Enero de 2025

Evaluación comparativa de grandes formatos: Comparativa de la Canon imagePROGRAF TX-3200 con la HP DesignJet T1600dr

Objetivo de la prueba

Canon Europa encargó a Keypoint Intelligence la realización de unas pruebas de rendimiento con carácter confidencial en los equipos Canon imagePROGRAF TX-3200 de 36 pulgadas (probado en configuración de doble bobina) y HP DesignJet T1600dr. Keypoint redactará un informe comparativo destacando los puntos fuertes y débiles de los dos productos en las áreas de calidad de imagen, productividad, impresión de carteles y pancartas, impresión directa, características del dispositivo, funcionalidad del controlador y consumo de tinta. Todas las pruebas se realizarán en las instalaciones que Keypoint Intelligence utiliza a tal efecto en Wokingham (Reino Unido).

Resumen

Categoría	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Calidad de imagen	✓	
Productividad de impresión	✓	
Impresión de pancarta	✓	
Impresión de póster	✓	
Impresión directa	=	=
Consumo de tinta	✓	
Características del dispositivo	✓	
Características del controlador de impresión	✓	

✓ indica una ventaja del modelo en cuestión; = indica un rendimiento equiparable.

La Canon imagePROGRAF TX-3200 mostró un rendimiento notable en las áreas de productividad, eficiencia en el uso de la tinta y calidad de imagen en color. Aunque el modelo HP registró una mayor velocidad en secuencias de trabajo dobles e impresión de carteles en el modo Rápido, la Canon TX-3200 se impuso en todas las demás pruebas de productividad. El diseño del depósito de tinta de cambio en caliente de la TX-3200 contribuye a mejorar la disponibilidad y garantiza un funcionamiento ininterrumpido, una prestación no disponible en la unidad HP. Los dos modelos admiten apiladores de alta capacidad que pueden mantener 100 hojas perfectamente alineadas. El apilador de la HP incorpora un sensor automático para poner en pausa las operaciones cuando está lleno, mientras que el apilador de Canon permite retirar fácilmente los materiales para el acabado fuera de línea. El sistema de bobina de Canon actúa también como unidad de alimentación automática, lo que permite gestionar de forma eficiente volúmenes de trabajo elevados. La función de impresión unidireccional de la unidad Canon elimina los efectos de banda, incluso en el modo rápido, mientras que sus funciones de impresión sin bordes en todo tipo de materiales en bobina y anidamiento flexible permiten controlar mejor la colocación de las imágenes y el ahorro de papel. El anidamiento también está disponible en la unidad HP, aunque sin tanta flexibilidad y con menos control sobre la colocación de las imágenes.

En cuanto a la calidad de impresión, ambos cumplen con las expectativas de los clientes de los mercados de arquitectura, ingeniería y construcción (AEC), de diseño asistido por ordenador (CAD) y de sistemas de información geográfica (GIS). Sin embargo, la Canon TX-3200 destacó por unos colores más vivos, una mayor profundidad de campo y unos tonos de piel naturales, así como unas líneas finas y textos más nítidos. También consiguió reproducir unas densidades ópticas superiores y unas gamas de colores más amplias en materiales estucados normales y mate. Los dos modelos ofrecen potentes soluciones de software y herramientas de envío directo de impresiones y son compatibles con la impresión desde dispositivos móviles, lo que ofrece unos grandes niveles de flexibilidad y productividad a los usuarios estén donde estén. Además, los embalajes de la Canon TX-3200 no utilizan poliestireno, lo que minimiza los desperdicios y refuerza su compromiso ambiental. En cuanto a consumo de tinta, el modelo de Canon fue el más eficiente en dos de los tres escenarios de prueba.

Con una calidad de imagen superior, una productividad más elevada y unas características del dispositivo y el controlador más completas, la Canon TX-3200 se impuso en global en esta evaluación.

Image Quality

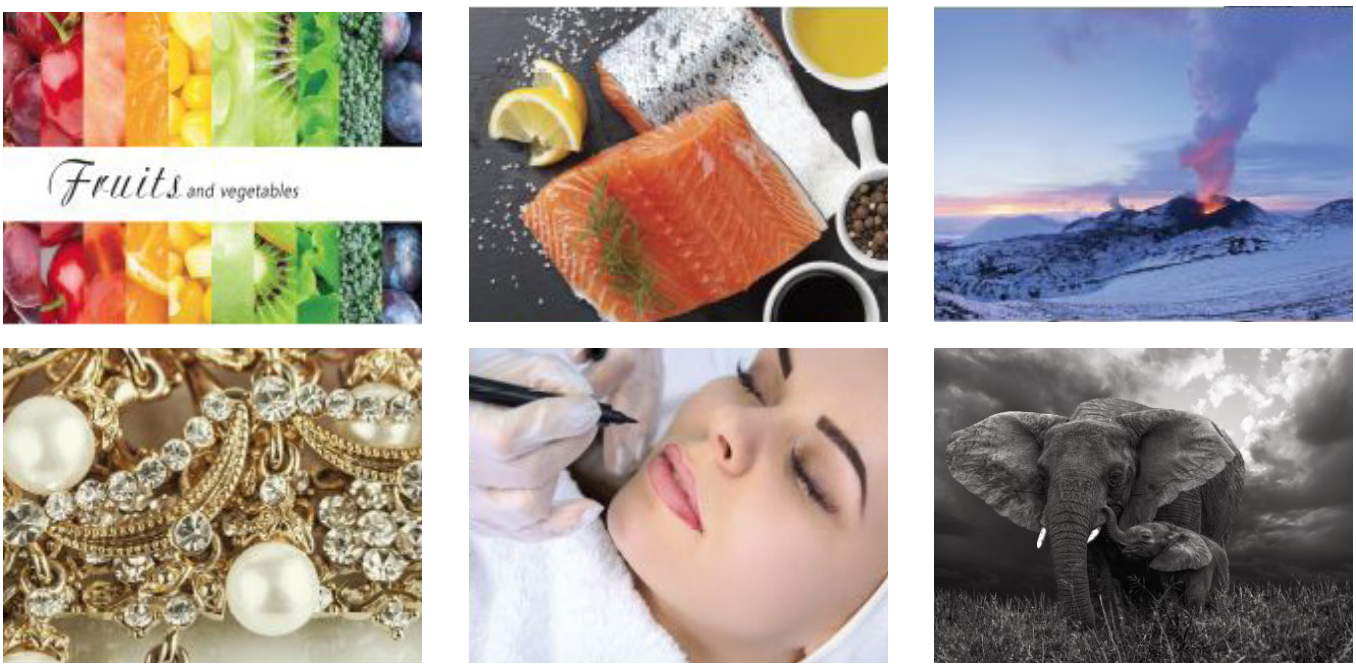
Category	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Text	✓	
Fine Lines	✓	
Halftone Range	=	=
Halftone Fill	=	=
Solid Density	✓	
AEC Graphics	✓	
GIS Graphics	=	=
Colour Photographic Images	✓	
Monochrome Photographic Images		✓
Colour Gamut (Fast)	✓	
Colour Gamut (Standard/Normal)	✓	
Colour Gamut (High/Best)	✓	
Colour Gamut (Matte Coated Paper, High/Best)	✓	

✓ denotes a model advantage; = denotes parity in performance. Image quality testing was conducted using Canon Standard Plain Paper 2 and HP Universal Bond.

- The Canon TX-3200 outperformed in black and colour optical density on plain paper across all modes compared to the HP T1600dr.
- On plain paper, the Canon TX-3200 consistently delivered a larger colour gamut compared to the HP T1600dr. It achieved an 88.1% larger gamut volume in Fast mode (190,057 vs. 101,018), 114.0% larger gamut in Standard/Normal mode (313.650 vs. 146,581), and 108.6% larger gamut in High/Best settings (318,110 vs. 152,492).
- On matte coated paper in highest quality settings, the Canon model delivered a slightly larger colour gamut than that of the HP T1600dr (387,435 vs. 370,075).
- The Canon TX-3200 consistently excelled in print quality tests across text, fine lines, circles, and grids. It produced clean, crisp text legible down to 3-pt. in all modes, with no bleed. The HP T1600dr delivered legible 3-pt. and 4.pt. text with minor ink bleed in Fast and Normal modes; text was bold and distinct in Best

mode. Canon's 0.1-pt. fine lines and circles were slender and clean in all modes, while the HP's fine lines exhibited slight bleed in Fast mode but were smooth and bold in Normal and Best. HP's circles were bold overall and slightly jagged in Fast (with no distinction between 0.1-pt. and 0.25-pt. thickness) and Normal modes, but much smoother in Best mode. Canon delivered consistent, well-formed 1x1 pixel grids in CMYK across all modes; HP's grids were intact but dot formation was poor in Fast mode though more distinct and well-formed in Normal and Best quality modes.

