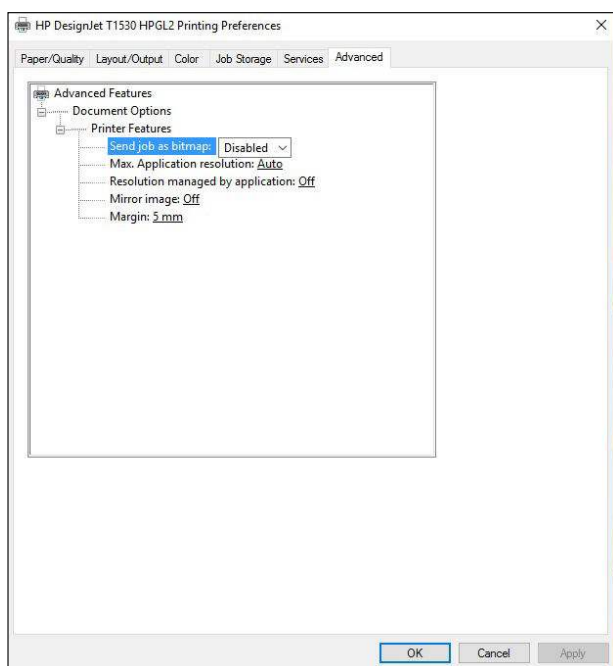
HP DesignJet T1530 Print Driver Advanced Tab
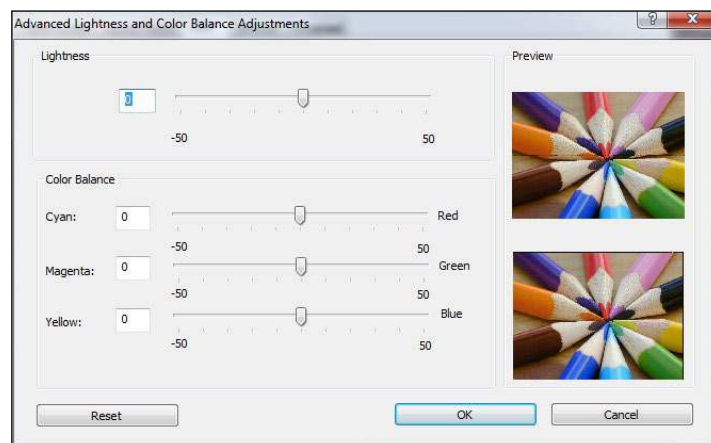
HP DesignJet T1530 Print Driver Colour Controls under Printer Preferences

SUPPORTING TEST DATA

Print Productivity

Job Stream Productivity

Mixed File Types, Same Size

Canon imagePROGRAF iPF850 (time in seconds)		HP DesignJet T1530 (time in seconds)	
Fast	645.10	Fast	675.03
Standard	1,119.96	Normal	1,583.30
High	1,809.38	Best	4,075.06

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 914 mm rolls, with each file set to auto-rotate to save media.

Mixed File Types, Same Size

Canon imagePROGRAF iPF850 (time in seconds)		HP DesignJet T1530 (time in seconds)	
Fast	844.31	Fast	848.00

BLI's dual-roll 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, sending alternate jobs to different rolls, at which time the stopwatch begins; timing ends when the last page of the last file exits the device. Both devices were loaded with 914 mm rolls, with alternate jobs sent to different media rolls.

Colour Productivity

Canon imagePROGRAF iPF850 (time in seconds)		HP DesignJet T1530 (time in seconds)	
Fast	404.84	Fast	408.12
Standard	604.03	Normal	1,035.12
High	1,106.36	Best	2,653.41

The 12-page DWF test file was printed using the device driver set to the plain paper/colour setting. Both devices were loaded with 914-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 iPF850 (time in seconds)		HP DesignJet T1530 (time in seconds)	
Fast	396.75	Fast	402.84
Standard	592.09	Normal	1,028.95
High	1,094.53	Best	2,622.84

The 12-page DWF test file was printed with the Canon driver set to the plain paper/monochrome setting and the HP driver set to plain paper, black mode. Both devices were loaded with 914-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 iPF850 (time in seconds)	HP DesignJet T1530 (time in seconds)
Time Before Printing Commences	61.35	101.19
First Page Out	124.71	172.01

First-Page-Out Productivity From Ready State

	Canon imagePROGRAF iPF850 (time in seconds)	HP DesignJet T1530 (time in seconds)
Time Before Printing Commences	12.38	15.83
First Page Out	54.41	86.72

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 HP driver set to plain paper, black mode. Both devices were loaded with 914-mm rolls.

