

KPI Comparative Lab Test Report

FEBRUARY 2018

Canon imagePROGRAF TX-3000 MFP T36

vs. HP DesignJet T3500 eMFP

Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Print Quality (Plain Low-Grade Media)	✓	
Print Quality (Plain Inkjet Media)	✓	
Copy Quality	✓	
Scan Capture Quality	✓	
Print Productivity	✓	
Copy Productivity		✓
Scan Productivity	✓	
Direct Print Submission Functionality	=	=
Banner Printing	✓	
Walk-up Ease of Use	✓	
Device Feature Set	✓	
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-3000 MFP T36 and the HP DesignJet T3500 eMFP, and produce a report comparing the relative strengths and weaknesses of the two products in the areas of image quality, productivity, banner printing, direct print submission functionality, walk-up ease of use, device feature set and driver functionality. All testing was performed in Buyers Lab's European test facility in Wokingham, UK.

Executive Summary

Designed to meet the demands for high productivity and exceptional image quality of both the high-end Computer-Aided Design (CAD) inkjet market and the entry-level LED plotter market, the Canon imagePROGRAF TX-3000 MFP T36 proved it's more than capable of fulfilling these requirements with a sterling performance in Buyers Lab's large-format evaluation. This 5-colour, 36-inch model outshone the HP DesignJet T3500 eMFP in most categories tested, delivering faster print and scan productivity, superior print, copy and scan image quality, richer device and driver feature sets and far stronger operational ease of use.

Whether printing on more economical uncoated media rolls suitable for the LED plotter market, or standard inkjet media, the Canon MFP delivered superior image quality overall. Specifically, it produced higher optical densities, larger colour gamuts, crisper text and fine lines, brighter colours and more natural-looking skin tones irrespective of media type; the Canon model even had the advantage when printing AEC graphics on the lower-grade paper, with output that exhibited much sharper details. However, with the better grade of media the HP T3500 eMFP had parity with AEC graphics, and on the low-grade media it delivered superior black-and-white photographic images with more neutral grey tones. The Canon unit also produced superior image quality in both copy and scan modes, overall. For example, it delivered more accurate colour fidelity when copying Buyers Lab's Pantone corporate logo test chart and produced far more subtle gradations of halftone shades, especially in dark contrast areas in its Colour Graphic mode, when scanning the mixed text/image Buyers Lab test chart in full colour at 300 dpi. However, one particularly noteworthy advantage for HP is its Color Center utility which offers third-party media and colour calibration management, while the Professional PANTONE Emulation feature lets users create swatch-books containing any user-specified PANTONE colours so that they can check how accurately they can be reproduced on the chosen media.

In Buyers Lab's round of print productivity tests, the Canon TX-3000 MFP T36 delivered superior print speeds across the board, whether printing after a weekend of non-use, from a ready state or printing Buyers Lab's jobstream, (which simulates a typical mixed workflow for a large-format unit). Remarkably, the performance advantage for the Canon model increased along with the quality mode, with print speeds that were more than twice as fast as that of the HP model in High/Best quality mode, which enables Canon users to achieve optimum image quality without sacrificing productivity. The Canon model gave a strong performance in the scan productivity evaluation with faster throughput and scan-to-desktop times in all modes tested. Both models support batch scanning, which can help boost productivity in high-volume environments; in the batch scan tests, the HP T3500 eMFP was faster overall. In copy mode, the HP DesignJet T3500 eMFP also had the speed advantage in the majority of modes tested.

In terms of operational ease of use, the Canon model proved easier to use and maintain. A significant advantage is that Canon's sub-ink tank replacement system ensures uninterrupted printing, further boosting productivity. In contrast, when the HP T3500 eMFP runs out of ink, printing has to stop for a cartridge to be replaced, leading to some operator downtime. Canon users can also scan and print at the same time (not available with the HP model). Thanks in part to a more integrated scanner, All-in-One PC system and a large, responsive 15.6-inch colour touchscreen interface, scan and copy operations are straightforward with the Canon MFP. The Canon SmartWorks MFP interface entails a simplified, time-saving Scan/Adjust/Print workflow. In contrast, the HP model's workflow of Scan/Print/Check Print/Change Settings and Re-scan/Reprint/Repeat as necessary, is clearly more time-consuming in real-world applications. Both models offer a high-capacity stacker; Buyers Lab technicians were impressed with the design and robust build quality of the HP T3500 eMFP's rear-mounted 50-sheet capacity stacker assembly which is integrated with the main unit giving it a more compact office footprint (which could be a critical factor where space is constrained). The Canon TX-3000 MFP's 100-sheet capacity stacker required a little more operator attention to set up initially, but it was capable of stacking 150 A0-size CAD prints with good alignment, while the HP T3500 eMFP managed to stack 100 A0-size sheets neatly.

The Canon TX-3000 MFP T36's feature set—both for the device and for the driver—is much stronger than that offered by the rival HP model. In addition to the aforementioned hot-swap ink tanks, the Canon unit's uni-directional print feature eliminates banding, even in Fast mode; it has higher cartridge capacities, smaller ink drop sizes, a lower rated energy consumption while printing, and a flexible layout nesting option that saves on paper. (The HP model offers a similar feature but the user doesn't have the same flexibility and control over

image placement.) Both models support direct PDF submission without the need to open an application, plus HP users have the further advantage of being able to email jobs directly to the printer, while Canon users can print from their smart devices via the Canon Print Service mobile app (Android currently supported, with iOS support to follow in 2018).

Overall, based on its superior print, copy and scan image quality, faster print and scan productivity and stronger ease of use and device and driver feature sets, Buyers Lab judges the Canon imagePROGRAF TX-3000 MFP T36 as the superior performer in its large-format production evaluation.

Print Quality (Plain Low-Grade Media)

Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Text	✓	
Fine Lines	✓	
Halftone Range	=	=
Halftone Fill	✓	
Solid Density	✓	
AEC Graphics	✓	
GIS Graphics	=	=
Business Graphics	✓	
Photographic Images	=	=
Colour Gamut (low-grade plotter paper, default settings)	✓	
Colour Gamut (matte coated paper, High/Best quality settings)	✓	

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

- O This first print image quality test evaluation was conducted using low-grade LED plotter media (Océ Red Label 175 m roll), with the Canon driver set to Uncoated in Fast, Standard and High modes and the HP driver set to Plain in Fast (Eco), Fast, and Best modes.
- + The Canon model delivered superior colour optical densities in all modes tested, except for magenta in Standard and High mode, and cyan in High/Best mode. In terms of black optical density, the Canon TX-3000 MFP T36 delivered darker solids in Fast mode, comparable black optical densities in Standard/Fast mode, while the HP T3500 eMFP had higher optical density in High/Best mode.
- + In Buyers Lab’s colour gamut assessment, the Canon TX-3000 MFP T36 produced a larger colour gamut in all three quality modes; in Fast/Fast Eco mode, the Canon model delivered a 240.9% larger colour gamut with a CIE volume of 58,297 versus a CIE volume of 17,099 for the HP unit; in Standard/Fast mode, it produced a 12.6% larger colour gamut than the HP unit (with a CIE volume of 127,942 versus a CIE volume of 113,666 for the HP unit; and, in High/Best quality mode, the Canon model produced a 9.3% larger colour gamut, with a CIE volume of 206,260 versus a CIE volume of 188,640 for the HP unit.

- + The Canon TX-3000 MFP T36 delivered superior colour and black text reproduction overall, with crisp serif and sans serif fonts legible down to the smallest (3-pt. level) size in Standard and High quality modes with no breakup and no ink bleed, and rated very good. In Normal mode, the HP model delivered fully legible colour fonts down to the 4-pt. level in Normal mode and 3-pt. level in Best mode, and rated good, while black text was legible down to the 3-pt. level in both modes and rated good in Normal mode (as characters were less distinct due to ink bleed), and very good in High quality mode.
- When evaluating colour text in Fast/Fast Eco mode, there were very slight differences in the output of the two models. Fonts were legible down to the 5-pt. level with the Canon unit, and 5-pt. level (Times) and 4-pt. level with the HP device, and rated equally good.
- + Black text in Fast/Fast Eco mode was fully formed and legible down to the 3-pt. level in the output of both models, however while Canon's text was rated good, the HP model's fonts were rated only fair as they were fuzzy.
- + Fine lines produced by the Canon TX-3000 MFP T36 remained distinct down to the 0.1-pt. level in all modes and were crisp, distinct and rated very good, except for lines in Fast mode which exhibited slight ghosting. While the HP unit's fine lines were distinct at the 0.1-pt. level in all quality modes, they exhibited some fuzziness in Fast Eco mode and were bolder than its 0.25-pt. lines in Normal and High quality modes, and rated good.
- + White-on-black fine lines were visible at the 0.1-pt. level in all modes for both models; the Canon unit's output was rated very good in Fast and Normal modes and good in Best mode, whereas the HP unit's white-on-black fine lines were rated only fair in Fast Eco mode and good in Normal and Best quality modes as they displayed some fuzziness.
- + The Canon TX-3000 MFP T36 produced 0.1-pt. level circles that were smooth, clean and unbroken, and rated very good overall, except in colour/Fast mode which yielded slightly fuzzy results. In contrast, circles produced by the HP model in colour were rated good in all modes with some ink bleed.
- + The Canon TX-3000 MFP T36 produced the 1x1 pixel grid with no quality issues, and coverage was consistently very good across all colours, except for its colour 1x1 pixel grid in Fast mode which was rated good as dot formation was inconsistent. In contrast, the HP model produced 1x1 pixel grids that showed inconsistent dot formation and were incomplete in Fast Eco and Fast modes.
- Both models delivered a very good halftone range—from the 10% to 100% dot-fill levels in all modes, with distinct transitions between all levels.
- + The Canon TX-3000 MFP T36 delivered smooth colour and monochrome halftone fills in all modes; the HP unit's halftones were comparably smooth in Fast and Best modes, but in Fast Eco mode, the HP unit's halftone fills were slightly grainy.
- + Architectural, Engineering and Construction (AEC) graphics produced in Standard/Fast and High/Best modes by both models exhibited very good details and a pin-sharp level of accuracy, however the Canon model delivered more distinct crisp fine lines when viewed under magnification. In Fast/Fast Eco mode, again there was very good detailing on output from both models, but the Canon TX-3000 MFP T36 had the advantage with sharper details.
- When outputting Geographic Information Systems (GIS) graphics in Fast/Normal and High/Best modes, both units delivered a fine level of detail and showed an equally good depth of field—a critical factor in delivering a realistic three-dimensional rendering of topographical features
- + Business graphics produced by the Canon TX-3000 MFP exhibited brighter colours and finer details than did those produced by the HP device.
- + When comparing colour photographic images, both models delivered excellent detailing in dark and light contrast areas, but the Canon TX-3000 MFP T36 delivered superior colours and better depth of field, when compared with images produced by the HP unit. Skin tones produced by the Canon TX-3000 model were natural-looking, while those produced by the HP model were reddish in Fast and Best modes.

- However, the HP T3500 eMFP produced superior black-and-white photographic images, with more neutral grey tones—perhaps aided by the HP model’s grey ink—whereas Canon’s output exhibited a slight sepia hue, though better detailing in light contrast areas.
- + When printing on low-grade economical plotter media, Buyers Lab technicians judged the Canon TX-3000 MFP T36 as the superior overall performer in Buyers Lab’s image quality evaluation. It delivered higher optical densities overall, larger colour gamuts on both media types, more vibrant colours, natural-looking skin tones, and none of the fuzziness in text and line art which were observed under magnification on output from the HP device. Both models delivered detailed GIS graphics and a full and distinct halftone range in all modes.

Print Quality (Plain Inkjet Media)

Advantage ✓	Canon imagePROGRAF TX-3000 MPF T36	HP DesignJet T3500 eMFP
Text	✓	
Fine Lines	✓	
Halftone Range	=	=
Halftone Fill	✓	
Solid Density	✓	
AEC Graphics	=	=
GIS Graphics	=	=
Business Graphics	✓	
Photographic Images	✓	
Colour Gamut (plain paper, default settings)	✓	
Colour Gamut (matte coated paper, High/Best quality settings)	✓	

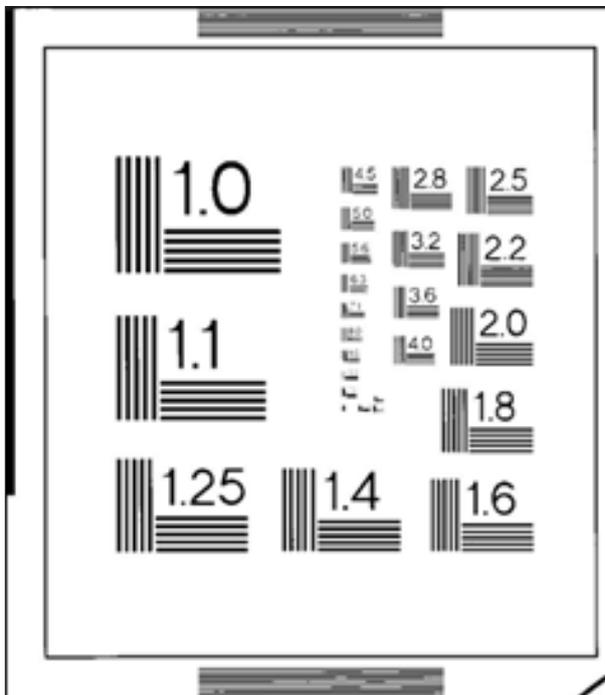
- This second print image quality test evaluation was conducted using plain CAD 90gsm inkjet paper with the Canon driver set to Plain paper in Fast, Standard and High modes and HP driver set to Plain paper in Fast, Normal and Best modes.
- + The Canon TX-3000 MFP T36 delivered superior optical densities on plain paper in all modes for cyan, and had higher densities for yellow in Fast and High quality settings and for composite black in Fast mode; it had comparable densities for magenta in Fast and High/Best modes, and for yellow in Standard/Normal mode. The HP T3500 eMFP produced the higher composite black optical densities in Standard and Best modes.
- In terms of black optical density, the Canon TX-3000 MFP T36 delivered darker solids in Fast mode, comparable black optical densities in Standard/Normal mode, while the HP T3500 eMFP produced higher optical density in High/Best mode.
- + In Buyers Lab’s colour gamut assessment, the Canon TX-3000 MFP T36 produced a larger colour gamut in all three quality modes; in Fast mode, the Canon model delivered a 27.1% larger colour gamut, with a CIE volume of 140,164 versus a CIE volume of 110,261 for the HP unit; in Standard/Normal mode, it produced a 18.0% larger colour gamut than the HP unit, with a CIE volume of 208,945 versus a CIE volume of 177,110 for the HP unit; and, in High/Best quality mode the Canon model produced a 20.8% larger colour gamut, with a CIE volume of 229,826 versus a CIE volume of 190,260 for the HP unit.

- + When printing on matte coated paper in High/Best quality mode, the Canon model delivered a 23.7% larger colour gamut than that of the HP unit, with a CIE volume of 402,815 versus a CIE volume of 325,623.
- + The Canon TX-3000 MFP T36 delivered superior text reproduction overall; it produced dark, pin-sharp Arial sans serif text that was legible down to the smallest (3-pt.) type size, with no breakup or bleed, in all tested modes. Serif characters, again, displayed no bleed and were legible down to 3-pt. size in Fast mode and 5-pt. size in Standard and High modes in colour, and 5-pt. (Fast and Standard modes) and 3-pt. level in black. In contrast, the HP T3500 eMFP produced fully legible text at the 5-pt. level in Fast and 4-pt. level in Normal and High modes in colour, and at the 3-pt level in black, but characters were less distinct as they exhibited some ink bleed.
- + Fine lines produced by both devices remained distinct at the 0.1-pt. level across all modes. However, there were some noticeable differences in quality, with fine lines from the Canon TX-3000 MFP T36 being consistently very good and distinct, while there was some bleed evident in output produced by the HP model in Fast mode. In Normal and Best quality modes, the HP model's fine lines were rated only fair in colour (as they exhibited some fuzziness and were less distinct) and rated good in black.
- + In Fast and Standard modes, the Canon model produced 0.1-pt. circles that were smooth and unbroken, and rated very good. In High quality mode, the Canon model delivered 0.25-pt. circles in colour that were, again, rated as very good, but 0.1-pt. circles in black were rated excellent. Circles produced by the HP T3500 eMFP were fully formed at 0.1-pt. but were only rated fair in Fast and Normal modes as they exhibited some stair-step-ping; black circles were rated good in all modes.
- The Canon TX-3000 MFP T36 produced the 1x1 pixel grid with no quality issues, and coverage was consistently very good across all colours—a result matched by the HP unit.
- 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-3000 MFP T36 delivered very good, smooth halftone fills in all modes, except for greyscale coverage in Fast which was slightly grainy at the 80% to 100% levels, while the HP model delivered smooth halftone coverage that was rated as good in Normal mode and very good in Best mode, but only Fair in Fast mode on account of being slightly grainy.
- When evaluating Architectural, Engineering and Construction (AEC) graphics in Standard/Normal and High/Best quality modes, the output from both devices exhibited an excellent level of detail, very distinct fine lines and clear text formation.
- When evaluating Geographic Information Systems (GIS) graphics in Standard/Normal mode on plain paper, both units produced 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-3000 MFP T36 exhibited slightly smoother transitions from light to dark areas and sharper fine details than did those produced by the HP device.
- + When comparing photographic images in Fast and Standard/Normal modes, the Canon TX-3000 MFP T36 delivered finer detailing in dark contrast areas, more saturated colours and more natural-looking skin tones. Both devices delivered excellent detailing in light contrast areas. In High/Best mode, there was little difference in photographic reproduction quality between both models, but colours were consistently brighter in output from the Canon model. Skin tones produced by the HP model were pale in Fast mode and slightly yellowish in Normal and Best modes.
- + Buyers Lab's overall assessment of image quality is that the Canon TX-3000 MFP T36 was the superior performer, having delivered superb crisp text and fine lines; smoother circles; brighter, more saturated colours and natural-looking skin tones as well as larger colour gamut sizes. The HP T3500 eMFP delivered higher composite black optical densities in Standard and Best modes, but there was not one 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.

Copy Quality

Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Text	✓	
Fine Lines	✓	
Solid Density	✓	
Halftone Reproduction	=	=
Colour Fidelity	✓	

- + Using the QA-1 test chart, the Canon model produced excellent text copy quality in Standard mode. Fonts were legible down to the 6-pt. size (the smallest level on this chart), characters were dark and crisp, and showed no breakup and no sign of halting. In copied output produced by the HP device, fonts were legible at the 6-pt. level in Normal mode but were less well defined and some ghosting was evident.
- + When evaluating fine lines using the same QA-1 test chart (see below) where the emphasis is on determining whether there is a clear distinction between lines rather than the rendering of each line, the fine lines produced by the HP model in Normal mode remained distinct only up to the 2.0 cpm (cycles per millimeter) level, while the Canon unit produced distinct fine lines up to 2.8 cpm in Standard mode.



Portion of QA-1 Image Evaluation Test Target used to evaluate fine line reproduction.

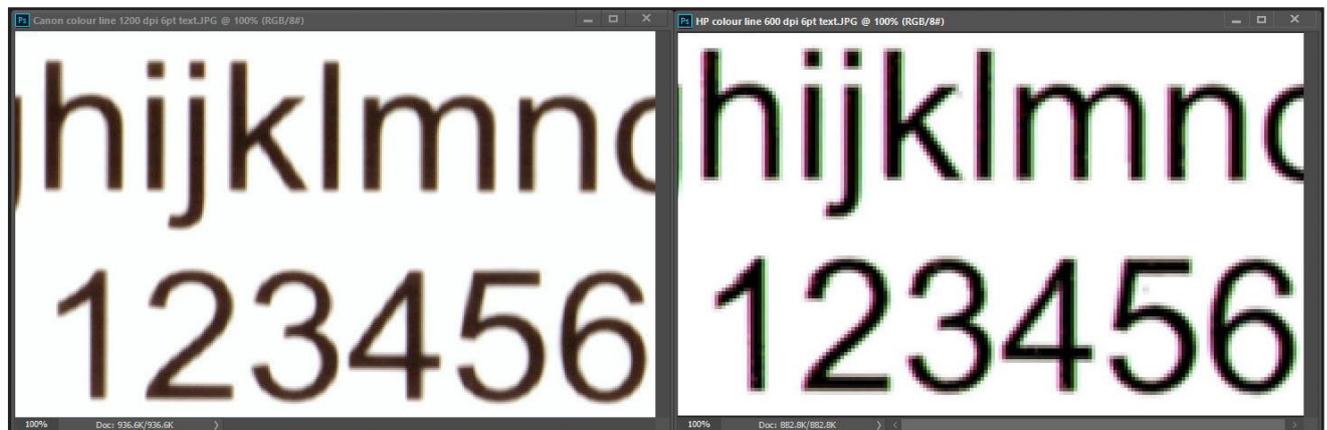
- + The Canon TX-3000 MFP T36 produced higher solid densities for magenta, yellow and black in copy mode, while the HP model produced higher cyan optical density.