- Both devices delivered very good, consistently smooth colour and greyscale halftone output across the full range—from the 10% to 100% dot-fill levels—in all modes with distinct transitions between all levels.
- AEC graphics output from both devices showed excellent detail in all modes. Under magnification, Canon's output was dark and clean in Standard and High, while there was slight ink bleed visible in Fast mode. HP's output was bolder and displayed slight ink bleed when viewed under magnification.
- GIS graphics in Standard/Normal and High/Best modes on plain paper were reproduced to a very high standard on both units, with excellent detailing and depth of field—a critical factor in delivering a realistic three-dimensional rendering of topographical features. The Canon produced very good standout labelling in red.
- The Canon TX-3200's photographic images exhibited bright, punchy colours, very good detailing and contrast, and smooth tonal transitions. Metallics in Fast mode lacked depth and jewellery appeared less 'premium', but both improved in Standard and High modes. Skin tones were warm and natural looking, overall, with a slight magenta bias in High. In contrast, images produced on the HP T1600dr lacked vibrancy and appeared flat in all modes, while tonal gradations were slightly grainy in Fast and Normal modes. Skin tones produced by the HP model were slightly magenta in Fast, and pale and lacked contrast in Normal and Best quality modes.
- Both models produced greyscale photographic images that were smooth and exhibited neutral grey tones. At the higher quality levels, Canon's output was overly dark and as a consequence exhibited some loss of detail in dark contrast areas.
- The Canon TX-3200's image quality was judged superior due the crisp and distinct text and fine lines, vibrant colours, and natural-looking skin tones. It also produced larger colour gamuts and higher optical densities. The HP unit produced consistent high quality greyscale images but its output on plain paper suffered from slight ink bleed (under magnification) and it could not match the Canon's bright and vibrant colours in photographic images.



Keypoint Intelligence's Colour and Greyscale Halftone Test Targets

Print Productivity

Category	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
First Page Out from Weekend Non-Use	✓	
First Page Out from Ready State	✓	
Throughput Speed (Fast)	=	=
Throughput Speed (Standard/Normal)	✓	
Throughput Speed (High/Best)	✓	
Job Stream	✓	
Dual-Roll Job Stream		✓
A0 Throughput Speed (Standard/Normal)	✓	

✓ denotes a model advantage; = denotes parity in performance.

- After a weekend of non-use, the Canon TX-3200's first page out result was 58.4% faster than that of the HP model (64.73 seconds versus 155.61 seconds). Start-up time before printing began was also faster at 43.02 seconds, compared with 92.50 seconds for the HP unit.
- The Canon device delivered a 68.3% faster first-page-out time of 29.95 seconds from its ready state, compared with 94.60 seconds for the HP T1600dr. Its start-up time before printing commenced was faster, too—9.91 seconds compared with 30.06 seconds for the HP model.
- In Keypoint Intelligence's job stream test, designed to simulate a typical mixed workflow for a large-format unit, the Canon TX-3200 was slightly slower (4.5%) than the HP T1600dr in Fast mode, but 55.5% faster in Standard/Normal mode, and 57.1% faster in High/Best mode.
- As both models offer a dual-roll design, a further job stream test was conducted. This involved sending the same files as alternate jobs to different rolls so to test both models' efficiency when switching between rolls. The Canon TX-3200 was 17.3% slower than the HP unit in Fast mode.
- In the 12-page colour DWF test, the Canon model was faster than the HP unit in two modes tested; it was 39.2% faster in Standard/Normal mode, and 58.9% faster in High/Best mode. In Fast mode, results were comparable.
- When printing the 12-page DWF test file in monochrome, the Canon TX-3200 was 3.0% faster in Fast mode; 38.5% faster in Standard/Normal mode and 58.8% faster in High/Best mode than the HP device.
- In the single-page A0-size test conducted in Standard/Normal, the Canon's first-page-out time of 85.50 seconds was 38.6% faster than that of the HP (139.32 seconds). It was also 40% faster at printing five A0-size pages (389.88 seconds versus 649.52 seconds for the HP).

Banner Printing

Category	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Image Quality	=	=
Productivity (Fast)	✓	

✓ denotes a model advantage; = denotes parity in performance.

- The Canon TX-3200 took 5.96 seconds to generate a preview at the desktop, with an additional print time of 1:51.21 from preview to final paper cut. The HP T1600dr took 15.08 seconds to create a preview and a further 1:59.26 to print the banner in full. Both models printed the entire image without any quality issues.

Keypoint Intelligence's 106" x 36" Banner Test Target (4,955-KB PDF)

Poster Printing

Category	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Image Quality	✓	
Productivity (Fast)		✓
Productivity (Standard/Normal)	✓	
Productivity (High/Best)	✓	

✓ denotes a model advantage; = denotes parity in performance.

- When printing the A1-sized Poster test target in Fast mode at 300 dpi, the Canon TX-3200 took 31.23 seconds to complete the job, while the HP T1600dr took 22.15 seconds.
- Banding was evident on output printed in Fast mode by both models (across the whole image with the HP unit, but only in dark areas with the Canon model). When unidirectional printing was selected in the Canon print driver (not available on the HP unit), banding was eliminated with a print time of 41.50 seconds.
- The Canon model took 45.23 seconds to print the poster in 600 dpi Standard mode, besting the HP unit's time of 1:04.54 in Normal mode. Canon's poster showed no banding, while HP's poster exhibited minimal banding in dark areas.
- In High/Best mode, the Canon model took 1:34.45, 42.8% faster than the HP unit's 2:45.21 result. As expected at the highest quality mode, there was no observable banding on output from both models.

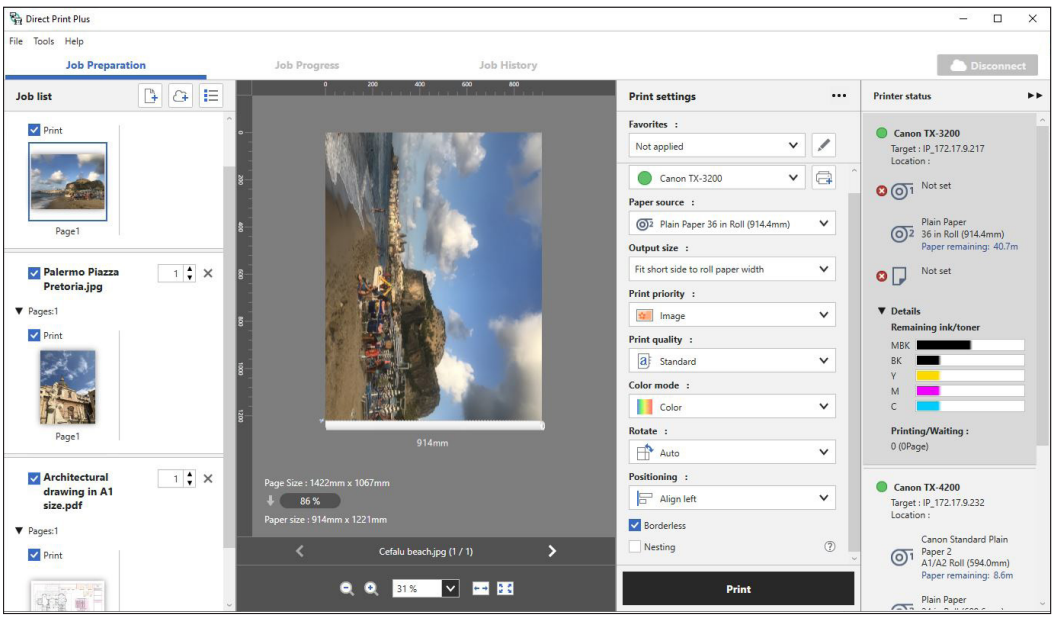
Keypoint Intelligence's A1 Poster Test Target

Direct Print Submission

Category	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Direct Print Submission	=	=
Mobile App Integration	=	=

✓ denotes a model advantage; = denotes parity in performance.

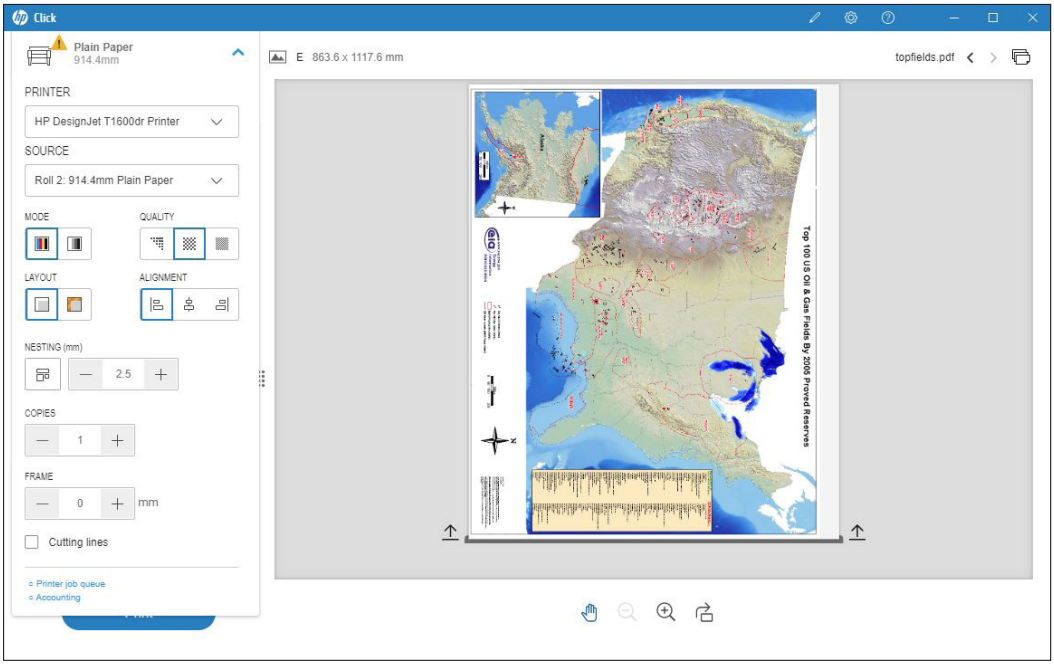
- Canon's Direct Print Plus, powered by a proprietary PDF engine, simplifies PDF file processing and printing with its intuitive interface. The Job Preparation tab, which serves as the home screen, provides quick access to job settings, previews, and printer status information, removing the need to rely on the Status Monitor. Bidirectional communication with the printer minimizes the risk of media mismatches, while built-in cloud integration lets users access files directly from services like Dropbox, OneDrive, Google Drive, and Box for added convenience.
- Direct Print Plus supports direct printing of PDF, JPEG, TIFF, and HPGL/2 files without requiring native applications or print drivers. Users can reprint jobs with the same settings as the original print, and the Job Progress tab provides real-time visibility into the number of pages printed, improving operator oversight. Additionally, the utility links with Canon Accounting Manager to help users track project costs efficiently.
- Shortcut Print functionality allows users to create customizable desktop shortcuts. These shortcuts enable drag-and-drop file printing with predefined settings, mimicking a hot folder workflow. Multiple shortcuts can be created, each tailored to specific workflows, making repetitive tasks faster and more consistent.



