

HP Designjet T770HD vs Canon imagePROGRAF iPF755

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	HP Designjet T770HD	Canon imagePROGRAF iPF755
Advantage denoted by ✓		
Reliability		
Color Print Quality	✓	
Black Print Quality	✓	
BLI Print Productivity		✓
Supplementary Print Productivity	✓	
File Compatibility	✓	
Ink Consumption/Waste	✓	
Security Features	✓	
Fleet Management	✓	

TEST OBJECTIVE

Buyers Laboratory Inc. (BLI) was commissioned by Hewlett-Packard to conduct a comparative evaluation of the Hewlett-Packard Designjet T770HD six-color, 44-inch wide-format inkjet printer and the Canon imagePROGRAF iPF755 five-color (six-ink), 36-inch wide-format inkjet printer and produce a report comparing the relative strengths and weaknesses in terms of reliability, print quality, print productivity, file compatibility, ink consumption/waste, security features and fleet management. All testing was performed in BLI's U.S. test facility in Hackensack, New Jersey.

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Executive Summary

The HP Designjet T770HD outperformed the Canon imagePROGRAF iPF755 in numerous aspects of this comparative evaluation. The HP Designjet T770HD exhibited superior file handling when compared with the Canon imagePROGRAF iPF755, arguably the HP printer's most noteworthy achievement. When subjected to BLI's standard file compatibility test, which included PDF, TIFF, DWF, DWG, XLS, PPT and JPG file formats, both units encountered no issues when processing and printing these files. However, the Canon unit provided faster print speeds at all quality settings. When tested with supplementary HP-GL/2 files, however, the HP Designjet T770HD outperformed the Canon imagePROGRAF iPF755. The HP Designjet T770HD experienced no processing or printing errors when printing these files, whereas the Canon imagePROGRAF iPF775 produced output with defects and displayed numerous control panel warning and/or error messages and printhead carriage stops resulting in print times that were two to three times longer than the times for the HP model. Also contributing to the HP Designjet T770HD's productivity is the Designjet Instant Printing Utility, available on the installation disk or as a free download. When used during the BLI evaluation to submit files directly to the HP printer, the Instant Printing Utility was both time-saving and easy to use, eliminating the need for a desktop application to be opened for file submission.

The HP Designjet T770HD also holds advantages over the Canon imagePROGRAF iPF755 in both color and black print quality. Color files produced on the HP Designjet T770HD exhibited more distinct fine lines than on the Canon, a critical feature for many users. By comparison, in numerous print areas, closely spaced fine lines printed by the Canon model did not remain distinct but instead blended together. In grayscale mode, the HP unit has the ability to print halftone fills with black ink only resulting in neutral gray halftone fills. In the equivalent default monochrome mode, the Canon unit instead printed these gray halftone fills using process (four-color) black, and as a result halftone fills appeared to have a cyan tint. Choosing an alternative print driver ink setting, "Monochrome (BK Ink)," did not solve the problem for the Canon device, as that choice, although utilizing black ink only, caused the printed output to appear more brown than black. Banding was also more prevalent on the Canon prints, especially on maps and posters with heavy ink coverage. The HP Designjet T770HD prints, in comparison, displayed little if any banding. The HP Designjet T770HD also generated a color gamut approximately 45.3 percent larger than that of the Canon unit on third-party bond paper.

The ink consumption/waste evaluation included printing 3,600 square feet of three different documents over six days with starts and stops to approximate real-world use. This analysis revealed that the HP Designjet T770HD printer used 13.5 percent less ink overall than the Canon imagePROGRAF iPF755. In terms of percentage of the ink cartridges used during this test, the HP Designjet T770HD utilized 50.5 percent of the six cartridges for the 600 print run, while the Canon imagePROGRAF iPF755 utilized 58.0 percent of its six cartridges over the same time.