- In Standard/Normal mode, the HP model delivered better neutral greyscale coverage, whereas greyscale output from the Canon device displayed a slight magenta hue. However, colour halftones from the Canon unit were more vibrant than those produced by the HP T3500 eMFP.
- + Solids on the QA-1 test chart were dark, smooth and consistent in Standard mode when produced by the Canon unit, whereas the solids produced by the HP T3500 eMFP were less bold and had a 'washed out' appearance.
- + In Buyers Lab's colour fidelity testing which is based on a select range of 12 Pantone shades for corporate logos, the Canon device had an 11.7% lower average Delta E shift of 9.1 compared with 10.3 for the HP unit.

Scan Capture Quality

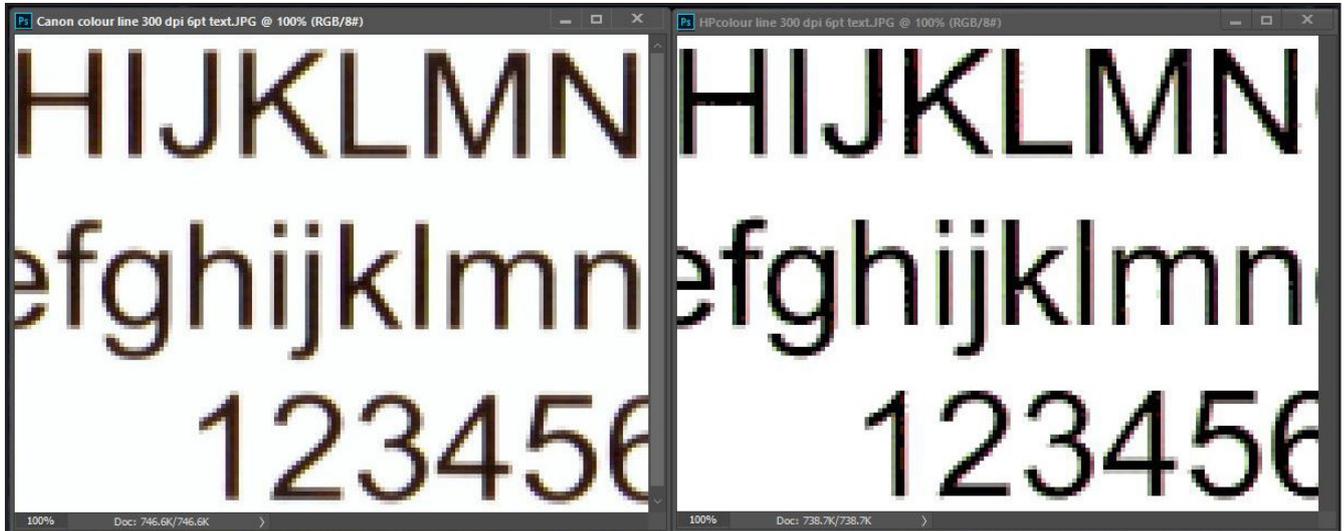
Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Resolution and Sharpness at Optical Resolution	✓	
Text	✓	
Fine Lines	✓	
Geometric Accuracy	=	=
Halftone Capture Quality	✓	

- + When scanning text and fine lines using the QA-1 test chart, the Canon TX-3000 MFP T36 clearly benefitted from using its maximum 1200-dpi resolution, whereas the HP DesignJet T3500 eMFP has a maximum resolution of only 600 dpi. Since PDF file formats are supported only by HP's PostScript sister model, the file was saved as a TIFF file.
- + As illustrated below (under magnification), the Canon model delivered fonts that were crisper and more distinct than those produced by the HP unit, with none of the ghosting that was apparent in fonts produced by the HP model in Fast mode.



Canon (shown left) and HP (shown right) fonts at maximum resolution. Although the HP fonts are darker, they are less well defined and show some colour fringing. All images were scanned using the Colour Line setting on both models.

- Text produced by both models (using Line preset) at 300 dpi was legible down to the smallest 6-pt. level, with very little difference between them.

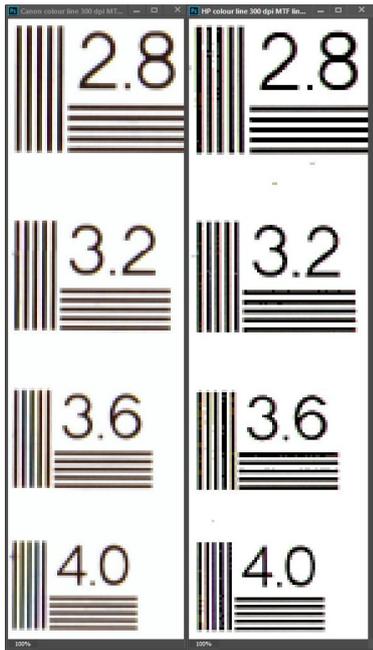


Canon (left) and HP (right) fonts at 300-dpi resolution. Note the pronounced stair-stepping in diagonal lines (K, M, N) from both models.

- + Text In the MTF Line Pairs Test, where the emphasis is on evaluating whether there is a clear distinction between lines rather than the rendering of each line, fine lines at maximum resolution were far more distinct in output produced by the Canon unit compared with the HP unit. Fine lines at 300 dpi were distinct up to the 3.6 level in output for both models.



Canon (left) and HP (right) fine line pairs at maximum resolution.



Canon (left) and HP (right) fine line pairs at 300-dpi resolution.

- Using the Adobe Photoshop Measuring Tool to evaluate geometric accuracy (defined as the variation between the actual length of the document and the length of the scanned image), both the Canon and HP models delivered comparably impressive accuracy, with a variation of 0.1 mm in landscape and 0.2 mm in portrait. (see Supporting Test Data).
- + When scanning the mixed text/image Buyers Lab test chart in full colour at 300 dpi, Buyers Lab technicians found that the Canon TX-3000 MFP T36 delivered far more subtle gradations of halftone shades, especially in dark contrast areas in its Colour Graphic mode, whereas areas of the darker halftones lost a lot of integrity when scanned by the HP DesignJet T3500 eMFP in its Mixed Colour mode. The quality of HP's halftone capture improved markedly when its Image mode was selected.



Halftone capture in full colour at 300 dpi with the Canon model (left) and HP model (centre and right, in Mixed and Image modes, respectively).

Print Productivity

Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
First Page Out	✓	
Throughput Speed (fastest mode)	✓	
Throughput Speed (default mode)	✓	
Throughput Speed (highest-quality mode)	✓	
Job Stream (multiple jobs submitted to device in fast succession simulating busy network environment)	✓	
Dual-roll Job Stream	✓	

- Job stream and colour and black throughput productivity were conducted in Fast/Fast Eco, Standard/Fast and High/Best modes, with the Canon driver set to uncoated media.
- + The Canon TX-3000 MFP T36 was 40.1% faster than the HP model in the first-page-out after a weekend of non-use evaluation, with a time of 86.28 seconds compared with 144.05 seconds for the HP device. Start-up time before printing commenced was, again, faster for the Canon model at 62.25 seconds, compared with 73.63 seconds for the HP unit.
- + The Canon device delivered a 43.8% faster first-page-out time of 45.53 seconds from its ready state, compared with 81.00 seconds for the HP T3500 eMFP. Start-up time before printing commenced was slower for the Canon model (22.53 seconds) versus 10.36 seconds for the HP model, but combined with the first-page-out from ready result, it is clearly the faster model, overall.
- + When printing Buyers Lab’s job stream, designed to simulate a typical mixed workflow for a large-format unit, the Canon TX-3000 MFP T36 was 19.1% faster than the HP model in Fast/Fast Eco mode, 2.4% faster in Standard/Fast mode, and 48.4% faster in High/Best mode.
- + As both models offer a dual-roll design, Buyers Lab conducted a second job stream test, sending the same files as alternate jobs to different rolls to test both models’ efficiency when switching between rolls. The Canon TX-3000 MFP T36 completed the dual-roll job stream in Fast mode in 703.01 seconds—which is 6.6% faster than that of the HP T3500 eMFP model (753.03 seconds) in Fast Eco mode.
- Buyers Lab analysts observed that the actual time taken to switch between rolls (around 22 seconds) was comparable for both models.
- + When printing Buyers Lab’s 12-page DWF test file in colour, the Canon TX-3000 MFP T36 was faster than the HP unit in all modes tested; it was 11.9% faster in Fast/Fast Eco mode; 15.1% faster in Standard/Fast mode; and 59.3% faster in High/Best mode.
- + Similarly, when printing Buyers Lab’s 12-page DWF test file in monochrome, the Canon model was the faster model across the board; it was 6.4% faster in Fast/Fast Eco mode; 14.9% faster in Standard/Fast mode and 59.4% faster in High/Best mode than the HP unit.
- + When printing Buyers Lab’s single-page A0-size Cottage Architectural Plan test target in Standard/Normal mode, the Canon TX-3000 MFP T36 delivered a first-page-out time (114.10 seconds) that was 17.9% faster than that of the HP unit (139.06 seconds). The time to print five A0-size pages was 28.7% faster for the Canon model than for the HP device (497.09 seconds versus 697.56 seconds).

- + The Canon model’s unique sub ink tank system provides a further boost to productivity. When the HP T3500 eMFP 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 a cartridge is being 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 are wasted.

Copy Productivity

Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
A1 (Landscape) First Page Out (fastest mode)		✓
A1 (Landscape) First Page Out (default mode)		✓
A1 (Landscape) First Page Out (highest-quality mode)	✓	
A0 First Page Out (fastest mode)		✓
A0 First Page Out (default mode)		✓
A0 First Page Out (highest-quality mode)	=	=

- In Buyers Lab’s A1 (Landscape) testing in Fast mode in default dpi settings, the Canon TX-3000 MFP’s first-copy time in monochrome was 14.1% slower than that of the HP DesignJet T3500 eMFP; it was 6.3% slower in greyscale and 10.6% slower in colour than the HP unit.
- In Buyers Lab’s A1 (Landscape) testing in Standard/Normal mode, the Canon TX-3000 MFP’s first-copy out time was 48.8% slower than that of the HP DesignJet T3500 eMFP in monochrome, 73.5% slower in greyscale and 60.4% slower in colour than the HP unit.
- + In the highest quality mode at 300 dpi, the Canon model was 9.6% faster in monochrome and 17.8% faster in colour than the HP unit; but in greyscale, it was 6.2% slower than the HP T3500 eMFP.
- In Buyers Lab’s A0 testing in Fast mode in default dpi settings, the Canon TX-3000 MFP’s first-copy out time in monochrome was 15.6% slower than that of the HP model; it was 9.0% slower in greyscale and 15.9% slower in colour.
- In Standard/Normal mode, the Canon device’s A0 first-copy out time was 83.7% slower in monochrome, 82.8% slower in greyscale and 64.2% slower in colour than the HP model.
- O In the highest quality mode in 300 dpi, the Canon model’s A0 first-page out times were 13.2% slower in monochrome and 9.7% slower in greyscale than those of the HP model, however in colour it was 18.6% faster.
- When Normal is selected on the HP model, the printing mode is automatically set to ‘fast mode’ which is likely to have contributed to its faster copy productivity over the Canon model.

Scan Productivity

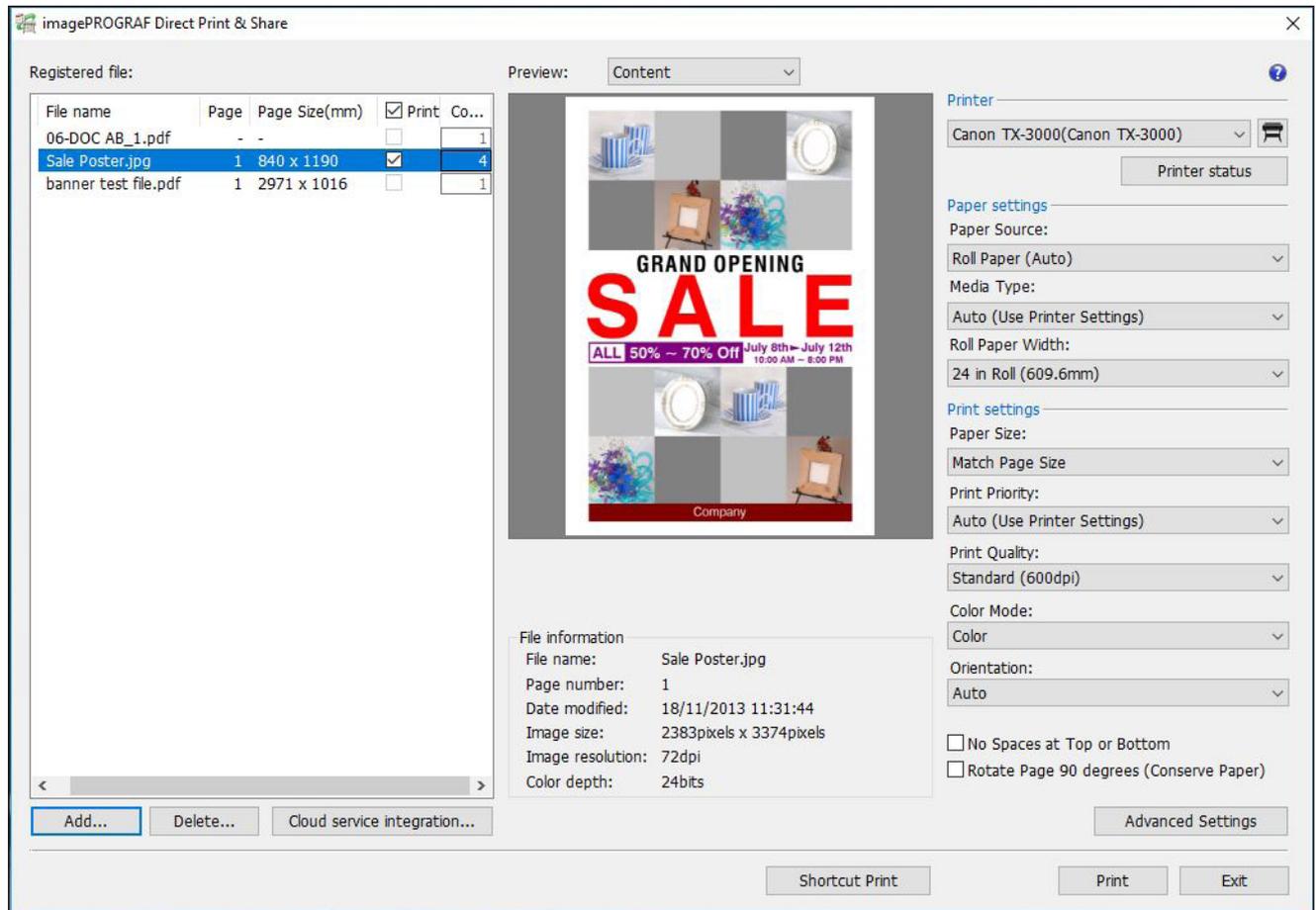
Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Batch Scanning	=	=
Single-Page Scanning	✓	
First Page Out to Desktop	✓	

- + In Buyers Lab’s batch scanning A1 (Landscape) evaluation, measuring the time required to scan 10 pages, the Canon TX-3000 MFP T36 was 11.8% faster than the HP T3500 eMFP in monochrome at 200 dpi and 19.0% faster at 300 dpi; in greyscale it was 3.6% faster at 200 dpi and 6.2% faster at 300 dpi.
- However, results for batch scanning A1 (L) test in full colour were in the HP T3500 eMFP’s favour, with the Canon device 3.5% slower at 200 dpi and 5.9% slower at 300 dpi.
- + In Buyers Lab’s A1 (L) scan throughput testing, timing from initiation to the document exiting the scanner, the Canon TX-3000 MFP T36 was faster in all modes tested, with speeds that were 54.2% faster in monochrome at 200 dpi and 56.1% faster at 300 dpi; in greyscale mode, the Canon model was 56.8% faster at 200 dpi and 55.4% faster at 300 dpi; at 200 dpi and 300 dpi in colour mode, the Canon model’s performance was 31.5% and 18.1% faster, respectively, than the HP model.
- + Similarly, in Buyers Lab’s A0 scan throughput testing the Canon TX-3000 MFP T36 was 52.3% faster than the HP DesignJet T3500 eMFP in monochrome mode at 200 dpi, and 19.0% faster at 300 dpi; in greyscale mode, the Canon model was 51.9% faster at 200 dpi and 21.0% faster at 300 dpi; in colour mode, the Canon model was 27.4% faster at 200 dpi and 11.5 % faster at 300 dpi.
- + In Buyers Lab’s scan-to-desktop A1 (Landscape) testing, measuring the time taken from initiation to the scan appearing at the desktop, the Canon TX-3000 MFP T36 was faster than the HP model in all modes tested. It was 43.7% faster in monochrome at 200 dpi, and 48.9% faster at 300 dpi; in greyscale mode, the Canon model was 42.1% faster at 200 dpi, and 42.2% faster at 300 dpi; in colour mode, the Canon unit was 47.4% faster at 200 dpi and 33.3% faster at 300 dpi.
- + In Buyers Lab’s scan-to-desktop A0 testing, the Canon TX-3000 MFP T36 was 39.0% faster than the HP model in monochrome at 200 dpi, and 39.0% faster at 300 dpi; in greyscale mode, the Canon model was 38.9% faster at 200 dpi and 32.7% faster at 300 dpi; in colour mode, the Canon model was 44.4% faster at 200 dpi and 28.2% faster at 300 dpi.

Direct Print Submission Functionality

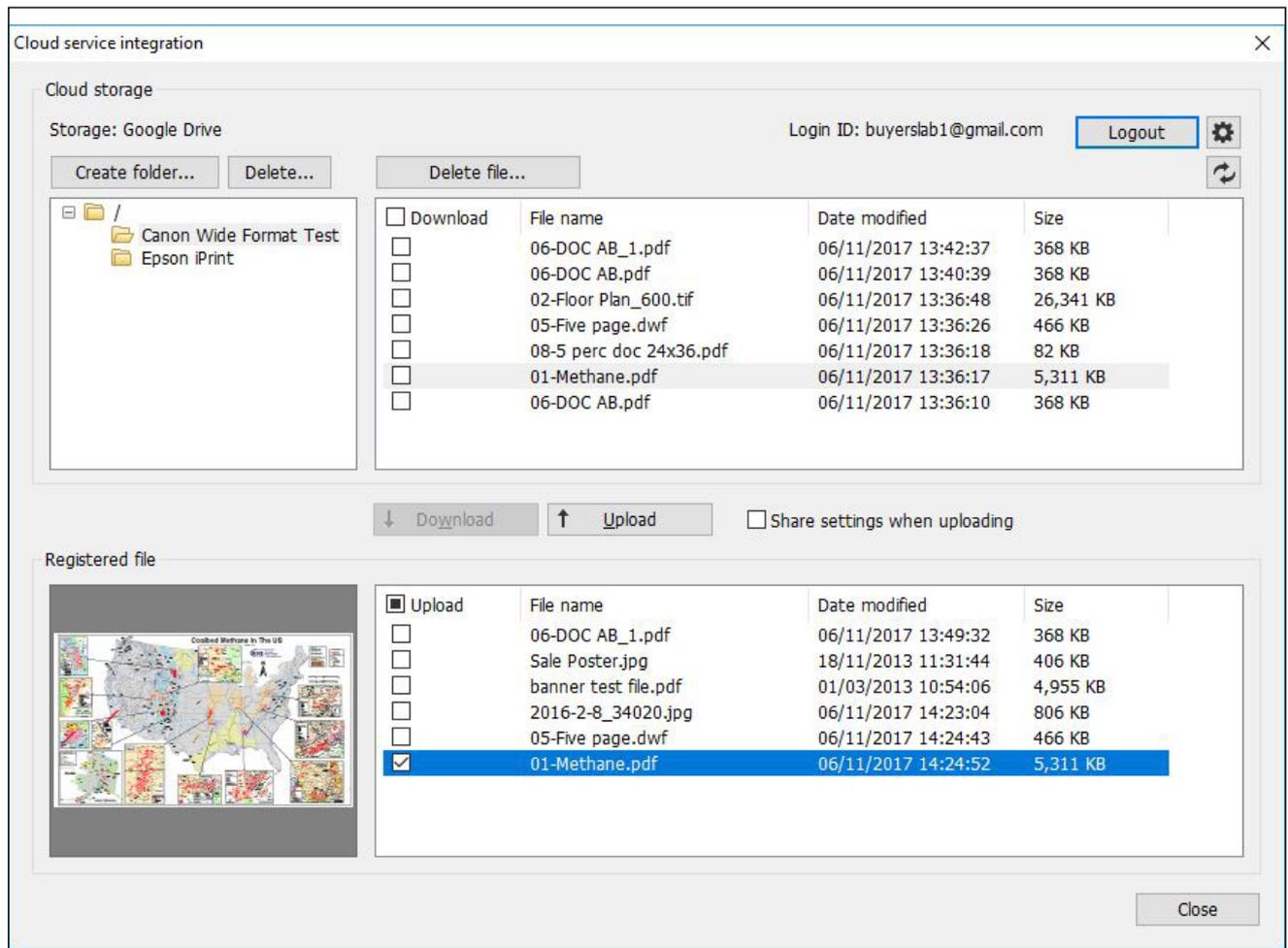
Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Ease of Use	=	=
Direct Print Submission Functionality	=	=

- 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.



