

BLI Comparative Lab Test Report

APRIL 2016

Canon imagePROGRAF iPF770 vs. HP DesignJet T730



Canon imagePROGRAF iPF770



HP DesignJet T730

Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
Colour Image Quality	=	=
Black Image Quality	✓	
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 iPF770 and the HP DesignJet T730, 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 feature set, driver functionality, and banner and poster printing. All testing was performed in BLI's test facility in Wokingham, UK.

TABLE OF CONTENTS

Executive Summary	2
Colour Image Quality	4
Black Image Quality	6
Print Productivity	7
Banner Printing	8
Poster Printing	8
Direct Print Submission Functionality	9
Ink Consumption	14
Device Feature Set	14
Driver Feature Set	15
Supporting Test Data	18
Ink Consumption Test Methodology Overview	30
About BLI	31

Executive Summary

On the strength of its productivity performance alone, the Canon iPF770 was a superb performer in BLI's evaluation and outshone its HP DesignJet T730 competitor in many key areas. Clearly, it is the more productive model, with significantly higher results in both colour and black modes, especially in High/Best modes where it delivered output in times that were 80% faster than those of the HP unit. The iPF770 also excelled in all modes when printing BLI's job stream, designed to simulate a typical mixed workflow for a large-format unit. Moreover, the Canon unit successfully printed BLI's banner image, whereas the HP

model only printed a portion of the banner. The iPF770 also offers some noteworthy features that boost productivity further: it's capable of handling ink and paper outages with minimal impact on user productivity or causing unnecessary waste. Inks can be replaced on the fly without interrupting printing due to its unique sub-ink tank design. When it's out of paper, the Canon unit will pause and alert the operator. After a new roll is installed and the operator confirms the paper type, it continues to print the interrupted page in full followed by all successive pages, thus reducing waste. These scenarios are handled very differently by the HP model: ink cartridges cannot be replaced while the device is actively printing, leading to operator downtime. More seriously, when the HP model runs out of paper, it stops and automatically cancels the entire job in progress, even if it's in the middle of a 50-page print run. Users are forced to set up the job again once paper is replenished and determine where to resume the job from the page on which it was interrupted, all of which requires additional user intervention.

In terms of colour image quality, results were mixed with neither model displaying a clear overall advantage. The Canon model produced higher optical densities in colour overall; smoother circles; sharper AEC graphics in High/Best mode printing on plain paper; more distinct detailing in dark and light contrast areas and more vibrant, saturated colours in photographic output; as well as more natural-looking skin tones than those produced by the HP T730. In addition, the iPF770 produced by far the larger colour gamut in High/Best mode when printing on photo-quality paper, with a colour gamut 35.8% larger than that of the HP unit. However, when printing on plain paper, the HP T730 delivered larger colour gamuts across the board. It also delivered a higher optical density for black overall and superior halftones, which displayed 'truer' neutral greys. As expected of models aimed at the Architectural, Engineering and Construction (AEC), Computer-Aided Design (CAD) and Geographic Information Systems (GIS) markets, the image quality produced by both models would easily satisfy customer expectations.

There is one feature the HP model lacks which can aid image quality and that is unidirectional printing, an option available with the Canon model's driver. Poster output produced by the HP model with its bi-directional printhead exhibited noticeable banding across the image in every mode except Best, while the Canon iPF770 had the advantage of using the unidirectional printing option to reduce any banding. Other notable device and driver feature set advantages include its aforementioned hot-swap ink tanks, 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 iPF770 device with a smaller-format MFP to produce enlarged, poster-size copies via the free Color imageRUNNER Enlargement Copy Mode, a feature which is not available with the HP T730.

The HP DesignJet T730, however, has a stronger device feature set: it's a more compact and lightweight device; it offers a 1-GB non-upgradeable RAM (compared with Canon's 256 MB); has Wi-Fi connectivity; and it consumes less energy while printing—less than 35 watts compared with 140 watts with the Canon model. It also offers a higher (300 ml) ink cartridge capacity for all colours (although Canon do offer this same ink tank capacity for all colours with the iPF780 sister model). Both models allow files to be retrieved from cloud storage for printing. The Canon model supports direct print submission functionality via its easy to use Direct Print & Share utility, which offers 'Shortcut Print' functionality for more efficient workflows. The HP's Mobile Printing service offers support for direct printing from Apple or Android mobile devices via a wireless network connection or Wi-Fi Direct; a free mobile print app (All in One Printer Remote) which provides scan to and print from capabilities for Android and iOS devices; while users can also submit PDF, TIFF and JPEG files remotely via email to the T730 for printing. Canon offers an app which enables direct PDF printing from Apple iPads.

In conclusion, the Canon imagePROGRAF iPF770 delivered a superior performance to that of the HP DesignJet T730 in many categories tested, with greater productivity overall, more vibrant colour output, the ability to handle BLI's banner test successfully (which the HP failed to output) and a more feature-rich driver.

Colour Image Quality

Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
Text		✓
Fine Lines	=	=
Halftone Range	=	=
Halftone Fill		✓
Solid Density	✓	
AEC Graphics	=	=
GIS Graphics (plain paper)	=	=
Business Graphics	=	=
Photographic Images	✓	
Colour Gamut (plain paper, default settings)		✓
Colour Gamut (photo paper, High/Best)	✓	

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

- + Overall, the Canon iPF770 delivered the higher optical densities for cyan and magenta across all modes, and a higher optical density for composite black in High mode. The models had comparable optical densities for yellow in Fast and Standard/Normal modes. The HP model delivered a higher optical density for yellow in Best mode, and higher optical densities for composite black in Fast and Normal modes.
- When printing on plain paper, the HP model delivered slightly larger colour gamuts across the board compared with the Canon unit; in Fast settings, it was larger by 2.0%, with a CIE volume of 200,555 versus 196,671 for the Canon device; in Standard/Normal settings it was fractionally larger with a 232,661 CIE volume versus 228,330 for the Canon device; and in High/Best settings it was 4.9% larger, with a CIE volume of 248,331 versus 236,769 for the Canon model.
- + However, when printing on photo-quality paper using Canon's High quality setting and the HP DesignJet T730's Best setting, the Canon model delivered a colour gamut 35.8% larger than that of the HP unit, with a CIE volume of 624,576 compared with 460,023 for the HP unit.
- BLI technicians noted some subtle differences in the text output of the two models in colour mode. Characters produced by the Canon iPF770 were legible down to the 3-pt. level in High quality mode; in Fast mode, its serif and sans serif fonts were legible down to the 4-pt. level and 3-pt. level, respectively; and in Standard mode, fonts were legible down to the 5-pt. level (serif) and 4-pt. level (sans serif). The HP model produced sans serif fonts that were legible down to the 3-pt. level across all modes; its Times New Roman text was legible down to the 4-pt. level in Fast and Standard modes, and 3-pt. level (Best). There was some slight ink bleed evident in both models' output, but it was a little more noticeable in text produced in Standard/Quality mode for the Canon iPF770.
- Fine lines produced by both devices remained distinct down to the 0.1-pt. level (black on white) and the 0.25-pt. level (white on black) in all modes. The fine lines produced by the HP model were rated as slightly more distinct in Normal mode, whilst the Canon device's fine lines were judged to be slightly better in the highest quality mode.
- Both devices delivered 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 iPF770 delivered good and consistent halftone fills in all modes. However, the HP model had a slight advantage overall, due to its superior greyscales, with neutral greys, and its colour halftones were rated very good in Standard and Best quality modes.
- + Both devices produced circles which were distinct down to the 0.1-pt. level in all modes, but the Canon device has the slight edge, with smoother circles in High/Best quality mode as compared with those delivered by the HP device, which displayed slight stair-stepping.
- Both models produced the 1x1 pixel grid in CMY with no quality issues, and coverage was very good and consistent across all colours.
- When evaluating Architectural, Engineering and Construction (AEC) graphics in Fast mode, the HP unit delivered sharper, more distinct fine lines than the Canon model.
- AEC graphics produced in Standard/Normal modes were of comparable quality; the Canon unit delivered the better colour detailing whilst fine lines on the HP model's output were slightly more distinct.
- + However, in High/Best mode, the Canon iPF770 delivered superior AEC graphics than the HP model, with sharper lines and crisper characters.
- When evaluating Geographic Information Systems (GIS) graphics in High/Best mode on plain paper, both units delivered a fine level of 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 both the HP and Canon devices exhibited sharp details and very good colour saturation.
- + When comparing photographic images produced in Standard/Normal and High/Best modes, the Canon model's output exhibited excellent detailing in dark and light contrast areas, and more vibrant colours compared with output from the HP device.
- + Skin tones produced by the Canon model were more natural-looking, while those produced by the HP device were distinctly yellowish-blueish in hue.
- Overall, results were mixed in BLI's assessment of colour image quality, with neither model demonstrating a clear-cut advantage. Both models delivered excellent GIS graphics, good quality colour business graphics, distinct fine lines and a consistent halftone range. The Canon iPF770's photographic images were superior to those from the HP unit, with more vibrant colours and better detailing, while skin tones were more natural-looking; it also delivered smoother circles, higher optical densities for cyan and magenta, and a far larger colour gamut when printing on photo paper. The HP model produced a higher optical density for composite black in two of the three modes tested, better text reproduction overall, truer neutral greyscale halftone coverage, plus it produced a slightly larger colour gamut in all modes on plain paper.