There are numerous common security features shared between the HP Designjet T770HD and the Canon imagePROGRAF iPF755. Among these are the ability to set an administrative password; the ability to set SNMP, TCP/IP and MAC address access rights; the ability to enable LPD and FTP printing; and the availability of three levels of disk drive erase. HP further enhances printer security by offering additional features such as five levels of control panel access, three levels of Encryption strength for Web management and full IPsec and IPv6 support through the standard Ethernet port as well as through the optional JetDirect 635n port.

HP's fleet management software, Web Jetadmin, clearly outperformed its competitor, Canon's imageWARE Enterprise Management Console. BLI especially liked Web Jetadmin's ease of use, real-time feedback and flexibility compared to the more complex operation of imageWARE Enterprise Management Console.

Both units were rated Highly Reliable, each having recorded three control panel errors over the test's more than 10,000-square-foot evaluation and neither requiring a service call.

Reliability

+, – and ○ represent positive, negative and neutral attributes, respectively, of the Canon model relative to the HP model.

- + A paper jam occurred in the Canon model after several pages accumulated in its collection bin, which is smaller than the HP's, preventing the next page from forwarding out of the printer. This resulted in a "Hardware error 03130031-2F" control panel error. Clearing the paper jam and restarting the printer eliminated the problem. Because the HP Designjet T770HD's paper collection bin is larger and further from the unit's paper exit point, it is capable of holding about 50 more prints than the Canon imagePROGRAF iPF755. In most instances, any more than seven Arch D-size prints would fall on the floor rather than collecting in the Canon unit's bin. As a result, users of the HP Designjet T1200 can expect to have longer unattended print runs than users of the Canon imagePROGRAF iPF755 and will likely experience fewer paper jams due to prints piling up in the collection bin.
- + For no apparent reason during reliability testing, the Canon imagePROGRAF iPF755 Status Monitor lost communication with the printer when the printer's control panel displayed, "Preparing 01:02 OK: Job Menu." Pressing the power button in an attempt to turn the printer off did not power off the unit. The unit was left in this condition overnight and continued to exhibit the same error the following morning. As a result, the power cord had to be unplugged and the error disappeared once the unit was turned back on.
- + Near the test's completion, after several days of non-use, the Canon imagePROGRAF iPF755 did not wake from sleep mode when files were submitted to the printer. The unit's power button was lit green, but it could not be awakened by pressing any control panel buttons, nor could it be powered off. Furthermore, although there was a reply when its IP address was pinged, its Web page could not be accessed. The only solution was to unplug the power cord and plug it back in. The printer behaved normally after it was restarted.
- During reliability testing, lifting the paper hold lever of the HP Designjet T770HD while the unit was asleep caused the following control panel error, "45.1:03 Restart the print. If the problem persists, call HP support." Restarting the printer eliminated the error, which never occurred again.
- Also during reliability testing, the following error was reported on the HP Designjet T770HD control panel during routine printing, "X79:04 Restart the printer. If the problem persists, call HP support." Restarting the printer eliminated the error.
- After four days on non-use, the HP Designjet T770HD again displayed the error, "X79:04 Restart the printer. If the problem persists, call HP support." Restarting the printer eliminated the error, which never occurred again.