A0 First-Page-Out and Throughput Productivity

	Canon imagePROGRAF iPF850 (time in seconds)	HP DesignJet T1530 (time in seconds)
First Page Out	94.38	150.17
Five Pages Out	445.91	716.64

The single-page A0-size Cottage Architectural Plan DWG TrueView Drawing test file was printed using the device driver with the plain paper/colour setting in Standard/Normal mode. The actual time indicated is the time it took to RIP, image and deliver all five pages of the test document to the collection bin.

Colour Print Quality

Colour Optical Density Evaluation

Canon imagePROGRAF iPF850						
Plain Paper						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.60	1.06	0.66	1.15	0.64	1.15
Magenta	0.58	0.99	0.66	1.13	0.64	1.15
Yellow	0.45	0.77	0.53	0.88	0.51	0.88
Black	0.58	1.25	0.69	1.40	0.68	1.42

HP DesignJet T1530						
Plain Paper						
	Fast		Normal		Best	
	50%	100%	50%	100%	50%	100%
Cyan	0.39	0.74	0.45	0.85	0.51	0.98
Magenta	0.51	0.83	0.58	0.86	0.60	0.99
Yellow	0.58	0.77	0.65	0.87	0.65	0.99
Black	0.57	1.47	0.62	1.52	0.60	1.39

Note: Colour density readings were assessed by printing a BLI IQ test target 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 Comparisons