Black Image Quality

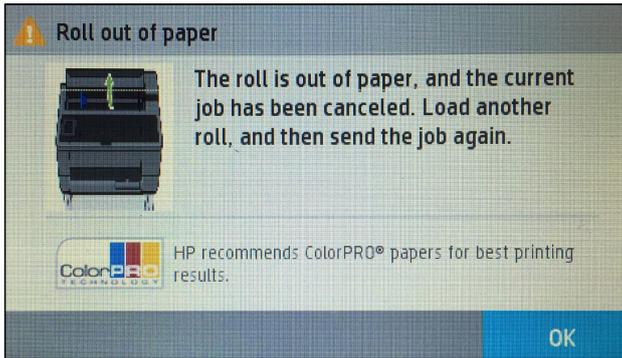
Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
Text	=	=
Fine Lines	=	=
Halftone Range	=	=
Halftone Fill	=	=
Solid density		✓
Business Graphics	✓	
Photographic Images	✓	

- The HP model delivered superior optical density for black across two of the three tested modes (Fast and Standard/Normal), and its optical density in the highest quality mode was competitive with that of the Canon unit.
- Text reproduction from the Canon device was crisp and legible down to the 3-pt. level across all modes, a performance matched by the HP device.
- Both devices produced fine lines that remained distinct down to the 0.1-pt. level in all modes, with no evidence of stair-stepping in diagonal lines.
- Whilst both devices delivered white-on-black fine lines at the 0.25-pt. level in all quality modes, the Canon output was rated as poor in Fast mode and only fair in Standard mode, compared with good ratings for the HP device in the respective modes. In High/Best quality mode, both models' fine lines were rated fair.
- + Circles produced by both models were fully formed in all print modes, but those generated by the iPF770 were slighter smoother than those produced by the HP in High/Best mode.
- Both models delivered an excellent halftone range—from the 10% to 100% dot-fill levels in all modes, with distinct transitions between all levels.
- The Canon device's output was rated good in all modes for halftone fills, a performance matched by the HP unit.
- + When producing black AEC graphics in Standard/Normal mode, the Canon unit delivered superior detail and sharper fine lines than did the HP model.
- + The Canon model had the edge in quality, as well, when producing monochrome business graphics in High/Best mode on plain paper, with smooth halftone gradations and crisp text.
- + Monochrome photographic images in High/Best mode on plain paper were produced very accurately by both models, however the Canon iPF770 delivered much smoother halftone gradations (the HP model's images appeared grainy by comparison) and sharper detailing in light and dark contrast areas.
- + In BLI's monochrome image quality evaluation, each model delivered strengths in certain areas but the Canon model had the slight advantage overall. It excelled when producing photographic images, which exhibited smoother halftone coverage and sharper details; it delivered superior AEC graphics in Standard/Normal mode, as well as better monochrome business graphics in High/Best mode, with smoother circles. The HP T730 produced darker solids, more distinct white-on-black fine lines overall, and had higher optical densities in two of the three quality modes.

Print Productivity

Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
First Page Out (from a weekend of 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)	✓	

- The Canon iPF770 delivered a faster (by 14.2%) first-page-out time of 84.87 seconds after a weekend of non-use, compared with 98.87 seconds for the HP device. Start-up time before printing commenced was 41.82 seconds for the Canon model, which is slower than the 26.09 seconds for the HP unit. When each model's start-up time and first-page-out time are aggregated, the Canon iPF770's overall time is on a par with that of the HP T730.
- + The Canon iPF770 delivered a much faster (by 57.9%) first-page-out time of just 38.98 seconds from its ready state, compared with 92.53 seconds for the HP device. Start-up time before printing commenced was 13.91 seconds for the Canon model, faster than the 19.06 seconds for the HP unit.
- + When printing BLI's job stream, designed to simulate a typical mixed workflow for a large-format unit, the Canon iPF770 was 35.8% faster than the HP model in Fast mode, 33.0% faster in Standard/Normal mode, and 78.5% faster in High/Best quality mode.
- + When printing BLI's 12-page DWF test file in colour, the Canon unit was 35.4% faster in Fast mode, 32.3% faster in Standard/Normal mode, and 80.9% faster in High quality/Best mode when compared with the HP unit.
- + When printing BLI's 12-page DWF test file in monochrome, the Canon unit was 36.5% faster than the HP model in Fast mode, 7.9% slower in Standard/Normal mode and 80.4% faster in High quality/Best mode.
- + In BLI's single-page A0-size test, the Canon iPF770 delivered a first-page-out time (92.84 seconds) that was 39.7% faster than that of the HP unit (154.06 seconds). The Canon model was also faster (by 39.6%) than the HP T730 when printing five A0-size pages (459.50 seconds versus 760.28 seconds).
- + The Canon model's unique sub ink tank system provides an additional productivity advantage for users. When ink needs replacing on the iPF770, it still continues to print (drawing ink from its sub tank). As inks can be replaced while printing is in progress, no ink or paper is wasted and there is no operator downtime. In addition, its control panel conveniently alerts the user to replace ink and provides purchasing information. Conversely, when the HP T730 model runs out of ink, printing has to stop for the cartridge to be replaced, which leads to operator downtime.
- + When the HP model runs out of paper, it stops and automatically cancels the entire job in progress, even if it's in the middle of a multi-page print run. Users are forced to resubmit the job once paper is replenished. This has a negative impact on productivity, since the operator must determine the number of the last page printed and then resubmit the job from that point to avoid wasting unnecessary paper and ink. The Canon model, in contrast, will pause operation and alert the operator. After a new roll is installed, the operator is prompted to confirm the paper type, after which the job will continue printing from the beginning of the interrupted page without any further user action required.



The HP display message alerts users to replace the media roll and that the current job has been cancelled.

Banner Printing

Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
Banner printing capability	✓	
Productivity	✓	

- + The Canon imagePROGRAF iPF770 successfully printed BLI's 36" x 105" banner (a 4,955-KB PDF file) in Fast mode, taking 32.7 seconds to generate a preview, and a further 3 minutes, 26.06 seconds from preview to final paper cut.
- + The HP DesignJet T730 was unable to print the banner. It printed the background only and none of the actual image detail; there was no error message displayed on the device.

Poster Printing

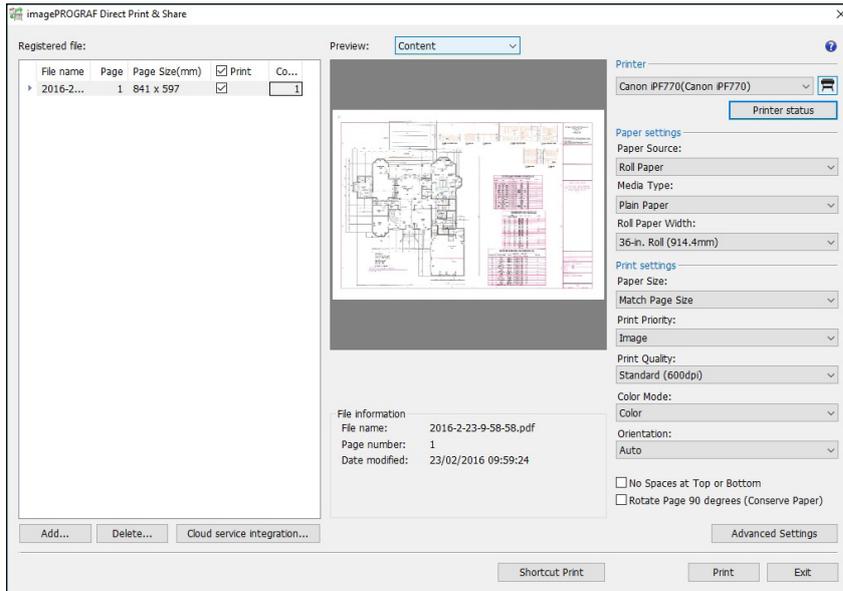
Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
Image Quality (Fast mode)	✓	
Image Quality (Standard/Normal mode)	✓	
Image Quality (High/Best mode)	✓	
Productivity (Fast mode)	✓	
Productivity (Standard/Normal mode)	✓	
Productivity (High/Best mode)	✓	

- + When printing a poster in Fast mode at 300 dpi, the Canon model took 32.15 seconds to complete the job and the HP unit took 49.18 seconds. Banding was slightly evident on output from the Canon iPF770 in fast mode, but only in dark solid areas, while there was a great deal of banding evident with the HP model across the entire image, in both light and dark areas. When unidirectional printing was selected in the Canon driver, print time increased to 47.53 seconds and the banding was minimized.
- + When printing a poster in Standard/Normal mode at 600 dpi, the Canon model took 54.08 seconds; there was some slight banding visible but it was confined to one particular dark area on the poster. The HP unit took 83.18 seconds, and, again, there was some banding evident across the whole image.
- + Printing a poster in High quality (600 dpi) mode on the Canon model took 1 minute, 32.22 seconds, while the HP model in Best quality (1200 dpi) mode took 5 minutes, 6.74 seconds to print—a 69.9% faster print time for the Canon model. There was no noticeable banding on output from either model.
- In the poster printing evaluation, the Canon iPF770 consistently delivered colours that were brighter, especially reds, and as mentioned, it suffered less banding overall in Fast and Standard/Normal modes. However, in Standard/Normal mode, the HP unit delivered slightly sharper details in light and dark areas.
- + In High/Best quality settings, definition was equally good on output from each model, but the Canon has the advantage with its vibrant colours.