Color Image Quality

- + On third-party 24-lb. bond paper at the Normal/Plain Paper/Printer Managed Colors settings, the HP Designjet T770HD produced a color gamut that was wider than that of the Canon imagePROGRAF iPF755 in the green, yellow and purple ranges, while the Canon imagePROGRAF iPF755 produced a wider color gamut in the blue and cyan ranges. Overall, the color gamut produced by the HP Designjet T770HD was approximately 45.3% larger than that of the Canon imagePROGRAF iPF755, as measured by the ColorThink Pro 3.0 software.
- The Canon imagePROGRAF iPF755 produced the BLI GIS document with moderate banding, while the HP Designjet T770HD displayed only slight banding. However, the HP Designjet T770HD print displayed a slightly grainier appearance in the gray and tan mid-tone areas of the map than did the Canon unit.
- + BLI technicians observed that the Canon imagePROGRAF iPF755 exhibited the above-mentioned banding on virtually all heavier ink coverage documents, such as maps and posters, at the Draft print quality setting. The banding appeared as slightly different colors in areas that should be uniform in color. By comparison, the banding observed under the same print conditions on the HP Designjet T770HD was slight and uniform in color.
- At the same driver settings on both units, BLI's line art test document exhibited very good image quality. Both produced fine color lines, text and curves distinctly, and colors were of good density.
- Color production remained highly consistent throughout the test period for both the HP Designjet T770HD and Canon imagePROGRAF iPF755. No noticeable changes were detected in a visual observation of a group of images printed at the start of the evaluation compared to the same group printed at the end of the test, nor was there any significant shift between start and end color gamut charts.
- On third-party 24 lb. bond paper, the Canon imagePROGRAF iPF755 produced slightly higher densities than the HP Designjet T770HD and colors appeared more saturated than those generated on the HP.

In addition to BLI's standard color image quality test targets, which include mainly architectural and engineering files, HP requested that several additional engineering and graphics files be evaluated for image quality. For this evaluation the HP printer was loaded with HP's 80 gsm Universal Bond paper, and the HP print driver was set to Plain Paper/Printer Managed Colors. The equivalent Canon paper, 80 gsm Premium Bond was used on the imagePROGRAF iPF755, and the Canon Garo print driver was set to Plain Paper/Color. (Image or Line/Text was selected in the Canon driver depending on the file being printed.)

- + The HP-supplied "Coast.tif" and "Expo.tif" files, which both have heavy ink coverage across the entire print, exhibited slight banding in certain areas when printed on the Canon imagePROGRAF iPF755 at the highest quality setting. The same prints generated on the HP Designjet T770HD at the Best quality setting were smooth and exhibited no banding.
- BLI technicians noted that the printhead carriage of the Canon imagePROGRAF iPF755 did not move at a constant speed while printing the above named documents, passing across the paper faster at some points than at others within the same job. This non-uniform print speed could be cause for the banding detected on some of the Canon prints.
- + When submitted from the AutoCAD 2010 application with minimum line weight set to 0.00 mm to produce the finest lines possible, the HP-supplied "Tower.dwg" file displayed distinct fine solid color lines when printed on the HP Designjet T770HD at all driver quality settings. Closely spaced fine lines were well-defined and could be distinguished. Using the draft quality setting to print this file on the Canon imagePROGRAF iPF755 resulted in lines that were visibly thicker than those printed on the HP unit. This was especially evident on closely spaced

black lines, which caused the image to appear as solid black, even under magnification. The HP Designjet T770HD also displayed better line width definition at the Normal driver setting vs. the standard setting on the Canon unit. Only with the High quality print driver setting did the closely spaced fine lines output on the Canon imagePROGRAF iPF755 become visible.

- + The HP-supplied “Planta.dwg” file exhibited neutral gray at all three HP Designjet T770HD print driver quality settings. The same files printed on the Canon imagePROGRAF iPF755 displayed a slight magenta tint in the same gray areas at all driver settings.
- + When printed on the Canon imagePROGRAF iPF755, the HP-supplied “Arterials.prn” file exhibited defects that were observed in the prints’ solid blue areas, which appeared as thin grainy bands of yellow that were perpendicular to the print direction. The same file output on the HP Designjet T770HD did not exhibit this defect.
- + On the Canon imagePROGRAF iPF755, the HP-supplied “Prague.prn” print was missing elements including text and bounding boxes, which rendered this map unreadable. The HP Designjet T770HD produced this print without any defects.
- + When printed on the HP Designjet T770HD, the HP-supplied “Rebaixes.tif” file displayed a smooth neutral gray appearance on heavyweight coated paper. The same output on the Canon imagePROGRAF iPF755 had a cyan-gray appearance. Furthermore, the cyan-gray area that is bordered with solid black exhibited a magenta spray directly next to the black border.