Media Type/Settings	Canon imagePROGRAF iPF850	HP DesignJet T1530
Plain Paper Fast	238,781	157,245
Plain Paper Standard/Normal	285,581	160,331
Plain Paper High/Best	299,268	184,281
Matte Coated High/Best	607,470	279,864
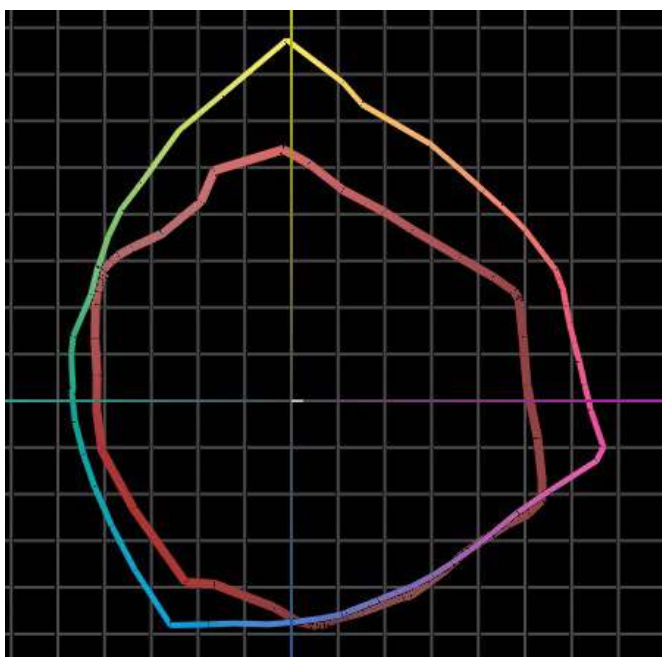
HP DesignJet T1530 colour gamut on plain paper in Fast settings (red) versus Canon imagePROGRAF iPF850 colour gamut (shown chromatically) on plain paper in Fast settings.
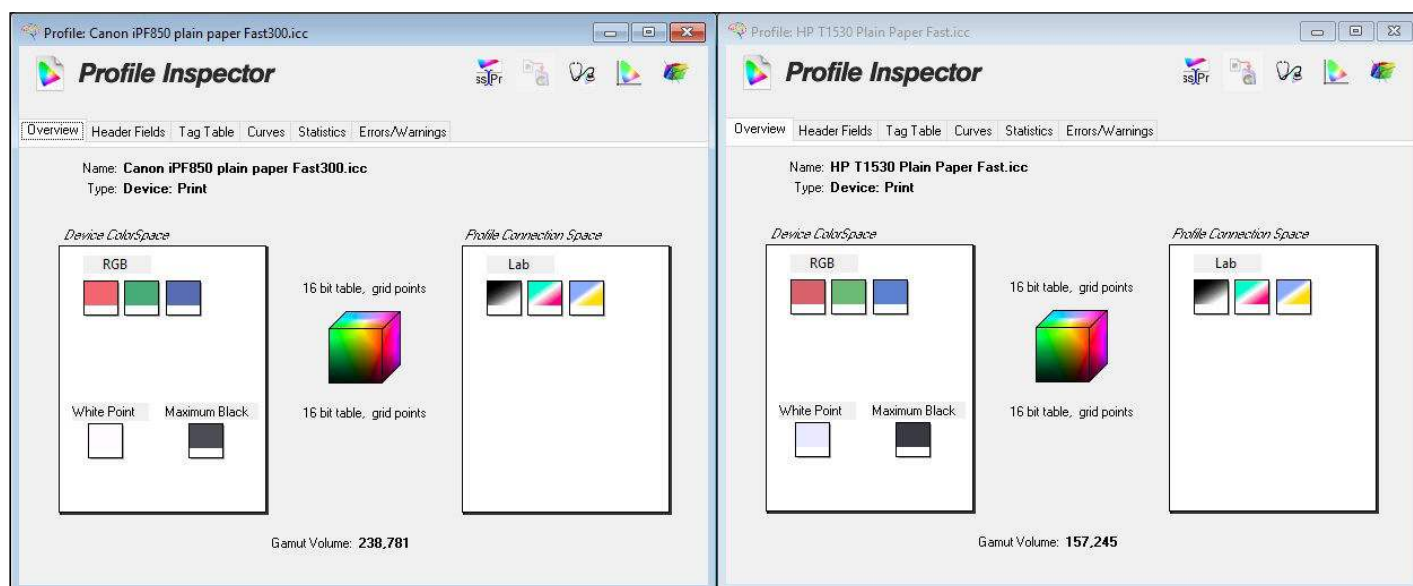
Colour gamut profile for Canon imagePROGRAF iPF850 (left) and HP DesignJet T1530 (right) on plain paper in Fast mode.
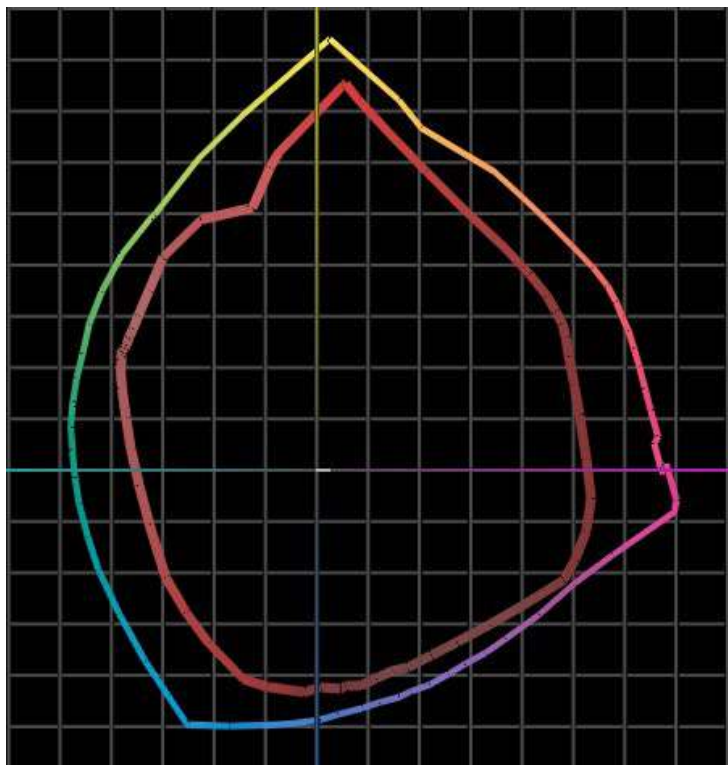
HP DesignJet T1530 colour gamut on plain paper in Normal quality settings (red) versus Canon imagePROGRAF iPF850 colour gamut (shown chromatically) on plain paper in Standard quality settings.