Direct Print Submission Functionality

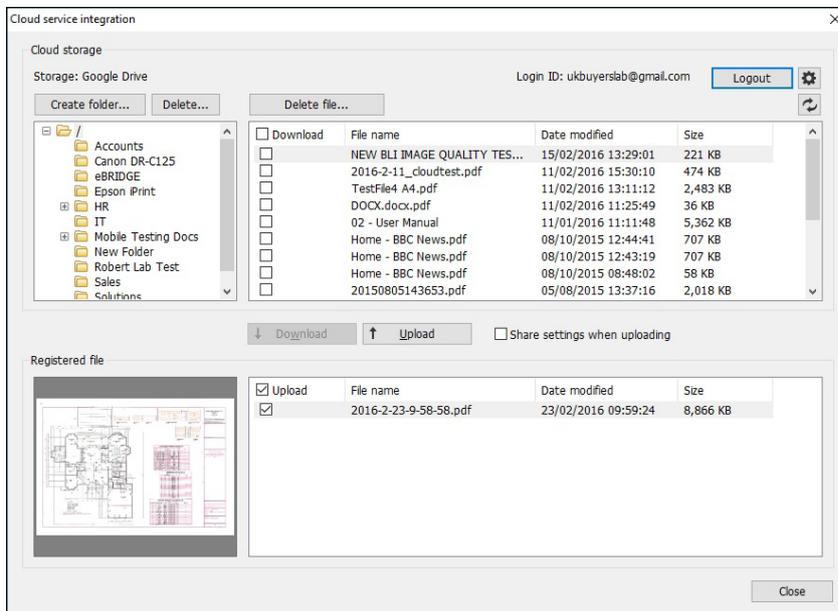
Advantage ✓	Canon imagePROGRAF iPF770	HP DesignJet T730
Ease of Use	=	=
Functionality	=	=

- 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 enables the user print multiple files simultaneously.



Canon's iPF Direct Print & Share utility gives users an image preview.

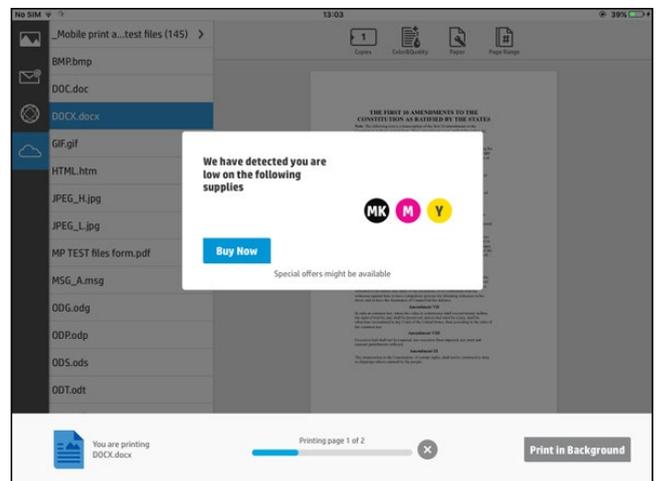
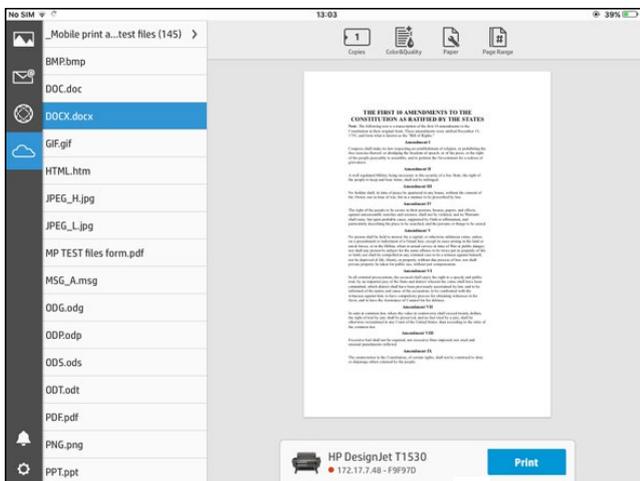
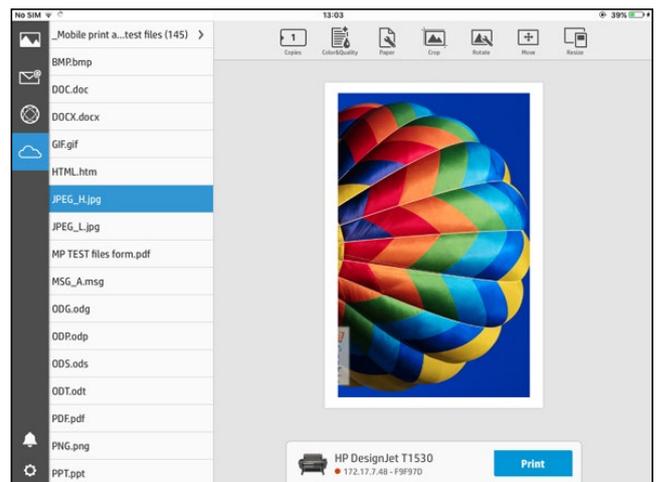
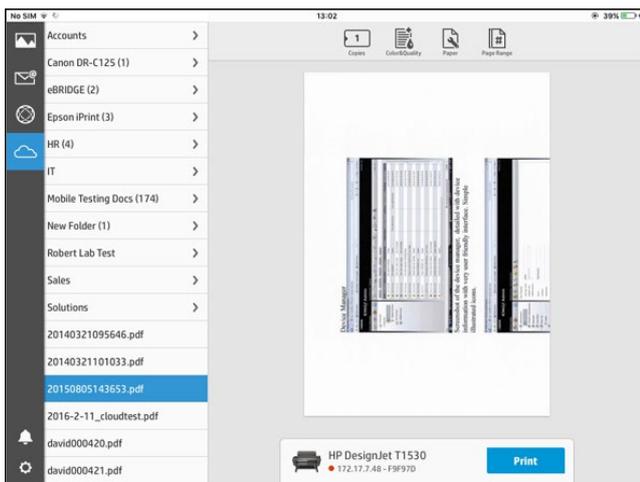
- iPF Direct Print & Share supports “Shortcut Print” functionality, which enables users to define several print settings that might be commonly used in combination and represent them with a desktop icon. Files are automatically printed with those predefined settings when users drag-and-drop them to the icon. Multiple desktop icons can be created for different print settings or combinations of print settings. HP does not offer this convenient workflow.



Retrieving files from Google Drive 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).

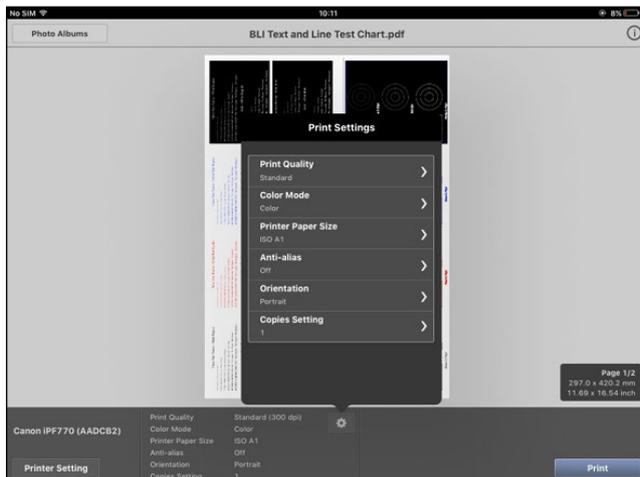
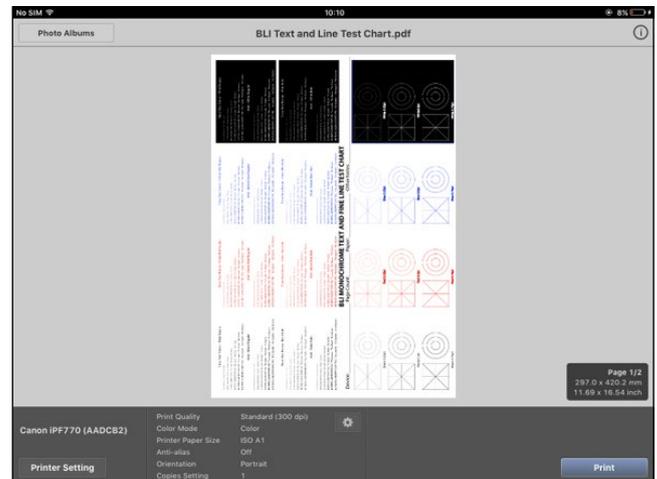
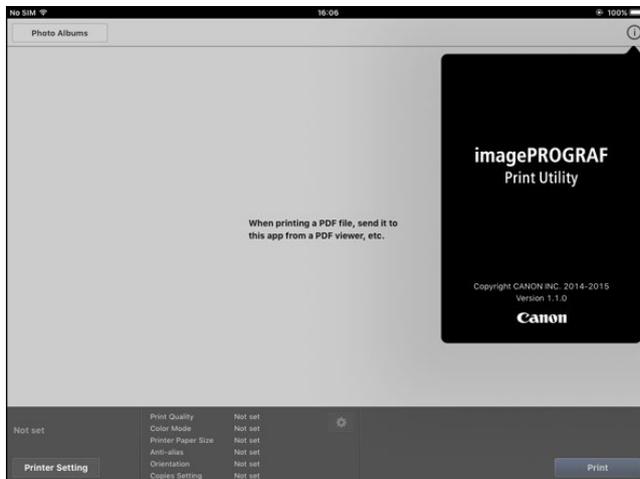
- The HP Mobile Printing service allows users to print directly from an iOS or Android smart device to a compatible HP large-format device. Unlike the previous version (ePrint & Share), users do not need to create an account in order to access direct print functionality; instead, the mobile device quickly pairs with the printer 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 that is either stored locally on their device, is an email attachment, or resides 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 the job to their preferred HP printer.