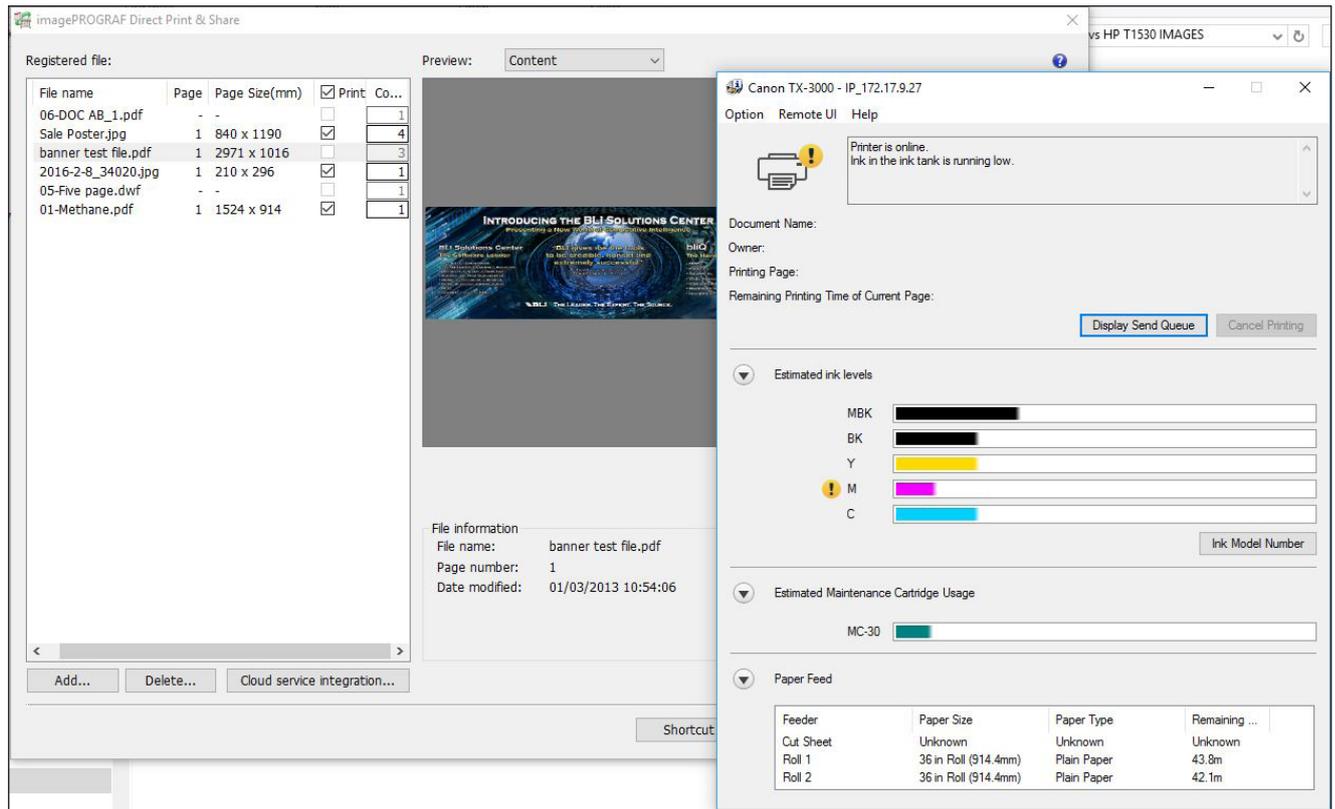
Canon’s imagePROGRAF Direct Print & Share utility gives users an image preview.

- Canon’s imagePROGRAF Direct Print & Share 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.



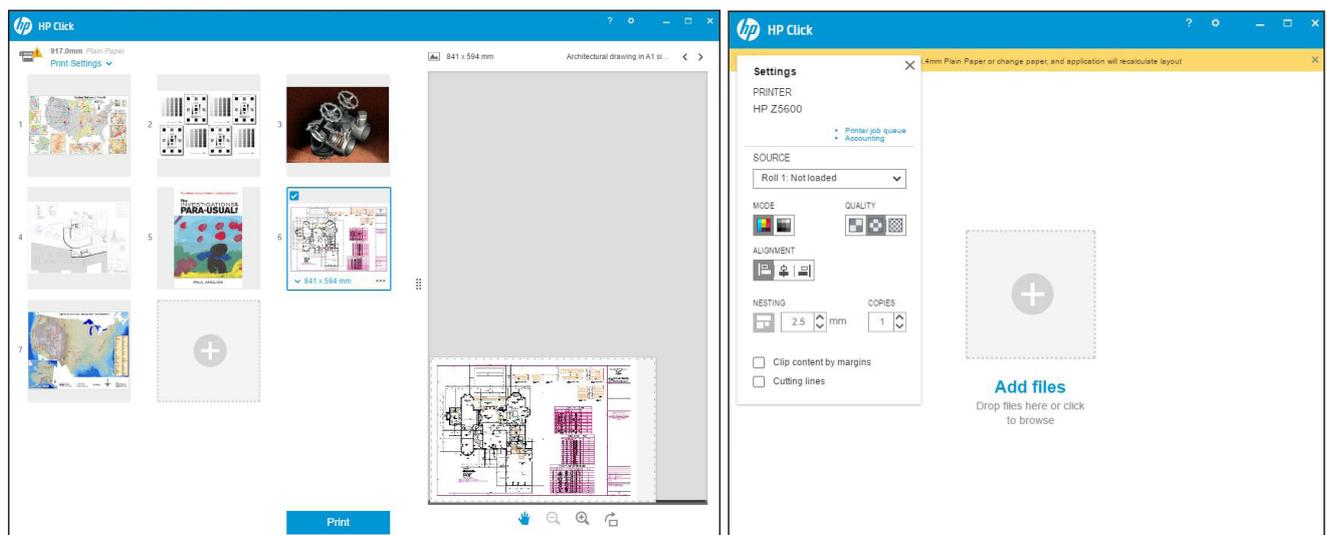
Retrieving files from Google Cloud using imagePROGRAF Direct Print & Share.

- 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 imagePROGRAF Direct Print & Share utility.

- 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.

- The HP T3500 eMFP 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.
- 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 flexibly.

Banner Printing

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Image Quality	=	=
Productivity	✓	

- + Both models successfully printed Buyers Lab's 36" x 105" banner (a 4,955-KB PDF file) in Fast mode. The HP DesignJet T3500 eMFP took 3 minutes, 36.7 seconds to create a preview at the desktop, and an additional 2 minutes, 2.25 seconds from preview to final paper cut. In contrast, the Canon model took 7.68 seconds to generate a preview at the desktop, and an additional 1 minute, 54.53 seconds from preview to final paper cut for the Canon model. With a total preview and print time of 2 minutes, 2.21 seconds, the Canon TX-3000 MFP T36 is clearly the faster model.



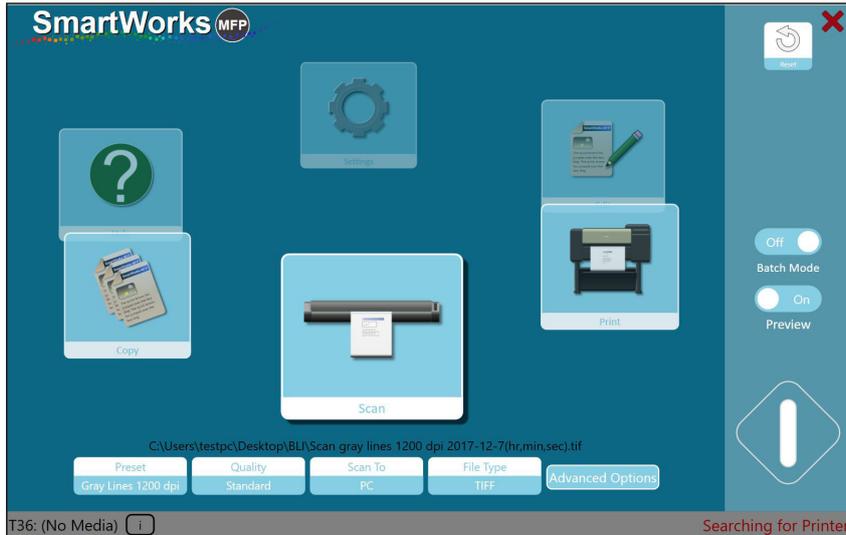
Buyers Lab's Banner Test File

Walk-Up Ease of Use

Advantage ✓	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Touchscreen Interface	✓	
Scanner Media Handling	✓	
Print Media Handling	=	=
User Maintenance/Consumable Replacement	=	=
Copy Programming	✓	
Scan to Desktop/Network Folder Programming	=	=
Scan to Email/USB/Cloud Programming	✓	
Stored Job Reprinting (including via USB key and cloud)	✓	

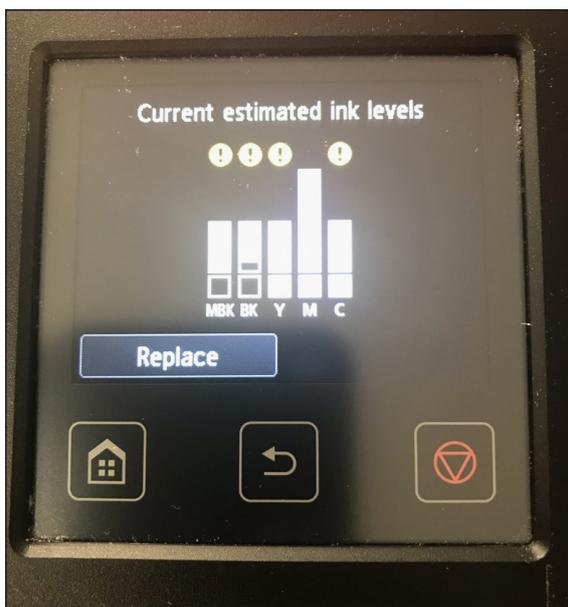


The Canon TX-3000 MFP's T36 Colortrac Scanner is operated via the All-in-One (AIO) PC system, which features a large 15.6-inch colour touchscreen user interface and updated SmartWorks software. The MFP scanner and AIO system has been designed to be more closely integrated with the main unit than previously seen with Canon MFP models, thus reducing the MFP's overall office footprint.

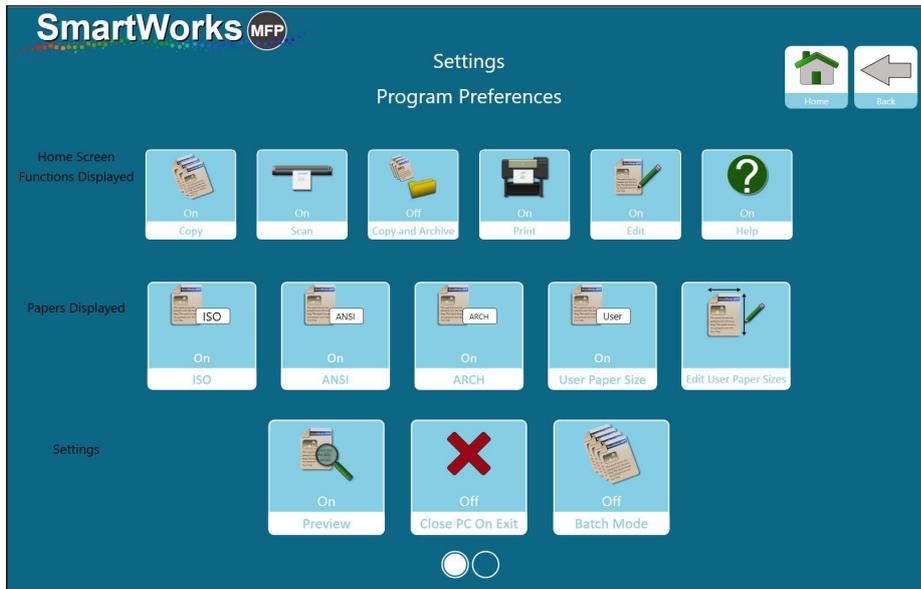


SmartWorks MFP Home Screen

- + The Canon TX-3000 MFP T36 has a 15.6” All-in-One (AIO) touchscreen monitor for programming copy and scan jobs, whereas the HP T3500 eMFP has a smaller 4.3” touchscreen LCD display.
- + Buyers Lab technicians were very impressed by the Canon TX-3000 MFP’s touchscreen interface which is intuitive and responsive, and offers a familiar Windows-based environment to reduce the learning curve for first-time users. All main functions—Copy, Scan and Print—are available from the icon-based carousel on the SmartWorks home page, along with Settings, Presets and Help options. When a function is selected, the current active job settings for that function are shown on the bottom of the home screen; these can be edited by clicking on the buttons or via the ‘Advanced Options’ button, so users have full control over all settings, which greatly simplifies job programming at the device. Users can ‘pinch and zoom’ to enlarge specific areas of the touchscreen, and, when zoomed in, pan with one finger on the image. A ‘Virtual Keyboard’ can be displayed to make it easy to enter email addresses and a numerical keypad can also be displayed for quantity selections.
- However, although the angle of the Canon AIO touchscreen can be adjusted, it’s positioned at a height that makes it inaccessible to users in wheelchairs. The HP control panel display can be raised or lowered to adjust the viewing angle.

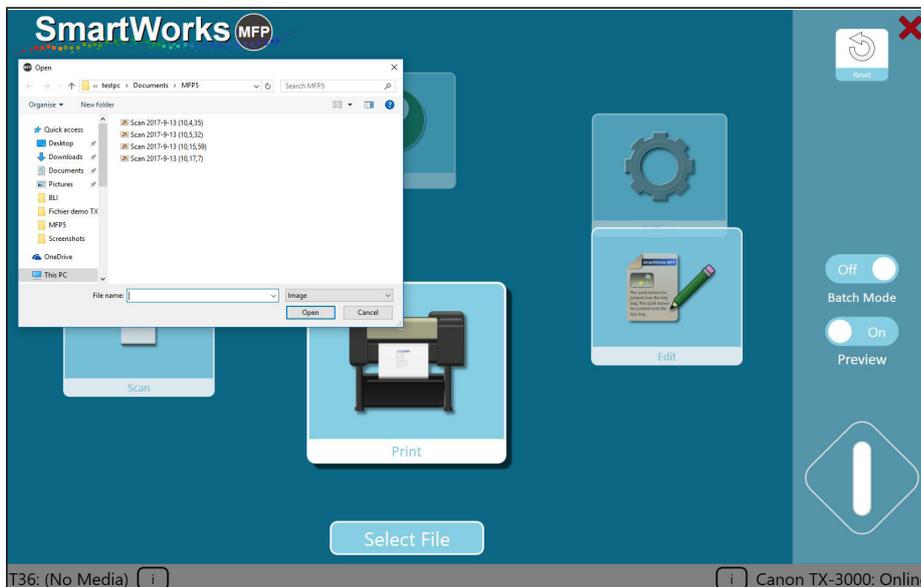


The Canon TX-3000 MFP’s control panel on the main unit displays feedback on consumable levels.

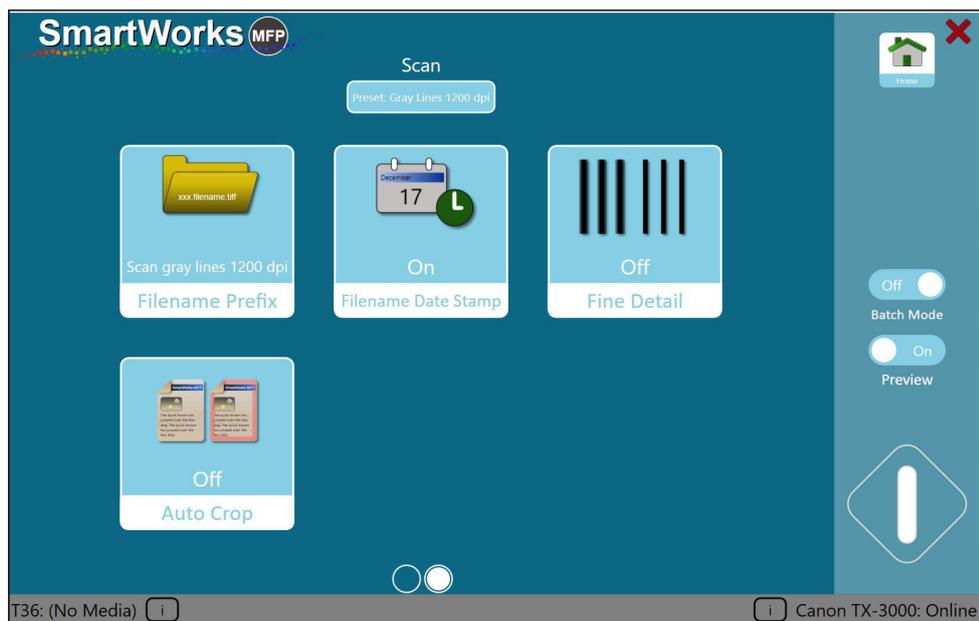
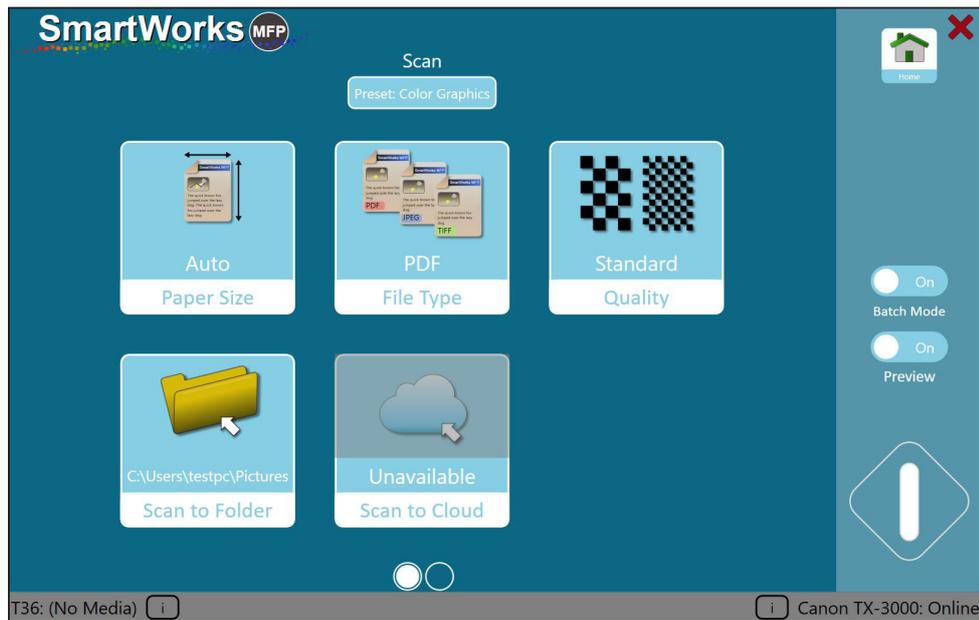


Users can configure the SmartWorks Home Screen appearance and enable settings such as Batch Mode and Preview, via the Program Preferences screen.

- Not all device control for the Canon unit is provided by the AIO touchscreen with media control, ink and print-head maintenance and other tasks accessed via the Canon printer's LCD control panel on the main unit, which has a small but responsive touchscreen and soft button navigation controls.

