KEYPOINT INTELLIGENCE Buyers Lab

Custom Test Report

KPI Comparative Lab Test Report

FEBRUARY 2018

Canon imagePROGRAF TX-4000

vs. HP DesignJet T795 ePrinter

Advantage ✔	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
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

Keypoint Intelligence – Buyers Lab was commissioned by Canon Europe to conduct confidential document imaging device performance testing on the Canon imagePROGRAF TX-4000 and the HP DesignJet T795 ePrinter, and produce a report comparing the relative strengths and weaknesses of the two products in the areas of image quality, productivity, banner and poster printing, direct print submission functionality, device feature set, driver functionality and ink consumption. All testing was performed in Buyers Lab's European test facility in Wokingham, UK.

Executive Summary

The 5-colour 44-inch Canon imagePROGRAF TX-4000 is designed to meet the needs of customers who require higher productivity for their technical documents, but still demand exceptional quality as befitting the Architectural, Engineering and Construction (AEC) and Geographical Information Systems (GIS) markets. In Buyers Lab's wide-format production test, this model proved it can meet those expectations with an outstanding overall performance, outshining the HP DesignJet T795 ePrinter in most areas of the evaluation. As demonstrated in Buyers Lab's productivity tests, the Canon model offers a clear speed advantage when printing both colour and black output, and it particularly excelled when printing Buyers Lab's job stream, designed to simulate a typical mixed workflow for a large-format unit. Remarkably, in High/Best quality mode, the TX-4000 delivered output in less than a third of the time required for the HP device, enabling Canon users to achieve optimum image quality without sacrificing productivity. One 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 T795 runs out of ink, printing has to stop for a cartridge to be replaced, which leads to some operator downtime.

Both models delivered image quality that would easily satisfy any AEC, Computer-Aided Design (CAD), or GIS customer requirements, yet the Canon TX-4000 produced superior colour and black image quality overall. It delivered a much larger colour gamut in all tested modes on all media, crisper text and fine lines, sharper fine details in business graphics and in photographic images, as well as brighter, more saturated colours. The HP T795 produced smoother greyscale fills and a higher optical density in monochrome mode—perhaps helped by the fact that HP includes grey, photo black and matte black inks, as opposed to Canon's matte black and black inks. In other respects, there was little to differentiate between the two models' output, with both delivering a full halftone range with smooth coverage. The TX-4000 has a further advantage with its unidirectional printing driver option, which, when selected, can eliminate banding, as demonstrated on the Canon model's poster output printed in Fast mode. Whilst it should be noted that Buyers Lab technicians observed banding on the HP device's output only when printing posters in Fast mode, the HP device does not offer a unidirectional feature which can rectify such issues. The Canon unit also outperformed the HP unit in Buyers Lab's ink consumption testing, using less ink than the HP device did with all three test documents used.

Rounding off the package, the Canon TX-4000 offers impressive device and driver feature sets—both are stronger than those of the HP model. In addition to the aforementioned hot-swap ink tanks and unidirectional print feature, the Canon model has higher cartridge capacities, higher standard and maximum memory capacities and higher hard drive capacity to aid with job processing and storage, smaller ink drop sizes, a lower rated energy consumption while printing, more media profiles, and a flexible layout nesting option to save on paper. (The HP model offers a similar layout feature, but the same and control over image placement are not available.) Both models support direct printing of JPEG, TIFF and PDF files from a USB flash drive providing convenience to mobile workers, plus HP users have the further advantage of being able to email their jobs directly to the printer for instant printing, while Canon users can print via the Canon Print Service mobile app (Android currently supported, with iOS support to follow in 2018).

Overall, based on its superior image quality, faster productivity across the board, stronger feature sets and lower ink consumption, Buyers Lab judges the Canon imagePROGRAF TX-4000 as the stronger performer in its large-format production evaluation.

Colour Image Quality

Advantage ✔	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
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 Quality)	✔	
Colour Gamut (Matte Coated Paper, High/Best Quality)	✔	

+, — and O represent positive, negative and neutral attributes, respectively.

O All image quality testing was conducted on CAD 90gsm inkjet plain paper.

O The Canon TX-4000 delivered superior optical densities on plain paper in all modes for cyan, and for yellow in Fast and High modes, while the HP T795 produced higher optical densities for composite black and magenta in all modes. Both models had comparable densities for yellow in Standard/Normal mode.

+ In the colour gamut assessment conducted on plain paper in Fast mode, the Canon TX-4000 delivered a fractionally (1.3%) larger colour gamut, with a CIE volume of 132,214 versus a CIE volume of 130,521 for the HP model.

+ The Canon model produced a 21.4% larger colour gamut when printing on plain paper using Standard/Normal settings—with a CIE volume of 201,752 versus a CIE volume of 166,227 for the HP device.

+ When printing on plain paper in High/Best quality settings, the Canon TX-4000 delivered a 22.6% larger colour gamut than the HP T795, with a CIE volume of 221,323 versus a CIE volume of 180,578 for the HP model.

+ When printing on matte coated paper using Canon's High quality setting and the HP T795's Best quality setting, the Canon model delivered a larger (44.0%) colour gamut than the HP unit, with a CIE volume of 410,918 compared with 285,263 for the HP unit.

+ Although both models delivered fully formed text that was legible down to the smallest (3-pt.) type size, the Canon TX-4000 delivered superior colour text overall, with sharper, more distinct serif and sans serif characters in all tested modes.

+ Fine lines produced by both devices remained distinct at the 0.1-pt. level across all modes, but the Canon TX-4000 delivered very clean and crisp lines that were rated very good in Standard/Normal and High/Best modes compared with a good rating for the HP model.

+ Both models delivered fully formed circles at 0.1pt that were rated good in all modes, except for circles produced by the Canon TX-4000 in Standard mode, which were smoother than the HP model's and rated very good.

O Both devices produced the 1x1 pixel grid in CMY with no quality issues, and coverage was consistently very good across all colours.

O 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 TX-4000 delivered very good, smooth colour halftone fills in all modes, while the HP T795 delivered halftone coverage that was rated good in Fast mode (as the 100% fill area was slightly grainy) and very good in Normal and Best modes.

O When evaluating Architectural, Engineering and Construction (AEC) graphics in Standard/Normal mode, the Canon and HP units' output exhibited an excellent level of detail, very distinct fine lines and clear text formation.

O 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 TX-4000 exhibited slightly sharper fine details and superior colour saturation than did those produced by the HP device, which in Fast mode looked 'streaky' and had distinct banding.

+ When comparing photographic images, the Canon TX-4000 delivered better depth, finer detailing in dark contrast areas and brighter colours in all modes than the HP unit, while both models delivered excellent detailing in light contrast areas. Images produced in Fast mode showed some banding, which was more obvious on the HP unit's output, and was eliminated in the higher quality modes.

O Skin tones produced by the Canon TX-4000 model were slightly yellowish in all modes, while those produced by the HP model were reddish in all modes.

+ Overall, Buyers Lab technicians judged the Canon TX-4000 as the superior performer in Buyers Lab's colour image quality evaluation, delivering superb crisp text and fine lines, smoother circles in Standard/Normal mode, brighter, more saturated colours and sharper detail in dark contrast areas in photographic images, as well as larger colour gamut sizes. The HP T795 model delivered the higher composite black and magenta densities, but there was no single area where it truly stood out. 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

Advantage ✔	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
Text	✔	
Fine Lines	✔	
Halftone Range	=	=
Halftone Fill		✔
Solid density		✔
AEC Graphics	=	=
Business Graphics	✔	
Photographic Images	✔	

- When printing in monochrome, the HP T795 delivered darker solids with higher optical densities in all tested modes.

+ Black text produced by the Canon TX-4000 unit displayed clear character definition and was legible down to the 3-pt. size with no breakup or bleed in all modes; it was consistently rated very good except in Standard mode where it was rated excellent. Although serif and sans serif fonts produced by the HP T795 were legible down to the 3-pt. size level for all modes, character definition was less distinct and output suffered from some ink bleed in Fast mode.

+ In Buyers Lab's line art reproduction test, both models' fine lines remained distinct at the 0.1-pt. level in all modes. However, the Canon TX-4000 delivered better quality overall, with crisp and distinct fine lines, that were rated very good in Fast and High modes, and excellent in Standard, while fine lines were consistently rated good for the HP model. White-on-black fine lines produced by both models remained distinct at the 0.25-pt. level in all quality modes and were rated very good for the Canon TX-4000 across the board, but only fair for the HP T795, except in Fast mode where it was rated good.

+ Circles produced by both models were fully formed at 0.1pt, but the Canon TX-4000 delivered smoother and crisper circles than those produced by the HP unit in all modes.

+ Both printers produced the 1x1 pixel grid in black with no quality issues; coverage was very good for the HP unit, but rated excellent for the Canon model in Standard and High modes, as dots were sharper and more uniform.

O Both models delivered black halftone output across the full range—from the 10% to the 100% dot-fill levels—with distinct transitions between all levels.

- Halftone fill results were rated good (in Fast mode) and very good (in Normal and Best modes) for the HP device. Although, greyscale coverage was slightly grainy on the 80% to 100% fills in Fast and Standard modes with the Canon model, coverage was smooth in High quality mode and judged very good.

O When evaluating AEC graphics in Standard/Normal mode in black, both models delivered very good details and 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.

+ Despite some graininess in dark solid areas on greyscale photographic images produced on plain paper by the Canon TX-4000, it delivered better depth, smoother tonal gradations and superb fine detailing in light contrast areas (particularly in the model's rendering of chrome surfaces) in all modes. Photographic images produced by the HP unit in Fast and Normal modes looked fairly flat in comparison, and some banding was observed.