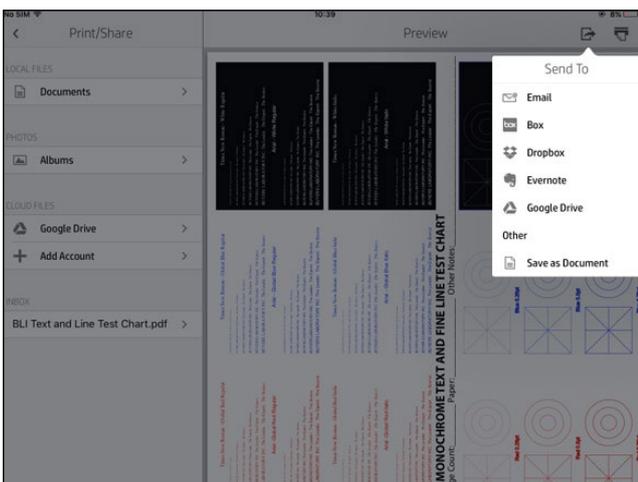
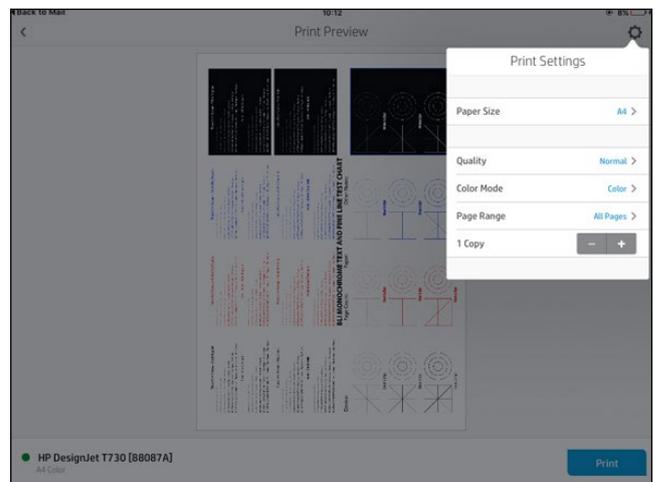
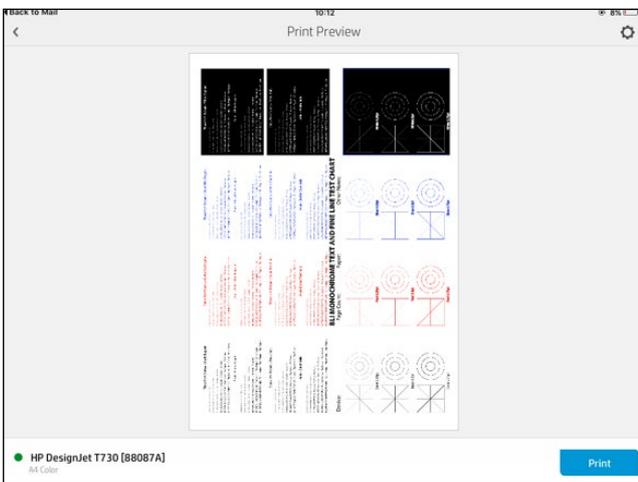
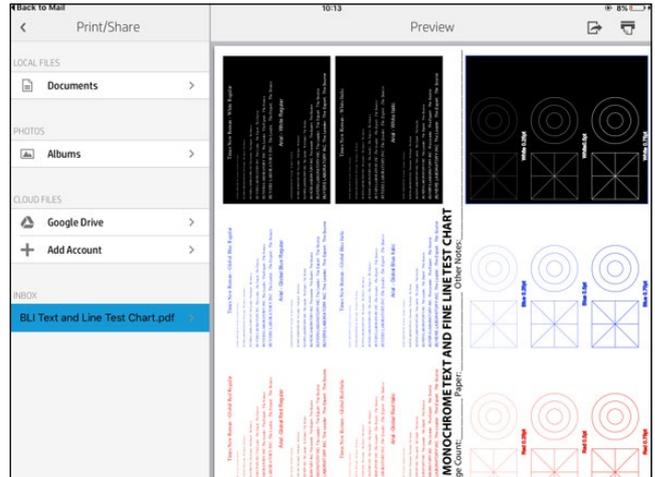
The HP Mobile Printing service enables Android and iOS mobile devices to pair with the T730 and other compatible HP devices easily. Users can retrieve files from cloud storage, preview images and perform image adjustments.

- In addition, the T730 supports HP ePrint functionality, whereby users are able to send print jobs remotely as an email attachment either from their workstation PC or from their mobile device to the T730; PDF, TIFF and JPEG files (up to 10 MB) are supported.
- The T730 supports HP's All-in-One Printer Remote mobile app for Android and iOS devices. The app lets users scan documents directly to their mobile device, retrieve, print or upload files to a variety of cloud storage services such as Dropbox, Box, Google Drive and Evernote, as well as monitor printer status.

- The Canon model also supports a free mobile print app, the Canon imagePROGRAF Print Utility, which enables PDF printing (but only from Apple iPads) to facilitate workflows for mobile workers.



The Canon imagePROGRAF Print Utility lets users print PDF files directly to the iPF770 from their iPads; while offering an image preview and enabling users to select printer options, such as orientation and colour mode.



The HP AiO Printer Remote mobile app for Android and iOS devices allows the direct printing of files and offers send to cloud storage services and email functionality (the iOS app version is shown here).

Ink Consumption

Results—Overall weight of ink used (grams)

Results averaged across three sets of 50-page A1 printing in various modes (specified below)	Canon imagePROGRAF iPF770	HP DesignJet T730
COTTAGE ARCHITECTURAL PLAN (Fast mode)	22.1	17.4
COTTAGE ARCHITECTURAL PLAN (Standard/Normal Mode)	23.8	21.3
RETAIL POSTER (Standard/Normal Mode)	66.2	70.1
GIS MAP (Standard/Normal Mode)	40.4	45.8

- When producing 50 prints of a Cottage Architectural Plan in Fast mode, the Canon unit used 27.0% more ink than the HP T730.
- When producing 50 prints of a Cottage Architectural Plan in Standard/Normal mode, the Canon unit used 11.7% more ink than the HP T730.
- + When printing a Retail Poster in Standard/Normal mode, the Canon unit used 5.4% less ink than did the HP T730.
- + When printing a GIS Map in Standard/Normal mode, the Canon iPF770 used 11.8% less ink compared with the HP device.
- + As noted earlier, the fact that the Canon cartridges can be run to exhaustion without interrupting the print process means that less ink and paper are likely to be wasted by the Canon model than by the HP T730.

Device Feature Set

- The Canon black, cyan, magenta and yellow cartridges are all only available in 130-ml capacities, which is a lower capacity than the of 300 ml maximum capacity for the HP model's cartridges. Consequently, they will need replacing more frequently than with the HP device. However, Canon do offer this same 300 ml ink capacity for all colours with the iPF780 sister model.
- + The capacity of the Canon iPF770's starter cartridges is 540 ml in total, which is far more generous than those offered by the HP T730 (90 ml for CMY and 69 ml for K).
- + Canon's ink cartridges are replaceable during operation (unlike with the HP model), which helps to reduce downtime for Canon users.
- + 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 HP unit, although BLI analysts did not encounter any nozzle clogging issues during testing.
- + The Canon unit supports a larger diameter of roll paper (150 mm as opposed to 100 mm with the HP device), and a higher maximum media thickness (0.8 mm compared with HP's 0.3 mm). It accommodates borderless printing as well, unlike the HP device.
- The HP T730 supports a fractionally higher maximum cut-sheet media length of 1.676 m compared with 1.6 m for the Canon unit, while its maximum printable paper roll length is far longer at 46 m compared with 18 m for the Canon unit.

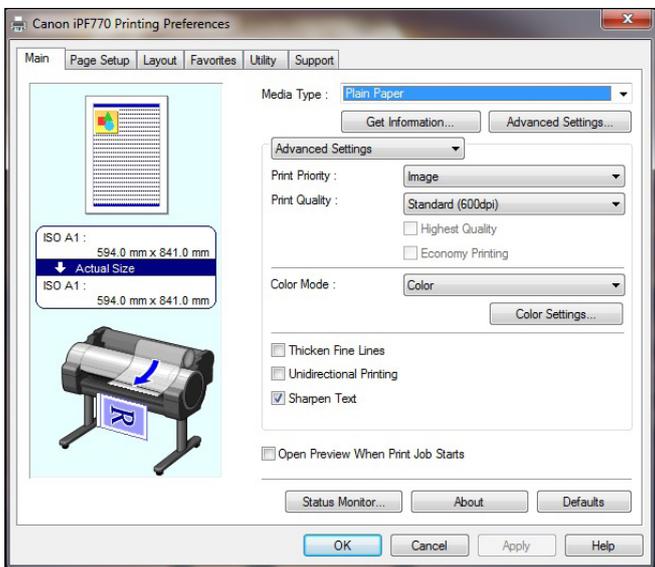
- Both models offer USB 2.0 connectivity.
 - Unlike the Canon device, the HP model is Wi-Fi-enabled.
- The catch trays of both models enable most printed sheets to be stacked neatly, with the Canon model offering the advantage of flat stacking. However, there was little to distinguish between the two models when the end of media rolls approached, as the tightly curled output from both models had a tendency to spill out of the baskets.
 - The Canon model offers a standard, non-upgradable RAM of 256 MB, while the HP unit has a higher standard, non-upgradable RAM of 1 GB.
 - The HP T730 is a more compact, lightweight device than the Canon model, weighing in at just 48 kg versus 64.6 kg for the Canon unit.
 - The HP model includes a colour touchscreen, while the Canon model has a monochrome non-touchscreen LCD display. The HP's touchscreen display lets walkup users access a library of short 'How To' video tutorials on activities such as loading media, replacing cartridges and clearing jams.
 - The HP T730's power consumption while active (35 W) is much lower than that of the Canon model's (140 W). In standby mode (where the devices are likely to spend more of their time) the Canon model's power consumption (0.5 W) is fractionally higher than the HP device (0.2 W).
- Rated noise emissions are comparable (48 dB).