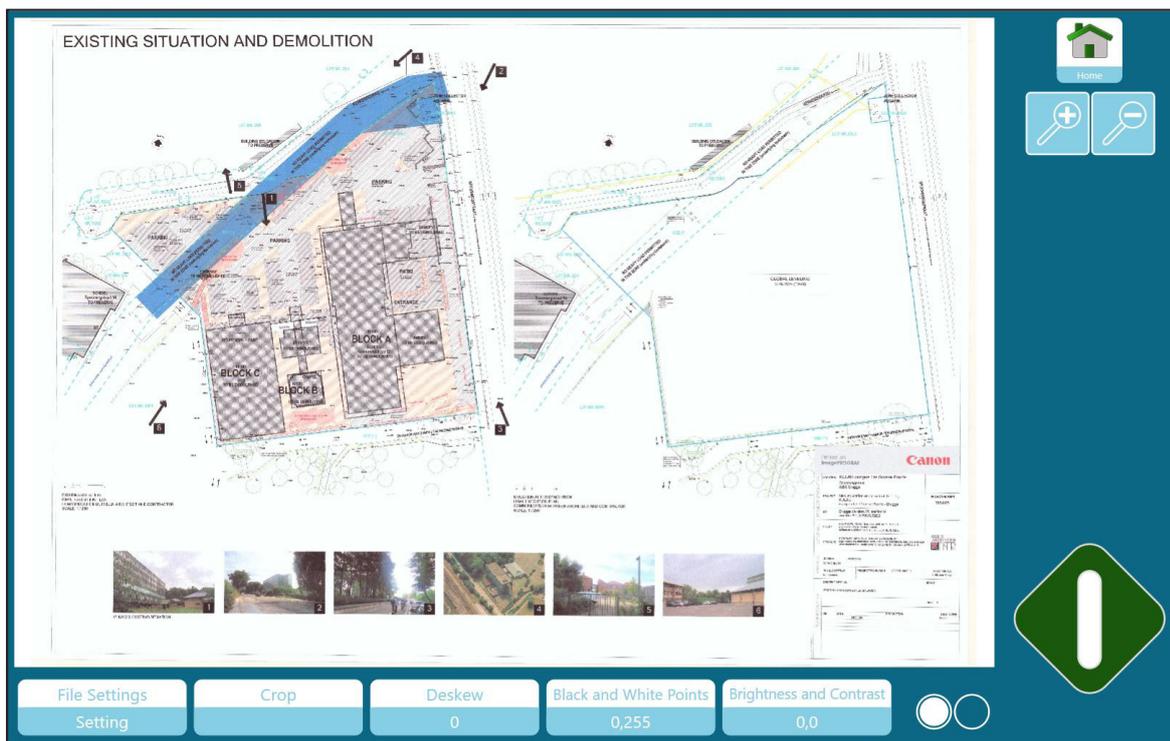
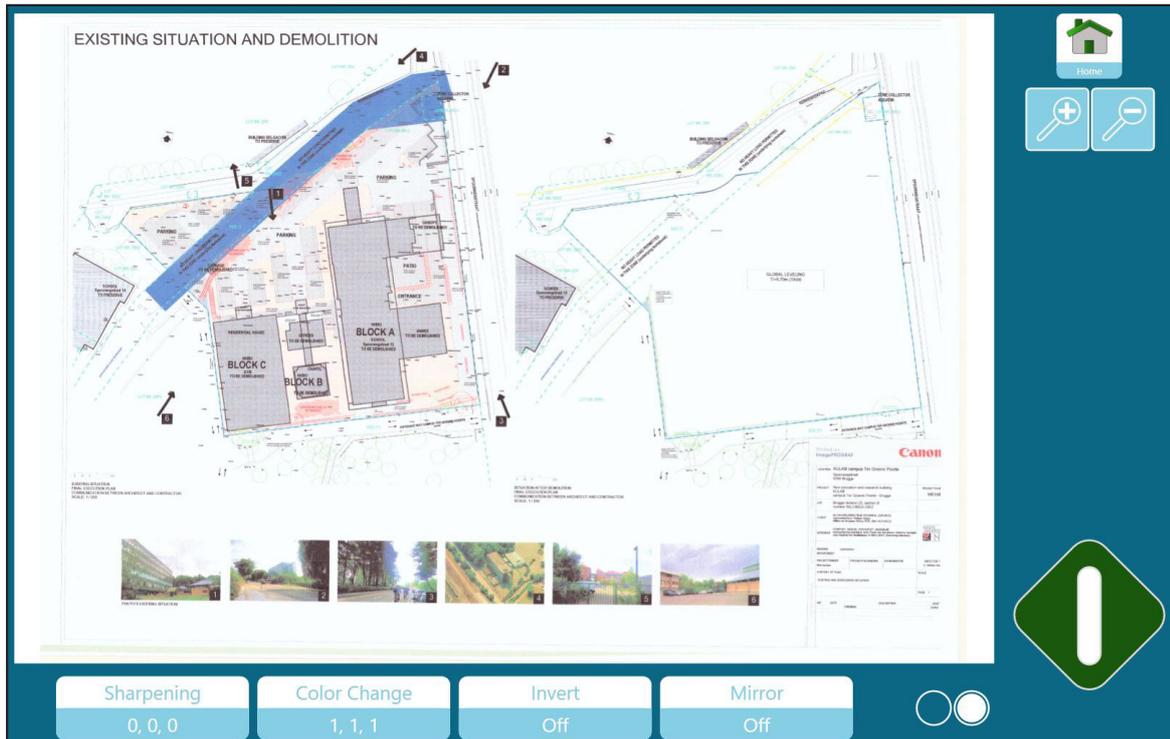


SmartWorks MFP offers users the ability to browse network folders and select files for printing easily.



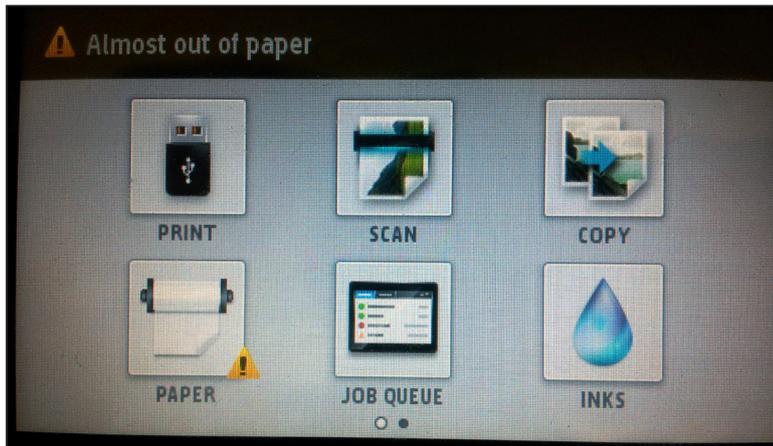
SmartWorks Scan adjustment settings (shown top and bottom).

- + The Canon model's Copy, Edit, Scan and Print functions all offer a Preview screen with the document displayed in the centre and a variety of image adjustment options—Crop, Deskew, Black Point & White Point, Brightness and Contrast, Sharpening, RGB Colour Change, Invert, Mirror and Simple/Adaptive Threshold—running along the bottom of the screen. Users are given full control over image quality before jobs are released. The preview allows users to zoom in multiple levels of magnification on a linear scale (whereas the HP unit's preview screen permits only three levels of magnification). The Canon SmartWorks MFP interface entails a simplified, time-saving Scan/Adjust/Print workflow. In contrast, the HP model entails a workflow of Scan/Print/Check Print/Change Settings and Re-scan/Reprint/Repeat as necessary, which is clearly more time-consuming for real-world applications.

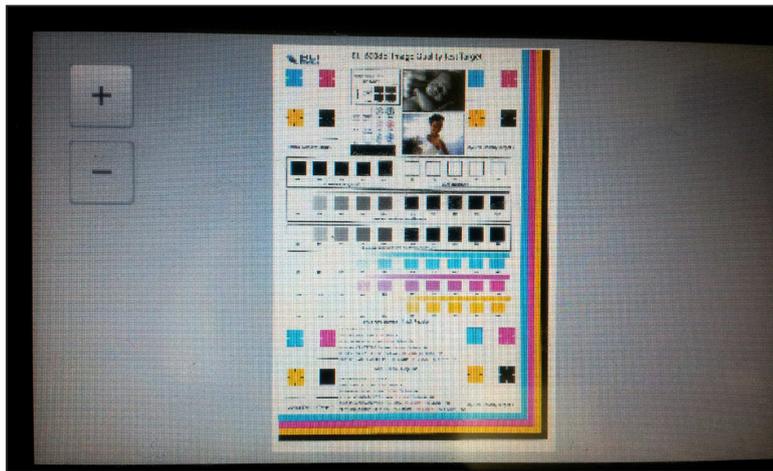


Preview screen showing the range of image adjustment settings available from two menu screens (shown top and bottom).

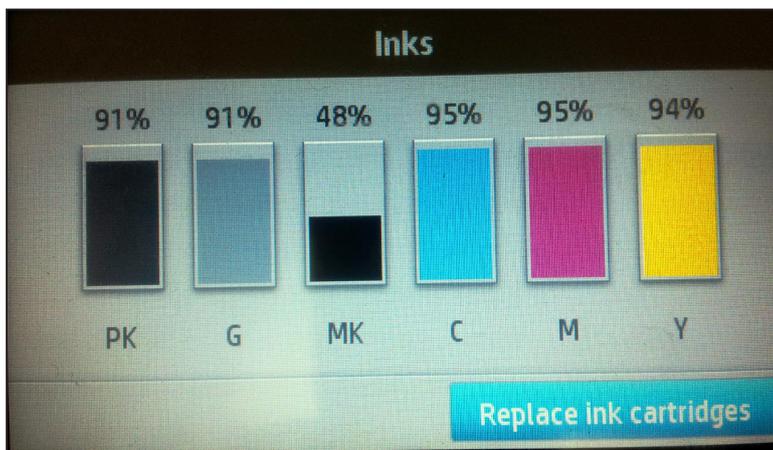
- + The HP T3500 eMFP's touchscreen UI is bright and easy to navigate, however Buyers Lab technicians found it more difficult to use as the screen had to be tapped quite firmly in order to elicit a response. In addition, the buttons on the keyboard display are fairly small, which makes entering email addresses more of an error-prone process compared when using the Canon MFP's larger virtual keyboard.



HP DesignJet T3500 eMFP Home Screen



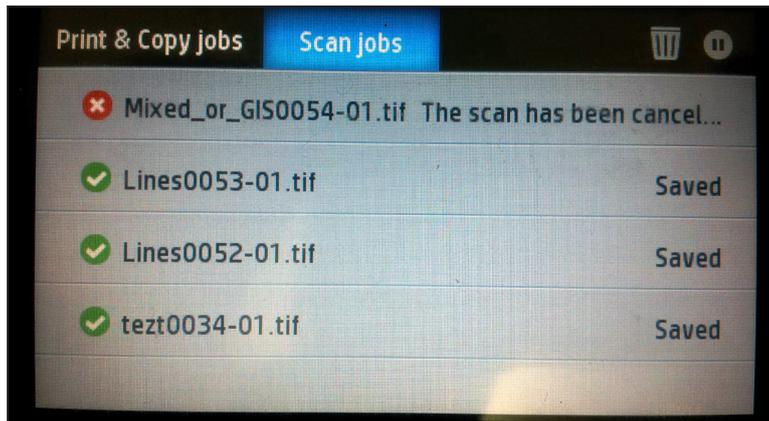
HP DesignJet T3500 eMFP Preview Screen



Percentage of ink remaining is displayed in 1 percent increments.



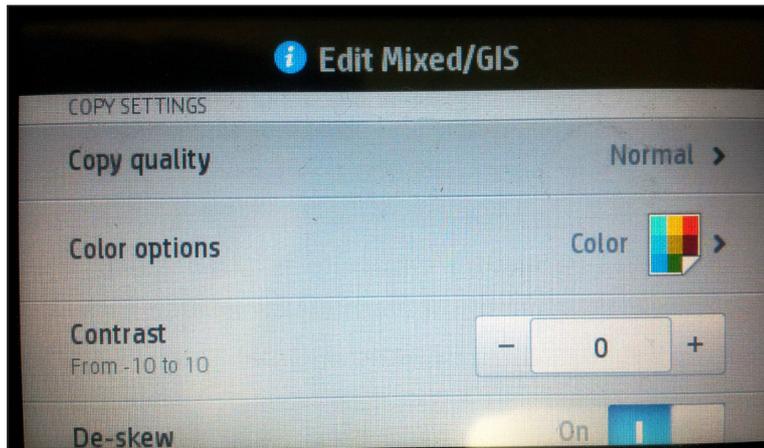
HP DesignJet T3500 eMFP Scan Screen



Scan Job Log on the HP DesignJet T3500 eMFP



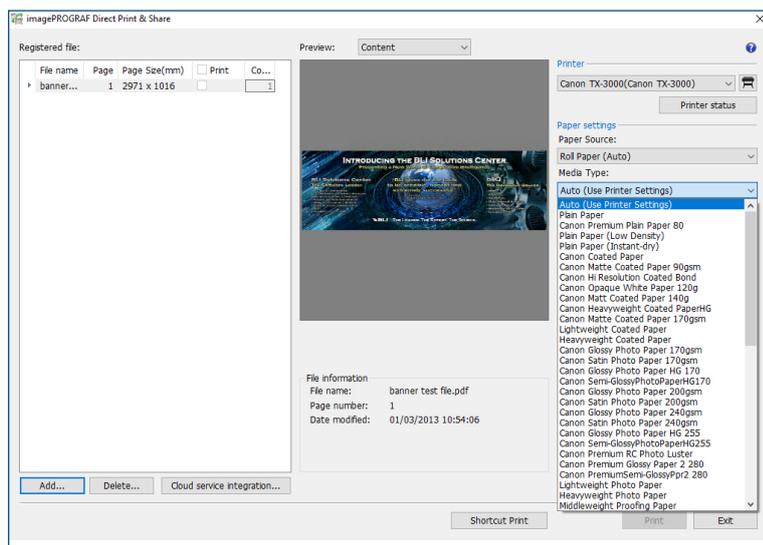
HP DesignJet T3500 eMFP Scan Quicksets Screen



HP DesignJet T3500 eMFP Scan Image Adjustment Screen

Media Handling

- Both MFPs are compatible with a wide range of media types. The Canon unit supports 53, plus 10 user-defined media types, while the HP unit supports 33, including Coated and Heavyweight Coated, as well as Matte Photo, Premium Gloss Photo and Semi-Gloss/Satin media for photographs. A specific drying time is built into many of the selections to ensure that prints will be dry after completion. Custom media types can be added and saved as well.



Canon's imagePROGRAF Direct Print & Share displays a wide range of media types.

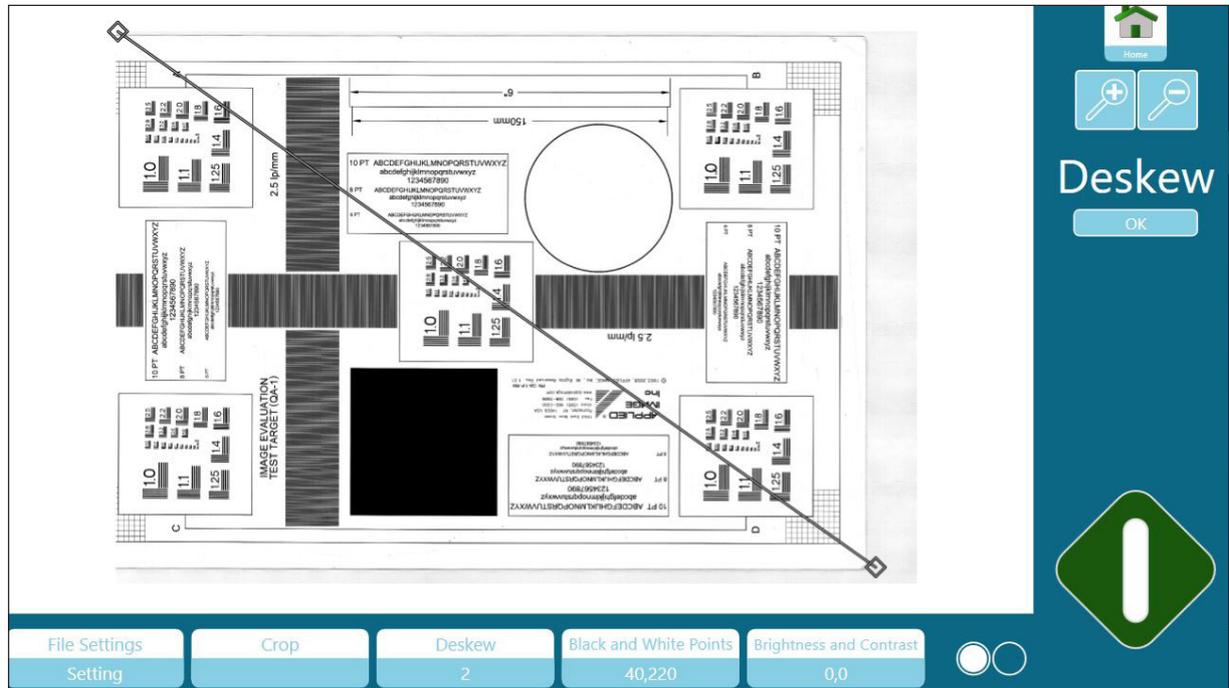
- For maximum convenience and minimum downtime, both models offer the advantage of a dual-roll design, giving users the flexibility of readily switching between different media types and sizes without having to reload each time a second media selection is required.

- Both devices employ automatic roll switching, so that jobs are automatically routed to a second roll after the first is depleted. If this happens while a page is printing, the page will be printed in its entirety once a new roll is loaded without further user intervention.
- The Canon model provides excellent ease of access when loading or unloading rolls at the front of the device. However, if the stacker assembly is already attached to the device, operators will need to remove it in order to gain access to load the rolls. In contrast, the second roll is located at the rear of the HP printer, making it more awkward to access.
- + Buyers Lab technicians found loading cut-sheet media on the HP DesignJet T3500 eMFP was slightly more challenging than loading roll media, and often were unable to load cut-sheet media correctly on the first attempt. The operator manually inserts the sheet on the right hand side, aligning the edge with a slightly raised line at the far right of the unit's cover. Several times during the process, the control panel reported that the sheet was skewed. The media lever had to be released and the sheet repositioned before returning the lever to its locked position. This process had to be repeated several times. Buyers Lab technicians found loading cut-sheet media on the Canon TX-3000 MFP to be a fairly straightforward process; the user must press the Load button on the touchscreen control panel and then open the cover and lift the release lever located on the right of the device in order to insert the sheet into the gap at the front of the device. There are insertion guide marks to help the user to judge where to align paper.
- Both models coped well when handling creased or folded originals.
- However, Buyers Lab technicians observed that if an original is excessively curled, the document will catch inside the Canon unit leading to tiny tear marks appearing on the leading edge of the original. Operators should be vigilant and use a document carrier sheet as a precaution against tearing.
- + The Canon TX-3000 MFP T36 was able to scan and copy lightweight documents such as a newspaper in both portrait and landscape, whereas the HP T3500 eMFP's scanner could not handle these. When Buyers Lab technicians attempted to scan a newspaper spread on the HP unit, the original would not feed into the scanner, leaving the paper crumpled.



The Canon MFP scanned a double-page newspaper original in both portrait and landscape.

- For maximum convenience and minimum downtime, both models offer the advantage of a dual-roll design, giving users the flexibility of readily switching between different media types and sizes without having to reload each time a second media selection is required.



SmartWorks MFP Deskew Function

- Buyers Lab technicians were highly impressed with the design and build quality of the HP T3500 eMFP’s rear-mounted stacker assembly which can hold up to 50 printed sheets of multiple media sizes in perfect alignment, while a built-in sensor detects when the stacker is full and halts operation (which prevents paper spillage or paper jamming issues), allowing the operator to unload the stacker, after which it resumes automatically. Moreover, the stacker was capable of holding 100 A0-size prints very neatly.



HP T3500 eMFP stacker holding 100 A0-sized prints in perfect alignment.



HP T3500 eMFP stacker holding 100 A1-sized prints in perfect alignment.

- + Although it took several attempts to install the Canon's stacker assembly in the correct configuration, and at times during testing it required more operator intervention to ensure output was being stacked correctly, Buyers Lab technicians noted the 100-sheet capacity stacker held A0- and A1-sized CAD prints in good alignment. In fact, it was capable of holding up to 150 A0-size sheets without issue (although it should be noted that the weight of the print stack would make it difficult to lift and remove the sheets from the stacker).
- While Canon's high-capacity stacker is better suited for stacking CAD drawings, the HP unit stacks any type of output (CAD or poster prints) in a consistent manner.



The Canon MFP stacker held A0 and A1 sheets in good alignment.

User Maintenance/Consumable Replacement

- Ink replacement is a very simple process with both devices. The HP MFP has three ink cartridges at each end, including separate cartridges for Photo Black, Matte Black and Grey. Each cartridge is slotted differently to prevent incorrect replacement. Inks are located on the right hand side of the Canon device; the user needs to lift the ink cartridge cover and pull a blue lever to release the ink tanks. If the AIO PC is attached to the device, the user must swivel the monitor in order to gain easier access.
- + Ink cartridges can be replaced during operation with the Canon model, but not with the HP device, helping to reduce operator downtime.
- Printhead replacement is a straightforward process with both devices, and takes a comparable amount of time to complete.
- The Canon device also includes a maintenance cartridge for waste that will occasionally need to be changed. This process cannot be conducted during printing. Note: Buyers Lab conducted three maintenance cartridge changes during its lab evaluation.



Replacing ink tanks on the Canon TX-3000 MFP is very easy; however, the AIO monitor will need turning to one side to gain better access to the ink cartridge assembly.