Direct Print Plus

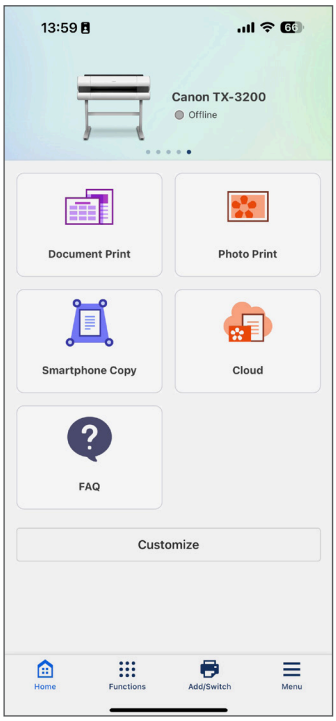
- HP Click printing software, available as a free download, offers direct printing of PDF, JPEG, TIFF, and HPGL/2 files from the desktop without requiring native applications or print drivers. It provides basic print settings, along with options to preview, resize, and align images, as well as automatic nesting to minimize waste

(although it lacks the precise job positioning controls found in Canon's tool). For printer and consumable status, users can click the 'Accounting' link, which opens the device's embedded web utility for detailed information.

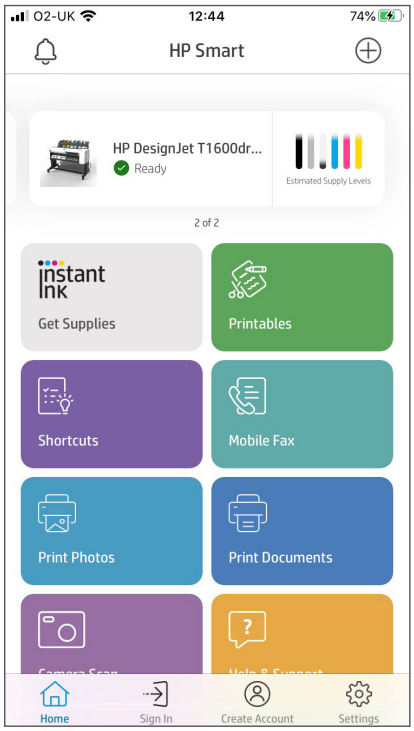


HP Click

- Both Canon PRINT and HP Smart mobile print apps enable wireless printing to compatible large-format printers on the same WiFi network. With clean interfaces, extensive print settings, and integration with cloud storage services like Dropbox, Box, and Google Drive, both apps streamline mobile printing. Canon Android users need the Canon Print Service app for device compatibility, while HP Smart supports both iOS and Android.
- Both models support mobile printing via AirPrint for added convenience.
- The HP T1600dr's ePrint functionality enables users to send print jobs remotely by email from a workstation or mobile device, supporting PDF, TIFF, and JPEG files up to 10 MB in size.



Canon PRINT Mobile Print App



HP Smart Mobile Print App

Ink Consumption

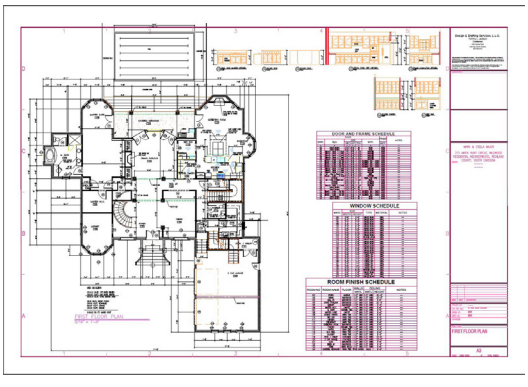
Keypoint Intelligence technicians noted that the inherent variability of inkjet technology—such as unpredictable head flushing and calibration routines—can lead to differing test results at different times. While every effort is made to ensure fair and consistent testing, the results should be seen as indicative of likely performance rather than a precise prediction of actual ink consumption in real-world conditions.

Overall Weight of Ink Used (in Grams)

Document Type	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Cottage Architectural Plan	52.6	36.8
ISO Office Poster	111.1	125.1
GIS Map	61.5	114.8

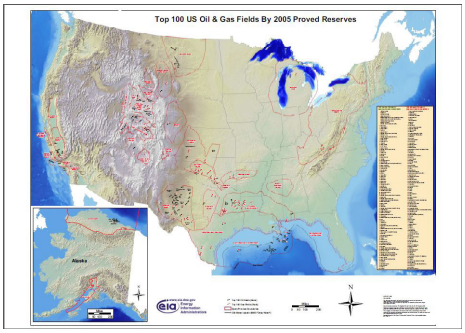
✓ denotes a model advantage; = denotes parity in performance. Results are averaged across three sets of 50-page A0 prints in Standard/Normal mode.

- The Canon TX-3200 device used 42.9% more ink than the HP T1600dr when printing a Cottage Architectural Plan test target on plain media. This translates to the Canon device using 1.4% of its total available ink, while the HP model used 2.1%.
- In the ISO Poster test conducted on matte coated media, the Canon unit used 11.2% less ink compared with the HP device. In this print scenario, the Canon TX-3200 used 3.0% of its total available ink, while the HP model used 7.2%.
- In the GIS Map ink consumption test conducted on matte coated media, the Canon TX-3200 used 46.4% less ink compared with the HP device; it used 1.7% of its total available ink, while the HP model used 6.6%.