Black Image Quality

	HP Designjet T770HD	Canon imagePROGRAF iPF755
Text	VG	VG
Line Art	G	G
Halftone Pattern/Fill	VG	G
Halftone Range	E	E
Solids	E	E

Black image quality was generated on a third-party 24-lb. bond paper. The Designjet T770HD print driver was set to Plain Paper/Grayscale while the Canon imagePROGRAF iPF755 Garo print driver was set to Plain Paper/Monochrome.

- + On third-party 24 lb. bond paper, the HP Designjet T770HD produced slightly higher solid black densities than the Canon imagePROGRAF iPF755 at all print quality settings.

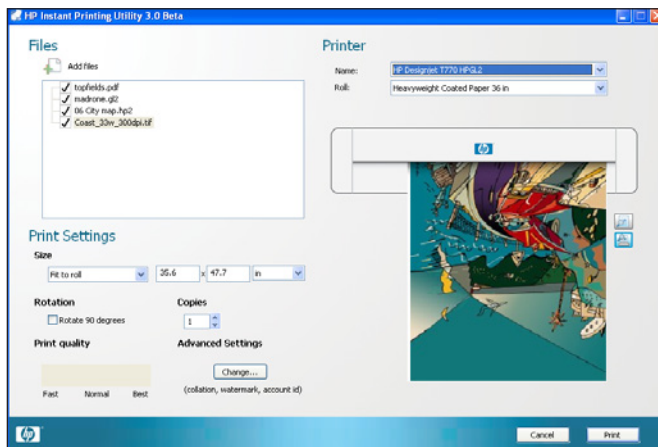
- Text was rated very good for both the HP Designjet T770HD and Canon imagePROGRAF iPF755. Both displayed bold text with no breakup and no visible ink overspray or haloing.
- Line Art was rated good for both units. The HP Designjet T770HD displayed more distinct fine lines than the Canon imagePROGRAF iPF755; however, the Canon displayed better consistency of vertical and horizontal line thickness than the HP. All other parameters, including fully formed circles, toner overspray and haloing were rated above average for both units.
- + The HP Designjet T770HD generated neutral gray halftone fills with above average smoothness and minimal banding. The Canon imagePROGRAF iPF755 also generated fills with above average smoothness and minimal banding, but they displayed a slight cyan tint, even though “monochrome” was selected in the Canon print driver. The Canon unit’s monochrome print driver setting produced process (four-color) black, resulting in the cyan tint, while the comparable “grayscale” selection in the HP driver issued black ink only.
- + A second monochrome Canon print driver setting of Draft/Monochrome (BK Ink)/Line Drawing/Text, produced black-only output, but halftone fill did not appear as neutral gray. Instead it had a brown appearance throughout all halftone levels.
- Halftone range was rated excellent for both printers. Both displayed a visible range from 1% to 100% with distinct separation between all levels.
- Both units produced solid output with dark consistent coverage, earning an excellent rating.

BLI Print Productivity

	HP Designjet T770HD	Canon imagePROGRAF iPF755
First Page Out		✓
Throughput Speed		✓
Job Stream (multiple jobs submitted to device in succession simulating busy network environment)		✓

- The Canon imagePROGRAF iPF755 delivered first-page-out time advantages versus the HP Designjet T770HD from both the ready state (46 seconds versus 58 seconds) and from energy-save, after a weekend of dormancy (73 seconds versus 115 seconds).
- The Canon imagePROGRAF iPF755 delivered productivity advantages over the HP Designjet T770HD of 25.7% and 34.5% when the BLI 12-page Arch D-size DWF test file was printed in color fast and normal modes, respectively.