+ Results were more mixed in Buyers Lab's monochrome image quality assessment, with the HP model having the higher optical densities across the board and smoother halftone fills. However, the Canon TX-4000 produced better quality, overall, delivering superior text and fine lines (with no ink bleed), sharper business graphics and more depth in photographic images.

Print Productivity

Advantage ✔	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
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	✔	

+ The Canon TX-4000 delivered a much faster first-page-out time of 89.35 seconds after a weekend of non-use, compared with 146.78 seconds for the HP T795. Start-up time before printing commenced was faster for the Canon model at 58.10 seconds, compared with 62.65 seconds for the HP unit.

+ The Canon device delivered a 53.9% faster first-page-out time of 45.59 seconds from its ready state, compared with 98.81 seconds for the HP device. Although start-up time before printing commenced was slower for the Canon model—21.95 seconds versus 16.31 seconds—the Canon TX-4000 is clearly the faster device overall after taking into account the two measurements.

+ When printing Buyers Lab's job stream, designed to simulate a typical mixed workflow for a large-format unit, the Canon TX-4000 delivered a far superior performance in High/Best quality mode, running 66.9% faster than the HP model. In the other tested modes, it was also faster—by 45.1% in Fast mode and 51.7% in Standard/Normal mode.

+ When printing Buyers Lab's 12-page DWF test file in colour, the Canon TX-4000 was 45.1% faster in Fast mode, 53.3% faster in Standard/Normal mode, and 71.3% faster in High/Best quality mode.

+ Similarly, when printing Buyers Lab's 12-page DWF test file in monochrome, the Canon unit was 42.6% faster than the HP model in Fast mode, 52.3% faster in Standard/Normal mode, and 70.2% faster in High/Best quality mode.

+ When printing Buyers Lab's single-page A0-size test in Standard/Normal mode, the Canon TX-4000 delivered a first-page-out time (117.55 seconds) that was 31.1% faster than that of the HP unit (170.58 seconds). The Canon model was also 34.6% faster than the HP T795 when printing five A0-size pages (523.25 seconds versus 800.48 seconds).

+ The Canon model's unique sub ink tank system provides a further boost to productivity. When the HP T795 model runs out of ink, printing must stop for the cartridge to be replaced, which leads to operator downtime. In contrast, when ink needs replacing on the Canon model it will continue to print, drawing ink from its sub tank while ink is replaced, so there's no operator downtime. For added convenience, the control panel alerts users to replace ink and also provides purchasing information.

O 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 TX-4000	HP DesignJet T795 ePrinter
Image Quality	✔	
Productivity	✔	

+ The Canon TX-4000 successfully printed Buyers Lab's 36" x 105" banner (a 4,955-KB PDF file) in Fast mode, taking 6.06 seconds to first generate a preview at the desktop, and an additional 2 minutes, 0.41 seconds from preview to final paper cut. In Fast mode the HP DesignJet T795 took far longer to print the banner. No preview was available, and it took 9 minutes, 10.67 seconds from PC release to final paper cut. There were no quality issues observed with the banner produced by the Canon model, while there was some banding evident on the HP model's output.

Poster Printing

Advantage ✔	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
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 Buyers Lab's Poster test target in Fast mode at 300 dpi, the Canon TX-4000 took 37.88 seconds to complete the job, while the HP T795 took 55.46 seconds. Slight banding was evident with both models, but only in the dark areas. When unidirectional printing (not supported on the HP model) was selected in the Canon print driver, banding was eliminated and the time to print the banner increased to 56.74 seconds.

+ When printing a poster in Standard/Normal mode, the Canon model took 1 minute, 0.52 seconds, while the HP unit took 1 minute, 34.18 seconds. Both models' output showed no banding.

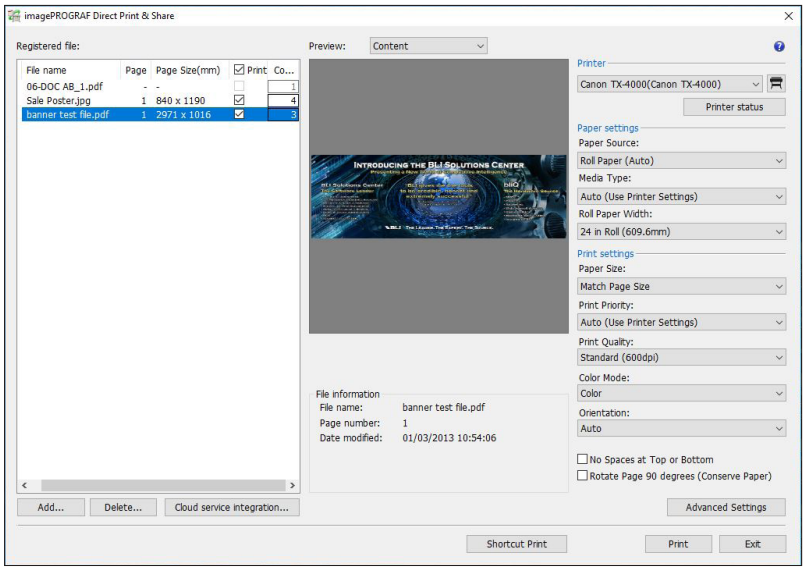
+ When printing the poster in High quality (600 dpi) mode, the Canon model took 1 minute, 43.26 seconds, which is 59.5% faster than the 4 minutes, 15.02 seconds taken by the HP model to print the poster in Best mode.

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

Direct Print Submission Functionality

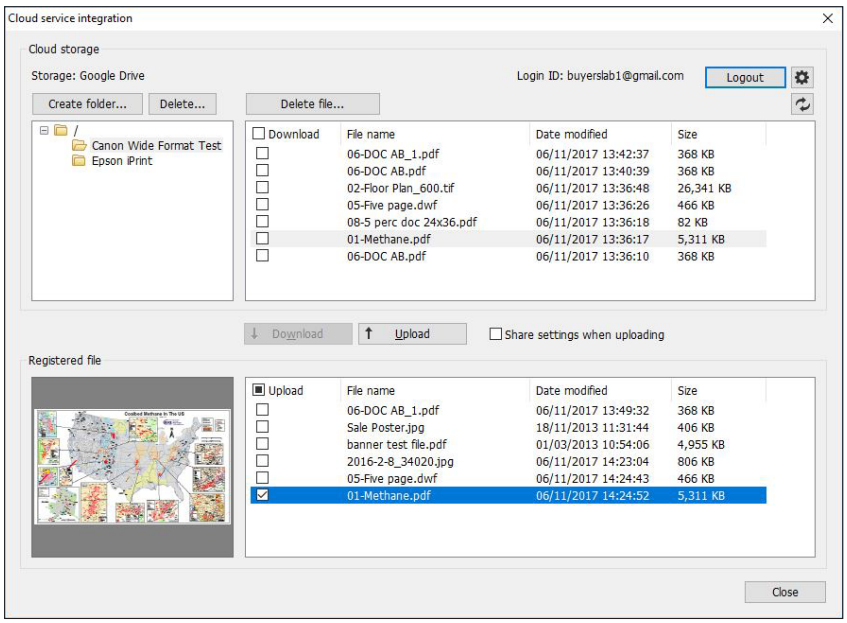
Advantage ✔	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
Ease of Use	=	=
Direct Print Submission Functionality	=	=

O Available as a free download from Canon's website, the imagePROGRAF 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. Via the utility, users can preview print layouts and select print settings without the need to open up the driver properties. For added convenience, it also lets users print multiple files simultaneously.



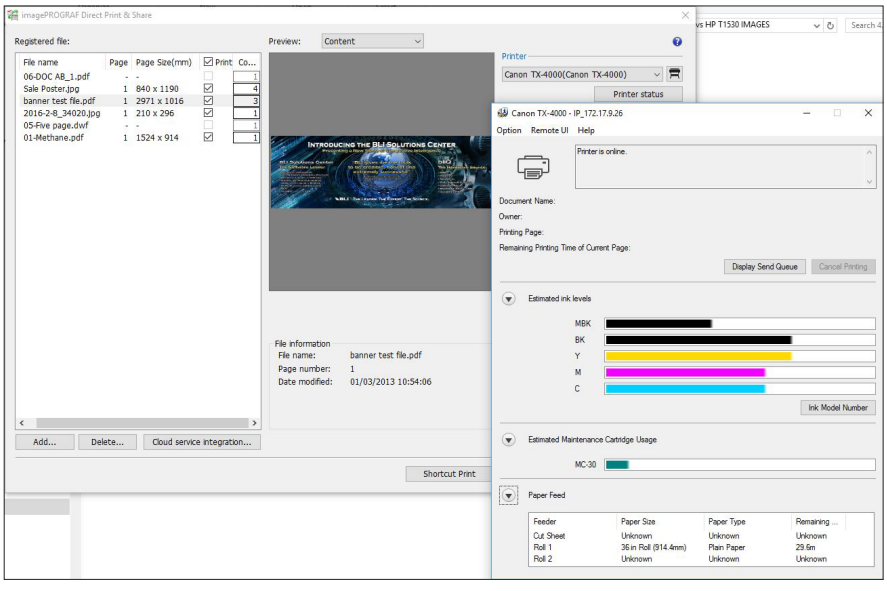
Canon's imagePROGRAF Direct Print & Share utility gives users an image preview.

O The imagePROGRAF Direct Print & Share utility supports “Shortcut Print” functionality, enabling users to create a desktop shortcut that includes commonly used print settings. Akin to a hot folder workflow, files are automatically printed with the predefined settings when users drag-and-drop the files to the desktop icon. Multiple desktop icons can be created for different print settings or combinations of print settings.