Cottage Architectural Plan

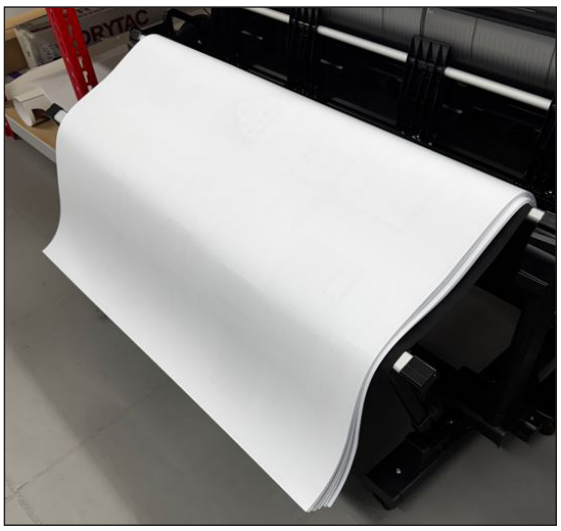
ISO Office Poster



GIS Map

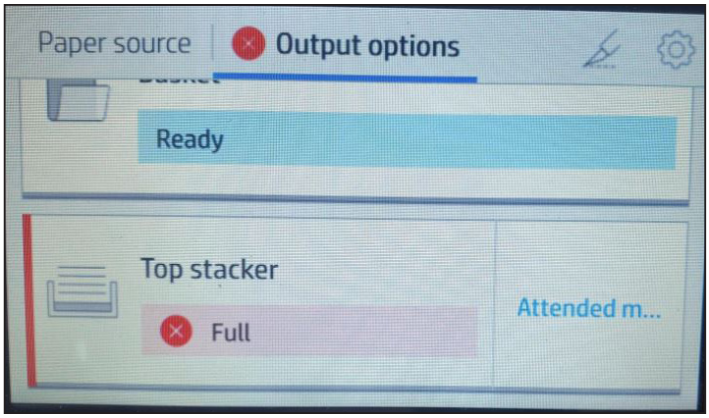
Device Feature Set

- The Canon TX-3200 has a total starter cartridge capacity of 970 ml (compared to the HP T1600dr's 240 ml) and offers 160/330/700 ml capacity cartridges versus the HP's 130 ml and 300 ml—reducing replacement frequency. Additionally, Canon's cartridges can be replaced during operation, minimizing downtime, a feature not available with the HP device.
- The Canon TX-3200 features a fast, user-friendly media loading process with a smart roll paper set function that automates feeding after securing the roll. A proximity sensor detects the paper edge and enables the printer to complete the loading process, with minimal user input. Built-in sensors identify paper characteristics like type and thickness, saving settings for future use, though first-time media use may require the operator to select the type on the control panel. Similarly, the HP device automates alignment and width adjustments once paper is loaded, eliminating further user intervention.
- Both models offer an optional dual-roll design for added convenience, allowing users to switch between media types or sizes without reloading. The Canon TX-3200's system doubles as an auto Take-up Roll unit with bi-directional rewind, a useful feature for high-volume production, enabling multiple prints to be stored on a single roll—an option not available on the HP device.
- The Canon TX-3200 supports front media loading, though the stacker (if attached) must be removed for roll access. In contrast, the HP device requires top-rear or back loading, necessitating sufficient space behind the unit to prevent paper advance issues. Some HP models include wall spacers to ensure proper clearance.
- The Canon printer features dual sensors that measure, estimate, and display the remaining roll length on its touchscreen. This feature eliminates barcode printing and reading for partially used rolls, and alerts operators if there's insufficient media to complete a job, reducing the risk of unexpected runouts. The HP model supports paper tracking capabilities with the remaining roll length, media type, and barcode printed on the partially used roll's edge before its removal from the device.
- The Canon TX-3200 supports borderless printing on all roll media types, a feature not available on the HP model. It handles roll diameters of 170 mm, a maximum 1.6 m printable cut sheet media length, and up to 0.8 mm media thickness while the HP T1600dr handles 135 mm in roll diameter, 1.219 m printable cut sheet media length, and up to 0.5 mm media thickness.
- Both models come with a simple catch bin/basket to collect output from media rolls. Canon's catch basket can be arranged in different positions to suit the type of paper and quantity being produced, and whether the roll unit is employed.
- The Canon TX-3200 supports a high-capacity stacker, collating up to 100 A0- or A1-sized CAD prints (mixed size prints cannot be accommodated). It easy to attach by wheeling it into place but operators must remove the stacker assembly to access the front-loading roll mechanism. The HP T1600dr's rear-mounted stacker is compact and accommodates 100 prints which can be of mixed size originals.



Keypoint Intelligence technicians noted the Canon TX-3200's stacker assembly at the front of the device successfully held 100 printed A0 (left) and A1 (right) sheets in good, neat alignment. For added convenience, the stacker can be detached and wheeled away with the sheets held in place ready for offline finishing.

The HP T1600dr's rear mounted stacker holds printed sheets in perfect alignment. A1 printouts hang over the edge but as they are held firmly in place, there were no issues experienced.



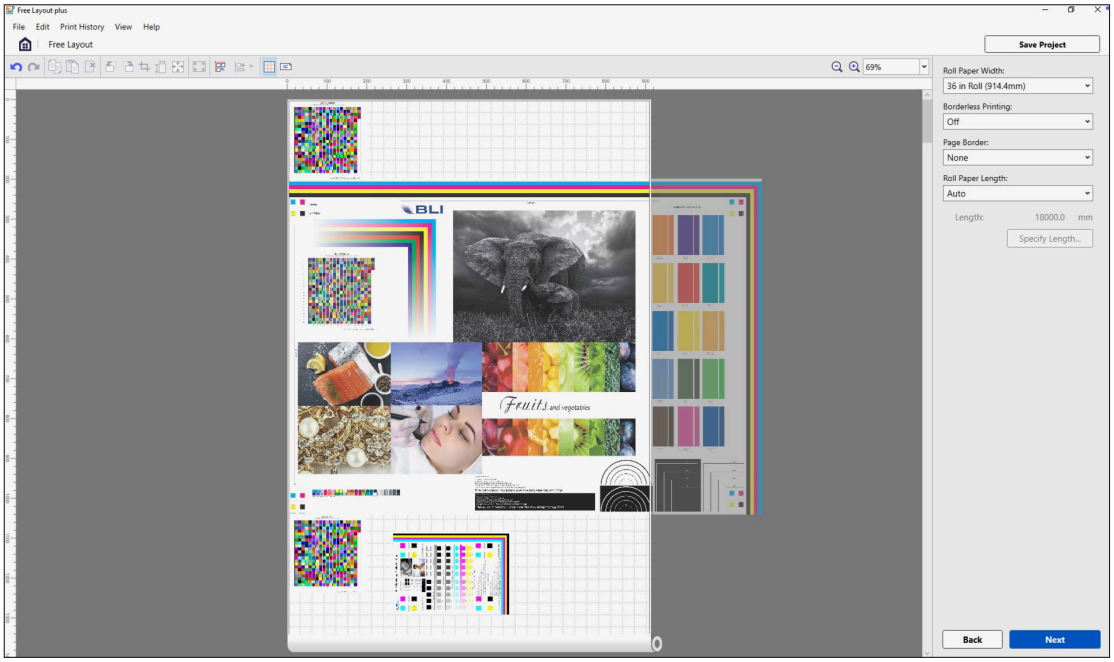
Notably, the HP unit's stacker has a built-in paper sensor, which detects when the stacker capacity threshold has been reached. The device subsequently stops printing to allow the operator to remove printouts before resuming the job automatically. The Canon TX-3200 will continue to print when its stacker capacity has been reached, which could lead to potential paper jamming and spillage issues, although it's assumed that the operator would unload the stacker before it reached this stage.

- The Canon TX-3200 automatically places jobs requiring unavailable media on hold while continuing to print other compatible jobs. Once the correct media is loaded, the held jobs are printed. HP users can choose to hold the job and proceed with others, print the job on the current media, or enable warnings in the print driver and control panel to address mismatches before or after job submission.
- Both the Canon and HP models feature a standard 128 GB (virtual) RAM capacity, with the Canon utilizing 2 GB of physical RAM and the HP employing 4 GB of DDR3 RAM. Both devices also include a built-in 500 GB encrypted hard drive for secure document storage and improved spooling workflow.
- The HP model is lighter with a net weight of 85 kg versus the Canon unit's 103 kg. While the Canon unit has lower active power consumption at 86 watts versus the HP's 100 watts, it generates higher noise emissions during printing, rated at 51 dB compared to the HP model's 42 dB.
- The Canon TX-3200 does not feature any polystyrene foam in its packaging, minimizing waste.

The Canon TX-3200's packaging contains no polystyrene.

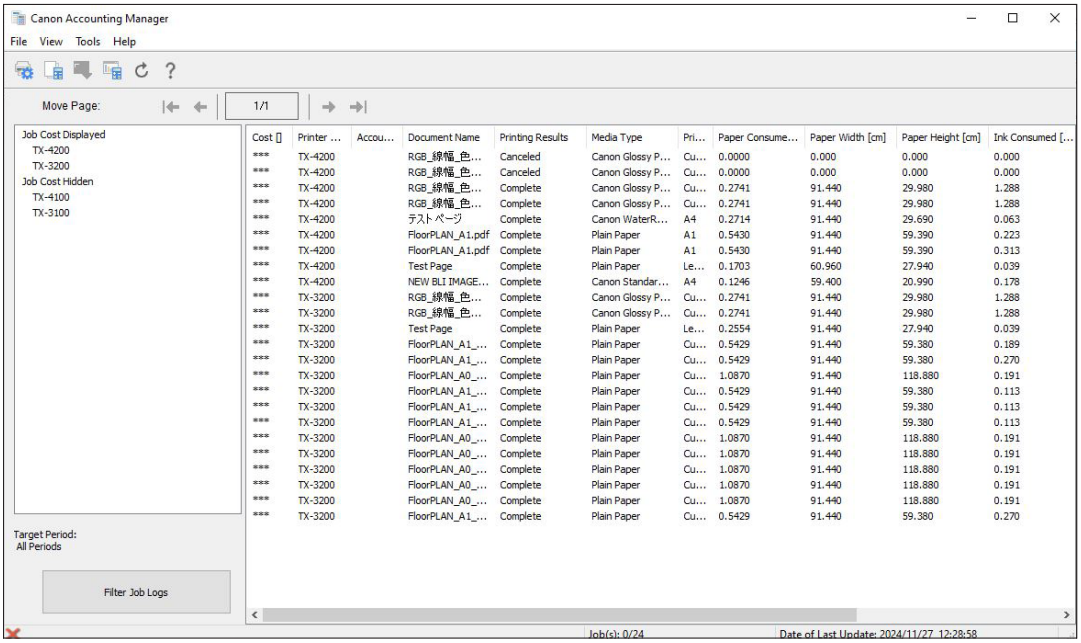
Driver Feature Set

- The Canon TX-3200 and the HP device offer comparable speed settings, though availability depends on the media type. Both device drivers' offer an intuitive overview of selected job settings, with the Canon driver featuring seven predefined profiles and the HP driver offering five.
- Canon also provide an additional driver (Driver Select) for Canon Production Printing product users, who can program print settings in a single window following the output workflow from paper selection through layout to finishing.
- The Canon driver offers several features not available in the HP driver, such as multi-up printing (2-16), poster printing (2x2), page stamping, and a unidirectional printing option, which reduces banding by ensuring the printhead moves in only one direction, even in Fast mode.
- The HP driver offers a helpful thumbnail preview for real-time colour adjustments (a feature absent in the Canon driver).
- Canon offers a broad range colour adjustments for CMY balance, brightness, and contrast, along with advanced colour-matching options like ICC profile matching and customizable rendering intents based on document elements, while the HP T1600dr's HPGL/2 driver also offers CMY balance and brightness adjustments.
- The Canon driver, available in both 64-bit and 32-bit versions, includes the Color imageRUNNER Enlargement Copy Mode utility. This feature integrates a Canon small-format MFP with the TX-3200, allowing scanned documents to be automatically routed to a monitored hot folder, resized, and printed. This streamlined tool simplifies poster creation for office users, a functionality not offered by the HP driver.
- Canon's Free Layout plus software allows users to scale, resize, and group files from different applications into a single job directly from the printer driver. With drag-and-drop functionality, images can be precisely positioned on a single page, reducing paper waste. While the HP unit offers a similar nesting feature via the control panel, print driver, or HP Click, it lacks the Canon tool's precise placement control. Instead, jobs are automatically arranged across the page width based on submission order or an 'optimized' layout.