Colour gamut profile for Canon imagePROGRAF iPF850 (left) and HP DesignJet T1530 (right) on plain paper in Standard/Normal mode.
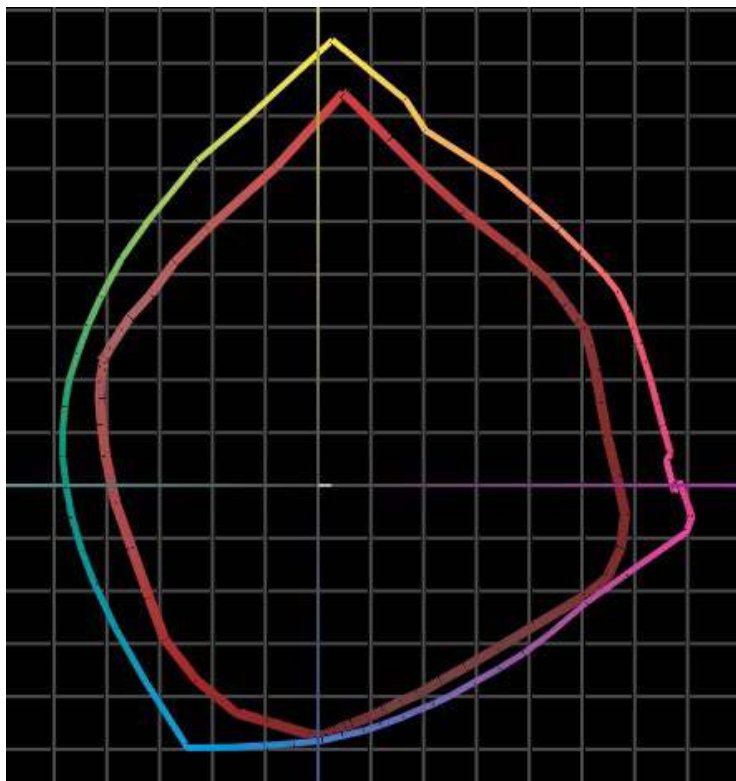
HP DesignJet T1530 colour gamut on plain paper in Best quality settings (red) versus Canon imagePROGRAF iPF850 colour gamut (shown chromatically) on plain paper in High quality settings.

Colour gamut profile for Canon imagePROGRAF iPF850 (left) and HP DesignJet T1530 (right) on plain paper in High/Best mode.