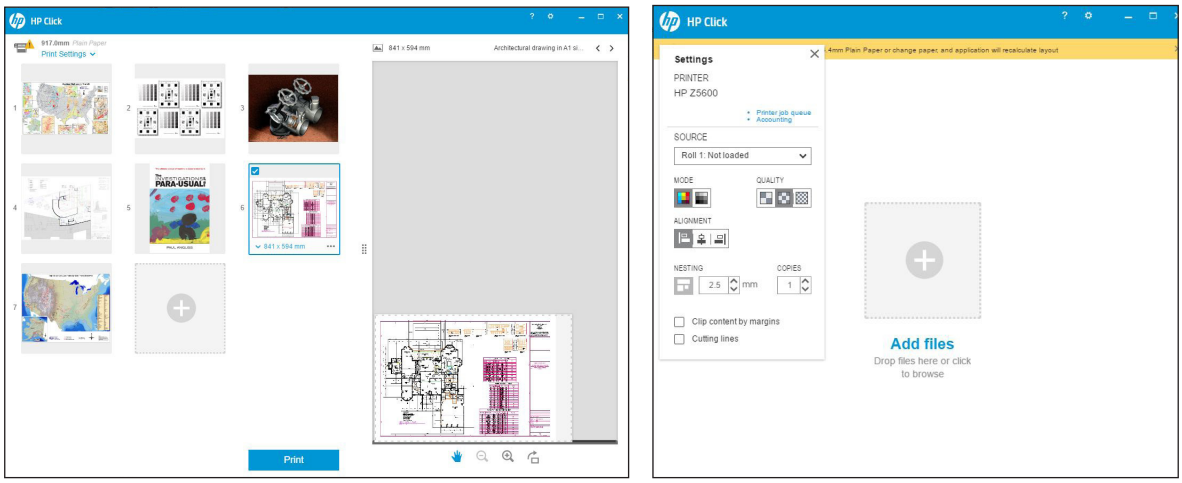
Retrieving files from Google Cloud using imagePROGRAF Direct Print & Share.

O Users can download stored files from Google Drive and AutoCAD 360 cloud storage services for printing via the imagePROGRAF Direct Print & Share utility, and can upload files directly to cloud storage as well, which boosts collaboration. For added convenience, the utility also offers the option of sharing files simultaneously with one or more users (via Google Drive only), who will receive an email notification with a link to download the shared file without the need to log in.



Users can view device status information via the utility.

O Available as a free download, HP Click printing software allows direct printing of PDF, JPEG, TIFF and HPGL/2 files from the desktop, without the need for native applications or print drivers. Via the utility, users can preview print layouts, resize and align images without the need to open up the driver properties. It also has an automatic nesting feature to reduce waste.



Via HP Click, users can select basic print settings, preview images, manipulate images as well as utilise the automatic nesting feature to reduce paper waste.

O The HP T795 ePrinter supports HP ePrint functionality, whereby users are able to send print jobs remotely by email either via a workstation PC or a mobile device; PDF, TIFF and JPEG files (up to 10 MB) are supported. Unlike the Canon device, it does not support any mobile print app solutions for printing via smartphones and tablets.

O The Canon TX large-format series supports Canon Print Service, a mobile print app for Android users (with support for Apple iPad devices to follow in 2018), which is a productivity boost in environments where workers are travelling between sites or working remotely.

Ink Consumption

Overall Weight of Ink Used (in Grams)

	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
Cottage Architectural Plan	29.6	44.7
ISO Poster	81.6	104.1
GIS Map	82.8	117.8

Results are averaged across three sets of 50-page A0 printing in Standard/Normal mode.

+ When printing 50 prints of a Cottage Architectural Plan in Standard/Normal mode, the Canon unit used 33.8% less ink than the HP T795.

+ When printing an ISO Poster in Standard/Normal mode, the Canon unit used 21.6% less ink than the HP T795.
+ When printing a GIS Map in Standard/Normal mode, the Canon TX-4000 used 29.7% less ink than the HP device.

Device Feature Set

+ The total capacity of the Canon TX-4000's starter ink cartridges is 970 ml, which is much higher than the 269 ml total starter ink volume available with the HP model.
+ Canon's replacement ink cartridge capacities are 160 ml, 330 ml and 700 ml for all colours, whereas the HP model offers 130 ml for CMY, Photo Black and Grey and 300 ml for Matte Black, and as a consequence Canon inks will need replacing less frequently than with the HP device.
+ Canon's ink cartridges are replaceable during operation, which helps reduce downtime for users. HP's cartridges cannot be replaced during operation.
+ If the Canon device detects that printhead nozzles are becoming clogged, it automatically starts a cleaning routine when there are no nozzles available to compensate for the clogged ones. This task would have to be done manually with the HP unit, although Buyers Lab analysts did not encounter any nozzle clogging issues with either model during testing.
O Both units utilise user-replaceable printheads, that take less than five minutes to replace on both models.
O Both models offer USB 2.0 and Gigabit Ethernet connectivity.
O Both models offer easy and quick roll paper loading with auto paper feed—once the user loads paper on to the device, alignment and width adjustments are automatically carried out without further user intervention.
+ The Canon TX-4000 supports an optional Multifunction Roll system, giving users the added flexibility of switching between different media types or sizes without having to reload the media each time. It can also act as an auto Take-up-Roll unit with bi-directional rewind, which could be a valuable asset in high-volume production environments, enabling large numbers of prints to be conveniently stored on a single roll. This option is not available for the HP device.
+ The Canon model offers a standard, non-upgradable RAM capacity of 128 GB, while the HP unit has a standard non-upgradable RAM capacity of 16 GB.
+ The Canon model has a 500-GB hard drive as standard. A 160-GB hard drive is available for the HP unit, but only as an extra-cost option.
+ The Canon TX-4000 supports borderless printing regardless of what roll media type is being used, whilst the HP T795 does not support this feature.
+ Both models support up to 0.8 mm media thickness for roll paper, but the Canon TX-4000 supports 170 mm as the outside diameter of the roll, while the HP T795 supports 140 mm in diameter.
O The Canon device includes a media mismatch option, which places jobs on hold that can't be printed due to the 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 as well as 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 that are slated for the paper types that are already loaded will be printed without delay.

O The Canon TX-4000 comes with robust security features, including newly added hard drive encryption and protocol locking to prevent unauthorised access to the device; it also supports SNMP v3 (secure network protocol) and IPsec which provide further security by authenticating and encrypting data over the network.

– The HP model is much lighter with a net weight of 81.6 kg versus 114 kg for the Canon unit.

O The output catch baskets of both models are very simple designs which collect output from media rolls. The HP catch basket is attached to the device, whereas Canon's is a separate assembly that must be wheeled up to the device.

+ The Canon TX-4000's high-capacity stacker can accommodate up to 100 A0-sized CAD prints (depending on paper weight and thickness).

O Both models offer a colour touchscreen user interface, which are similarly responsive and intuitive to navigate.

+ The Canon TX-4000's power consumption while printing is lower—107 watts versus 120 watts—than that of the HP model.

– Rated noise emissions are higher for the Canon model (51 dB) compared to the HP device (43 dB) while the devices are printing.

Driver Feature Set

+ The Canon TX-4000 has five speed settings (Fast 300, Standard 600, Fast 600, High 600 and 1200), which are matched by three settings on the HP device (Fast, Normal and Best), although not all speed settings are available with all media types on the Canon model.

O Both the Canon imagePROGRAF Printer Driver and the HP HP-GL/2 driver provide a useful overview of the settings for predefined profiles.

+ Six predefined profiles are available with the Canon driver, while the HP driver offers five profile settings.

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

+ The Canon 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), while the HP unit does not support this feature.

O The Canon imagePROGRAF Printer Driver offers a broad range of built-in adjustments for CMY balance, brightness and contrast, while the HP T795's HP-GL/2 driver also offers CMYK balance and brightness adjustments. The Canon driver's advanced colour-matching selections include the ability to match ICC profiles and select the rendering intent based on different elements in the document. 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. Additionally, users can preview images before printing—features which were not included in the Startup driver disk supplied to Buyers Lab with the device.

– The HP driver provides a handy thumbnail preview for users to check the effects on the image as they make colour adjustments, which is not available in the Canon driver. In addition, the HP driver displays a list of all the current settings on each tab window, providing users with a quick, at-a-glance summary.

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

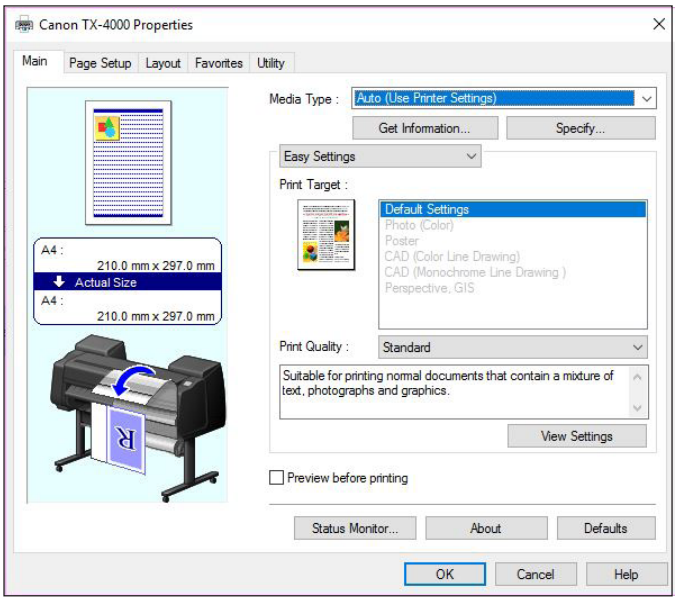
+ Both 64-bit and 32-bit versions of the Canon driver now include the Color imageRUNNER Enlargement Copy Mode utility, which enables users to integrate a Canon small-format MFP device with the TX-4000, whereby documents scanned at the MFP are automatically routed to a hot folder that is monitored by the TX-4000 driver. The image is then resized and printed, offering a fast, easy-to-use poster creation tool for office users. There is no equivalent functionality in the HP driver.