Driver Feature Set

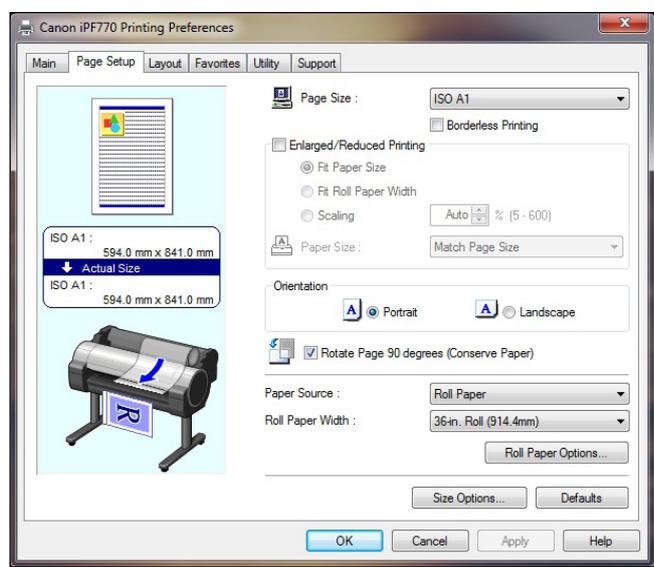
- + The Canon iPF770 has five speed settings (Fast 300, Standard 600, Fast 600, High 600 and 1200), as opposed to three with the HP device (Fast, Normal and Best).
- + Seven predefined profiles are available with the Canon driver, while the HP driver offers a range of five.
- + The Canon GARO driver provides an overview of the settings for predefined profiles, unlike HP's HP-GL/2 driver.
- + The Canon driver supports multi-up (2 to 16) printing, which the HP driver doesn't support.
- + The Canon GARO driver has a poster mode (2 by 2) that is not available from the HP driver.
- + Unlike the HP driver, the Canon driver offers page stamping (Date, Time, Name and Page Number).
- + 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 the option of using 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 iPF770. Documents scanned by the Canon MFP are automatically routed to a hot folder that is monitored by the driver of the iPF770. The image can be resized and printed, offering a fast, easy-to-use poster creation tool for office users. The HP driver lacks this feature.

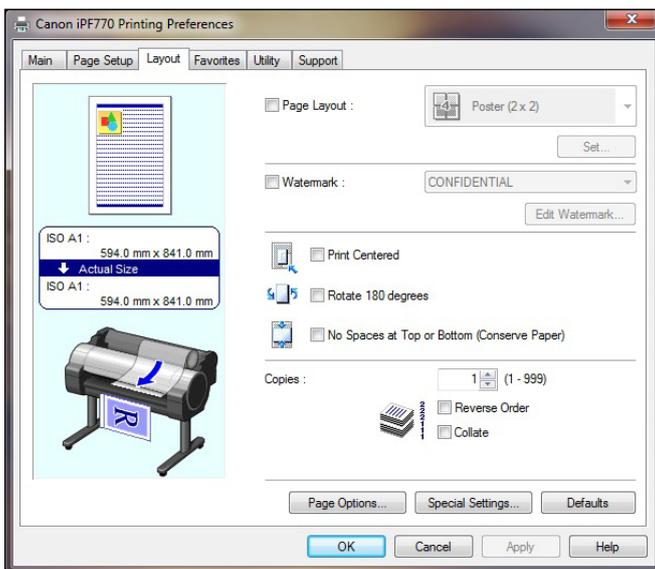
- + The Canon driver also includes a Free Layout nesting tool (available for free download via the Printer Driver Extra Kit) that enables files—even those created with different applications—to be scaled, resized, or grouped together as a single job from the printer driver. Images can be dragged and 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 or 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 (but not the HP) model also offers a plug-in for printing from Microsoft Office applications, which includes useful tools for automatic media resizing, nesting and borderless printing.



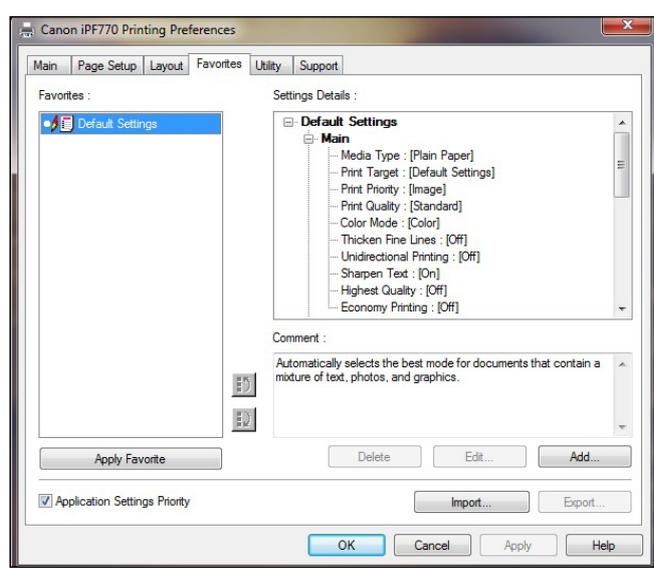
Canon imagePROGRAF iPF770 Print Driver Main Tab



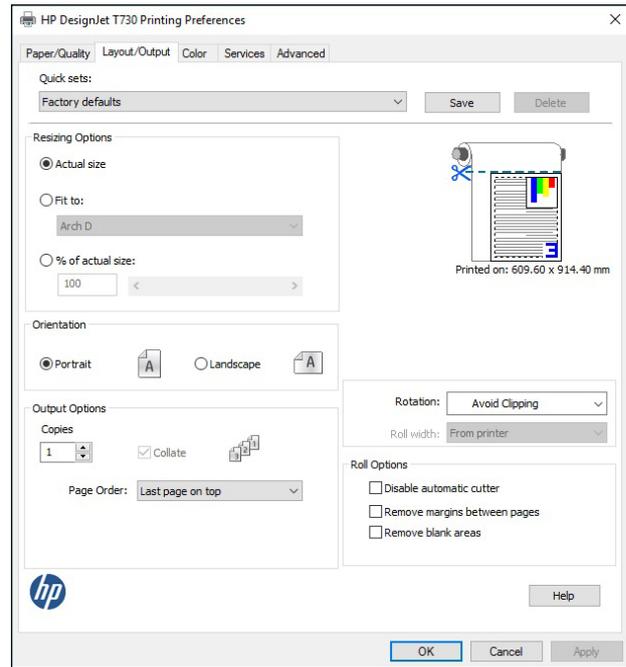
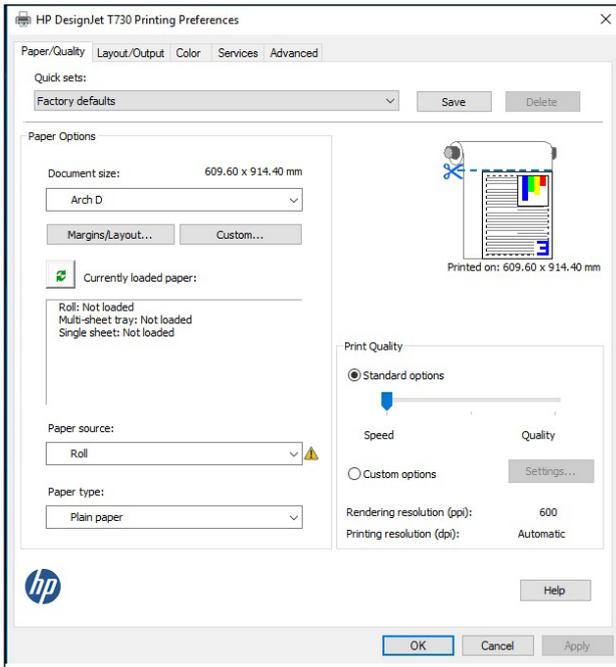
Canon imagePROGRAF iPF770 Print Driver Page Setup Tab



Canon imagePROGRAF iPF770 Print Driver Layout Tab

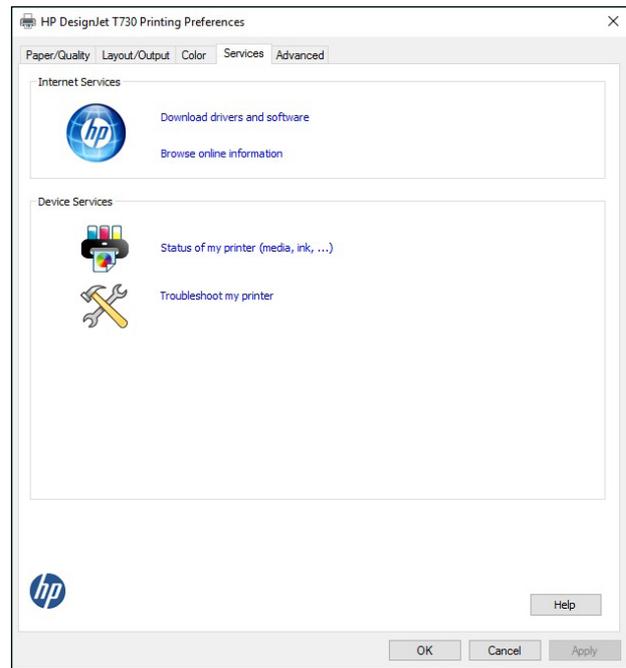
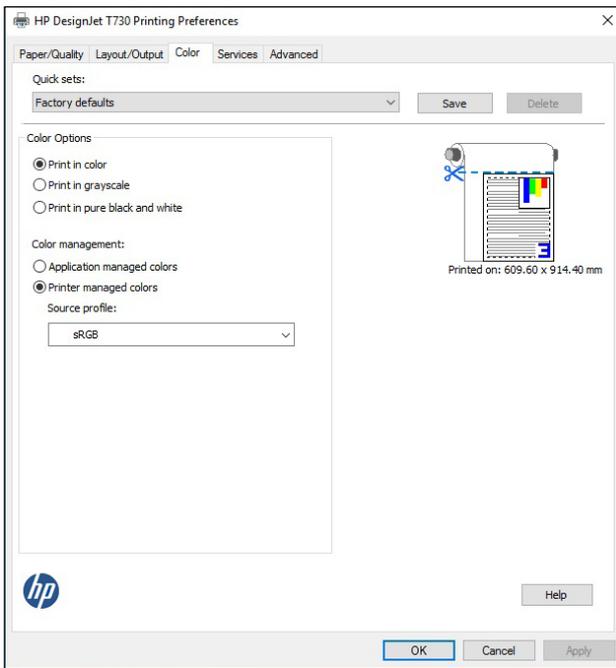