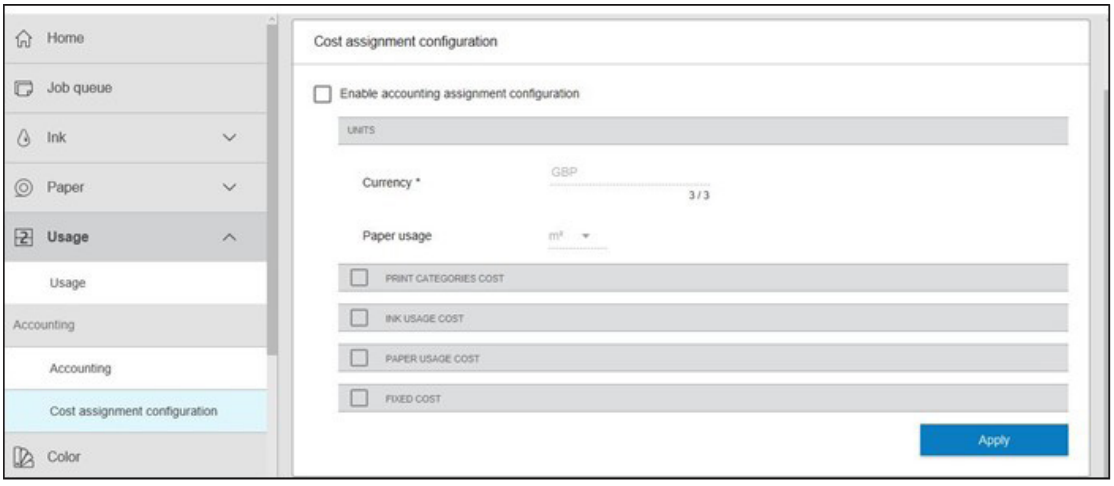


Canon's Free Layout plus

- The Canon model includes a Microsoft Office plug-in (not available with the HP device) that provides features such as automatic media resizing, nesting, and borderless printing.
- Canon's Accounting Manager, accessible through the Status Monitor, provides detailed accounting for all print jobs. Users can input ink and media costs to automatically calculate and display job costs, along with media type, print area, ink usage, and total print time. Detailed reports can be generated by selecting individual or multiple jobs, with data exportable in .CSV format for use in Excel. HP offers accounting management through the Accounting tab on the device's embedded web server.

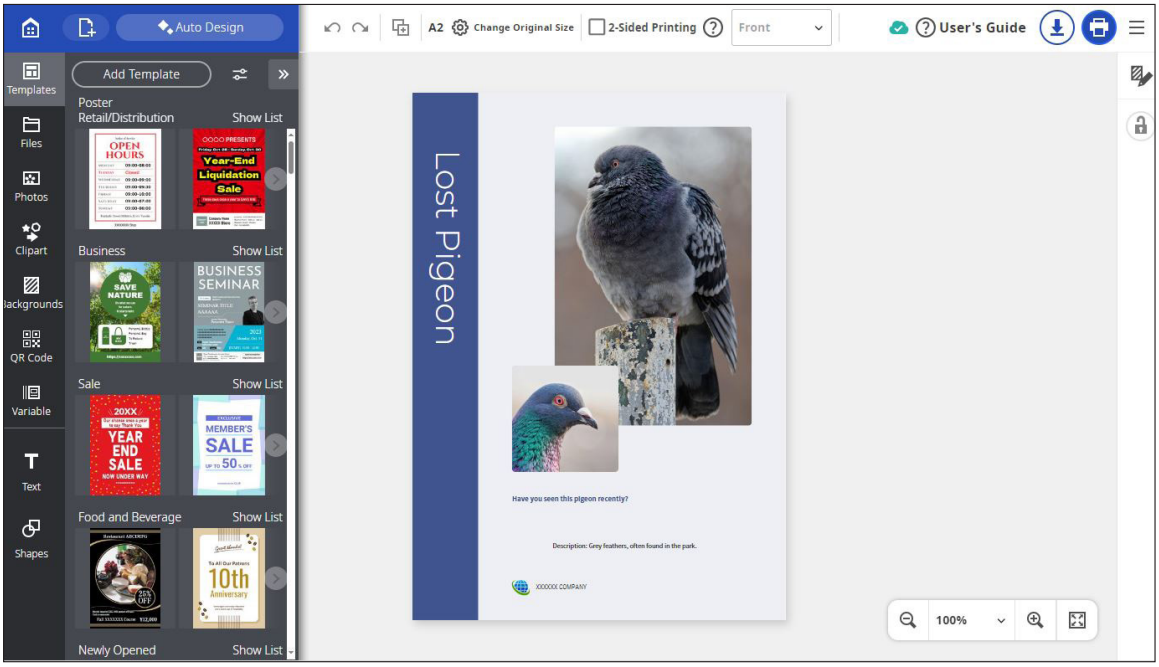


Canon Accounting Manager



HP embedded web server accounting features

- Canon's web-based PosterArtist is a user-friendly tool for creating posters and signage. It provides access to stock photo services like Pixabay, Pexels, and Unsplash, and a wide selection of royalty-free images. The software also offers a variety of pictographic icons and templates sorted by type and event, and supports multi-language poster creation with 900 common expressions across 10 languages.



Canon PosterArtist Web

SUPPORTING TEST DATA

Print Productivity

Job Stream (in Seconds)

Canon imagePROGRAF TX-3200		HP DesignJet T1600dr	
Fast	468.88	**Fast**	448.50
Standard	795.98	**Normal**	1,789.33
High	1,544.34	**Best**	3,600.37

Keypoint Intelligence's job stream consists of nine files, including PDF, TIFF, and DWF files, for a total of 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 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.

Job Stream, Dual Roll (in Seconds)

Canon imagePROGRAF TX-3200		HP DesignJet T1600dr	
Fast	758.33	**Fast**	646.24

Keypoint Intelligence's dual-roll job stream consists of nine files, including PDF, TIFF and DWF files, for a total of 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 files are submitted to the controller in a specific order and sent to the printer as a group, sending alternate jobs to different rolls, at which time the stopwatch begins; timing ends when the last page of the last file exits the device. Both devices were loaded with 914-mm rolls.

Colour Output (in Seconds)

Canon imagePROGRAF TX-3200		HP DesignJet T1600dr	
Fast	286.34	**Fast**	288.11
Standard	531.87	**Normal**	874.35
High	946.65	**Best**	2,303.66

The 12-page DWF test file was printed using the device driver set to the plain paper/colour setting. Both devices were loaded with 914-mm rolls. The actual time indicated is the time it took to RIP, image, and deliver all pages of the test document to the collection bin.

Monochrome Output (in Seconds)

Canon imagePROGRAF TX-3200		HP DesignJet T1600dr	
Fast	279.45	**Fast**	287.97
Standard	537.80	**Normal**	874.93
High	940.32	**Best**	2,284.87

The 12-page DWF test file was printed with the Canon driver set to the plain paper/monochrome setting and the HP driver set to plain paper, black mode. Both devices were loaded with 914-mm rolls. The actual time indicated is the time it took to RIP, image and deliver all pages of the test document to the collection bin.

First-Page-Out Time After Weekend Non-Use (in Seconds)

	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Time Before Printing Commences	43.02	92.50
First Page Out	64.73	155.61

First-page-out time was measured by printing an Arch D-size PDF in Fast mode, timed from job release to page out. The Canon driver was set to plain paper/monochrome, the HP driver to plain paper/black mode, with both devices loaded with 914-mm rolls.

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

	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Time Before Printing Commences	9.91	30.06
First Page Out	29.95	94.60

First-page-out time was measured by printing an Arch D-size PDF in Fast mode, timed from job release to page out. The Canon driver was set to plain paper/monochrome, the HP driver to plain paper/black mode, with both devices loaded with 914-mm rolls.