+ The Canon driver includes the Free Layout nesting tool (also available as a 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 the 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 the order jobs were sent or in 'optimized' layout order.

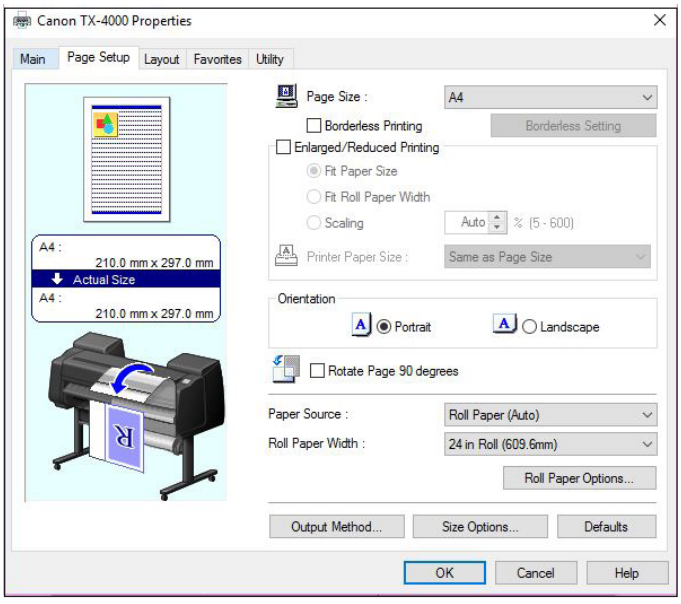
+ The Canon model also offers a plug-in for printing from Microsoft Office applications, which includes useful tools for automatic media resizing, nesting and borderless printing. HP offers no equivalent software.

+ Canon's Accounting Manager, accessed via the Status Monitor, offers comprehensive accounting management for all print jobs. Users enter the actual costs for individual inks and media types, and the cost per job is calculated automatically and displayed. For each job, the media type, area, ink used and total print time are listed, and more detailed cost and consumption information can be obtained by double-clicking on an individual job name or by highlighting a range of different jobs. Job cost information can then be saved in .CSV format and opened in Excel. There is no equivalent software supported by the HP model.

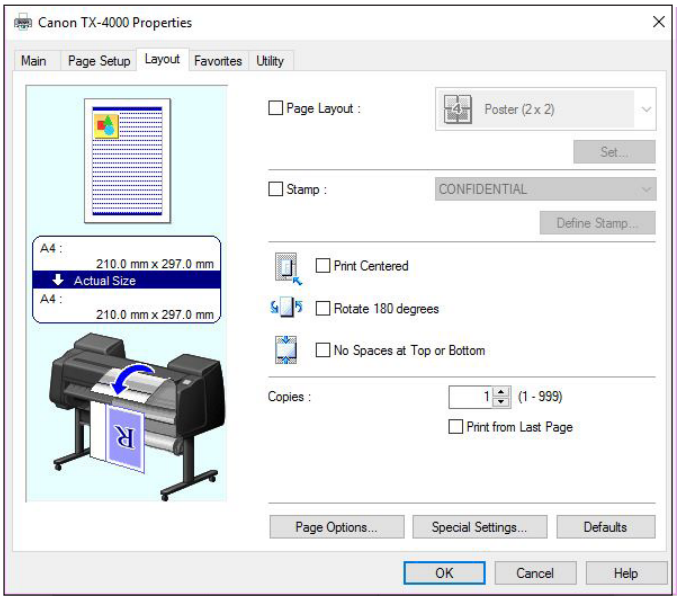
Test Models' Print Driver Screenshots



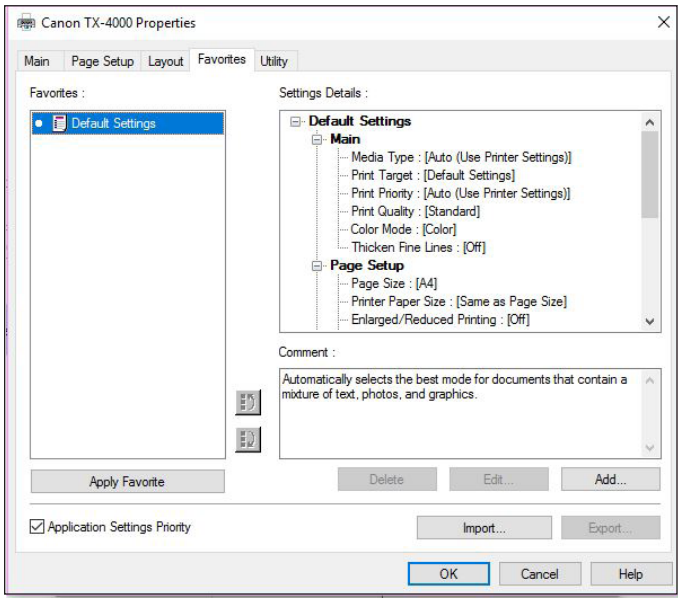
Canon imagePROGRAF TX-4000 Print Driver Main Tab



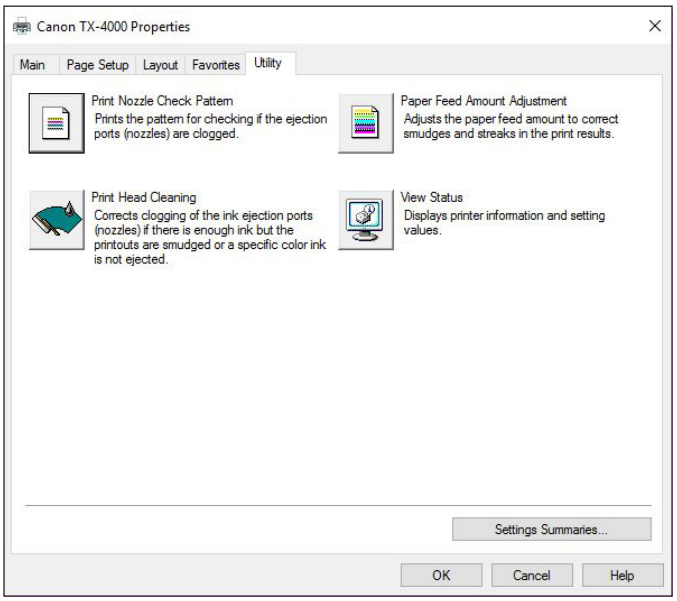
Canon imagePROGRAF TX-4000 Print Driver Page Setup Tab



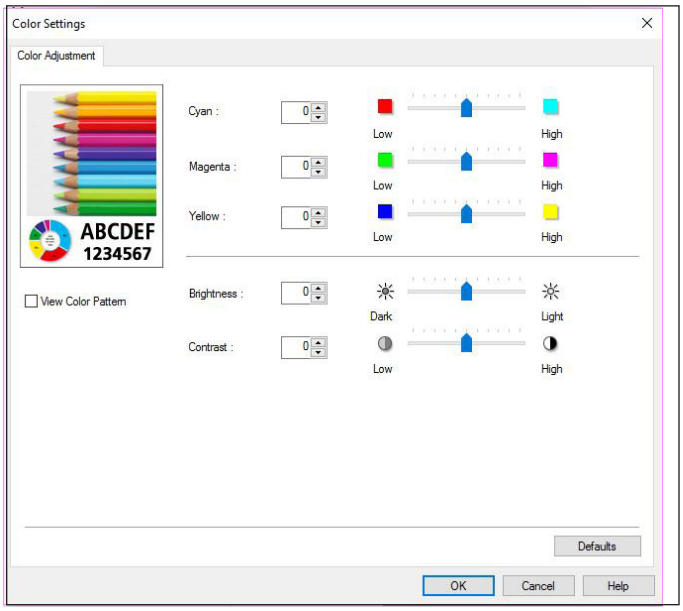
Canon imagePROGRAF TX-4000 Print Driver Layout Tab



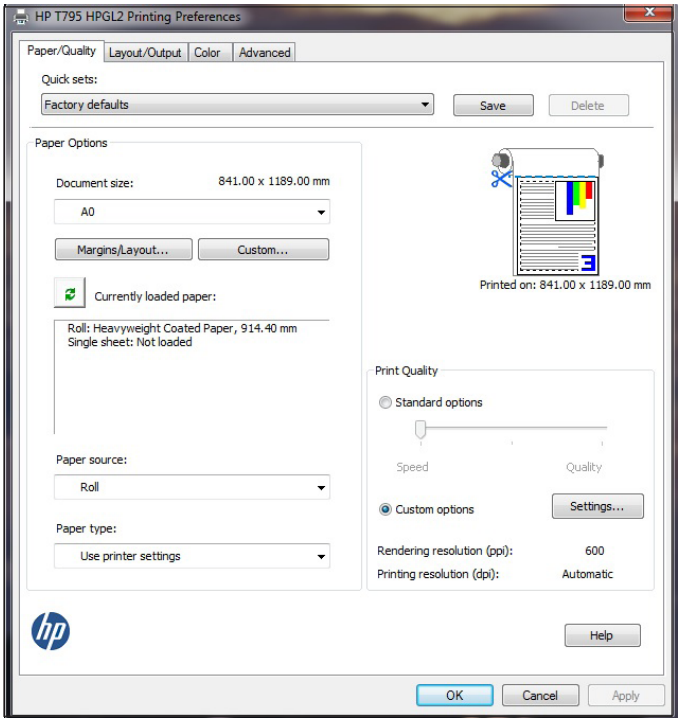
Canon imagePROGRAF TX-4000 Print Driver Favourites Tab