HP DesignJet T1530 colour gamut on matte coated paper in Best quality settings (red) versus Canon imagePROGRAF iPF850 colour gamut (shown chromatically) on photo quality paper in High quality settings.
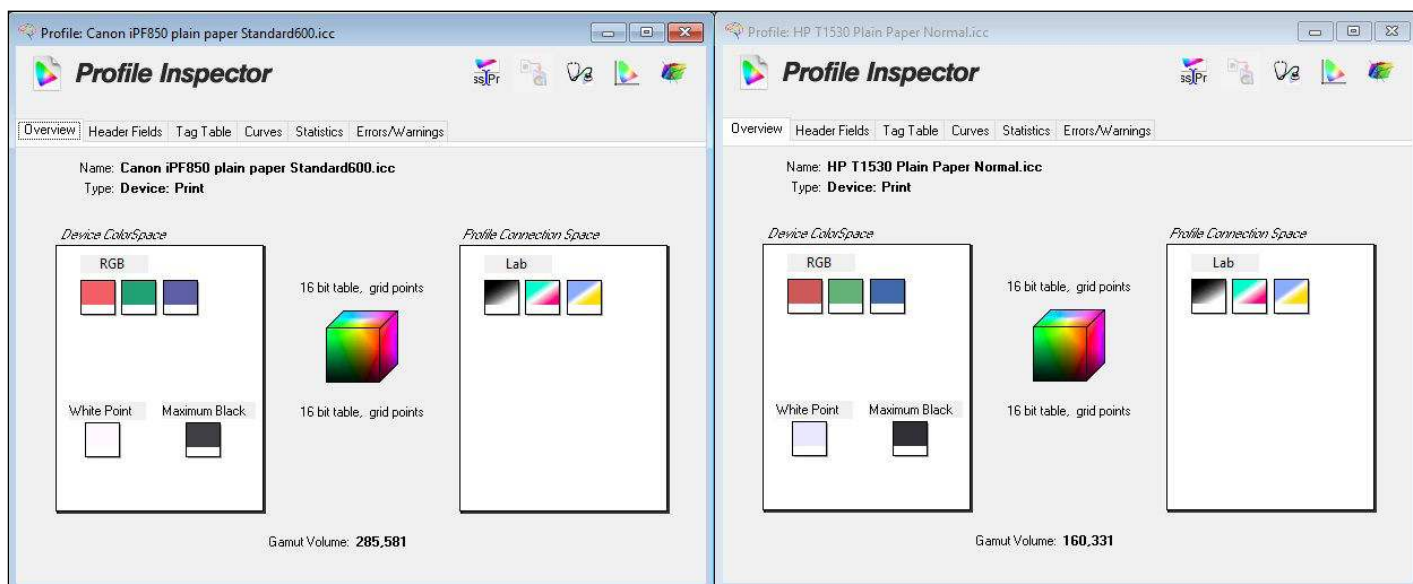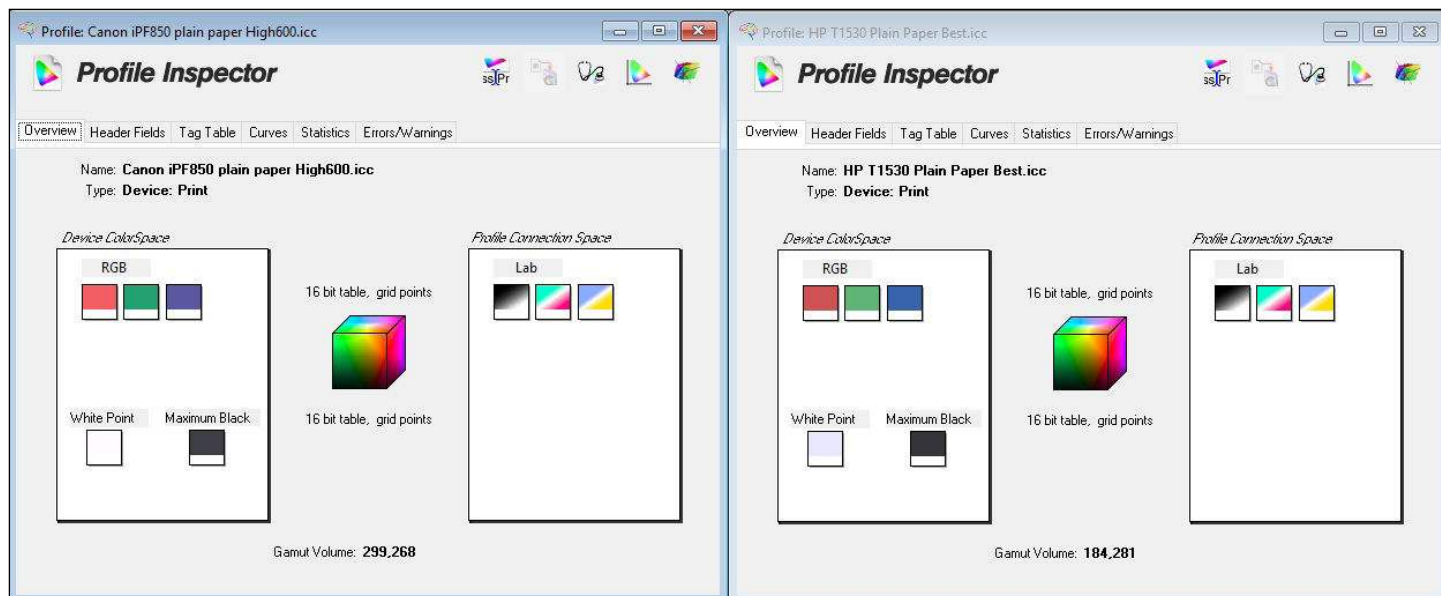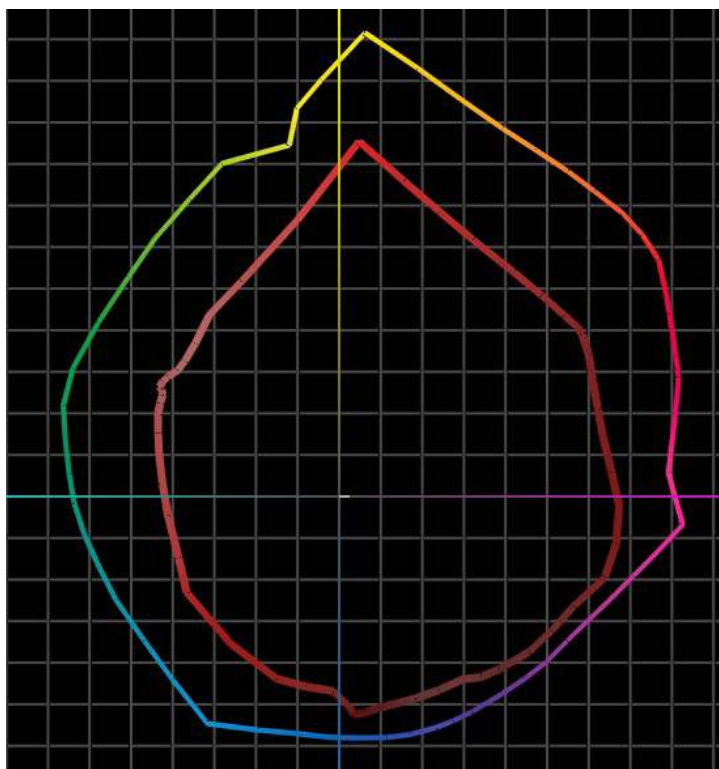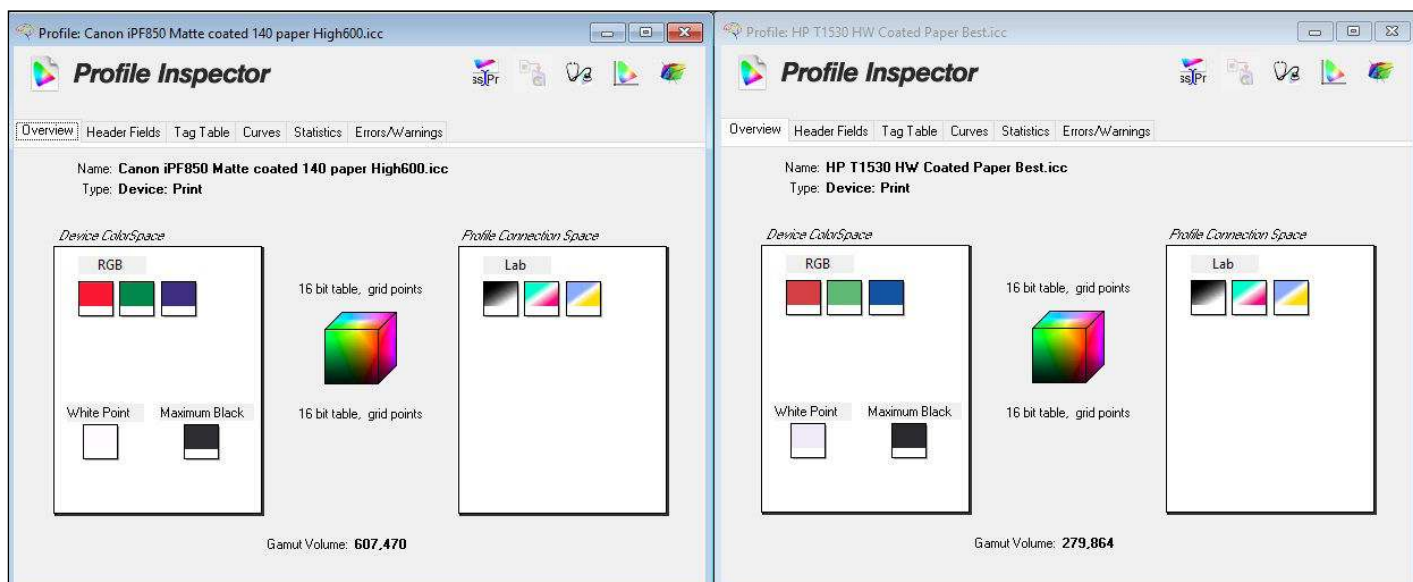