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

	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
First Page Out	85.50	139.32
Five Pages Out	389.88	649.52

A single-page A0-size Cottage Architectural Plan DWG TrueView Drawing test file was printed with the device driver set to the plain paper/colour setting in Standard/Normal 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 Print Quality

Colour Optical Density Evaluation

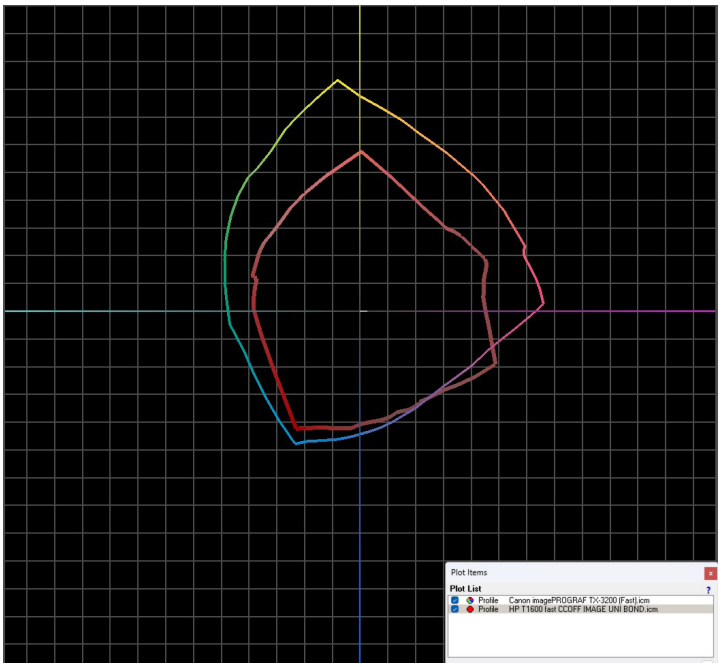
Canon imagePROGRAF TX-3200						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.49	1.03	0.58	1.30	0.57	1.33
Magenta	0.50	1.03	0.59	1.34	0.59	1.37
Yellow	0.45	0.84	0.52	1.03	0.53	1.08
Black	0.50	1.49	0.66	1.55	0.67	1.57

HP DesignJet T1600dr						
	Fast		Normal		Best	
	50%	100%	50%	100%	50%	100%
Cyan	0.49	0.78	0.50	0.78	0.58	1.08
Magenta	0.44	0.76	0.44	0.76	0.44	1.03
Yellow	0.44	0.60	0.44	0.60	0.43	0.81
Black	0.36	1.33	0.36	1.32	0.54	1.46

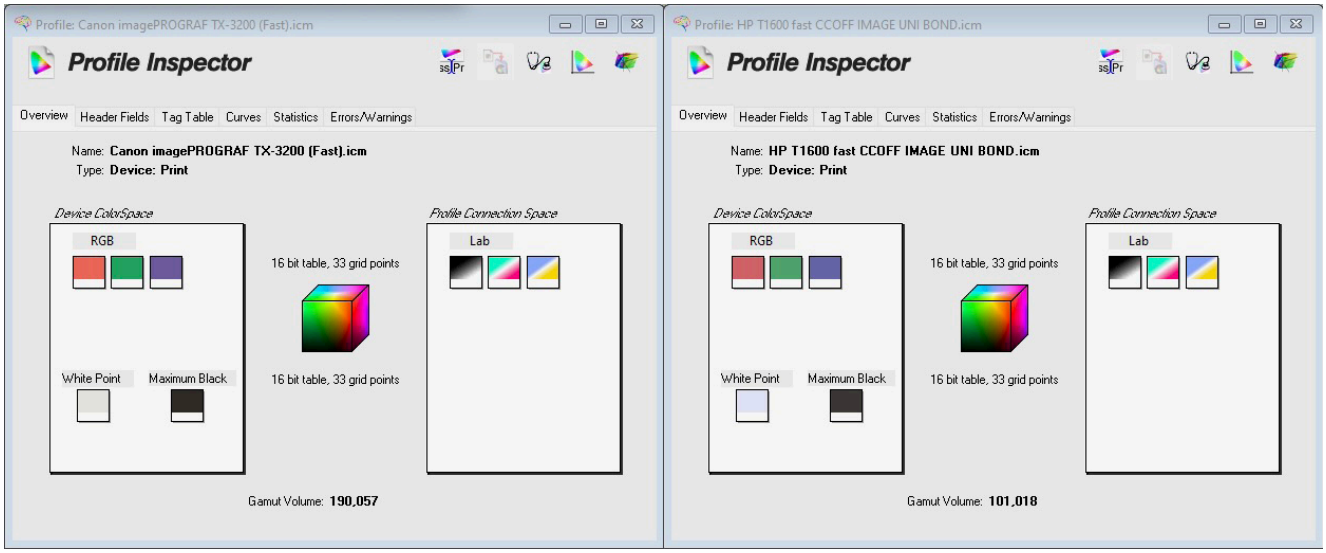
Colour density was measured by printing a Keypoint Intelligence proprietary PDF test target on plain paper using default colour settings across all quality modes. Density readings for 100% and 50% dot fills were taken with an XRite 508 and XRite exact^{Xp} densitometer.

Colour Gamut Cubic L*a*b* Unit Volume Comparisons

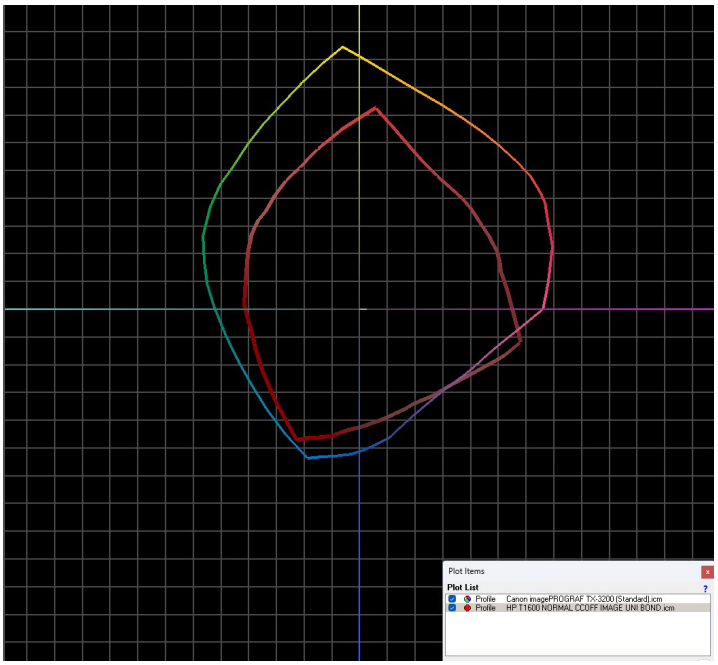
Media Type/Settings	Canon imagePROGRAF TX-3200	HP DesignJet T1600dr
Plain Paper Fast	190,057	101,018
Plain Paper Standard/Normal	313,650	146,581
Plain Paper High/Best	318,110	152,492
Matte Coated High/Best	387,435	370,075



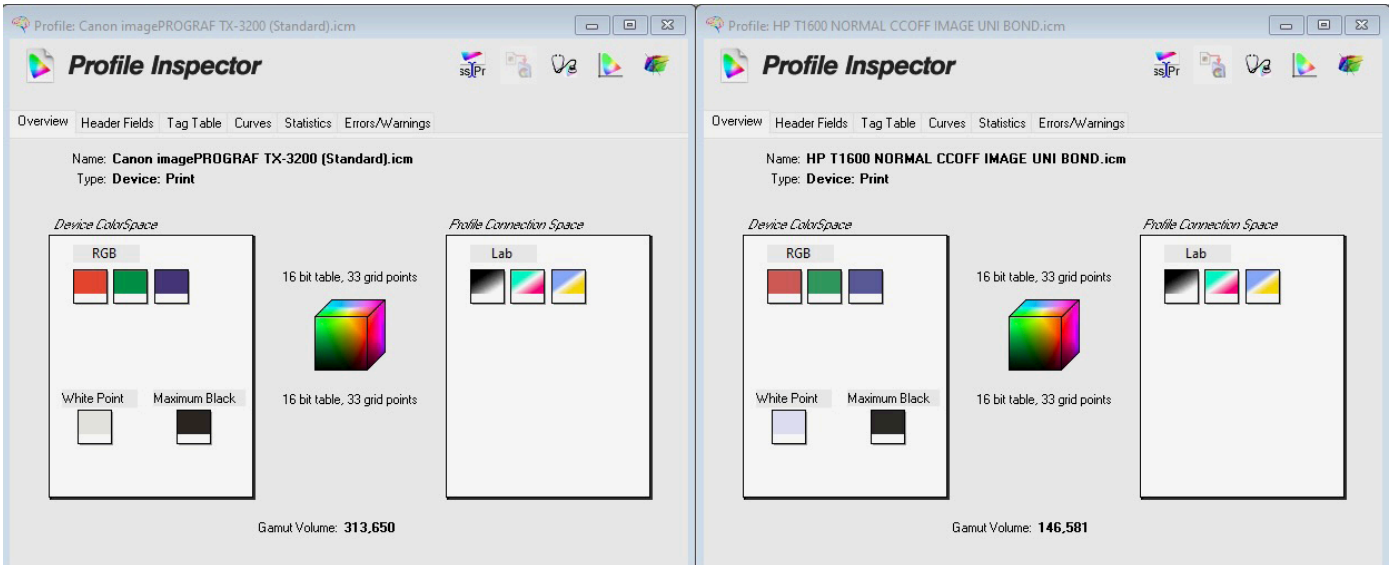
Canon imagePROGRAF TX-3200 colour gamut on plain paper in Fast settings (shown chromatically) vs. HP DesignJet T1600dr colour gamut (shown in red) on plain paper in Fast settings.