- The Canon model also delivered productivity advantages over the HP Designjet T770HD of 26.2% and 32.4% when the BLI 12-page Arch D size DWF test file was printed in monochrome fast and normal modes, respectively.
- In BLI’s wide-format job stream (which simulates a busy network environment, with 10 jobs, each consisting of from one to five pages, being sent to the device at once at the Fast driver setting), the Canon model again outperformed the HP model, delivering 19 pages in 11 minutes and 46 seconds versus 14 minutes and 36 seconds for the HP model, for a 19.4% speed advantage.
- + HP’s Instant Printing Utility v.3.0 is a time-saving and convenient solution for submitting files directly to an HP wide-format printer without requiring a desktop application to open the file. The utility is obtainable from the printer’s installation disk or as a free download from HP’s Web site. Users can launch the utility either by selecting the desktop icon or simply by right clicking on a file or files, scrolling to HP Printing Utility and selecting the desired HP wide-format printer. Once files reside in the Add Files column, a thumbnail of the image is presented on the right. Within this window, print size, rotation, number of copies and print quality settings can be modified before submission. Compatible file types include DWF, PDF, HP-GL/2, TIFF, PPT and JPEG. (HP offers compatibility with other Office applications with a Plug-in that is available as a free download.)



HP Instant Printing Utility v.3.0

- + BLI technicians saved approximately four minutes by utilizing HP’s Instant Printing Utility, rather than the standard method of file submission, to submit the 10 files that comprise BLI’s wide-format job stream. The Standard method requires users to open each file with a desktop application and choose File/Print to the desired printer. This method must be utilized when printing to the Canon unit as that company does not offer a direct printing option.

Supplementary Print Productivity

For this portion of the evaluation, the following six HP-GL/2 files were used:

	File Name	File Size	Source Application
1	BritishIslesTerrain.hpgl2	19.4 MB	ESRI
2	DSLOGO.hpgl2	151 KB	CATIA
3	Launceston.hpgl2	5.2 MB	Driver Generated
4	Madrone.hpgl2	62.5 MB	Synopsis
5	Noruega.hpgl2	4.2 MB	Driver Generated
6	Pelotas.hpgl2	13.6 MB	Driver Generated

Since Canon does not offer a direct method by which HP-GL/2 files can be submitted to the imagePROGRAF iPF755, this test was performed using the MS-DOS Script command, in which all six files were submitted at once using a batch file command. Each printer's default settings were used, with the HP printer's quality set to "Normal," while the Canon printer's quality was set to the equivalent "Standard." Once the DOS window was opened, the batch file name was typed, followed by the printer's IP address. The files were submitted when the Enter key was pressed on the keyboard and simultaneously the stopwatch was started. This procedure was conducted for each printer.

- + The HP Designjet T770HD printed each of the six files in full, without warning or error messages exhibited on the unit's control panel. The six files took approximately 11 minutes to print in total. The Canon imagePROGRAF iPF755 took considerably longer to print the same files, 31 minutes and 3 seconds in total.
- + Directly after the six files were submitted to the Canon imagePROGRAF iPF755, File 1 caused the message "Preparing" to display for 2 minutes on the unit's control panel, after which the file printed in its entirety in 2 minutes and 20 seconds. The HP Designjet T770HD completed printing this file in 1 minute and 44 seconds with no control panel messages displayed.
- + File 4 also initiated the "Preparing" message on the Canon's control panel, which lasted for 8 minutes and 17 seconds. The file then printed incorrectly in 4 minutes and 14 seconds, appearing to be reduced in size with visible overlapping elements. After the job was cut, the printer forwarded an additional extraneous foot of paper. The HP Designjet T770HD completed printing this document in 2 minutes and 43 seconds with no delays.
- + File 6 also initiated the "Preparing" message on the Canon control panel, which lasted for 4 minutes and 32 seconds, after which the job printed in its entirety, taking an additional 1 minute and 51 seconds. The Designjet T770HD printed the same file in 2 minutes and 16 seconds with no delays.