Colour gamut profile for Canon imagePROGRAF iPF850 (left) and HP DesignJet T1530 (right) on matte coated paper in High/Best mode.

Black Print Quality

Solid Density

Density Block	Canon imagePROGRAF iPF850			HP DesignJet T1530		
	Fast	Standard	High	Fast	Normal	Best
1	1.34	1.47	1.46	1.53	1.57	1.44
2	1.32	1.47	1.45	1.52	1.56	1.39
3	1.36	1.46	1.45	1.55	1.58	1.47
4	1.31	1.47	1.46	1.55	1.55	1.45

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 HP driver set to plain paper, black mode. Density was measured using an XRite 508 densitometer.

Device Feature Set

	Canon imagePROGRAF iPF850	Advantage		HP DesignJet T1530
Max. print quality	2400 x 1200 dpi			2400 x 1200 dpi
Number of inks	5		✔	6
Ink tanks replaceable during operation	Yes	✔		No
Ink-drop size	4 picoliter	✔		6 picoliter (C,M,Y, G, PBK); 9 picoliter (MBK)
Ink capacity out of the box	1,650 ml (330 ml x 5)	✔		240 ml (40 ml x 6)
Ink cartridge capacity	330/700 ml (CMYK, MBK)	✔		130/300 ml (CMY, G, PBK, MBK)
Number of nozzles	MBK: 5,120 nozzles; other colours: 2,560 nozzles each, 15,360 in total	✔		MBK: 2,752; other colours: 1,376 each, 9,632 in total
Number of printheads	1			1
Printhead replacement	User replaceable			User replaceable
Line accuracy	+/-0.1%			+/-0.1%
Minimum line width	0.02 mm			0.02 mm
Minimum print margins	3 mm			3 mm
Borderless (0 mm) printing	Yes	✔		Yes (with Photo paper only)
Maximum outside diameter of roll paper	150 mm	✔		140 mm
Maximum cut-sheet media length	1.6 m	✔		1.2 m
Maximum media thickness for roll paper	0.8 mm	✔		0.5 mm
Maximum media width	1,118 mm (44 inches)	✔		914 mm (36 inches)
Roll paper	Dual			Dual
Media loading	Front			Front
Optional media handling	Roll holder set			Roll media adaptor
High-capacity stacker assembly	100 sheets	✔		50 sheets
Stacker capacity sensor	No		✔	Yes
Standard RAM	32 GB		✔	96 GB
Maximum RAM	32 GB		✔	96 GB