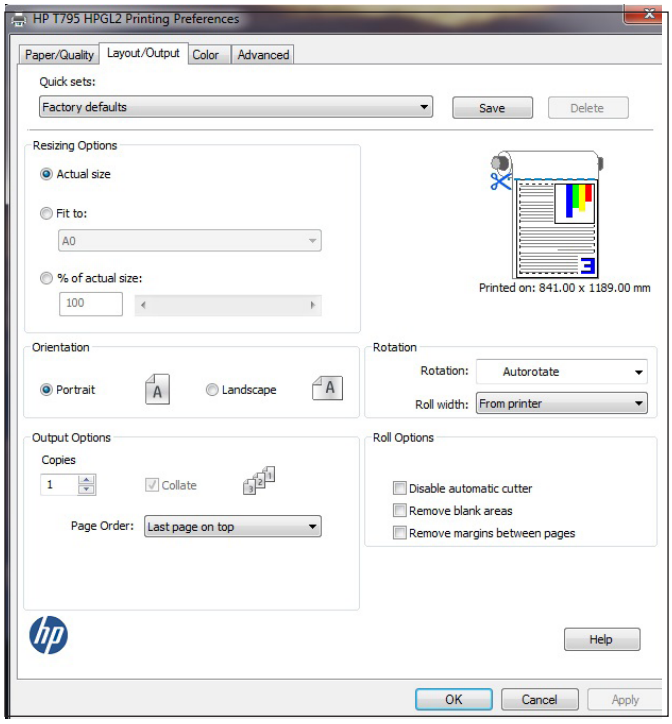
Canon imagePROGRAF TX-4000 Print Driver Utility Tab



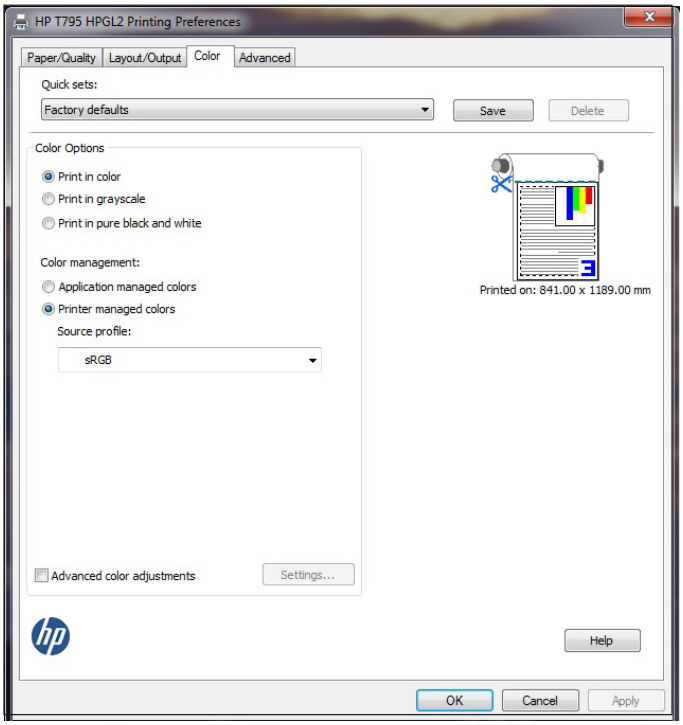
Canon imagePROGRAF TX-4000 Print Driver Colour Adjustment Tab



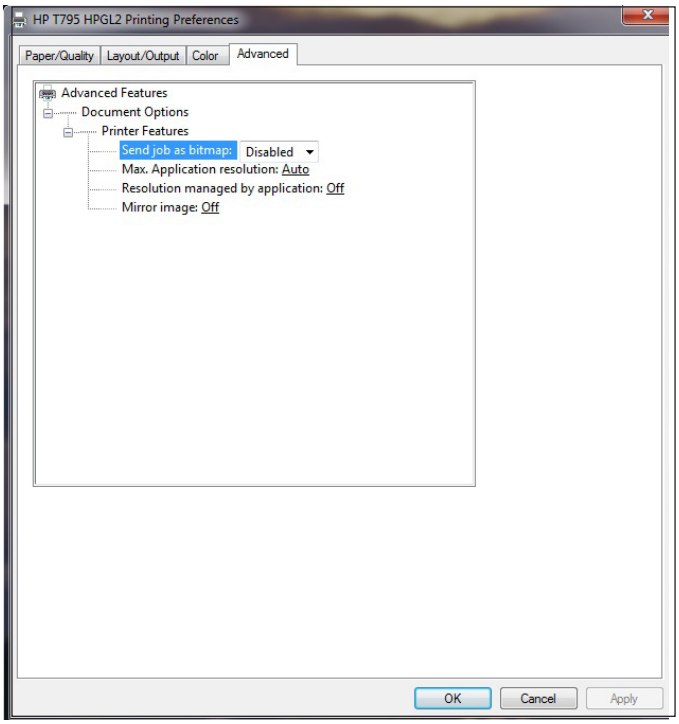
HP DesignJet T795 ePrinter Print Driver Paper/Quality Tab



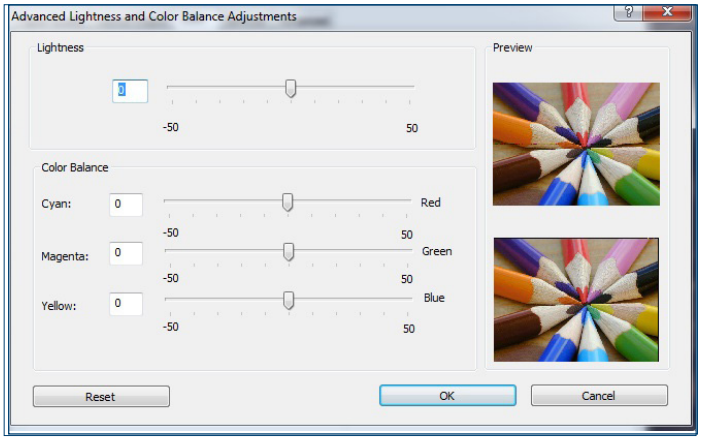
HP DesignJet T795 ePrinter Print Driver Layout/Output Tab



HP DesignJet T795 ePrinter Print Driver Colour Controls



HP DesignJet T795 ePrinter Print Driver Advanced Tab



HP DesignJet T795 ePrinter Print Driver Advanced Lightness and Colour Balance Adjustments

SUPPORTING TEST DATA

Print Productivity

Job Stream Productivity (in Seconds)

Mixed File Types, Same Size

Canon imagePROGRAF TX-4000		HP DesignJet T795 ePrinter	
Fast	593.83	Fast	1,082.09
Standard	914.85	Normal	1,893.16
High	1,844.69	Best	5,569.28

Buyers Lab's job stream consists of nine files, including PDF, TIFF and DWF files totalling 19 pages, all at Arch D-size, ensuring that the 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 44-inch rolls, with each file set to auto-rotate to save media.

Colour Productivity (in Seconds)

Canon imagePROGRAF TX-4000		HP DesignJet T795 ePrinter	
Fast	337.95	Fast	615.93
Standard	578.90	Normal	1,240.55
High	1,063.65	Best	3,703.38

The 12-page DWF test file was printed using the device driver set to the plain paper/colour setting. Both devices were loaded with 44-inch 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 (in Seconds)

Canon imagePROGRAF TX-4000		HP DesignJet T795 ePrinter	
Fast	347.76	Fast	606.06
Standard	581.16	Normal	1,218.97
High	1,069.90	Best	3,594.89

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 44-inch 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 (in Seconds)

	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
Time Before Printing Commences	58.10	62.65
First Page Out	89.35	146.78

First-Page-Out Productivity from Ready State (in Seconds)

	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
Time Before Printing Commences	21.95	16.31
First Page Out	45.59	98.81

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 44-inch rolls.

A0 First-Page-Out and Throughput Productivity (in Seconds)

	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
First Page Out	117.55	170.58
Five Pages Out	523.25	800.48

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 five pages of the test document to the collection bin.

Colour Image Quality

Colour Optical Density Evaluation

Canon imagePROGRAF TX-4000						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.41	0.87	0.49	1.03	0.51	1.07
Magenta	0.35	0.72	0.42	0.90	0.43	0.95
Yellow	0.32	0.71	0.38	0.86	0.40	0.91
Black	0.43	1.43	0.52	1.41	0.54	1.41

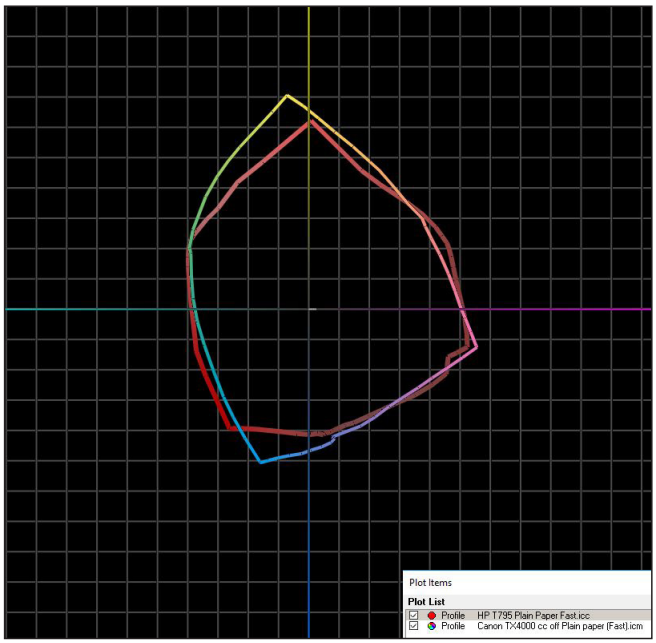
HP DesignJet T795 ePrinter						
	Fast		Normal		Best	
	50%	100%	50%	100%	50%	100%
Cyan	0.26	0.74	0.43	0.68	0.43	0.70
Magenta	0.46	0.92	0.49	0.93	0.50	0.98
Yellow	0.51	0.69	0.50	0.87	0.50	0.85
Black	0.58	1.54	0.62	1.52	0.60	1.48

Note: Colour density readings were assessed by printing a Buyers Lab 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 and XRite exact^{Xp} densitometer.