File Compatibility

- At each printer's Normal/Standard color settings, the following BLI Architectural, CAD and GIS files printed without problems on both the HP Designjet T770HD and the Canon imagePROGRAF iPF755 – "Topfields.PDF," "Methane.PDF," "Warehouse.DWG," "House.PDF," "11 Page.DWF" and "CityMap.HP2".
 - + BLI's "600 DPI.PLT" file produced the message, "GL2:W0504 This command is not supported. Check the printing results. If you cannot obtain suitable results, contact your service rep," on the Canon imagePROGRAF iPF755 control panel. Carriage stops were noted on the Canon printer and this file took 112% longer to print on the imagePROGRAF iPF755 than on the HP Designjet T770HD. The HP unit experienced no problems with this file.
 - + BLI's "Train.HP" file also produced the message, "GL2:W0504" on the imagePROGRAF iPF755 Status Monitor; however, no printing errors or delays were noted on the Canon unit. No problems were encountered on the HP printer either.
 - + Although image quality was comparable for the two units when printing BLI's "RaceCar.RTL" file, carriage stops were noted on the Canon imagePROGRAF iPF755 and the Canon unit took 112% longer to print this file than did the HP unit.
 - + BLI's "Cartography_heavy ink.HP" file caused the Canon imagePROGRAF iPF755 Status Monitor to report, "GL2: The parameter is out of range. Check the printing results. If you cannot obtain suitable results contact your service rep." The Canon unit printed a small portion of the job and then forwarded out the job's paper length without completing the job. The HP T770HD printed this file without a problem.
- To augment BLI's standard file compatibility evaluation, which focuses primarily on line drawings and maps of file formats such as PDF, TIFF, HP2, DWG and DWF, HP requested the addition of several HP-GL/2 files. The results are summarized below.*
- + The HP-supplied file "Arterials.PRN" caused carriage stops on the Canon imagePROGRAF iPF755 that did not occur on the HP Designjet T770HD. Although no warning or error messages were noted, it took 194% longer to print this file on the Canon unit than on the HP unit.
 - + The HP-supplied file "Greece.PRN" caused carriage stops on the Canon imagePROGRAF iPF755 that did not occur on the HP Designjet T770HD. As a result, it took 190% longer to print on the Canon unit. No control panel messages were displayed by the Canon imagePROGRAF iPF755 and there were no differences observed in the final output from the two units.
 - + The HP-supplied file "Prague.PRN" caused lengthy carriage stops on the Canon imagePROGRAF iPF755 and as a result took 279% longer to print on the Canon unit than on the Designjet T770HD. The Canon unit's control panel displayed two messages while printing: "GL2:W0904 and GL2:W0501 The memory is full. This command is not supported." The print produced by the Canon unit also displayed defects in image quality (text and bounding boxes were missing from the final print). Neither speed nor image quality issues were noted when printing this file on the HP Designjet T770HD.

Ink Consumption/Waste

	HP Designjet T770HD	Canon imagePROGRAF iPF755
Line Art Document – 200 Pages		
Weight of ink used (grams)	103.6	107.7
Weight of ink waste	1.0	0.7
Percentage of total ink used and waste for all colors	12.8%	13.2%
GIS Document – 200 Pages		
Weight of ink used	194.0	215.7
Weight of ink waste	7.4	6.9
Percentage of total ink used and waste for all colors	24.6%	27.0%
3D CAD Document – 200 Pages		
Weight of ink used	103.6	144.2
Weight of ink waste	3.2	2.1
Percentage of total ink used and waste for all colors	13.1%	17.8%
Total weight of ink + waste	412.8	477.3