	Canon imagePROGRAF iPF850	Advantage	HP DesignJet T1530
Hard drive	320 GB	✔	500 GB
Interface	10/100/1000Base-T/TX Ethernet, USB 2.0		1000Base-T Ethernet, USB 2.0
PDL	GARO, HP-GL/2, HP RTL	✔	HP-GL/2, HP-RTL, TIFF, JPEG, CALS G4, HP PCL 3 GUI, URF
Net weight (unpacked)	213 kg	✔	88 kg
Power consumption when in standby	0.5 W	✔	1.3 W
Power consumption when active	200 W	✔	120 W
Acoustic pressure	Operation: 60 dB (A) or less; Standby: 35 dB (A) or less	✔	Operation: 47 dB (A); Standby: 39 dB (A)
Acoustic power	Operation: 6.5 Bels		Operation: 6.5 Bels; Ready: 5.8 B(A)

Driver Feature Set

	Canon imagePROGRAF iPF850	Advantage	HP DesignJet T1530
Speed settings	5 (Fast 300, Standard 600, Fast 600, High 600 and 1200)	✔	3 (Fast, Normal and Best Quality)
Economy mode	Yes		Yes (only in Fast mode)
Predefined profiles	7	✔	4
Overview of profile settings provided	Yes	✔	No
Media profiles	38 + 5 user customizable options	✔	35
IQ optimized for print profiles	Yes	✔	Yes
Watermark	Yes	✔	No
Sharpen text	Yes	✔	No
Thicken fine lines	Yes	✔	No
Mirror image	Yes		Yes
Multi-up printing	Yes, 2 to 16	✔	No
Poster print mode	Yes (2 by 2)	✔	No
Page stamping	Yes		Yes
Image rotation	Yes, auto 180 degrees		Yes, 90 degrees
Option to preview before print	Yes	✔	No
Link to device web server from driver	No (there is a link to Status Monitor)		No
CMYK balance adjustment	Yes		Yes
Brightness adjustment	Yes		Yes
Contrast adjustment	Yes	✔	No
Saturation adjustment	Yes	✔	No
Advanced colour management options	Yes		Yes
Enlargement Copy Mode	Yes	✔	No
Free Layout Capability	Yes (flexible placement)	✔	Yes (automatic placement)
MS Office Plug-in	Yes	✔	No
Accounting Capability	Yes		Yes
Disable automatic cutter	Yes		Yes
Unidirectional printing selection option	Yes	✔	No
Integration with MFP	Yes	✔	No

iPF850 also offers PosterArtist Lite as bundled software

Ink Consumption

Table 1: Amount of Ink in each Canon iPF850 Cartridge (grams)

	Cyan	Magenta	Yellow	Matte Black	Black
Weight of cartridge prior to installation	949.1	935.7	936.8	947.4	952.4
Weight of cartridge at end of life	204.9	204.9	204.9	204.9	204.9
Net weight of ink	744.2	730.8	731.9	742.5	747.5
Total ink weight across five cartridges					3,696.9

Table 2: Amount of Ink in each HP DesignJet T1530 Cartridge (grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Weight of cartridge prior to installation	193.0	189.9	194.2	191.5	191.2	191.9
Weight of cartridge at end of life	57.3	57.3	57.3	57.3	57.3	57.3
Net weight of ink	135.7	132.6	136.9	134.2	133.9	134.6
Total ink weight across six cartridges						807.9

Table 3: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Standard Mode) on the Canon iPF850 (grams)

	Cyan	Magenta	Yellow	Matte Black	Black
Test Run 1 Net weight of ink used	4.6	2.2	2.2	25.9	3.9
Test Run 2 Net weight of ink used	5.4	2.2	2.4	28.1	4.0
Test Run 3 Net weight of ink used	5.6	2.3	2.0	26.2	4.4
Average amount of ink used across three runs	5.2	2.2	2.2	26.7	4.1
Total ink weight across five cartridges for 50-page run (based on averages)					40.4