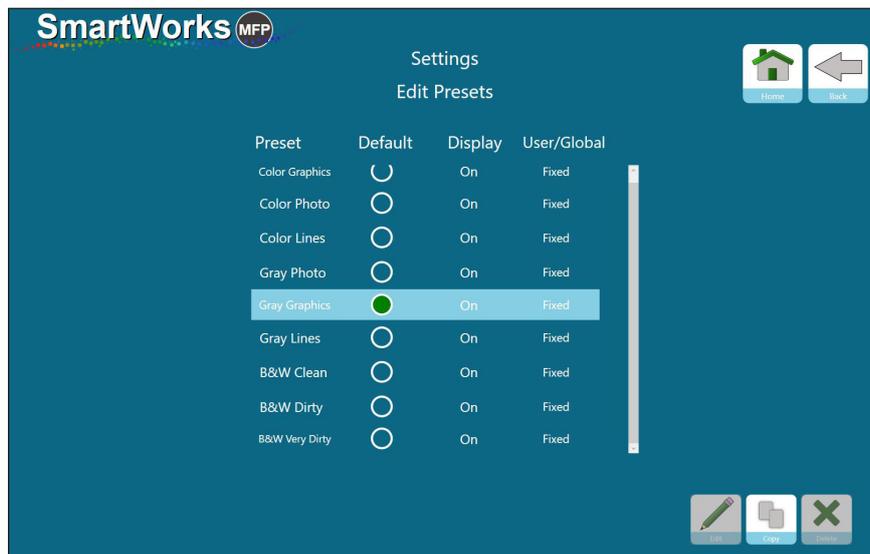
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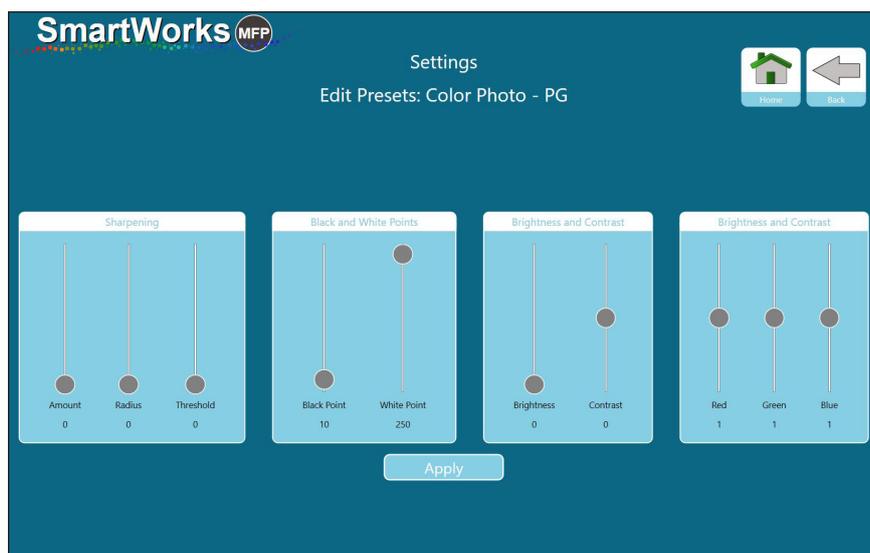
Loading ink is a straightforward process on the HP DesignJet T3500 eMFP.

Copy Programming

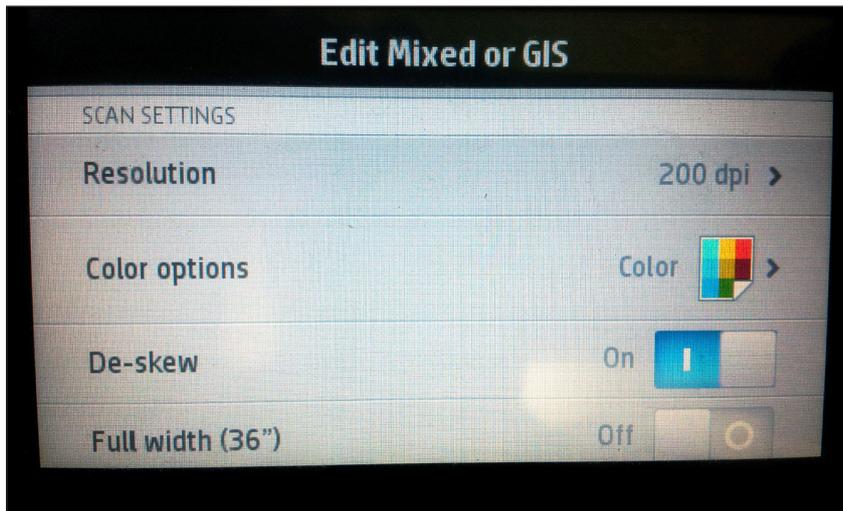
- + The Canon touchscreen in Copy mode offers a choice of nine (fixed) preset profiles, which include Colour Graphics, Colour Photographic images, etc., and new custom preset profiles can be created as well via the Settings screen, Presets option. Buyers Lab technicians found the process of creating copy presets very straightforward and were able to add at least 20 custom presets. Custom presets—not fixed presets—can be named, edited and deleted. The HP unit offers four image type presets (Quicksets, Images, Lines and Mixed Originals); under Quicksets, a number of preset options (b/w lines, colour lines, mixed/GIS and photo) are available and users can add custom copy presets as well. In addition, users can specify the original paper type (White Paper, Photo Paper, Blueprints, Recycled and Translucent).



SmartWorks MFP Copy Fixed Presets



SmartWorks MFP offers various image adjustment settings when creating copy and scan presets.



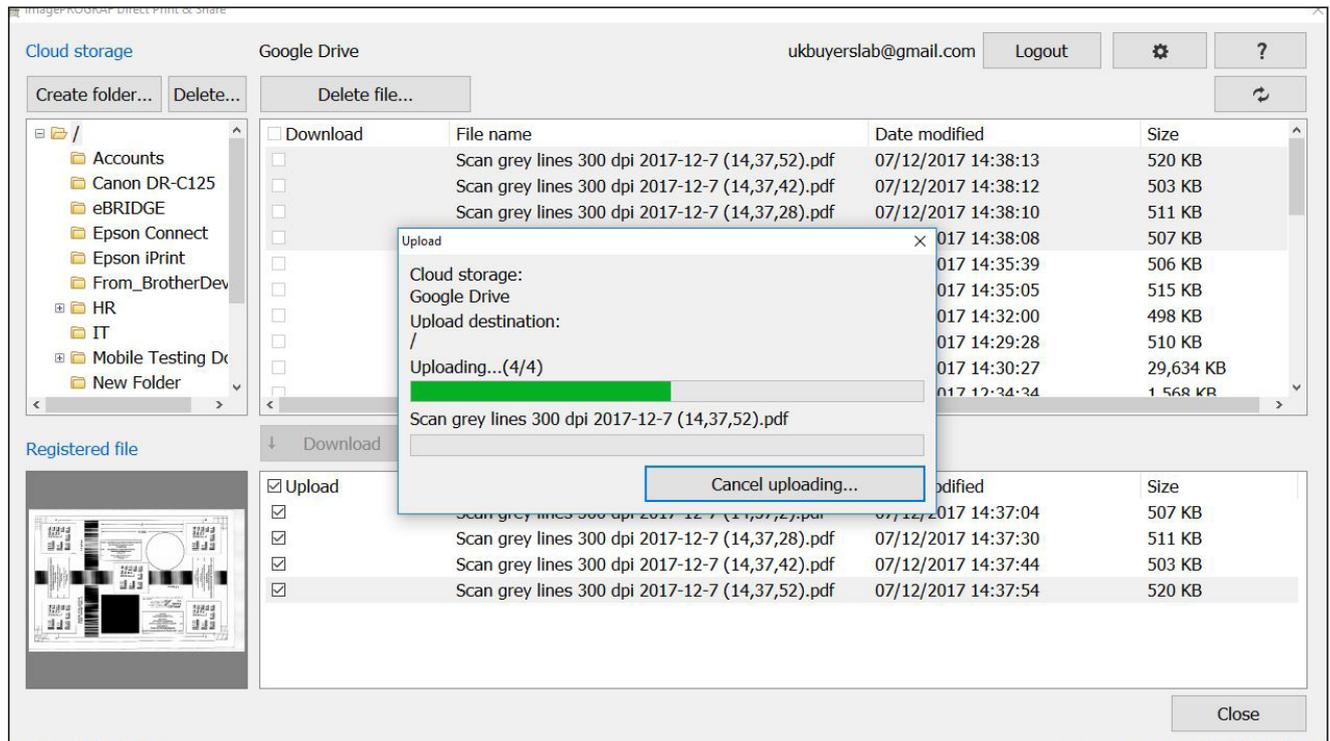
HP DesignJet T3500 eMFP Copy Screen

Scan to Desktop/Network Folder Programming

- The same 'Preview & Edit' functionality, with a similar list of fixed preset scan profiles and a full listing of setting selections, can be used in Canon's Scan mode, and again, users have the same ability to create and edit new presets. 'Scan to PC' is the default destination except when a USB flash drive is inserted. Users can edit custom presets to change the Filename Prefix, the Scan Folder destination, File Type and File Compression for JPG and PDF files, and can opt to scan concurrently both to the cloud and one other destination, with a date stamp automatically added to the file name if desired. Batch Mode is selectable at the right of the screen so that documents can be combined together in a single folder without the need for additional third-party software. Scanning to a network folder was straightforward on the HP T3500 eMFP, and the HP unit also supports batch scanning which expedites more scan-intensive workflows.

Scan to Email/USB/Cloud Programming

- The Canon TX-3000 MFP T36 does not support scan to email functionality, whereas the HP T3500 eMFP does.
- + However, scan to cloud functionality is offered on the Canon MFP and not the HP unit.
- + The Canon imagePROGRAF Direct Print & Share utility must be installed on the same PC as SmartWorks MFP to enable the Scan to Cloud option. As noted above, scanning to the cloud (Google Drive only) and one other destination (USB or network folder) with the Canon TX-3000 MFP T36 is a quick and easy process, with files being uploaded or downloaded quickly, with no apparent delays. Multiple files can be scanned and then uploaded in one go.



Uploading multiple scan files to Google Drive cloud account via SmartWorks MFP.

- When a USB flash drive is inserted on the Canon TX-3000 MFP T36, the Windows-based AIO system registers the USB drive and users can browse into sub-folders and create new folders to store scanned documents, as well as edit filenames. When a USB drive is inserted on the HP T3500 eMFP, it provides the user with two options: 'Print Documents' or 'Scan To'. When scanning to USB, users can opt to save the file in JPEG or TIFF format, and make other selections like resolution and colour mode, as well as input a file name. Users are notified when the scan job is completed and the file is saved successfully on the USB drive; users must actively eject the original from the device. Scan files are saved into a specific sub-folder (HPSCANS) which is automatically created on the USB drive.

Stored Job Reprinting (including via USB flash drive and Cloud)

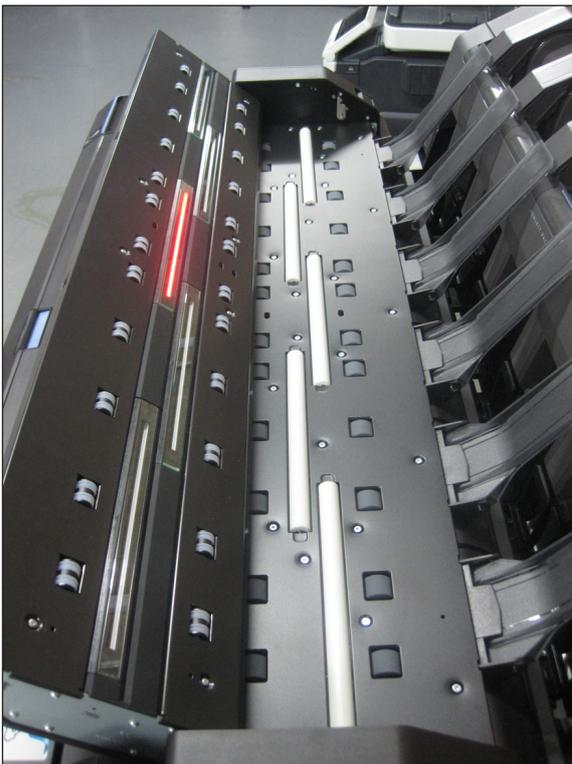
- + Although printing from a USB flash drive is a straightforward process with both models, with full control over document settings, the HP DesignJet T3500 eMFP's lack of support for printing PDF files (only available with the more expensive PostScript version of the eMFP) is a major limitation.
- With the Canon TX-3000 MFP T36, jobs that need reprinting can quickly and easily be retrieved either from the device hard drive, PC network or cloud storage (via the Direct Print & Share utility), with the same Preview & Edit functionality giving full control over output quality and settings. The Canon Print Service mobile app lets users print directly from their Android mobile device to a TX-series printer model.

(See the section on Direct Print Submission above for Buyers Lab's analysis of the differences between the two utilities in terms of functionality and ease of use).

Device Feature Set



Canon's SingleSensor array extends across the full width of the T36 scanner.



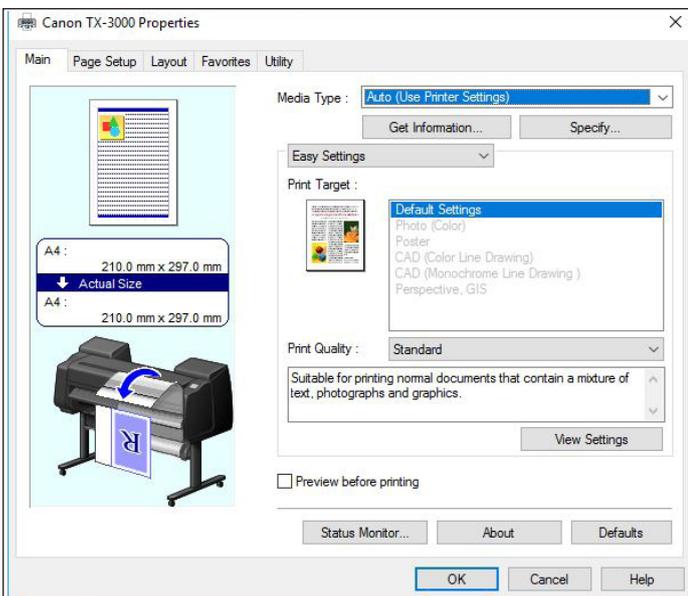
HP DesignJet T3500 eMFP scanner, showing its staggered array of RGB LEDs.

- + The Canon MFP's T36 scanner offers a wider range of eight scanning resolutions from 100 to 1200 dpi, whereas the HP unit's scanner only offers three—from 200 to 600 dpi.
- + The Canon MFP T36 scanner offers superior media-handling capabilities; it can handle documents up to 965 mm by 15,200 mm in size compared with 610 mm by 15,000 mm with the HP scanner. In addition, the Canon scanner can accommodate media up to 2.0 mm thick when the rear exit paper path is used (and with operator assistance to guide paper as it enters and exits the scanner), compared with just 0.8 mm with the HP scanner.

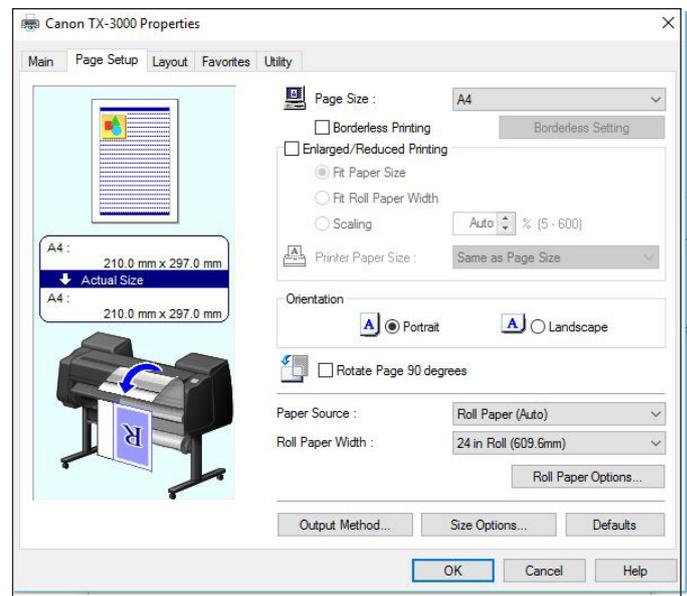
- + Scanned images can be saved as TIFF, JPEG or PDF files with the Canon TX-3000 MFP T36, whereas the HP device offers PDF file scan creation only with the more expensive PostScript version of its eMFP.
- O Both devices support batch scanning, which helps to boost productivity in many environments.
- + The HP T3500 eMFP can perform one function at a time only; it can scan or print, but not both at the same time, whereas the Canon T36 scanner is capable of scanning while printing.
- + The total capacity of the Canon TX-3000 MFP T36's starter ink cartridges is 970 ml, which is more generous than the HP T3500 eMFP's 375 ml total starter ink volume.
- + Canon's replacement cartridges are 160 ml, 330 ml and 700 ml for all colours, whereas the HP model offers 300 ml for all colours, and as a consequence they will need replacing less frequently than with the HP device.
- + Canon's ink cartridges are replaceable during operation, which helps reduce downtime for Canon 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 one user-replaceable printhead, taking less than five minutes to replace on both models.
- + The Canon unit supports a higher maximum cut-sheet media length of 1.6 m compared with 914 mm for the HP unit.
- The HP unit supports a larger diameter of roll paper (180 mm as opposed to 150 mm with the Canon device).
- + The Canon device supports a maximum media thickness of up to 0.8 mm as opposed to a maximum of 0.5 mm for the HP model.
- HP's Color Center utility offers third-party media and colour calibration management, while the Professional PANTONE Emulation feature enables the creation of swatch-books containing virtually any user-specified PANTONE colours to see how accurately they can be reproduced on the chosen media. These features are not supported by the Canon unit.
- O Both models offer easy and quick roll paper loading with auto paper feed—once the user loads paper on the device, alignment and width adjustments are automatically carried out without further user intervention.
- + The Canon model accommodates both 2" and 3" core adaptors, which provides additional flexibility for media handling. The HP model supports 3" core adaptors for use with 3" core media only as an option.
- + The Canon TX-3000 MFP supports borderless printing regardless of what roll media type is being used, whilst the HP T3500 eMFP supports this capability only when photo paper is selected.
- 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 which are slated for the paper types that are already loaded will be printed without delay.
- + The Canon TX-3000 MFP T36's high-capacity stacker can accommodate up to 100 printed sheets (depending on paper weight and thickness), while the HP T3500 eMFP's rear-mounted integrated stacker accommodates 50 printed sheets.
- O Both models offer both USB 2.0 and Gigabit Ethernet connectivity.

- Both models offer a standard, non-upgradeable RAM capacity of 128 GB.
- Both models come with a 500-GB hard drive as standard.
- The Canon TX-3000 MFP T36 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 provides further security by authenticating and encrypting data over the network. Similar security features are available with the HP T3500 eMFP.
- + The Canon TX-3000 MFP T36 is lighter (105 kg versus 114 kg) than the HP model.
- + The Canon model's rated power consumption is lower than that of the HP unit's while printing—105 watts versus 120 watts for the HP unit.
- However, the Canon TX-3000 MFP T36 has a higher power consumption (3.6 watts versus 2 watts for HP) in standby mode (in which they will likely spend more of their time).
- Rated noise emissions are comparable while the devices are printing (51 dB for the Canon model and 50 dB for the HP device).
- + However, rated noise emissions are slightly lower with the Canon device in standby mode (35 dB versus 38 dB with the HP model).