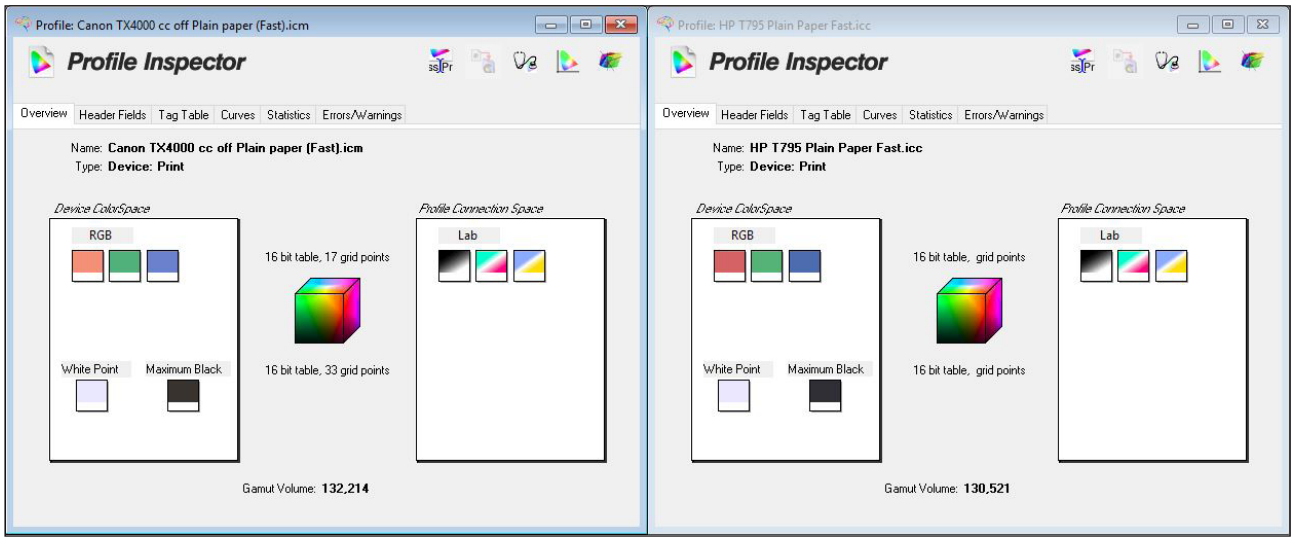
Colour Gamut Comparisons

Media Type/Settings	Canon imagePROGRAF TX-4000	HP DesignJet T795 ePrinter
Plain Paper Fast	132,214	130,521
Plain Paper Standard/Normal	201,752	166,227
Plain Paper High/Best	221,323	180,578
Matte Coated High/Best	410,918	285,263

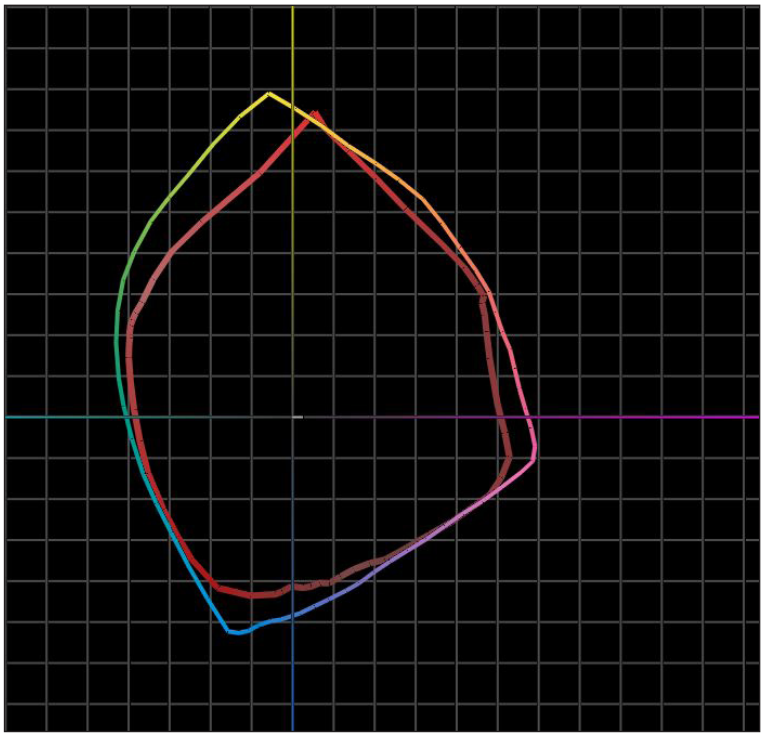
Colour Gamut Comparison



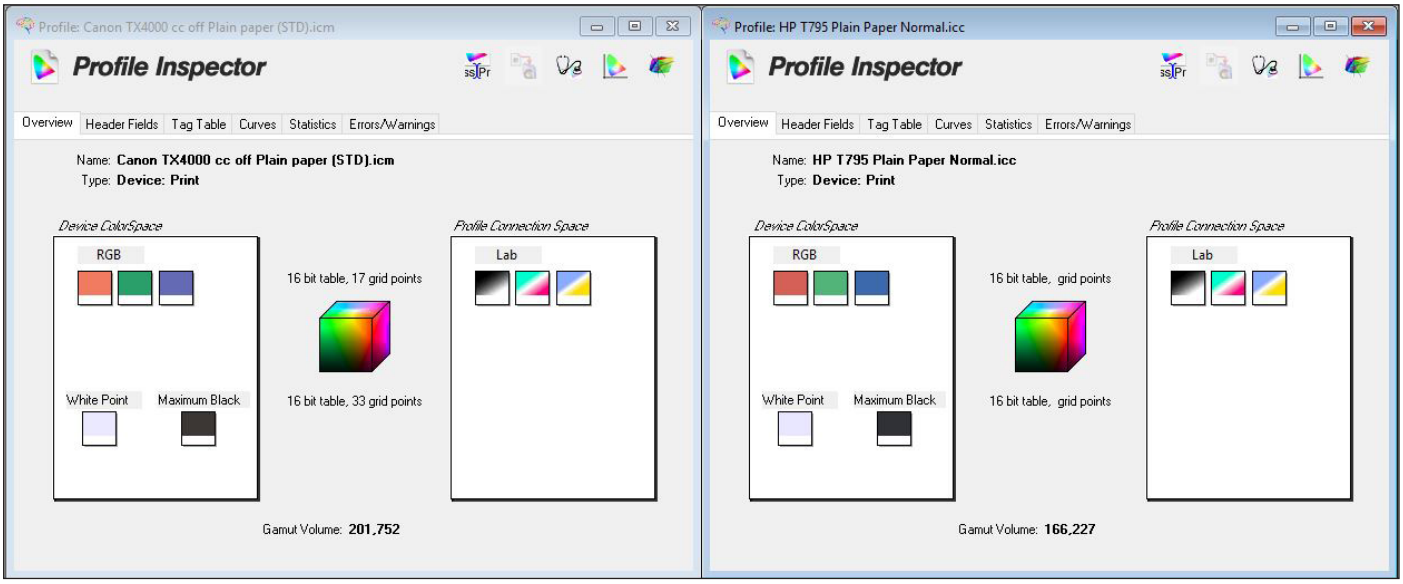
Canon imagePROGRAF TX-4000 colour gamut on plain paper in Fast settings (shown chromatically) versus HP DesignJet T795 ePrinter colour gamut (shown in red) on plain paper in Fast settings.



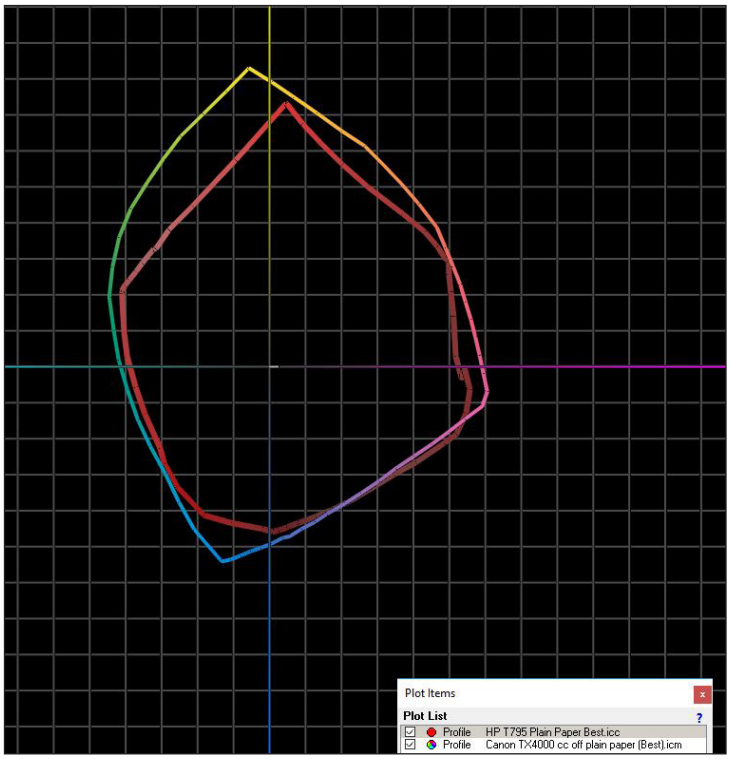
Colour gamut profile for Canon imagePROGRAF TX-4000 (left) and HP DesignJet T795 (right) on plain paper in Fast mode.