Table 4: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Normal Mode) on the HP DesignJet T1530 (grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1 Net weight of ink used	0.3	0.8	26.5	8.8	3.5	1.7
Test Run 2 Net weight of ink used	0.5	0.5	26.9	9.2	3.6	1.7
Test Run 3 Net weight of ink used	0.8	0.9	27.7	9.4	3.8	2.2
Average amount of ink used across three runs	0.5	0.7	27.0	9.1	3.6	1.9
Total ink weight across six cartridges for 50-page run (based on averages)						42.8

Table 5: Ink Used in Three 50-Page Runs of Office Poster Test Document (Standard mode) on the Canon iPF850 (grams)

	Cyan	Magenta	Yellow	Matte Black	Black
Test Run 1 Net weight of ink used	48.0	13.5	8.9	2.3	14.5
Test Run 2 Net weight of ink used	51.2	13.8	8.7	4.2	12.5
Test Run 3 Net weight of ink used	46.8	14.2	9.1	4.2	17.1
Average amount of ink used across three runs	48.7	13.8	8.9	3.6	14.7
Total ink weight across five cartridges for 50-page run (based on averages)					89.7

Table 6: Ink Used in Three 50-Page Runs of Office Poster Test Document (Normal mode) on the HP DesignJet T1530 (grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1 Net weight of ink used	1.2	5.3	20.1	55.3	23.1	7.8
Test Run 2 Net weight of ink used	0.5	4.2	20.6	55.0	15.7	4.4
Test Run 3 Net weight of ink used	0.6	4.2	20.6	54.6	18.3	4.4
Average amount of ink used across three runs	0.8	4.6	20.4	55.0	19.0	5.5
Total ink weight across six cartridges for 50-page run (based on averages)						105.3

Table 7: Ink Used in Three 50-Page Runs of GIS Map Test Document (Standard mode) on the Canon iPF850 (grams)

	Cyan	Magenta	Yellow	Matte Black	Black
Test Run 1 Net weight of ink used	38.5	19.9	15.6	6.8	12.8
Test Run 2 Net weight of ink used	37.9	19.2	14.9	6.5	13.6
Test Run 3 Net weight of ink used	37.0	19.2	16.4	5.4	16.2
Average amount of ink used across three runs	37.8	19.4	15.6	6.2	14.2
Total ink weight across five cartridges for 50-page run (based on averages)					93.2

Table 8: Ink Used in Three 50-page Runs of GIS Map Test Document (Normal mode) on the HP DesignJet T1530 (grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1 Net weight of ink used	0.5	36.1	11.0	28.2	10.3	18.1
Test Run 2 Net weight of ink used	0.5	37.0	11.2	28.1	10.5	18.0
Test Run 3 Net weight of ink used	1.7	37.9	14.5	29.8	12.2	19.7
Average amount of ink used across three runs	0.9	37.0	12.2	28.7	11.0	18.6
Total ink weight across six cartridges for 50-page run (based on averages)						108.4

Ink Consumption Test Methodology Overview

Buyers Lab's ink consumption analysis was conducted using three document types (architectural plan, ISO TIFF poster and GIS PDF map). The Cottage Architectural Plan was formatted as a DWG TrueView Drawing, and all documents were sized at ISO A0.

The Canon imagePROGRAF iPF850 was installed in BLI's lab with the latest "01.00" level of firmware (as of March 2015) 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 with media selection set to plain paper and the image set to print at actual size. For the Cottage Architectural Plan, Print Priority settings were set to Line Drawing/Text with Quality set to Standard (600 dpi). For the ISO Poster and the GIS map, Print Priority settings were set to Image with Quality set to Standard (600 dpi).

The HP DesignJet T1530 was installed in BLI's lab with the latest "MRY_04_01_00.2" level of firmware (as of January 2016) and connected to a Windows 10 workstation using a 1000BaseT TCP/IP connection. The HP GL2 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. For the Cottage Architectural Plan, the ISO Poster and the GIS map, the Normal quality setting was used.

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

This product was tested in BLI's environmentally controlled 3,000-square-foot UK test lab, which replicates typical office conditions.

Test Equipment

BLI's dedicated test network, consisting of Windows 2008 and Microsoft Exchange servers, Windows 7 work-stations, 10/100/1000BaseTX network switches and CAT6 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 LLC

Buyers Laboratory LLC (BLI) is the world's leading independent provider of analytical information and services to the digital imaging and document management industry. For 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 sup-port. 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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