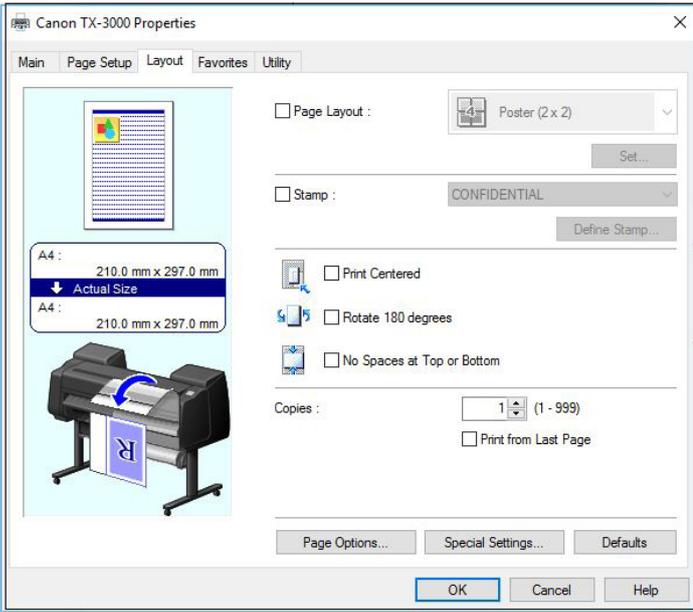
Test Models' Print Driver Screenshots



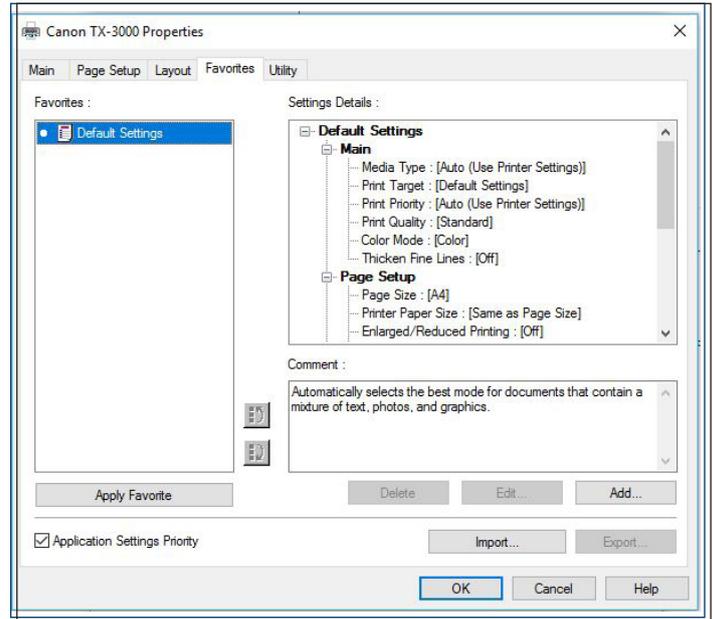
Canon imagePROGRAF TX-3000 MFP T36 Print Driver Main Tab



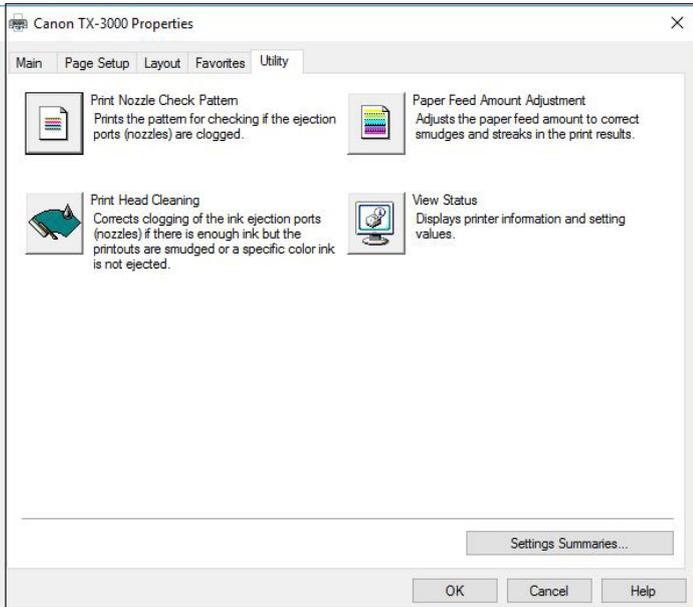
Canon imagePROGRAF TX-3000 MFP T36 Print Driver Page Setup Tab



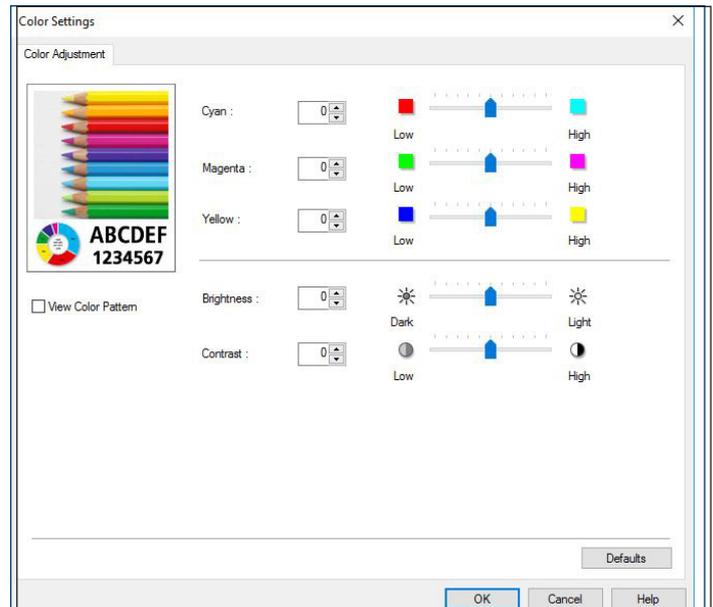
Canon imagePROGRAF TX-3000 MFP T36 Print Driver Layout Tab



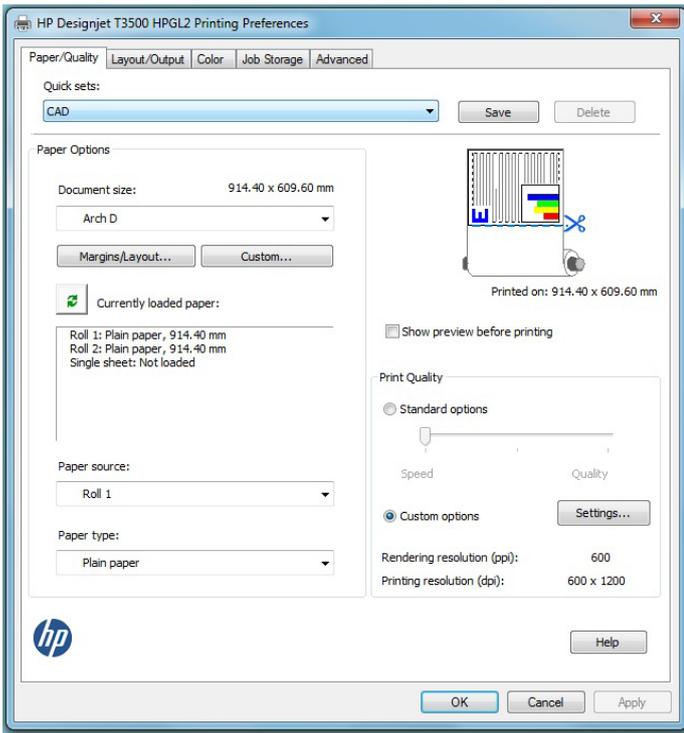
Canon imagePROGRAF TX-3000 MFP T36 Print Driver Favourites Tab



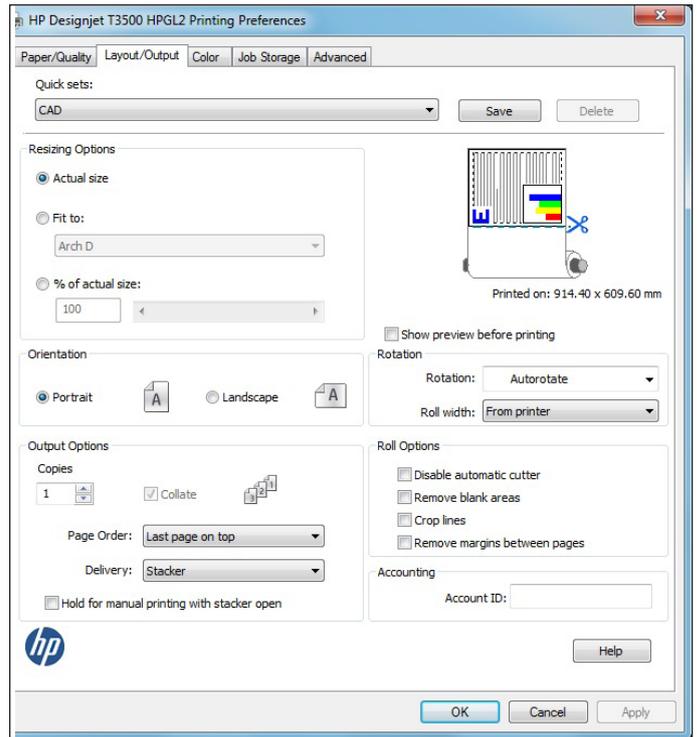
Canon imagePROGRAF TX-3000 MFP T36 Print Driver Utility Tab



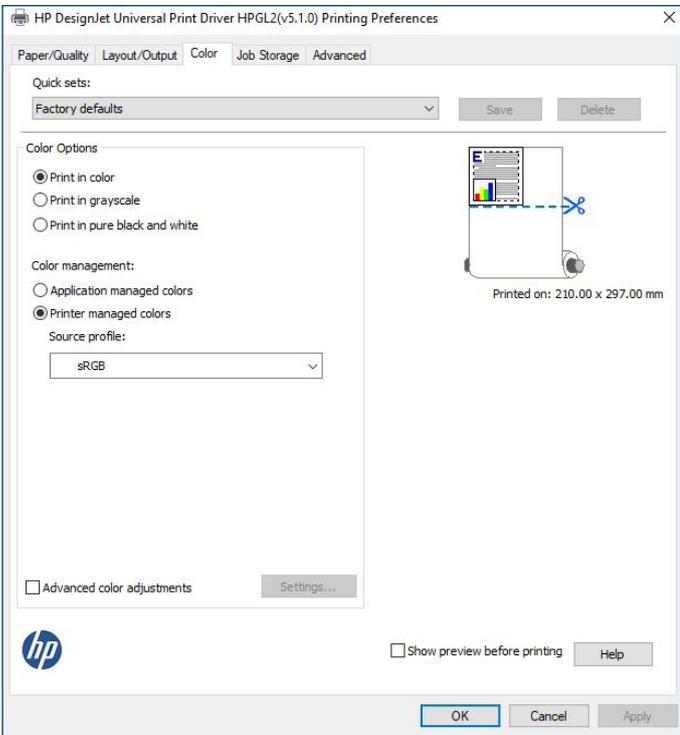
Canon imagePROGRAF TX-3000 MFP T36 Print Driver Colour Adjustment Tab



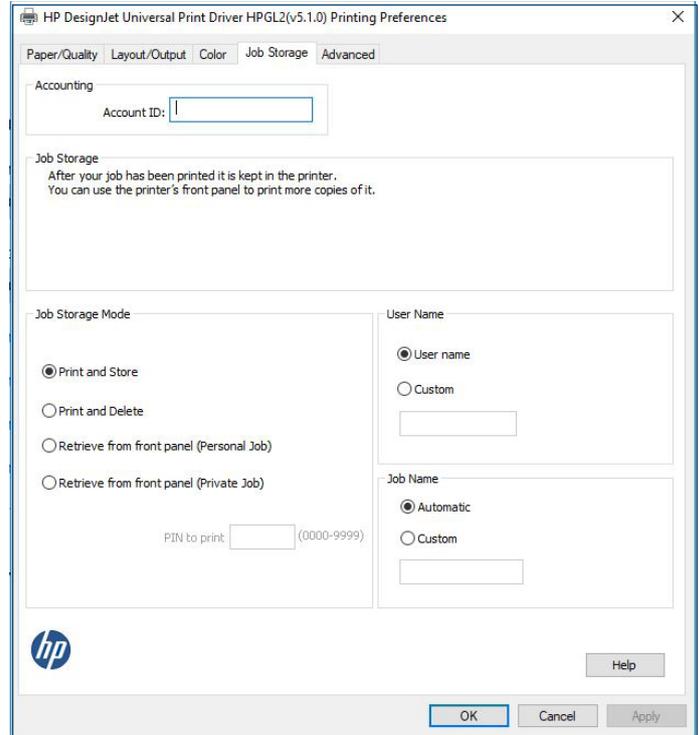
HP DesignJet T3500 eMFP HP-GL/2 Paper/Quality Tab



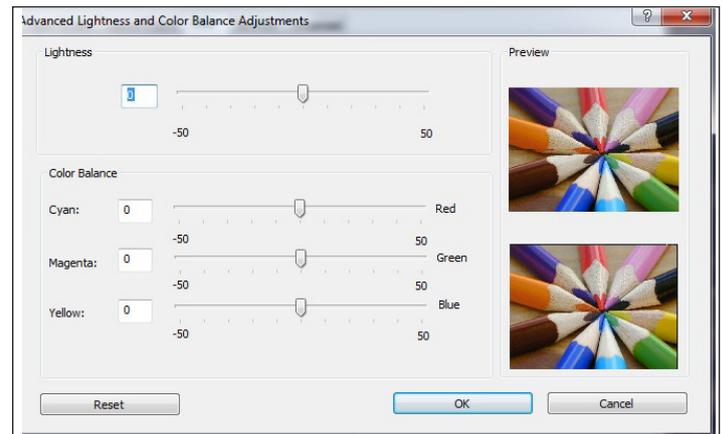
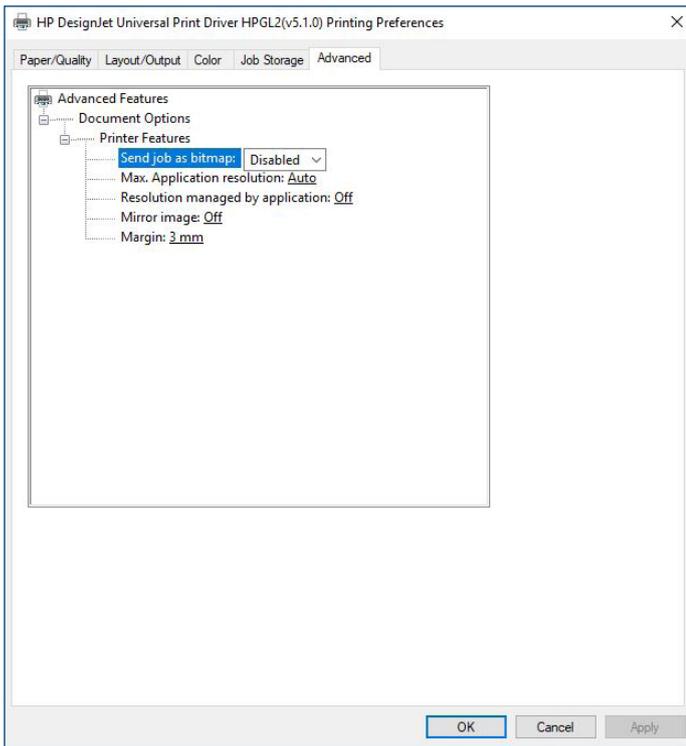
HP DesignJet T3500 eMFP HP-GL/2 Layout/Output Tab



HP DesignJet T3500 eMFP HP-GL/2 Colour Tab



HP DesignJet T3500 eMFP HP-GL/2 Job Storage Tab



HP DesignJet T3500 eMFP HP-GL/2 Advanced Lightness and Colour Balance Adjustments

HP DesignJet T3500 eMFP HP-GL/2 Advanced Tab

Driver Feature Set

- + The Canon TX-3000 MFP T36 has five speed settings (Fast 300, Standard 600, Fast 600, High 600 and High 1200), which are matched by three settings with 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-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 settings.
- + The Canon driver supports multi-up (2 to 16) printing, while the HP driver does not support this feature.
- + The Canon driver offers a 2 by 2 poster mode, while the HP model does not offer support for poster printing.
- + Unlike the HP driver, the Canon driver offers page stamping (Date, Time, Name and Page Number).
- O The Canon imagePROGRAF Printer Driver offers a broad range of built-in adjustments for CMY balance, brightness and contrast, while the HP T3500 eMFP's HP-GL/2 driver offers settings for CMY balance and brightness. The Canon driver includes advanced colour-matching capabilities such as 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, plus users can preview images before printing—features which were not included in the Startup driver disk supplied to BLI with the device.

- + The Canon driver offers the option to use unidirectional printing, even in Fast mode, which helps to avoid banding across output because the printhead travels in only one direction to create the desired image. The HP driver does not offer this feature.
- + The Canon driver includes the Colour imageRUNNER Enlargement Copy Mode utility, which enables users to integrate a Canon small-format MFP device on the network with the TX-3000. Documents scanned by the Canon MFP are automatically routed to a hot folder that is monitored by the driver of the TX-3000. 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 also includes a Free Layout nesting tool (available for free download via the Printer Driver Extra Kit) that enables files—even files created within different applications—to be scaled, resized or grouped together as a single job from the printer driver. Images can be dragged and dropped precisely to their desired locations and printed together on a single page, helping to save on paper. The HP unit offers a similar “Nest Options” feature which can be activated directly on the control panel and from the print driver utility. However, unlike the Canon tool, it does not allow users to have the same precise control over job positioning, rather it will randomly position jobs to print across the width of a page, either in job order sent or in ‘optimized’ layout order.
- + The Canon model also offers a plug-in for printing from Microsoft Office applications, which includes useful tools for automatic media resizing, nesting and borderless printing. No such plug-in is available to HP users.
- + 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.

SUPPORTING TEST DATA

Print Productivity

Job Stream Productivity (in Seconds)

Mixed File Types, Same Size, Single Roll

Canon imagePROGRAF TX-3000 MFP T36		HP DesignJet T3500 eMFP		Canon % Faster/Slower (-) than HP
Fast	474.90	Fast Eco	587.02	19.1%
Standard	649.05	Fast	665.11	2.4%
High	2,091.91	Best	4,057.49	48.4%

Buyers Lab’s job stream consists of nine files, including PDF, TIFF and DWF files totalling 19 pages, all at Arch D-size, ensuring 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 914 mm rolls, with each file set to auto-rotate to save media.

Mixed File Types, Same Size, Dual Roll

Canon imagePROGRAF TX-3000 MFP T36		HP DesignJet T3500 eMFP		Canon % Faster /Slower (-) than HP
Fast	703.01	Fast	753.03	6.6%

Buyers Lab's dual-roll job stream consists of nine files, including TIFF and DWF files totalling 19 pages, all at Arch D-size, ensuring the files are set to fit to page. All of the files are submitted to the controller in a specific order and sent to the printer as a group, sending alternate jobs to different rolls, at which time the stopwatch begins; timing ends when the last page of the last file exits the device. Both devices were loaded with 914-mm rolls, with alternate jobs sent to different media rolls.

Colour Productivity (in Seconds)

Canon imagePROGRAF TX-3000 MFP T36		HP DesignJet T3500 eMFP	
Fast	316.22	Fast Eco	358.89
Standard	335.06	Fast	394.67
High	1,074.24	Best	2,638.16

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

Monochrome Productivity (in Seconds)

Canon imagePROGRAF TX-3000 MFP T36		HP DesignJet T3500 eMFP	
Fast	338.35	Fast	361.59
Standard	340.02	Normal	399.66
High	1,062.16	Best	2,619.03

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

First-Page-Out Productivity after a Weekend of Non-Use (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster/ Slower (-) than HP
Time Before Printing Commences	62.25	73.63	15.5%
First Page Out	86.28	144.05	40.1%

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

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster/ Slower (-) than HP
Time Before Printing Commences	22.53	10.36	- 117.5%
First Page Out	45.53	81.00	43.8%

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, greyscale, black ink only. Both devices were loaded with 914-mm rolls.

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

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster/ Slower (-) than HP
First Page Out	114.10	139.06	17.9%
Five Pages Out	497.09	697.56	28.7%
Speed per page without processing	95.75	139.63	31.4%

First-page-out times are obtained 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, greyscale, black ink only. Both devices were loaded with 914-mm rolls.

Copy Productivity

A1 (Landscape) First-Copy-Out Productivity: Fast mode (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Mono	43.70	38.30
Greyscale	44.84	42.19
Colour	55.89	50.55

The single-page A1 (L) document was set to copy at 300-dpi scan resolution with copy settings left in default mode, with the exception of document size, which was set to A1 (Landscape). Print settings were set to Fast mode. Times were recorded from scan initiation to page exiting.

A1 (Landscape) First-Copy-Out Productivity: Standard/Normal mode (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Mono	64.60	43.41
Greyscale	71.81	41.39
Colour	81.45	50.78

The single-page A1 (L) document was set to copy at 300-dpi scan resolution with document size set to A1 (Landscape). Print settings were set to Standard/Normal. Times were recorded from scan initiation to page exiting.

A1 (Landscape) First-Copy-Out Productivity: High/Best mode (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Mono	114.27	126.35
Greyscale	115.22	108.50
Colour	127.18	154.69

The single-page A1 (L) document was set to copy at 300-dpi scan resolution with copy settings left in default mode, with the exception of document size, which was set to A1 (Landscape). Print settings were set to High/Best mode. Times were recorded from scan initiation to page exiting.

A0 First-Copy-Out Productivity: Fast mode (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Mono	78.62	68.03
Greyscale	74.91	68.71
Colour	89.87	77.52

The single-page A0 document was set to copy at 300-dpi scan resolution with copy settings left in default mode, with the exception of document size, which was set to A0. Print settings were set to Fast mode. Times were recorded from scan initiation to page exiting.

A0 First-Copy-Out Productivity: Standard/Normal mode (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Mono	134.22	73.08
Greyscale	125.14	68.44
Colour	141.98	86.46

The single-page A0 document was set to copy at 300-dpi scan resolution with copy settings left in default mode, with the exception of document size, which was set to A0. Print settings were set to Standard/Normal mode. Times were recorded from scan initiation to page exiting.

A0 First-Copy-Out Productivity: High/Best mode (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Mono	240.58	212.61
Greyscale	211.88	193.17
Colour	234.72	288.34

The single-page A0 document was set to copy at 300-dpi scan resolution with copy settings left in default mode, with the exception of document size, which was set to A0. Print settings were set to High/Best mode. Times were recorded from scan initiation to page exiting.

Scan Productivity

Batch Scanning Productivity

Batch Throughput Speed A1 (Landscape) Time in seconds to scan 10 pages

	Canon imagePROGRAF TX-3000 MFP T36		HP DesignJet T3500 eMFP	
	Scan Time (seconds)	A1 (L) Pages/Hour	Scan Time (seconds)	A1 (L) Pages/Hour
Black 200 dpi	94.91	379.3	107.63	334.5
Black 300 dpi	107.23	335.7	132.34	272.0
Grey 200 dpi	106.03	339.5	109.99	327.3
Grey 300 dpi	120.54	298.7	128.45	280.3
Full Colour 200 dpi	189.34	190.1	182.93	196.8
Full Colour 300 dpi	257.62	139.7	243.36	147.9

The 10-page A1 (L) document was scanned in batch mode with document size set to A1 (Landscape), and colour mode and resolution option changes as reflected in the table above. Applications were set to save jobs as TIFFs on the test PC with auto-naming enabled. Timing was taken from initiation to when the final page exited the scanner.