Canon imagePROGRAF iPF770 Print Driver Favourites Tab



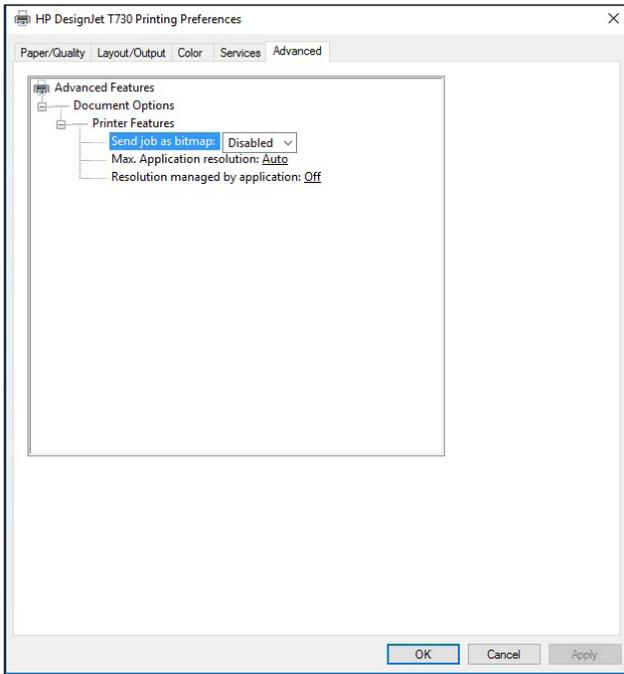
HP DesignJet T730 Print Driver Paper/Quality Tab

HP DesignJet T730 Print Driver Layout/Output Tab



HP DesignJet T730 Print Driver Colour Tab

HP DesignJet T730 Print Driver Services Tab



HP DesignJet T730 Print Driver Advanced Features Tab

SUPPORTING TEST DATA

Print Productivity

Job Stream Productivity

Mixed File Types, Same Size

Canon imagePROGRAF iPF770 (time in seconds)		HP DesignJet T730 (time in seconds)	
Fast	650.84	Fast	1,013.13
Standard	1,176.97	Normal	1,756.81
High	1,804.76	Best	8,394.62

BLI's job stream consists of nine files, including PDF, TIFF and DWF files totalling 19 pages, all at Arch D-size. 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.

Colour Productivity

Canon imagePROGRAF iPF770 (time in seconds)		HP DesignJet T730 (time in seconds)	
Fast	407.13	Fast	629.84
Standard	757.81	Normal	1,119.84
High	1,094.83	Best	5,723.30

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 with each file set to auto-rotate to save media. 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 iPF770 (time in seconds)		HP DesignJet T730 (time in seconds)	
Fast	398.53	Fast	627.28
Standard	767.17	Normal	711.30
High	1,111.56	Best	5,681.55

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, with each file set to auto-rotate to save media. 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 iPF770 (time in seconds)	HP DesignJet T730 (time in seconds)
Time Before Printing Commences	41.82	26.09
First Page Out	84.87	98.87

First-Page-Out Productivity From Ready State

	Canon imagePROGRAF iPF770 (time in seconds)	HP DesignJet T730 (time in seconds)
Time Before Printing Commences	13.91	19.06
First Page Out	38.98	92.53

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

A0 First-Page-Out and Throughput Productivity: Plain Paper, Fast Economy mode

	Canon imagePROGRAF iPF770 (time in seconds)	HP DesignJet T730 (time in seconds)
First Page Out	92.84	154.06
Five Pages Out	459.50	760.28

The single-page A0-size PDF test file was printed using the device driver with the plain paper/colour setting in default speed mode. The actual time indicated is the time it took to RIP, image and deliver all pages of the test document to the collection bin.

Colour Print Quality

Colour Optical Density Evaluation

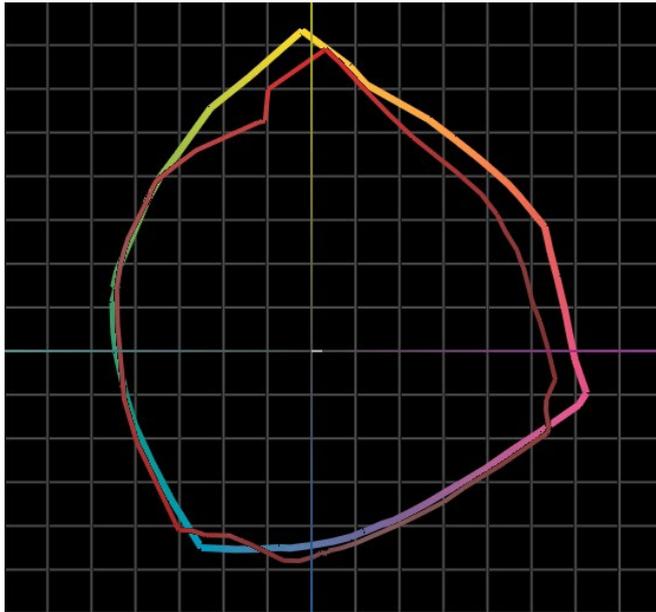
Canon imagePROGRAF iPF770						
Plain Paper						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.59	1.06	0.66	1.15	0.64	1.14
Magenta	0.57	0.99	0.63	1.12	0.63	1.14
Yellow	0.46	0.78	0.53	0.88	0.52	0.89
Black	0.57	1.31	0.69	1.44	0.67	1.44

HP DesignJet T730						
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

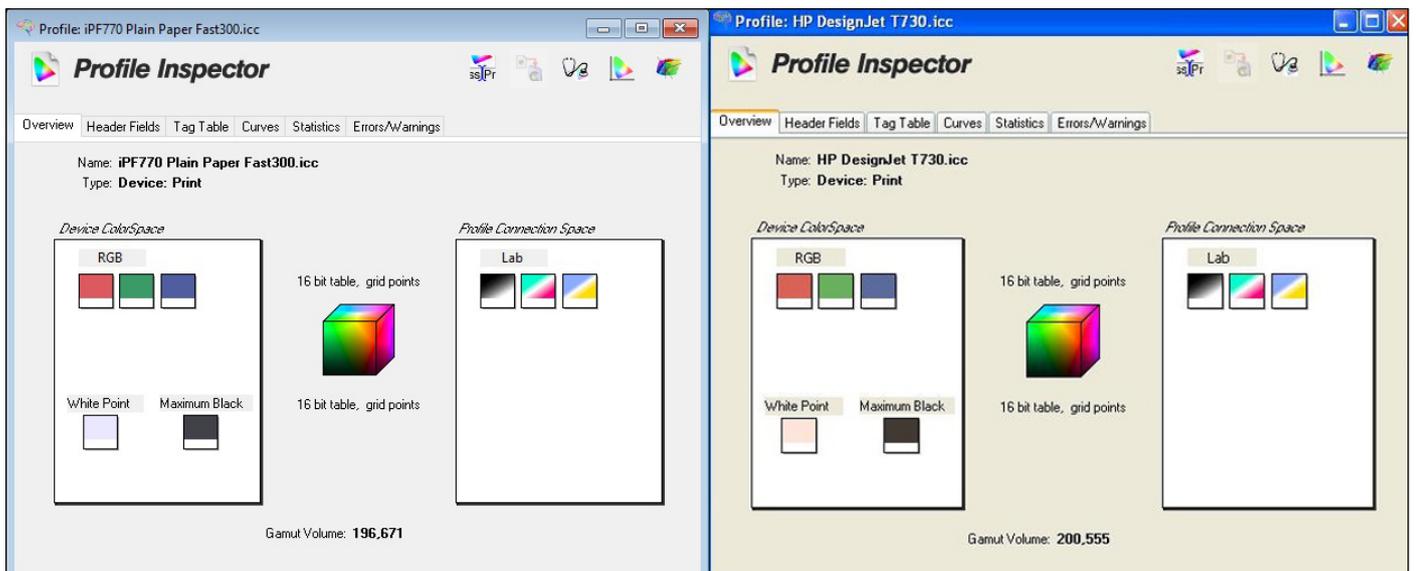
Note: Colour density readings were assessed by printing a BLI proprietary PDF test target file on plain paper in default colour settings at all quality settings available and measuring the density of 100% dot fill and 50% dot fill using an XRite 508 densitometer.

Colour Gamut Comparisons

Media Type/Settings	Canon imagePROGRAF iPF770	HP DesignJet T730
Plain Paper Fast	196,671	200,555
Plain Paper Standard/Normal	228,330	232,661
Plain Paper High/Best	236,769	248,331
Glossy Photo High/Best	624,576	460,023



Canon imagePROGRAF iPF770 colour gamut (shown chromatically) on plain paper in Fast settings versus HP DesignJet T730 colour gamut (red) on plain paper in Fast settings.