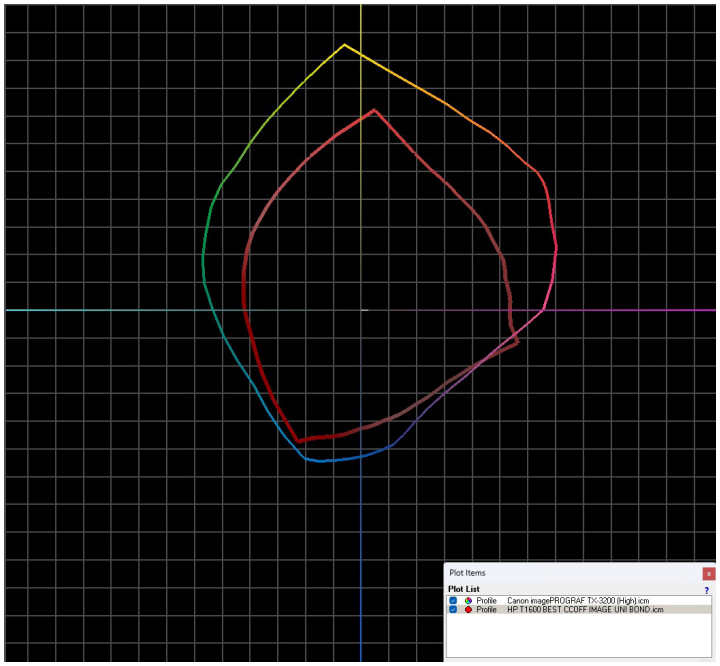
Colour gamut profile for Canon imagePROGRAF TX-3200 (left) and HP DesignJet T1600dr (right) on plain paper in Fast mode.



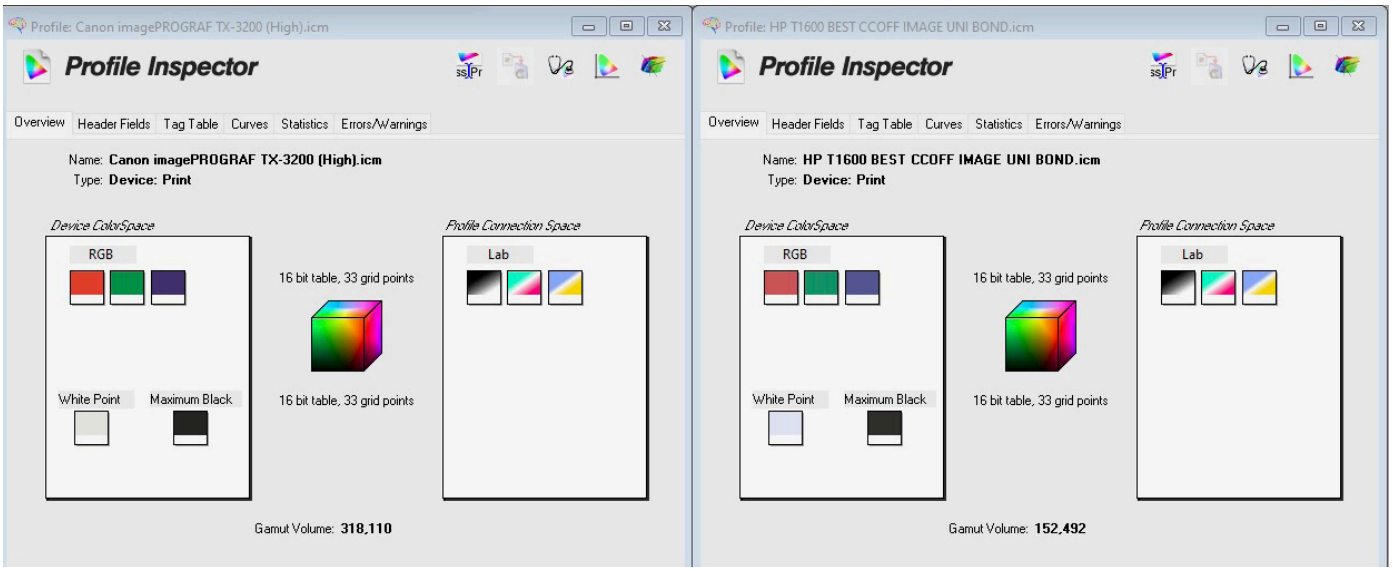
Canon imagePROGRAF TX-3200 colour gamut on plain paper in Standard settings (shown chromatically) vs. HP DesignJet T1600dr colour gamut (shown in red) on plain paper in Normal settings.



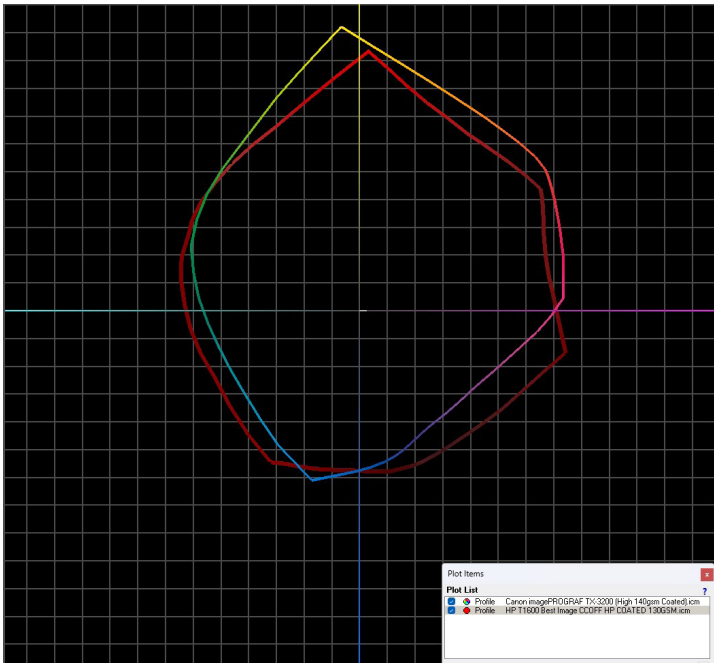
Colour gamut profile for Canon imagePROGRAF TX-3200 (left) and HP DesignJet T1600dr (right) on plain paper in Standard/Normal modes.



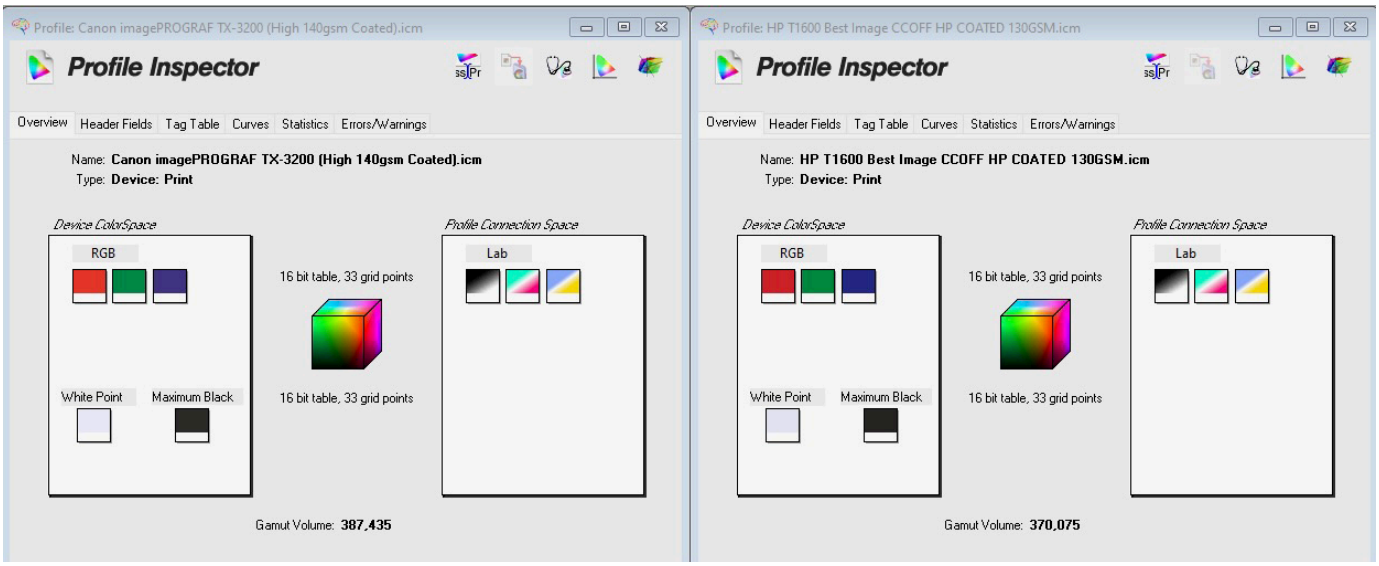
Canon imagePROGRAF TX-3200 colour gamut on plain paper in High settings (shown chromatically) vs. HP DesignJet T1600dr colour gamut (shown in red) on plain paper in Best settings.



Colour gamut profile for Canon imagePROGRAF TX-3200 (left) and HP DesignJet T1600dr (right) on plain paper in High/Best Quality modes.



Canon imagePROGRAF TX-3200 colour gamut on matte coated paper in High quality settings (shown chromatically) vs. HP DesignJet T1600dr colour gamut (shown in red) on matte coated paper in Best settings.



Colour gamut profile for Canon imagePROGRAF TX-3200 (left) and HP DesignJet T1600dr (right) on matte coated paper in High/Best Quality modes.