A1 Single-Page Scanning Productivity (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster/Slower (-) than HP
Black 200 dpi	2.84	6.20	54.2%
Black 300 dpi	3.73	8.50	56.1%
Grey 200 dpi	2.84	6.58	56.8%
Grey 300 dpi	3.86	8.66	55.4%
Full Colour 200 dpi	9.85	14.37	31.5%
Full Colour 300 dpi	16.26	19.85	18.1%

The single-page A1 document was scanned with document size set to A1 (Landscape) and colour mode and resolution option changes as reflected in the table above. Applications were set to save jobs as TIFFs on the test PC with auto-naming enabled. Each test was conducted twice and an average reading reported. Timing was taken from initiation to when the page exited the scanner.

A1 Single Page Scan to Desktop Productivity (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster/Slower (-) than HP
Black 200 dpi	5.65	10.03	43.7%
Black 300 dpi	7.36	14.40	48.9%
Grey 200 dpi	5.75	9.93	42.1%
Grey 300 dpi	7.44	12.88	42.2%
Full Colour 200 dpi	10.37	19.72	47.4%
Full Colour 300 dpi	18.56	27.84	33.3%

The single-page A1 document was scanned with document size set to A1 (Landscape) and colour mode and resolution option changes as reflected in the table above. Applications were set to save jobs as TIFFs on the test PC with auto-naming enabled. Each test was conducted twice and an average reading reported. Timing taken from initiation to the page being accessible at the desktop.

A0 Single-Page Scanning Productivity (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster/Slower (-) than HP
Black 200 dpi	4.65	9.75	52.3%
Black 300 dpi	11.38	14.05	19.0%
Grey 200 dpi	4.72	9.81	51.9%
Grey 300 dpi	11.41	14.45	21.0%
Full Colour 200 dpi	17.53	24.16	27.4%
Full Colour 300 dpi	29.84	33.71	11.5%

The single-page A0 document was scanned with document size set to A0 and colour mode and resolution option changes as reflected in the table above. Applications were set to save jobs as TIFFs on the test PC with auto-naming enabled. Each test was conducted twice and an average reading reported. Timing was taken from initiation to the page exiting the scanner.

A0 Single Page Scan to Desktop Productivity (in Seconds)

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Faster /Slower (-) than HP
Black 200 dpi	8.94	14.65	39.0%
Black 300 dpi	13.86	22.72	39.0%
Grey 200 dpi	8.94	14.64	38.9%
Grey 300 dpi	13.37	19.87	32.7%
Full Colour 200 dpi	18.06	32.47	44.4%
Full Colour 300 dpi	33.25	46.28	28.2%

The single-page A0 document was scanned with document size set to A0 and colour mode and resolution option changes as reflected in the table above. Applications were set to save jobs as TIFFs on the test PC with auto-naming enabled. Each test was conducted twice and an average reading reported. Timing was taken from initiation to the page being accessible at the desktop.

Colour Print Quality (conducted on Low-Grade Océ Red Label 175 m roll)

Colour Optical Density Evaluation

Canon imagePROGRAF TX-3000 MFP T36						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.25	0.65	0.39	0.88	0.49	1.00
Magenta	0.22	0.53	0.34	0.73	0.41	0.92
Yellow	0.19	0.55	0.31	0.72	0.37	0.84
Black	0.26	0.99	0.45	1.45	0.54	1.43

HP DesignJet T3500 eMFP						
	Fast Eco		Fast		Best	
	50%	100%	50%	100%	50%	100%
Cyan	0.20	0.45	0.46	0.80	0.55	1.15
Magenta	0.18	0.44	0.42	0.80	0.43	1.08
Yellow	NA	0.22	0.40	0.59	0.40	0.83
Black	0.22	0.86	0.37	1.35	0.57	1.39

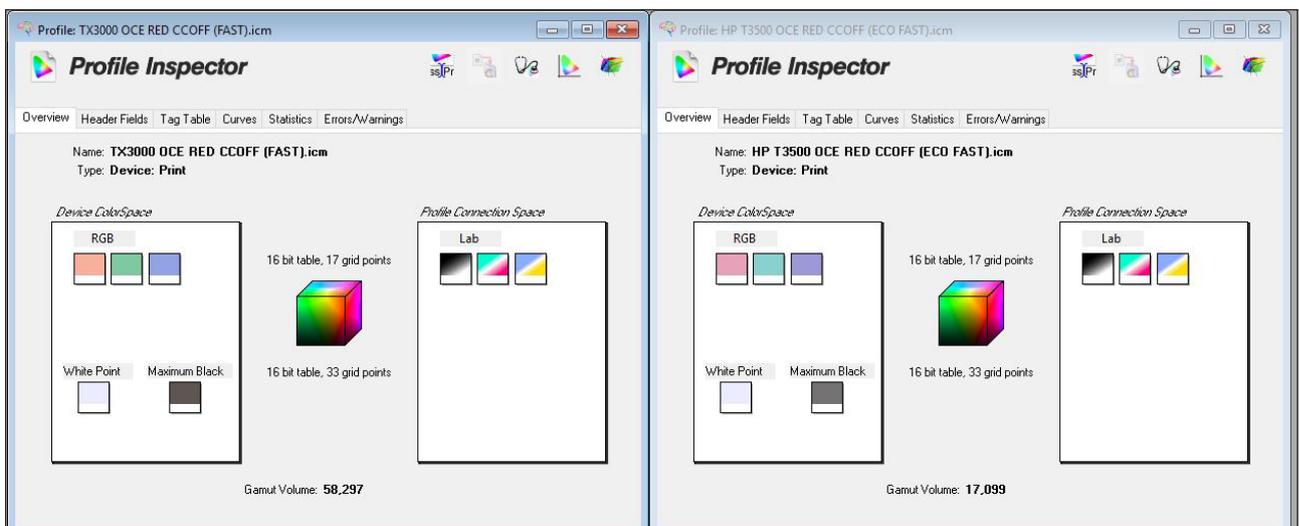
Note: Colour density readings were assessed by printing a Buyers Lab proprietary PDF test target file on Uncoated Paper in default colour settings at all quality settings available, and measuring the density of 100% dot fill and 50% dot fill using an XRite exact[®] densitometer.

Colour Gamut Comparisons

Media Type/Settings	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Larger/Smaller (-) than HP
Low-Grade Océ Paper Fast/Fast Eco	58,297	17,099	240.9%
Low-Grade Océ Paper Standard/Fast	127,942	113,666	12.6%
Low-Grade Océ Paper High/Best	206,260	188,640	9.3%



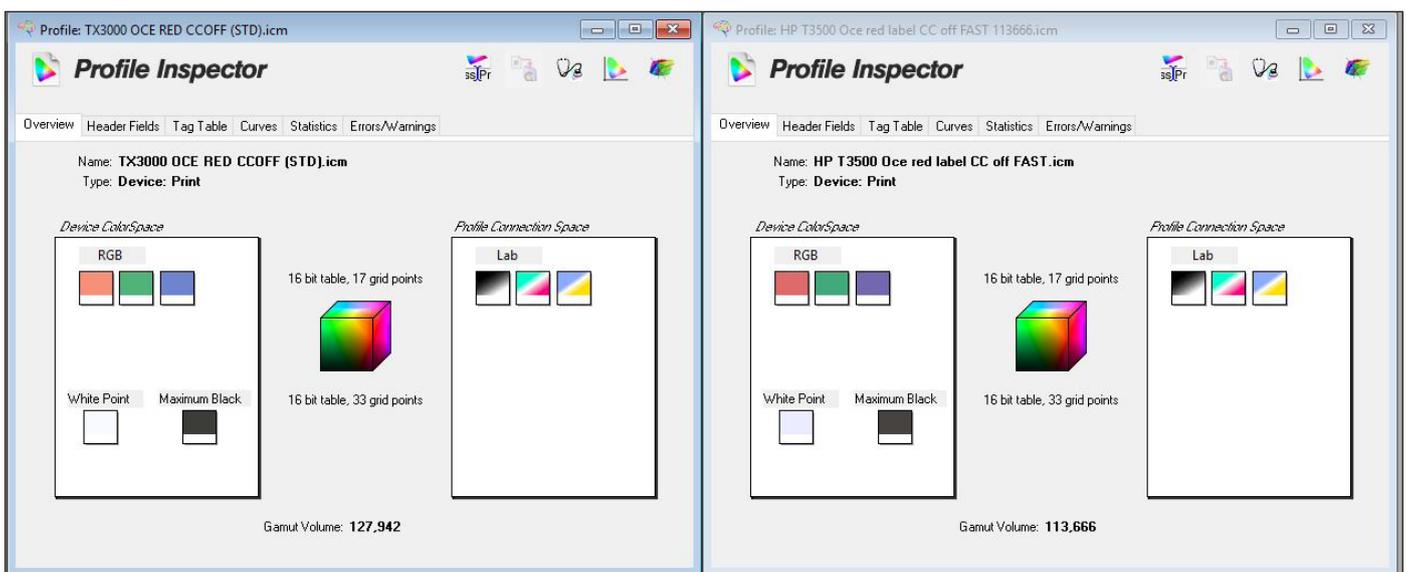
Canon imagePROGRAF TX-3000 MFP colour gamut on Océ Red Label low-grade paper in Fast mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on Océ Red Label low-grade paper in Fast Eco mode.



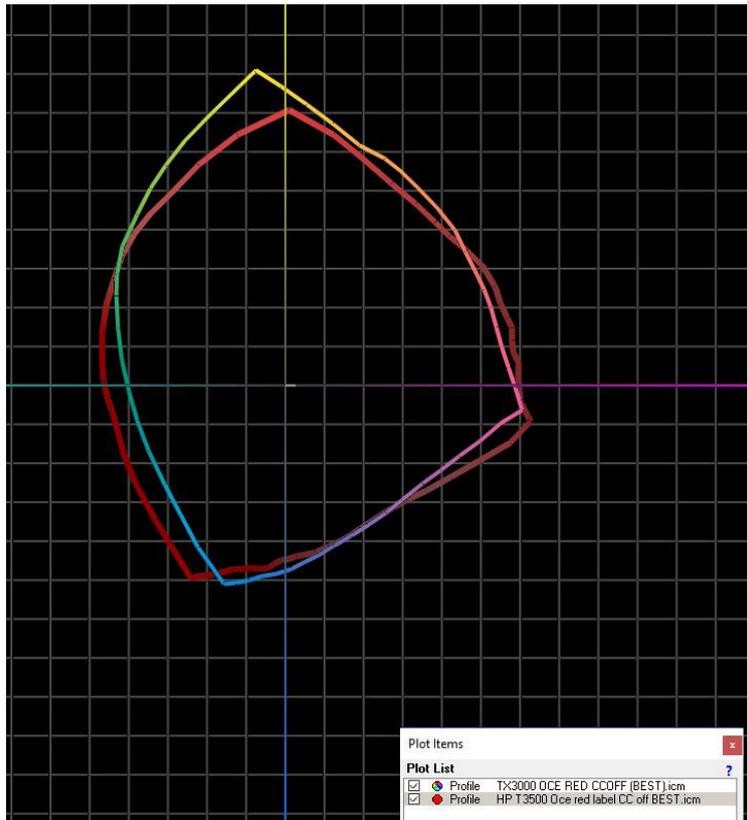
Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) in Fast/Fast Eco mode.



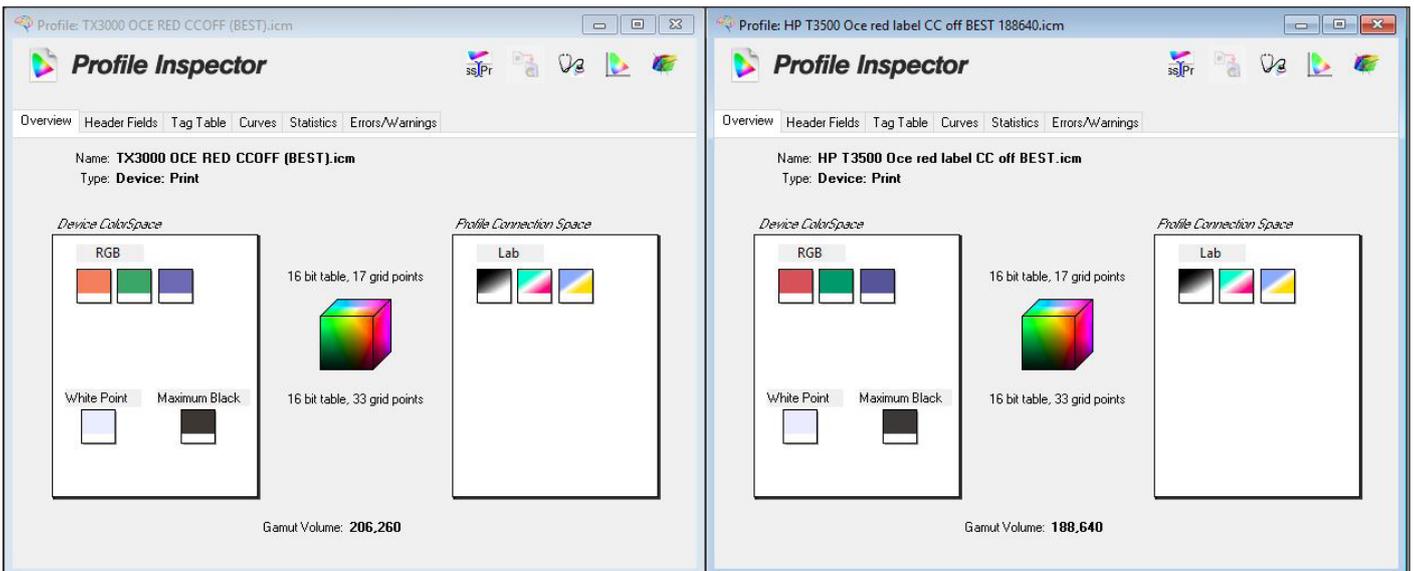
Canon imagePROGRAF TX-3000 MFP colour gamut on Océ Red Label low-grade paper in Standard mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on OCE Red Label low-grade paper in Fast mode.



Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) in Standard/Fast mode.



Canon imagePROGRAF TX-3000 MFP colour gamut on Océ Red Label low-grade paper in High quality mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on OCE Red Label low-grade paper in Best quality mode.



Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) in High/Best mode.

Black Print Quality (conducted on Low-Grade Océ Red Label 175 m roll)

Solid Density

Canon imagePROGRAF TX-3000 MFP T36				HP DesignJet T3500 eMFP		
Density Block						
	Fast	Standard	High	Fast Eco	Fast	Best
1	1.41	1.46	1.04	0.91	1.46	1.39
2	1.43	1.45	1.08	0.90	1.43	1.40
3	1.44	1.47	1.05	0.91	1.42	1.40
4	1.39	1.47	1.04	0.89	1.42	1.40

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 uncoated paper/monochrome setting and the HP driver set to plain paper, greyscale, black ink only. Density was measured using an XRite exact^{XP} densitometer.

Colour Print Quality (conducted on CAD 90gsm Inkjet Plain Paper)

Colour Optical Density Evaluation

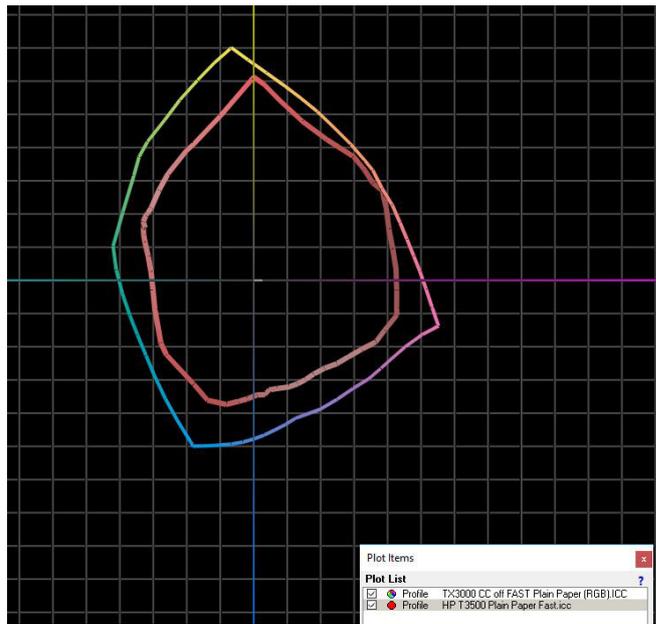
Canon imagePROGRAF TX-3000 MFP T36						
	Fast		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.41	0.87	0.50	1.03	0.52	1.09
Magenta	0.35	0.72	0.42	0.86	0.43	0.95
Yellow	0.32	0.72	0.38	0.86	0.40	0.92
Black	0.44	1.42	0.54	1.35	0.55	1.36

HP DesignJet T3500 eMFP						
	Fast		Normal		Best	
	50%	100%	50%	100%	50%	100%
Cyan	0.29	0.46	0.44	0.69	0.43	0.70
Magenta	0.34	0.72	0.50	0.92	0.52	0.96
Yellow	0.34	0.63	0.53	0.86	0.53	0.85
Black	0.46	1.32	0.57	1.45	0.57	1.40

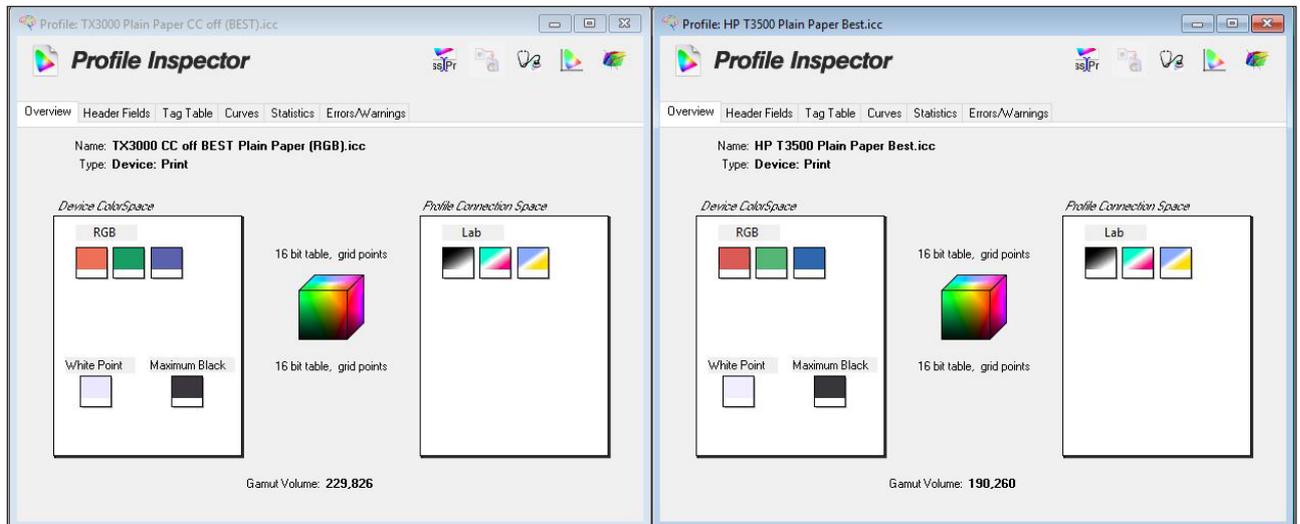
Note: Colour density readings were assessed by printing a Buyers Lab proprietary PDF test target file on plain paper in default colour settings at all quality settings available, and measuring the density of 100% dot fill and 50% dot fill using an XRite 508 densitometer and an an XRite exact^{XP} densitometer.