Colour gamut profiles for the Canon iPF770 (left) and HP DesignJet T730 (right) on plain paper in Fast mode.



Canon imagePROGRAF iPF770 colour gamut (shown chromatically) on plain paper in Standard settings versus HP DesignJet T730 colour gamut (red) on plain paper in Normal settings.

Profile: iPF770 Plain Paper Standard600.icc

Profile Inspector

Overview | Header Fields | Tag Table | Curves | Statistics | Errors/Warnings

Name: **iPF770 Plain Paper Standard600.icc**
Type: **Device: Print**

Device ColorSpace

RGB

White Point

Maximum Black

Profile Connection Space

Lab

16 bit table, grid points

16 bit table, grid points

Gamut Volume: **228,330**

Profile: HP T730 Plain Paper Normal.icc

Profile Inspector

Overview | Header Fields | Tag Table | Curves | Statistics | Errors/Warnings

Name: **HP T730 Plain Paper Normal.icc**
Type: **Device: Print**

Device ColorSpace

RGB

White Point

Maximum Black

Profile Connection Space

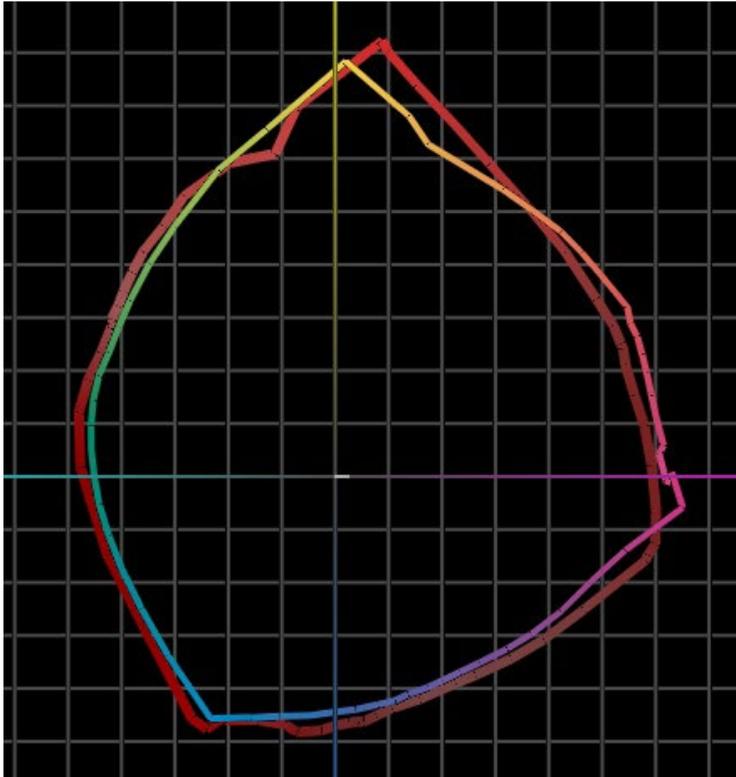
Lab

16 bit table, grid points

16 bit table, grid points

Gamut Volume: **232,661**

Colour gamut profiles for the Canon iPF770 (left) and HP DesignJet T730 (right) on plain paper in Standard/Normal modes.



Canon imagePROGRAF iPF770 colour gamut (shown chromatically) on plain paper in High setting versus HP DesignJet T730 colour gamut (red) on plain paper in Best setting.

Profile: iPF770 Plain Paper High600.icc

Profile Inspector

Overview | Header Fields | Tag Table | Curves | Statistics | Errors/Warnings

Name: **iPF770 Plain Paper High600.icc**
Type: **Device: Print**

Device ColorSpace

RGB

White Point Maximum Black

Profile Connection Space

Lab

16 bit table, grid points

16 bit table, grid points

Gamut Volume: **236,769**

Profile: HP T730 Plain Paper Best.icc

Profile Inspector

Overview | Header Fields | Tag Table | Curves | Statistics | Errors/Warnings

Name: **HP T730 Plain Paper Best.icc**
Type: **Device: Print**

Device ColorSpace

RGB

White Point Maximum Black

Profile Connection Space

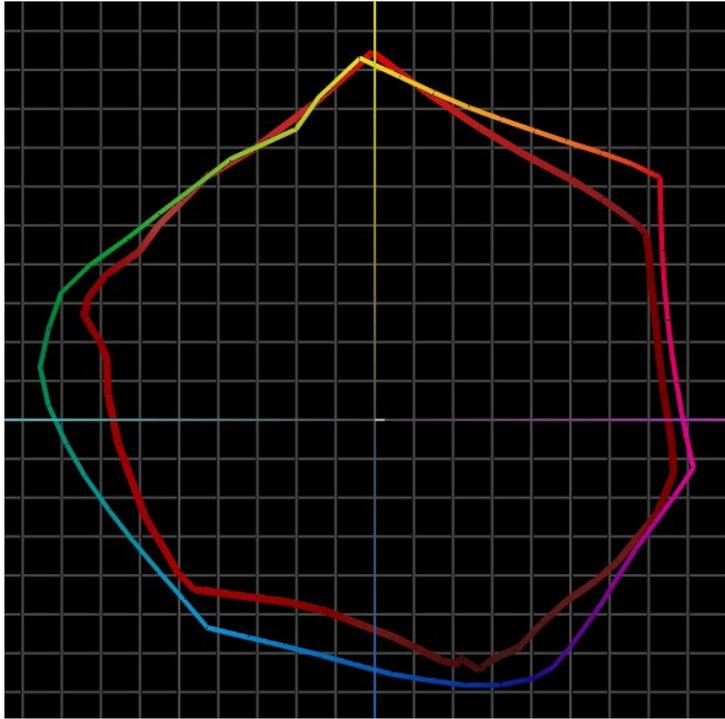
Lab

16 bit table, grid points

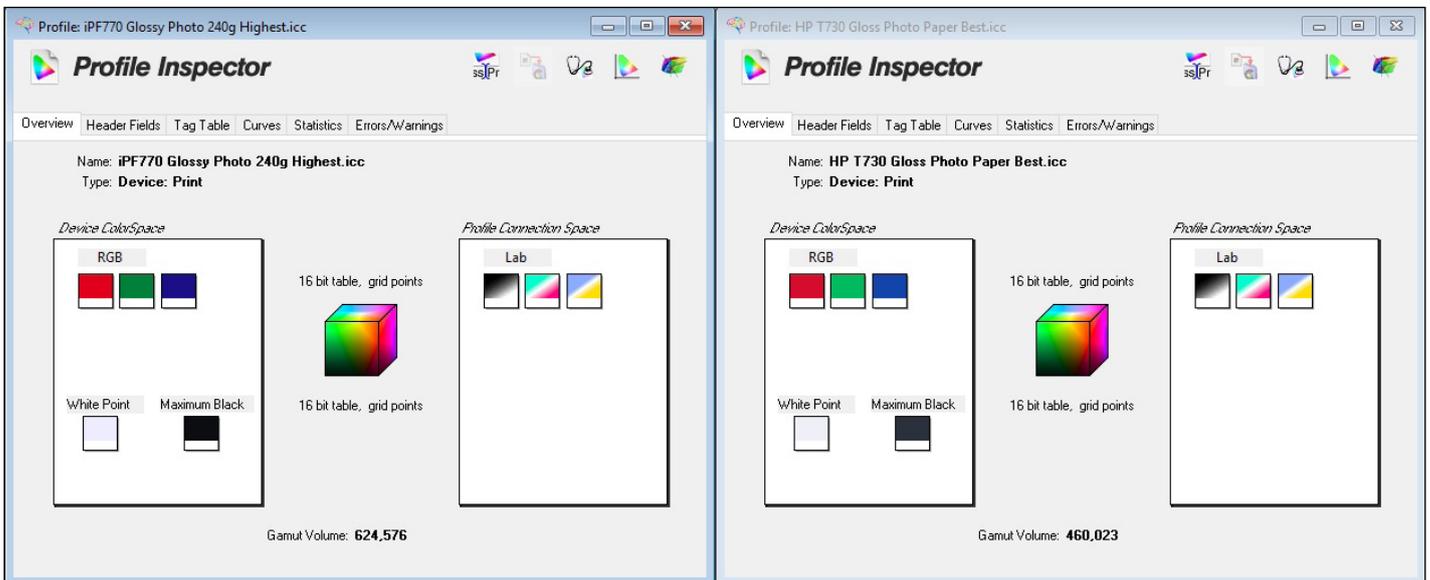
16 bit table, grid points

Gamut Volume: **248,331**

Colour gamut profiles for the Canon iPF770 (left) and HP DesignJet T730 (right) on plain paper in High/Best modes.



Canon imagePROGRAF iPF770 colour gamut (shown chromatically) on photo quality paper in High quality setting versus HP DesignJet T730 colour gamut (red) on photo quality paper in Best setting.



Colour gamut profiles for the Canon iPF770 (left) and HP DesignJet T730 (right) on photo quality paper in High/Best modes.