Black Print Quality

Solid Density

	Canon imagePROGRAF TX-3200			HP DesignJet T1600dr		
Density Block						
	Fast	Standard	High	Fast	Normal	Best
1	1.51	1.55	1.56	1.45	1.39	1.46
2	1.50	1.56	1.56	1.45	1.37	1.46
3	1.49	1.56	1.56	1.46	1.39	1.46
4	1.51	1.55	1.56	1.43	1.36	1.45

Solid black density measurements are based on four readings taken from a Keypoint Intelligence 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

Category	Canon imagePROGRAF TX-3200	Advantage ✓		HP DesignJet T1600dr
Ink Tanks Replaceable During Operation	Yes	✓		No
Starter Ink Capacity	970 ml (330 ml MBk; 160 ml CMYK)	✓		240 ml (40 ml x 6)
Ink Cartridge Capacity	160/330/700 ml (all colours)	✓		130/300 ml (all colours)
Number of Nozzles	MBK: 5,120 nozzles; CMYK: 2,560 nozzles each; 15,360 in total	✓		8,256 in total (1,376 per colour)
Borderless (0 mm) Printing	Yes (Roll only)	✓		No
Maximum Outside Diameter of Roll Paper	170 mm	✓		140 mm
Maximum Cut-Sheet Media Length	1.6 m	✓		1.219 m
Maximum Media Thickness for Roll Paper	0.8 mm	✓		0.5 mm
Roll Paper	Optional Multifunction Roll System (with auto media take up)	✓		Optional dual
Standard/Maximum RAM	128 GB (2 GB physical)		✓	128 GB (4 GB physical)
Net Weight (Unpacked)	103 kg (including Roll Holder Set and Roll unit, excluding ink and printhead)		✓	85 kg (includes roll unit)
Power Consumption (Active)	86 W or less	✓		100 W

Acoustic Pressure	Operation: 51 dB (A); Standby: 35 dB (A)		✓	Operation: 42 dB (A); Standby: 32 dB (A)
Acoustic Power	Operation: 6.9 Bels		✓	Operation: 5.9 Bels; Ready: 4.9 B(A)

Driver Feature Set

Category	Canon imagePROGRAF TX-3200	Advantage ✓		HP DesignJet T1600dr
Media Profiles	50 + 10 user customizable special options	✓		36
Watermark	Yes	✓		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 plus the ability to add custom stamps)	✓		Not supported
Enlargement Copy Mode	Yes	✓		No
Free Layout Capability	Yes (flexible placement)	✓		Yes (automatic placement)
MS Office Plug-In	Yes	✓		No
Unidirectional Printing Option	Yes	✓		No
Integration with MFP	Yes	✓		No

Ink Consumption

Canon imagePROGRAF TX-3200: Amount of Ink Used in Each Cartridge (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Weight of Cartridge Prior to Installation	957.5	942.5	937.0	958.0	941.0
Weight of Cartridge at End of Life	205.5	205.5	205.5	205.5	205.5
Net Weight of Ink	752.0	737.0	731.5	752.5	735.5
Total Ink Weight Across Five Cartridges					**3,708.5**

HP DesignJet T1600dr: Amount of Ink Used in Each Cartridge (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Weight of Cartridge Prior to Installation	390.0	396.6	394.9	401.9	404.1	403.5
Weight of Cartridge at End of Life	109.2	109.2	109.2	109.2	109.2	109.2
Net Weight of Ink	280.8	287.4	285.7	292.7	294.9	294.3
Total Ink Weight Across Six Cartridges						**1,735.8**

Canon imagePROGRAF TX-3200: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document in Standard Mode (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Test Run 1: Net Weight of Ink Used	23.5	5.5	3.5	9.0	11.0
Test Run 2: Net Weight of Ink Used	22.5	6.0	4.0	8.5	12.0
Test Run 3: Net Weight of Ink Used	23.5	4.5	5.5	9.0	10.5
Average Amount of Ink Used Across Three Runs	23.1	5.3	4.3	8.8	11.1
Total Ink Weight Across Five Cartridges for 50-Page Run (based on average)					**52.6**

HP DesignJet T1600dr: Ink Used in Three 50-Page Runs of Cottage Architectural Plan Test Document in Normal Mode (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1: Net Weight of Ink Used	0.1	0.3	26.8	5.4	2.6	1.9
Test Run 2: Net Weight of Ink Used	0.1	0.2	26.6	5.1	3.5	1.5
Test Run 3: Net Weight of Ink Used	0.2	0.4	26.6	5.2	2.9	1.1
Average Amount of Ink Used Across Three Runs	0.1	0.3	26.7	5.2	3.0	1.5
Total Ink Weight Across Six Cartridges for 50-Page Run (based on average)						36.8

Canon imagePROGRAF TX-3200: Ink Used in Three 50-Page Runs of ISO Poster Test Document in Standard Mode (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Test Run 1: Net Weight of Ink Used	19.5	7.0	6.0	18.0	59.5
Test Run 2: Net Weight of Ink Used	12.5	6.0	7.0	13.5	72.0
Test Run 3: Net Weight of Ink Used	13.0	5.5	6.5	18.0	69.5
Average Amount of Ink Used Across Three Runs	15.0	6.1	6.5	16.5	67.0
Total Ink Weight Across Five Cartridges for 50-Page Run (based on average)					111.1

HP DesignJet T1600dr: Ink Used in Three 50-Page Runs of ISO Poster Test Document in Normal Mode (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1: Net Weight of Ink Used	10.8	3.5	16.9	59.7	24.7	7.4
Test Run 2: Net Weight of Ink Used	11.1	3.5	16.7	60.9	26.5	8.0
Test Run 3: Net Weight of Ink Used	10.7	3.8	17.1	60.1	25.9	7.9
Average Amount of Ink Used Across Three Runs	10.9	3.6	16.9	60.2	25.7	7.8
Total Ink Weight Across Six Cartridges for 50-Page Run (based on average)						125.1

Canon imagePROGRAF TX-3200: Ink Used in Three 50-Page Runs of GIS Map Test Document in Standard Mode (in Grams)

	Matte Black	Black	Yellow	Magenta	Cyan
Test Run 1: Net Weight of Ink Used	16.5	3.0	8.5	12.0	21.0
Test Run 2: Net Weight of Ink Used	16.5	5.0	8.5	12.0	21.0
Test Run 3: Net Weight of Ink Used	16.0	3.5	8.0	12.0	21.5
Average Amount of Ink Used Across Three Runs	16.3	3.8	8.3	12.0	21.1
Total Ink Weight Across Five Cartridges for 50-Page Run (based on average)					61.5

HP DesignJet T1600dr: Ink Used in Three 50-Page Runs of GIS Map Test Document in Normal Mode (in Grams)

	Photo Black	Grey	Matte Black	Cyan	Magenta	Yellow
Test Run 1: Net Weight of Ink Used	9.3	35.1	9.2	36.2	10.1	14.3
Test Run 2: Net Weight of Ink Used	9.0	34.9	9.7	34.3	10.8	14.1
Test Run 3: Net Weight of Ink Used	9.8	36.1	10.0	35.4	11.2	14.8
Average Amount of Ink Used Across Three Runs	9.4	35.4	9.6	35.3	10.7	14.4
Total Ink Weight Across Six Cartridges for 50-Page Run (based on average)						114.8

Test Methodology

Ink Consumption: Keypoint Intelligence analyzed ink consumption using three different document types: a Cottage Architectural Plan, an ISO Office Poster, and a GIS map. Each document was formatted as a PDF file except for the Cottage Architectural Plan which was formatted as a DWG TrueView Drawing, and all were sized at ISO A0.

In Keypoint Intelligence's lab, the Canon imagePROGRAF TX-3200, with the latest "1.04" firmware (as of November 2024) was connected to a Windows 10 workstation via a 1000BaseT TCP/IP connection and maintained in default configuration for testing. Using the Canon imagePROGRAF Printer Driver, the documents were set to print at actual size in Standard (600dpi) mode. The Cottage Architectural Plan was printed on plain paper with print priority settings set to Line Drawing/Text. The ISO Poster and the GIS map were both printed on 140gsm matte coated media with print priority settings set to Image.

The HP DesignJet T1600dr was installed in Keypoint Intelligence's lab with the latest "CYCLOPSNEPTUNE_05_02_48.1" level of firmware (as of March 2021) and connected to a Windows 10 workstation via a 1000BaseT TCP/IP connection and maintained in default configuration for testing. Using the HP GL/2 driver in default colour

setting, the documents were set to print at actual size in Normal mode. The Cottage Architectural Plan was printed on plain paper; the ISO Poster and the GIS map were both printed on HP Heavy Weighted coated media.

Lab technicians weighed each ink cartridge before installation (with the weight of each ink with all packaging removed recorded) and after every 50-print test run, calculated the weight of ink used for each colour. To account for the Canon model's sub-tank, 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 considered 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 Keypoint Intelligence's environmentally controlled UK test lab, which replicates typical office conditions.

Test Equipment: Keypoint Intelligence's dedicated test network in Europe, consisting of Windows 10 Professional workstations, 10/100/1000BaseTX network switches and CAT5e/6 cabling.

Test Procedures: Keypoint Intelligence employs proprietary procedures and industry-standard test procedures in its lab test methods. In addition to a number of proprietary test documents, Keypoint Intelligence uses industry-standard files including an ASTM monochrome test document for evaluating black image quality. Alongside 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 i1i0 Advanced Scanning Table. Density of black and colour output was measured using XRite 508 and XRite exact^{Xp} densitometers.

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About Keypoint Intelligence

For over 60 years, clients in the digital imaging industry have relied on Keypoint Intelligence for independent hands-on testing, lab data, and extensive market research to drive their product and sales success. Keypoint Intelligence has been recognized as the industry's most trusted resource for unbiased information, analysis, and awards due to decades of analyst experience. Customers have harnessed this mission-critical knowledge for strategic decision-making, daily sales enablement, and operational excellence to improve business goals and increase bottom lines. With a central focus on clients, Keypoint Intelligence continues to evolve as the industry changes by expanding offerings and updating methods, while intimately understanding and serving manufacturers', channels', and their customers' transformation in the digital printing and imaging sector.

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