Colour Gamut Comparisons

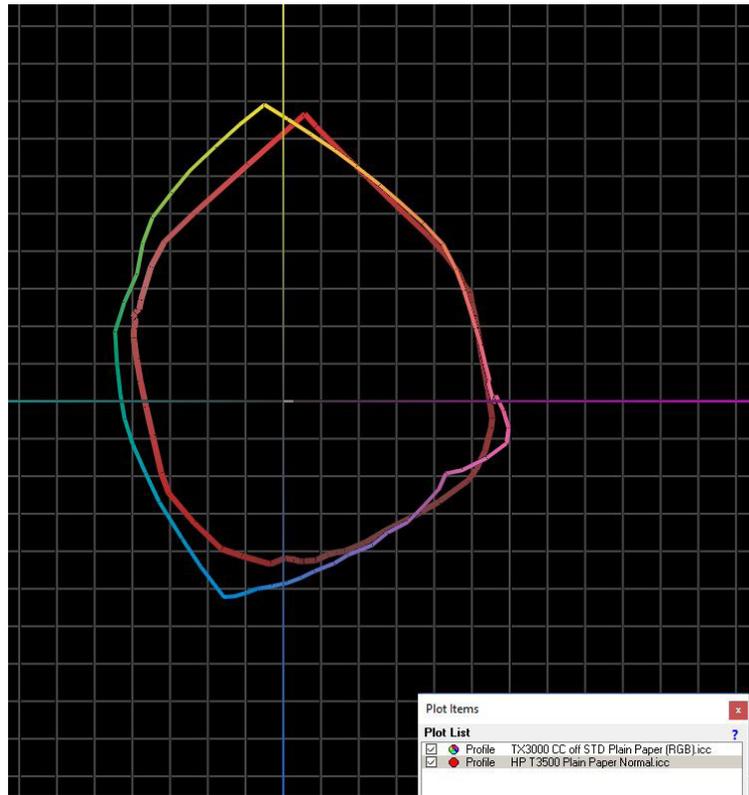
Media Type/Settings	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP	Canon % Larger/Smaller (-) than HP
Plain Paper Fast	140,164	110,261	27.1%
Plain Paper Standard/Normal	208,945	177,110	18.0%
Plain Paper High/Best	229,826	190,260	20.8%
Matte Coated High/Best	402,815	325,623	23.7%



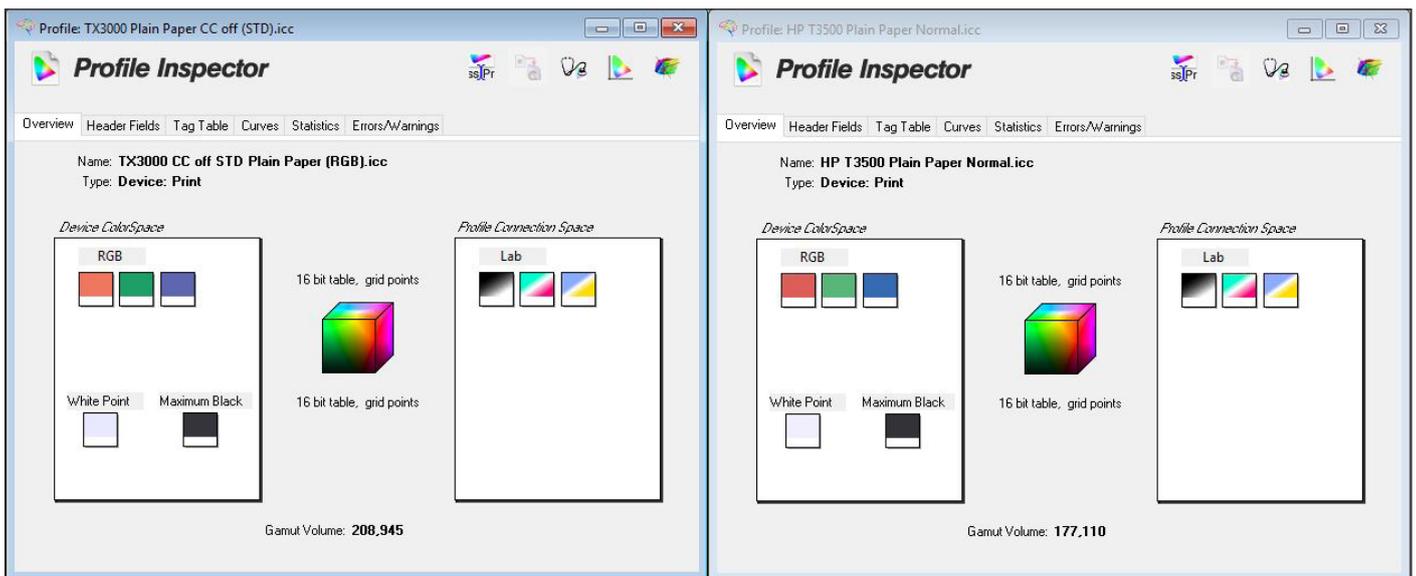
Canon imagePROGRAF TX-3000 MFP colour gamut on plain paper in Standard mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on plain paper in Normal mode.



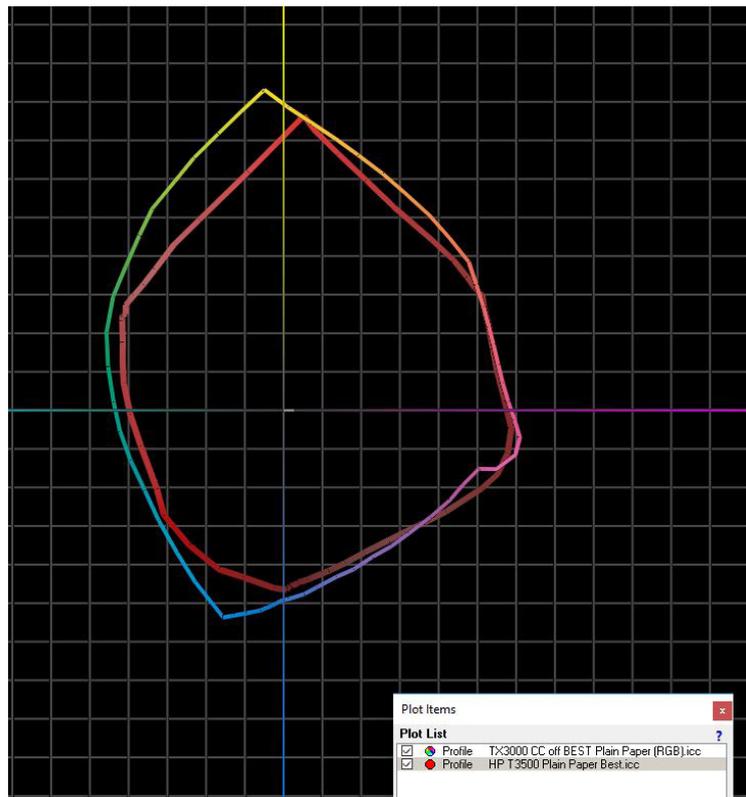
Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) in Standard/Normal mode.



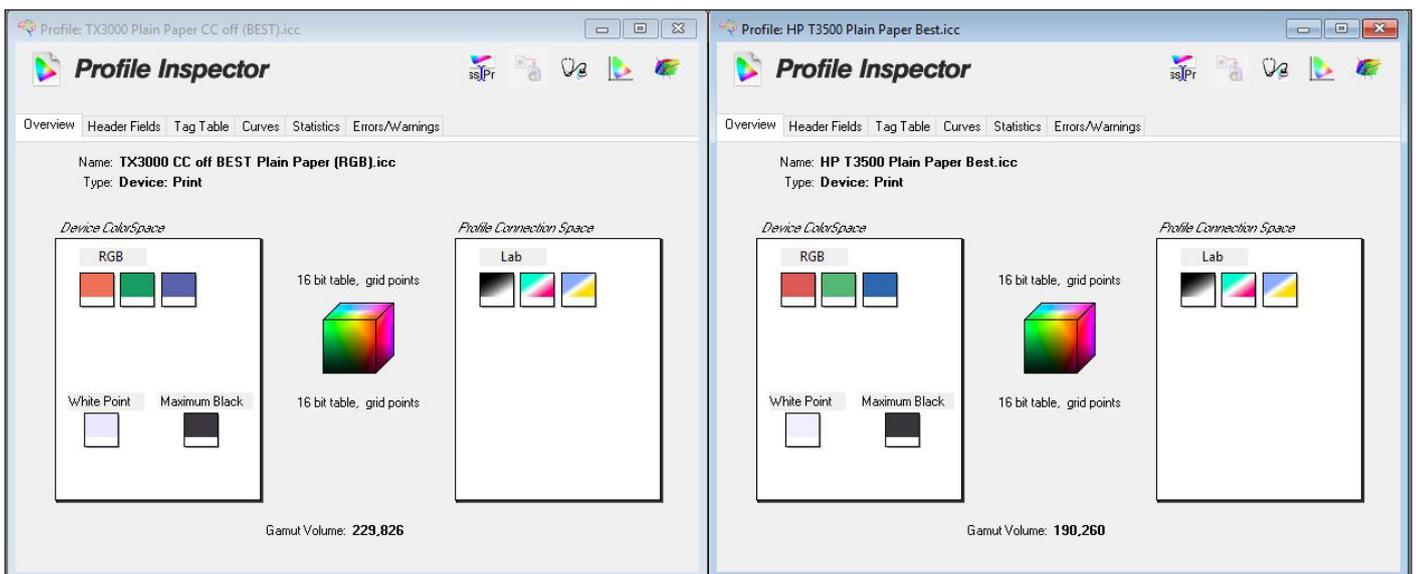
Canon imagePROGRAF TX-3000 MFP colour gamut on plain paper in High mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on plain paper in Best mode.



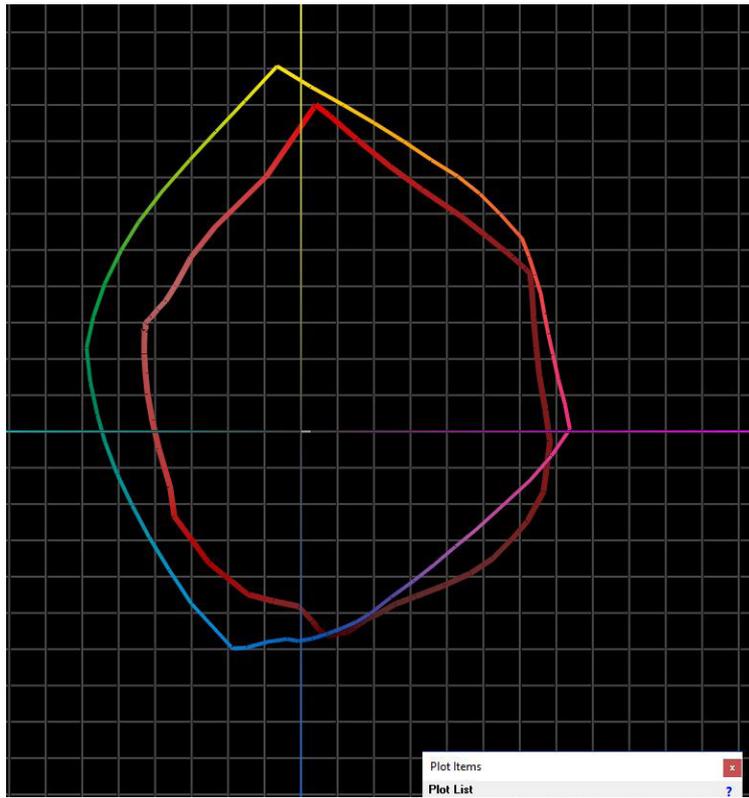
Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) in High/Best mode.



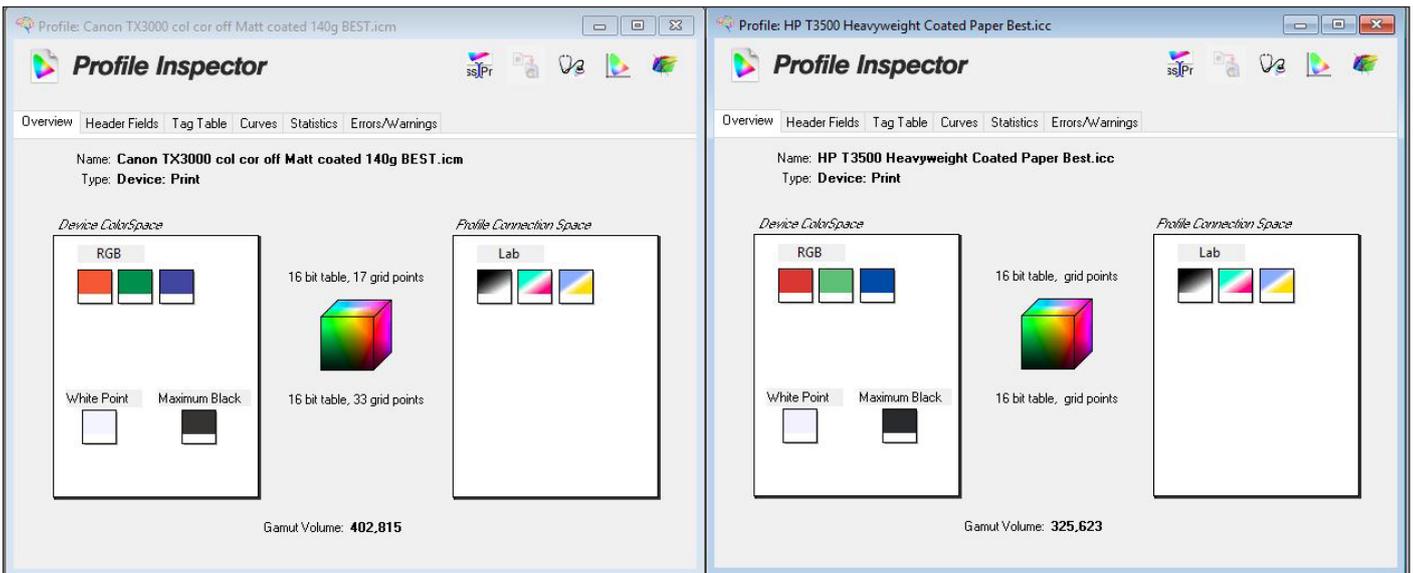
Canon imagePROGRAF TX-3000 MFP (colour gamut on matte coated paper in High quality mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on matte coated paper in Best quality mode.



Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) on matte coated paper in High/Best mode.



Canon imagePROGRAF TX-3000 MFP (colour gamut on matte coated paper in High quality mode (shown chromatically) versus HP DesignJet T3500 eMFP colour gamut (shown in red) on matte coated paper in Best quality mode.



Colour gamut profile for Canon imagePROGRAF TX-3000 MFP (left) and HP DesignJet T3500 eMFP (right) on matte coated paper in High/Best mode.

Black Print Quality (conducted on CAD 90gsm Inkjet Plain Paper)

Canon imagePROGRAF TX-3000 MFP T36				HP DesignJet T3500 eMFP		
Density Block						
	Fast	Standard	High	Fast	Normal	Best
1	1.42	1.39	1.40	1.46	1.40	1.46
2	1.43	1.36	1.36	1.48	1.40	1.46
3	1.45	1.41	1.34	1.47	1.40	1.46
4	1.45	1.45	1.39	1.47	1.40	1.47

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, greyscale, black ink only. Density was measured using an XRite 508 densitometer and XRite exact[®] densitometer.

Copy Quality

Solid Density

	Original Target	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Cyan	1.57	0.72	0.81
Magenta	1.54	0.89	0.82
Yellow	1.12	0.80	0.67
Black	1.84	1.41	1.15

Note: Solid density measurements in normal/colour copy mode based on copying a Katun test original containing blocks of all solid colours (based on an average of two readings for each colour) printed on plain paper. Density was measured using an XRite 508 densitometer and XRite exact[®] densitometer.

Colour Fidelity

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
McDonalds	7.0	3.2
Coca Cola Red	11.6	21.2
FedEx Blue	14.2	14.2
FedEx Green	5.7	10.4
Microsoft	6.2	3.5
Sun Microsystems	8.8	4.0
Ikea Blue	11.0	10.1
Ikea Yellow	6.2	10.2
Time Fortune 500	11.9	15.3
Quark	4.6	8.7
Versonic	13.8	14.0
T-Mobile Red	8.2	8.8
AVERAGE	9.1	10.3

Buyers Lab's Pantone test chart was used for Image Quality testing, with High/Best quality settings using 24-bit colour in the case of both models. Delta E measurements recorded the accuracy with which 12 Pantone colours were reproduced.

Dimensional Accuracy

	Canon imagePROGRAF TX-3000 MFP T36	HP DesignJet T3500 eMFP
Variation in line length in mm (scanned in landscape)	0.1	0.1
Variation in line length in mm (scanned in portrait)	0.2	0.2

Dimensional Accuracy was determined using the Applied Images QA-1 Test Chart (150 mm line length) and the Adobe Photoshop Measuring Tool. Charts were scanned in both Portrait and Landscape mode using the highest resolution available (1200 and 600 dpi) with both devices set to Line, B&W mode, and saved as TIFF files.

Device Feature Set

	Canon imagePROGRAF TX-3000 MFP T36	Advantage		HP DesignJet T3500 eMFP
User Interface	15.6" Touchscreen LCD	✓		4.3" Touchscreen LCD
Scanner Features				
Maximum optical resolution (dpi)	1200	✓		600
Scanning resolution (dpi)	100, 200, 300, 400, 600, 800, 1000, 1200	✓		200, 300, 600
Colour Scanning Speed	7.62 cm (3")/sec. (200 dpi/24-bit)	✓		6.35 cm (2.5")/sec. (200 dpi)
Black Scanning Speed	33.0 cm (13")/sec. (200 dpi/8-bit)	✓		19.05 cm (7.5")/sec. (200 dpi)
Scanning Mode	24-bit RGB Colour, 8-bit Greyscale, 1-bit Black & White			24-bit RGB Colour, 8-bit Greyscale, 1-bit Black & White
Max. Document Size	965 mm x 15,200 mm	✓		914 mm x 15,000 mm
Max. Scanning Width	914 mm (36")			914 mm (36")
Max. Thickness of Paper (mm)	2.0 (with operator support to guide paper as it enters and exits scanner)	✓		0.8
Paper Path	Front (straight); Rear exit (front eject via Document Return Guide)			Rear exit (must be rewound to the front to eject from the scanner)
File Save Formats	TIFF, JPEG, PDF; PDF/A (optional), multi-page PDF (optional)	✓		TIFF, JPEG (PDF and multi-page PDF only with PostScript sister model)
File Saving Area	Network folder, USB memory, HDD (controller PC)			Network folder, USB memory, HDD
Preset Document Types	Colour Mixed, Colour Photo, Colour Graphics, Colour Lines, Grey Photo, Grey Graphics, Grey Lines, B&W Clean, B&W Dirty, B&W Very Dirty	✓		Quicksets, Line, Mixed, Image
Ability to Save Custom Presets	Yes			Yes
Background Removal	Yes (in Preview edits)			Yes
Preview Scaling	Yes (Linear)	✓		Yes (only 3 size variations)
Deskew	Yes (in Preview edits)			Yes (Auto)
Preview Editing	Yes (Skew, Crop, Brightness, Sharpen, Black Point, White Point, Mirror, Invert)	✓		No
Scan Speed Adjustment	Yes	✓		No
Batch Scanning	Yes			Yes
Scan to Email	No		✓	Yes
Scan to Cloud	Yes (via Canon imagePROGRAF Direct Print & Share)	✓		No
Auto Paper Size Detection	Yes			Yes
Rename and Save	Yes	✓		No
Printer Features				
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, M, Y, PK, G); 9 picoliter (MBK)

	Canon imagePROGRAF TX-3000 MFP T36	Advantage		HP DesignJet T3500 eMFP
Ink cartridge capacity	160/330/700 ml (CMYK, MBK)	✓		MBK: 300 ml; C, M, Y, PK, G: 69/300 ml
Starter ink (total)	970 ml (330 ml MBK; 160 ml CMYK)	✓		375 ml (30 ml x 1, 69 ml x 5)
Number of nozzles	MBK: 5,120 nozzles, Other colours: 2,560 nozzles each; 15,360 in total	✓		1,376 each, 8,256 in total
Number of printheads	1 (User-replaceable)			1 (User-replaceable)
Max. paper width	914 mm (36")			914 mm (36")
Line accuracy	+/-0.1%			+/-0.1%
Minimum line width	0.02 mm			0.02 mm
Minimum print margins	3 mm			3 mm
Borderless (0 mm) printing	Yes (Roll only)	✓		Yes (Photo paper only)
Roll paper	Optional Multifunction Roll System (with Auto Take Up)	✓		Dual
Maximum outside diameter of roll paper	170 mm		✓	180 mm
Maximum cut-sheet media length	1.6 m	✓		914 mm
Maximum media thickness	0.8 mm	✓		0.5 mm
Media loading	Top and Front Loading Slot for Sheet Paper			Front
Optional media handling	Roll holder set			Roll media adapter
High-capacity stacker	100 sheets	✓		50 sheets
Standard RAM	128 GB			128 GB
Maximum RAM	128 GB			128 GB
Hard drive	500 GB			500 GB
Interface	Hi-Speed USB; 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, TIFF, JPEG, CALS G4, HP PCL 3, GUI, URF
Net weight (unpacked)	105 kg	✓		114 kg
Power consumption when in standby	3.6 W		✓	< 2 W
Power consumption when active	105 W	✓		120 W
Acoustic pressure, active	51 dB (A)			50 dB(A)
Acoustic pressure, standby	35 dB(A)			38 dB(A)

Driver Feature Set

	Canon imagePROGRAF TX-3000 MFP T36	Advantage		HP DesignJet T3500 eMFP
Speed settings	5 (Fast 300, Fast 600, Standard 600, High 600 and High 1200)	✓		3 (Fast, Normal, 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, B/W Photo)
Overview of profile settings provided	Yes			Yes
Media profiles	53 + 10 user customizable special options	✓		33
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
Multi-up printing	Yes, 2 to 16	✓		No
Poster print mode	Yes (2 by 2)	✓		No
Page stamping	Yes (Date, Time, Name, Page Number)	✓		No
Image rotation	Yes – auto 90 or 180 degrees	✓		Yes – auto 90 degrees
Option to preview before print	Yes			Yes
CMY balance adjustment	Yes			Yes
PANTONE Emulation	No		✓	Yes
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			Yes
Accounting Capability	Yes	✓		No
Disable automatic cutter	Yes			Yes
Unidirectional printing	Yes	✓		No
Integration with MFP	Yes			No

The Canon imagePROGRAF TX-3000 MFP T36 comes bundled with PosterArtist Lite.

Test Environment

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

Test Equipment

Buyers Lab'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 Buyers Lab in its lab testing include Buyers Lab's proprietary procedures and industry-standard test procedures. In addition to a number of proprietary test documents, Buyers Lab uses industry standard files including a Buyers Lab 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.

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