Black Image Quality

Solid Density

	Canon imagePROGRAF iPF770			HP DesignJet T730		
Density Block	Fast	Standard	High	Fast	Normal	Best
1	1.32	1.41	1.44	1.53	1.57	1.44
2	1.32	1.38	1.44	1.52	1.56	1.39
3	1.30	1.38	1.43	1.55	1.58	1.47
4	1.31	1.36	1.43	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 iPF770	Advantage	HP DesignJet T730
Max. print resolution	2400 x 1200 dpi		2400 x 1200 dpi
Number of inks	5	✓	4
Ink tanks replaceable during operation	Yes	✓	No
Ink-drop size	4 picoliter	✓	C,M,Y: 6 picoliter; K: 12.6 picoliter
Ink cartridge capacity	130 ml for all colours	✓	K: 69 ml (Starter), 300 ml; CMY: 40 ml (Starter), 130 ml and 300 ml
Number of nozzles	2,560 nozzles each, 15,360 in total	✓	1,376 each, 5,504 in total
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	✓	5 mm
Borderless (0 mm) printing	Yes	✓	No
Maximum outside diameter of roll paper	150 mm	✓	100 mm
Maximum printable paper roll length	18 m (varies according to the OS and the application)	✓	46 m
Maximum cut-sheet media length	1.6 m	✓	1.676 m
Maximum media thickness for roll paper	0.8 mm	✓	0.3 mm
Maximum media width	36 inches		36 inches
Media loading	Front		Rear
Optional media handling	Roll holder set	✓	None
Standard RAM	256 MB	✓	1 GB
Maximum RAM	256 MB	✓	1 GB
Hard drive	None		None
Interface	10/100/1000Base-T/TX, Ethernet, USB 2.0	✓	10/1000Base-T, Ethernet, USB 2.0, WiFi

	Canon imagePROGRAF iPF770	Advantage	HP DesignJet T730
PDL	GAR0, HP-GL/2, HP RTL	✓	HP-GL/2, HP RTL, HP PCL3 GUI, URF, JPEG, TIFF, CALS G4
Net weight (unpacked)	64.6 kg	✓	48 kg
Power consumption when in standby	0.5 W	✓	0.2 W
Power consumption when active	140 W	✓	35 W
Acoustic pressure	Operation: 48 dB (A) or less; Standby: 35 dB (A) or less		Operation: 48 dB (A); Standby: 16 dB (A) or less
Acoustic power	Operation: 6.5 Bels		Operation: 6.5 Bels

Driver Feature Set

	Canon imagePROGRAF iPF770	Advantage	HP DesignJet T730
Speed settings	5 (Fast 300, Standard 600, Fast 600, High 600 and 1200)	✓	3 (Fast, Normal, Best)
Economy mode	Yes		Yes (in Fast mode only)
Predefined profiles	7	✓	5 (Default, CAD, GIS, Photo, B/W Photo)
Overview of profile settings provided	Yes	✓	No
IQ optimized for options	Yes		Yes
Watermark	Yes	✓	No
Sharpen text	Yes		Yes (Max detail setting)
Thicken fine lines	Yes		Yes (Max detail setting)
Mirror image	No		No
Multi-up printing	Yes, 2 to 16	✓	No
Poster print mode	Yes (2 by 2)	✓	No
Page stamping	Yes (Date, Time, Name, Page Number)	✓	No
Image rotation	Yes, auto 180 degrees		Yes, auto 90 degrees
Option to preview before print	Yes	✓	No
CMYK balance adjustment	Yes	✓	No
Brightness adjustment	Yes	✓	No
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 Plugin	Yes	✓	No
Disable automatic cutter	Yes		Yes
Unidirectional printing selection option	Yes	✓	No
Integration with MFP	Yes	✓	No

Ink Consumption

Table 1: Amount of Ink in each Canon iPF770 Cartridge (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Weight of cartridge prior to installation	176.2	170.0	169.9	175.0	171.4	176.5
Weight of cartridge at end of life	45.0	45.0	45.0	45.0	45.0	45.0
Net weight of ink	131.2	125.0	124.9	130.0	126.4	131.5
Total ink weight across six cartridges						769.0

Table 2: Amount of Ink in each HP DesignJet T730 Cartridge (grams)

	Cyan	Magenta	Yellow	Black
Weight of cartridge prior to installation	412.5	414.5	414.6	418.8
Weight of cartridge at end of life	105.6	105.6	105.6	105.6
Net weight of ink	306.9	308.9	309	313.2
Total ink weight across four cartridges				1,238.0

Table 3: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Fast Mode) on the Canon iPF770 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	3.2	3.7	2.3	6.0	6.3	1.7
Test Run 2 Net weight of ink used	3.0	3.0	1.7	6.2	6.3	1.7
Test Run 3 Net weight of ink used	3.4	2.6	1.7	6.1	6.0	1.4
Average amount of ink used across three runs	3.2	3.1	1.9	6.1	6.2	1.6
Total ink weight across six cartridges for 50-page run (based on averages)						22.1

Table 4: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Fast Mode) on the HP DesignJet T730 (grams)

	Cyan	Magenta	Yellow	Black
Test Run 1 Net weight of ink used	3.8	2.2	0.7	10.9
Test Run 2 Net weight of ink used	3.7	2.1	0.5	10.7
Test Run 3 Net weight of ink used	3.9	2.2	0.7	10.9
Average amount of ink used across three runs	3.8	2.2	0.6	10.8
Total ink weight across four cartridges for 50-page run (based on averages)				17.4

Table 5: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Standard Mode) on the Canon iPF770 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	4.1	1.6	1.7	7.9	7.8	1.2
Test Run 2 Net weight of ink used	3.7	1.1	1.5	8.1	7.9	1.6
Test Run 3 Net weight of ink used	3.9	1.8	1.6	7.1	7.2	1.6
Average amount of ink used across three runs	3.9	1.5	1.6	7.7	7.6	1.5
Total ink weight across six cartridges for 50-page run (based on averages)						23.8

Table 6: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Normal Mode) on the HP DesignJet T730 (grams)

	Cyan	Magenta	Yellow	Black
Test Run 1 Net weight of ink used	6.2	2.7	0.8	12.0
Test Run 2 Net weight of ink used	6.2	2.7	0.8	11.9
Test Run 3 Net weight of ink used	5.9	2.5	0.7	11.4
Average amount of ink used across three runs	6.1	2.6	0.8	11.8
Total ink weight across four cartridges for 50-page run (based on averages)				21.3

Table 7: Ink Used in Three 50-Page Runs of Retail Poster Test Document (Standard Mode) on the Canon iPF770 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	13.2	29.5	13.1	4.2	4.6	1.8
Test Run 2 Net weight of ink used	13.2	30.2	13.2	4.6	4.5	1.9
Test Run 3 Net weight of ink used	12.7	27.8	13.3	4.7	4.7	1.5
Average amount of ink used across three runs	13.0	29.2	13.2	4.5	4.6	1.7
Total ink weight across six cartridges for 50-page run (based on averages)						66.2

Table 8: Ink Used in Three 50-Page runs of Retail Poster Test Document (Normal Mode) on the HP DesignJet T730 (grams)

	Cyan	Magenta	Yellow	Black
Test Run 1 Net weight of ink used	13.5	28.3	22.8	5.0
Test Run 2 Net weight of ink used	13.5	28.2	22.8	5.2
Test Run 3 Net weight of ink used	13.5	29.2	22.7	5.4
Average amount of ink used across three runs	13.5	28.6	22.8	5.2
Total ink weight across four cartridges for 50-page run (based on averages)				70.1

Table 9: Ink Used in Three 50-Page Runs of GIS Map Test Document (Standard Mode) on the Canon iPF770 (grams)

	Cyan	Magenta	Yellow	Matte Black 1	Matte Black 2	Black
Test Run 1 Net weight of ink used	14.4	9.2	7.3	3.6	3.7	1.9
Test Run 2 Net weight of ink used	14.4	8.6	8.2	4.4	3.9	2.2
Test Run 3 Net weight of ink used	14.3	7.4	7.6	4.1	3.7	2.2
Average amount of ink used across three runs	14.4	8.4	7.7	4.0	3.8	2.1
Total ink weight across six cartridges for 50-page run (based on averages)						40.4

Table 10: Ink Used in three 50-page Runs of GIS Map Test Document (Normal Mode) on the HP DesignJet T730 (grams)

	Cyan	Magenta	Yellow	Black
Test Run 1 Net weight of ink used	18.4	9.4	14.2	3.9
Test Run 2 Net weight of ink used	18.3	9.1	13.7	3.6
Test Run 3 Net weight of ink used	19.0	9.4	14.4	4.0
Average amount of ink used across three runs	18.6	9.3	14.1	3.8
Total ink weight across four cartridges for 50-page run (based on averages)				45.8

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 (except for the Cottage Architectural Plan, which was formatted as a DWG TrueView Drawing) and sized at ISO A1.

The Canon imagePROGRAF iPF770 was installed in BLI's lab with the latest (01-00) level of firmware (as of November 2014) and connected to a Windows 10 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 Fast (600 dpi) and Standard (600 dpi). For the Retail Poster and the GIS map, Print Priority settings were set to Image with Quality set to Standard (600 dpi).

The HP DesignJet T730 was installed in BLI's lab with the latest level of firmware CANDELPR2N001.1548A.00 (as of January 2016) and connected to a Windows 10 workstation using a 1000BaseT TCP/IP connection. The device was left in default configuration throughout testing. The Windows 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. Quality was set to Normal (600 dpi) mode for all document types with the exception of the Cottage Architectural Plan, which was tested in both Fast and Normal 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.

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

Test Environment

Testing was conducted in BLI's European test lab, in an atmospherically controlled environment monitored by a 24/7 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 2008 servers, Windows 10 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 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 support. Using BLI's web-based bliQ and Solutions Center services, 40,000 professionals worldwide create extensive side-by-side comparisons of hardware and software solutions for more than 15,000 products globally, including comprehensive specifications and the performance results and ratings from BLI's unparalleled Lab, Solutions and Environmental Test Reports, the result of months of hands-on evaluation in its US and UK labs. The services, also available via mobile devices, include a comprehensive library of BLI's test reports, an image gallery, hard to find manufacturers' literature and valuable tools for configuring products, calculating total cost of ownership (TCO) and annual power usage. BLI also offers consulting and private, for-hire testing services that help manufacturers develop and market better products and consumables.

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