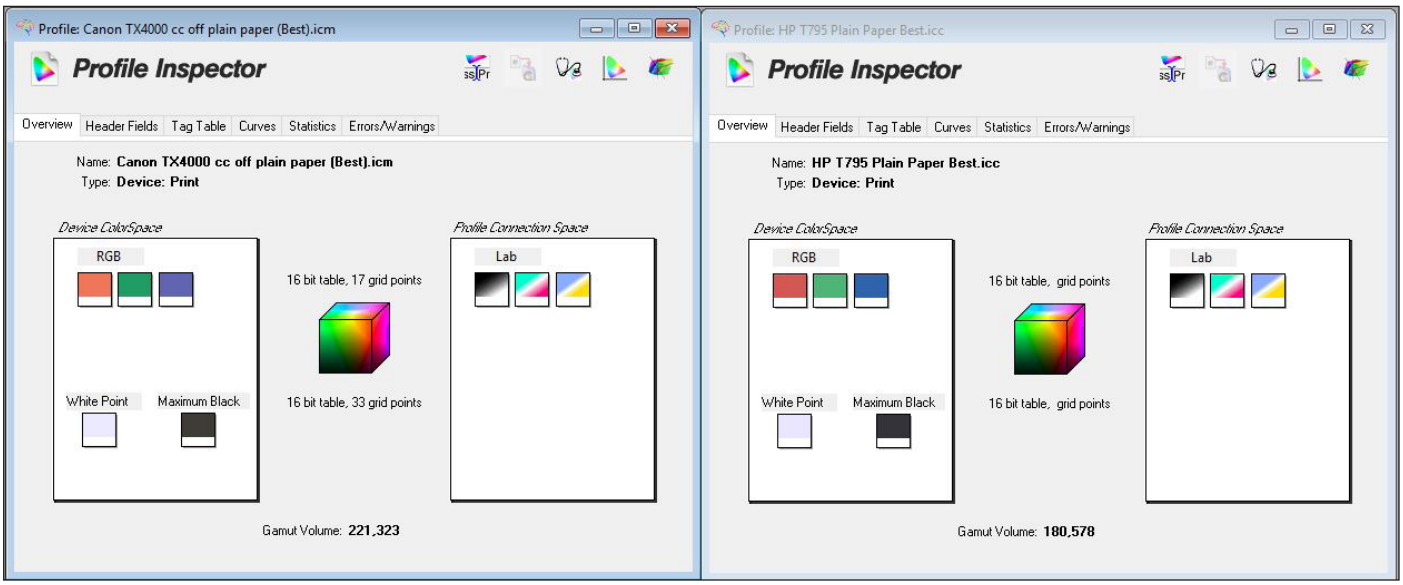
Canon imagePROGRAF TX-4000 colour gamut on plain paper in Standard settings (shown chromatically) versus HP DesignJet T795 ePrinter colour gamut (shown in red) on plain paper in Normal settings.



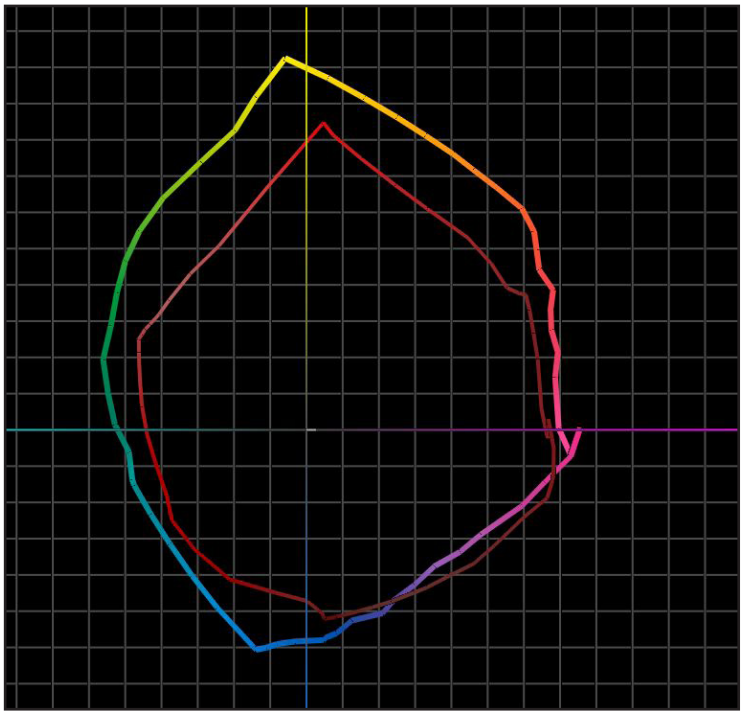
Colour gamut profile for Canon imagePROGRAF TX-4000 (left) and HP DesignJet T795 (right) on plain paper in Standard/Normal modes.



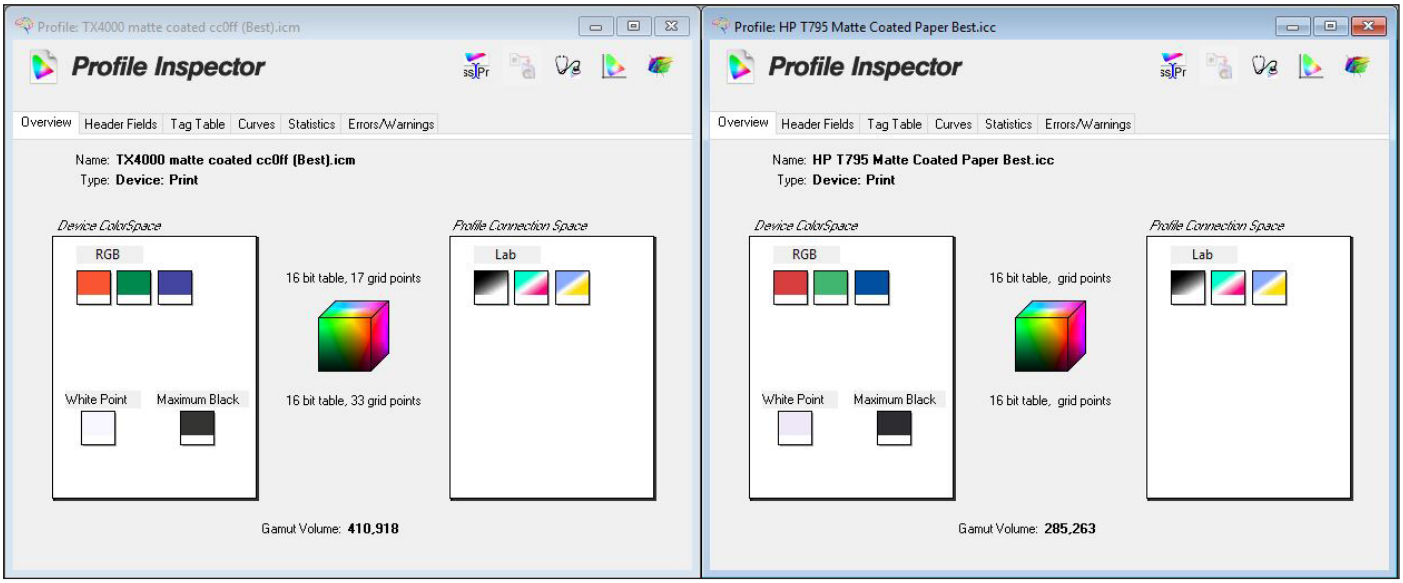
Canon imagePROGRAF TX-4000 colour gamut on plain paper in High settings (shown chromatically) versus HP DesignJet T795 ePrinter colour gamut (shown in red) on plain paper in Best settings.



Colour gamut profile for Canon imagePROGRAF TX-4000 (left) and HP DesignJet T795 (right) on plain paper in High/Best modes.



Canon imagePROGRAF TX-4000 colour gamut on matte coated paper in High quality settings (shown chromatically) versus HP DesignJet T795 ePrinter colour gamut (shown in red) on matte coated paper in Best settings.



Colour gamut profile for Canon imagePROGRAF TX-4000 (left) and HP DesignJet T795 (right) on matte coated paper in High/Best modes.

Black Print Quality

Black Optical Density Evaluation

	Canon imagePROGRAF TX-4000			HP DesignJet T795 ePrinter		
Density Block						
	Fast	Standard	High	Fast	Normal	Best
1	1.38	1.36	1.28	1.52	1.52	1.45
2	1.39	1.32	1.39	1.53	1.52	1.47
3	1.37	1.37	1.34	1.54	1.50	1.45
4	1.40	1.37	1.36	1.54	1.49	1.45

Note: Solid black density measurements are based on four readings taken from a Buyers Lab 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 and XRite exact^{Xp} densitometer.

Device Feature Set

	Canon imagePROGRAF TX-4000	Advantage		HP DesignJet T795 ePrinter
Max. image resolution	2400 x 1200 dpi			2400 x 1200 dpi
Number of inks	5		✔	6
Ink tanks replaceable during operation	Yes	✔		No
Ink-drop size	5 picoliter	✔		6 picoliter (C, G, M, pK); 9 picoliter (mK, Y)
Ink capacity out of the box	970 ml (330 ml MBk; 160 ml CMYK)	✔		269 ml (5 x 40 ml, 1 x 69 ml)
Ink cartridge capacity	160/330/700 ml (CMYK, MBk)	✔		69 ml/130 ml (C, G, M, Y, pK); 130/300 ml (mK)
Number of nozzles	MBk: 5,120 nozzles; other colours: 2,560 nozzles each; 15,360 nozzles in total	✔		6,336 in total (1,056 per colour)
Number of printheads	1 (User-replaceable)			3 (2 colours per printhead; user-replaceable)
Line accuracy	+/-0.1% or less			+/-0.1%
Minimum line width	0.02 mm			0.02 mm
Minimum print margins	3 mm			3 mm
Borderless (0 mm) printing	Yes (Roll only)	✔		No
Maximum outside diameter of roll paper	170 mm	✔		140 mm
Maximum printable paper roll length	18 m			INA
Maximum cut-sheet media length	1.6 m			INA
Maximum media thickness for roll paper	0.8 mm			0.8 mm
Maximum media width	44 inches			44 inches

	Canon imagePROGRAF TX-4000	Advantage		HP DesignJet T795 ePrinter
Media loading	Top and Front			Front
Roll media	Optional Multifunction Roll System (with auto Take Up)	✔		NA
Optional media handling	Roll holder set			Roll media adapter
Standard RAM	128 GB	✔		16 GB
Maximum RAM	128 GB	✔		16 GB
Hard drive Capacity	500-GB (Standard)	✔		160-GB (Optional)
Interface	10/100/1000Base-T/TX Ethernet, USB 2.0			1000Base-T Ethernet, USB 2.0
PDL	HP-GL/2, HP RTL			HP-GL/2, HP RTL, CALS G4, HP PCL3-GUI, URF, Optional Post-Script 3, Adobe PDF 1.7
Net weight (unpacked)	114 kg		✔	81.6 kg
Power consumption when in standby	INA			27 W
Power consumption when active	107 W	✔		120 W
Acoustic pressure	Operation: 51 dB (A) or less; Standby: 35 dB (A) or less		✔	Operation: 43 dB (A); Standby: 29 dB (A)
Acoustic power	INA			Operation: 6.1 Bels

INA – Information not available

Driver Feature Set

	Canon imagePROGRAF TX-4000	Advantage		HP DesignJet T795 ePrinter
Speed settings	5 (Fast 300, Standard 600, Fast 600, High 600 and 1200)	✔		3 (Fast, Normal and Best)
Economy mode	Yes			Yes
Predefined profiles	6 (Default, Photo (colour), Poster, CAD (colour line drawing), CAD (mono line drawing) and Perspective GIS)	✔		5 (Default, CAD, GIS, Photo and B/W Photo)
Overview of profile settings provided	Yes			Yes
Media profiles	53 + 10 user customizable special options	✔		34
IQ optimized for print profiles	Yes			Yes
Watermark	Yes	✔		No
Sharpen text	Yes			Yes (Max. Detail setting)
Thicken fine lines	Yes			Yes (Max. Detail setting)
Mirror image	Yes			Yes

	Canon imagePROGRAF TX-4000	Advantage		HP DesignJet T795 ePrinter
Multi-up printing	Yes, 2 to 16	✔		No
Poster print mode	Yes (2 by 2)	✔		No
Page stamping	Yes (Date, Time, Name, Page Number)	✔		Not supported
Image rotation	Yes, auto 180 degrees			Yes, 90 degrees
Option to preview before print	Yes	✔		No
CMYK balance adjustment	Yes (CMY)			Yes (CMY)
Brightness adjustment	Yes			Yes
Contrast adjustment	Yes			Yes
Saturation adjustment	No			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	✔		No
Disable automatic cutter	Yes			Yes
Unidirectional printing selection option	Yes	✔		No
Integration with MFP	Yes	✔		No

The Canon imagePROGRAF TX-4000 comes bundled with PosterArtist Lite.

Ink Consumption

Table 1: Amount of Ink in each Canon imagePROGRAF TX-4000 Cartridge (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Weight of cartridge prior to installation	952.9	777.6	805.8	786.2	785.2
Weight of cartridge at end of life	205.5	205.5	205.5	205.5	205.5
Net weight of ink	747.4	572.1	600.3	580.7	579.7
Total ink weight across five cartridges					3,080.2

Table 2: Amount of Ink in each HP DesignJet T795 ePrinter Cartridge (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Weight of cartridge prior to installation	191.4	193.3	194.7	192.9	191.4	191.9
Weight of cartridge at end of life	55.4	55.4	55.4	55.4	55.4	55.4
Net weight of ink	136.0	137.9	139.3	137.5	136.0	136.5
Total ink weight across six cartridges						823.2

Table 3: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Standard Mode) on the Canon imagePROGRAF TX-4000 (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Test Run 1 Net weight of ink used	16.0	3.1	3.8	4.3	2.2
Test Run 2 Net weight of ink used	16.6	3.3	4.7	4.4	3.0
Test Run 3 Net weight of ink used	14.9	3.5	3.9	3.5	1.8
Average amount of ink used across three runs	15.8	3.3	4.1	4.1	2.3
Total ink weight across five cartridges					29.6

Table 4: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document (Normal Mode) on the HP DesignJet T795 ePrinter (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1 Net weight of ink used	0.5	6.3	24.1	1.8	3.2	8.0
Test Run 2 Net weight of ink used	0.5	6.5	25.0	1.8	3.4	8.1
Test Run 3 Net weight of ink used	0.6	6.4	24.9	1.7	3.3	8.0
Average amount of ink used across three runs	0.5	6.4	24.7	1.8	3.3	8.0
Total ink weight across six cartridges for 50-page run (based on averages)						44.7

Table 5: Ink Used in Three 50-Page Runs of ISO Poster Test Document (Standard Mode) on the Canon imagePROGRAF TX-4000 (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Test Run 1 Net weight of ink used	20.5	2.6	2.0	21.5	33.1
Test Run 2 Net weight of ink used	19.5	3.8	5.1	27.3	27.2
Test Run 3 Net weight of ink used	18.9	3.0	3.1	25.6	31.9
Average amount of ink used across three runs	19.6	3.1	3.4	24.8	30.7
Total ink weight across five cartridges					81.6

Table 6: Ink Used in Three 50-Page Runs of ISO Poster Test Document (Normal Mode) on the HP DesignJet T795 ePrinter (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1 Net weight of ink used	3.8	9.1	9.8	7.1	19.5	52.9
Test Run 2 Net weight of ink used	4.0	9.2	10.2	7.4	20.1	54.3
Test Run 3 Net weight of ink used	4.1	9.3	10.2	7.4	20.0	53.9
Average amount of ink used across three runs	4.0	9.2	10.1	7.3	19.9	53.7
Total ink weight across six cartridges for 50-page run (based on averages)						104.2

Table 7: Ink Used in Three 50-Page Runs of GIS Map Test Document (Standard Mode) on the Canon imagePROGRAF TX-4000 (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Test Run 1 Net weight of ink used	25.0	3.4	14.2	15.9	24.8
Test Run 2 Net weight of ink used	24.8	3.7	13.4	16.9	23.8
Test Run 3 Net weight of ink used	24.0	3.5	13.3	16.3	25.5
Average amount of ink used across three runs	24.6	3.5	13.6	16.4	24.7
Total ink weight across five cartridges					82.8

Table 8: Ink Used in Three 50-page Runs of GIS Map Test Document (Normal Mode) on the HP DesignJet T795 ePrinter (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1 Net weight of ink used	44.8	5.3	6.6	21.1	13.0	28.1
Test Run 2 Net weight of ink used	42.7	4.6	6.4	20.0	12.3	31.9
Test Run 3 Net weight of ink used	42.5	4.4	6.2	19.7	12.2	31.5
Average amount of ink used across three runs	43.3	4.8	6.4	20.3	12.5	30.5
Total ink weight across six cartridges for 50-page run (based on averages)						117.8

Ink Consumption Test Methodology Overview

Buyers Lab's ink consumption analysis was conducted using three document types (Cottage Architectural Plan, ISO 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 A0.

The Canon imagePROGRAF TX-4000 was installed in Buyers Lab's lab with the latest "01.10" level of firmware (as of October 2017) and connected to a Windows 10 workstation using a 1000BaseT TCP/IP connection. The Canon imagePROGRAF Printer Driver was used for all testing 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 T795 ePrinter was installed in Buyers Lab's lab with the latest IG_07_00_00.3 level of firmware and connected to a Windows 7 workstation using a 1000BaseT TCP/IP connection. The HP-GL/2 driver was used for all testing, 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 CAD with quality set to Normal. For the ISO Poster, print priority settings were set to Poster with quality set to Normal, and for the GIS map print priority settings were set to Perspective GIS with quality set to Normal.

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.

Test Environment

Products were tested in BLI's environmentally controlled UK test lab, which replicates typical office conditions.

Test Equipment

BLI's dedicated test network, consisting of Windows 2008 and Microsoft Exchange servers, Windows 10 workstations, 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 XRite i1 profile software and an i1 Pro colour spectrophotometer, and analysed using XRite i1i0 Advanced Scanning Table. Density of black and colour output was measured using XRite 508 and XRite exact^{Xp} densitometers.

About Keypoint Intelligence - Buyers Lab

Keypoint Intelligence is a one-stop shop for the digital imaging industry. With our unparalleled tools and unmatched depth of knowledge, we cut through the noise of data to offer clients the unbiased insights and responsive tools they need in those mission-critical moments that define their products and empower their sales.

For over 50 years, Buyers Lab has been the global document imaging industry's resource for unbiased and reliable information, test data, and competitive selling tools. What started out as a consumer-based publication about office equipment has become an all-encompassing industry resource. Buyers Lab evolves in tandem with the ever-changing landscape of document imaging solutions, constantly updating our methods, expanding our offerings, and tracking cutting-edge developments.

For more information, please call David Sweetnam at +44 (0) 118 977 2000 or email him at david.sweetnam@keypointintelligence.com