- + Over six days of printing 600 Arch D-size documents and four days of inactivity, the HP Designjet T770HD utilized less ink, both in terms of net weight (412.8g vs. 477.3g) and percentage of cartridge weight (50.5% vs. 58.0%), than did the Canon imagePROGRAF iPF755.
- + To print 200 of BLI's line art document over two days, the HP Designjet T770HD utilized less ink, both in terms of net weight (103.6g vs. 107.7g) and percentage of cartridge weight (12.8% vs. 13.2%), than did the Canon imagePROGRAF iPF755.
- For the same print run, the HP Designjet T770HD wasted virtually the same amount of ink (1.0g) than did the Canon (0.7g).
- + To print 200 of BLI's GIS document over two days, the HP Designjet T770HD utilized less ink than did the Canon imagePROGRAF iPF755, both in terms of net weight (194.0g vs. 215.7g) and percentage of cartridge weight (24.6% vs. 27.0%).
- For the same print run, the HP Designjet T770HD wasted slightly more ink (7.4g) than did the Canon (6.9g).
- + To print 200 of BLI's 3D CAD document over two days, the HP Designjet T770HD utilized less ink than did the Canon imagePROGRAF iPF755, both in terms of net weight (103.6g vs. 144.2g) and percentage of cartridge weight (13.1% vs. 17.8%).
- For the same print run, the HP Designjet T770HD wasted more ink (3.2g) than the Canon imagePROGRAF iPF755 did (2.1g).

Security Features

- Both the HP Designjet T770HD and the Canon imagePROGRAF iPF755 wide-format printers offer basic security settings including the ability to set an administrator password, setting SNMP, TCP/IP and MAC address access rights and enabling LPD and FTP printing. These settings are accessible from each unit's Embedded Web page, when logged in as an administrator.
- + The HP Designjet T1770HD offers numerous additional security settings that the Canon imagePROGRAF iPF755 does not:
 - Five levels of control panel access
 - Three levels of Encryption strength for Web management
 - SLP, Bonjour, Multicast IPv4 and WS device discovery
 - Telnet Management Protocol
 - The ability to request, install and manage X.509 digital certificates, which are used to identify the Jetdirect print server both as a valid Web server for network clients, and as a valid client requesting access on a secure network.
- + The HP Designjet T770HD has full support for IPsec and IPv6, both through the standard Ethernet port as well as through the optional JetDirect 635n port.
- The HP Designjet T770HD offers three levels of hard disk erase – Non-Secure Fast Erase, Secure Fast Erase and Secure Sanitizing Erase. The last method meets USDoD 5220-22.m requirements. These selections are available on the printer's control panel when it is put in service mode by an administrator or service person. The Canon imagePROGRAF iPF755 also offers three levels of hard disk erase – High Speed, Secure High Speed and Secure, which are also selectable from the unit's control panel.
- IP address settings for both the HP and Canon printers can be assigned either at the units' control panel or from the Embedded Web page.

Fleet Management

- + HP's fleet management software, Web Jetadmin (WJA) v.10.2 is a free download from HP's Web site. After downloading, it had a file size of 172.6 MB. The utility was installed on a networked Windows XP PC in BLI's laboratory in about five minutes, taking nine mouse clicks to complete. Also a free download, Canon's imageWARE Enterprise Management Console (iWEMC) v.3.0 was 157 MB in size. Because of confusing user name and password requirements for this software during the installation process on the same PC, BLI's technician did not install it correctly the first time. It had to be uninstalled and then reinstalled correctly a second time, taking approximately 30 minutes.
- + Upon launching HP's WJA, numerous device discovery options can be easily configured from within the Discovery tab. BLI technicians used "IP range" for this evaluation. Within approximately two minutes of installing the IP address range used in BLI's laboratory, 41 (HP and non-HP) devices were automatically discovered. The same method of device discovery was utilized within Canon's iWEMC; however, it was not as easy or intuitive for technicians to configure. In the iWEMC Menu's Discovery tab, "Create Task to Discover Devices," was used. Herein technicians configured the option "SNMPv1 Discovery" and set the lab's IP address range. This resulted in three Canon devices being discovered on the BLI network. There is a box named "Discover standard MIB devices" that is unchecked by default at the bottom of the "Create Task to Discover Devices" window. When this box was checked and the window refreshed, the same 41 devices were discovered by the Canon software.
- + BLI technicians found HP's WJA more intuitive, flexible and easier to use overall compared with Canon's iWEMC fleet management utility. The Web Jetadmin user interface is intelligently laid out and will be familiar to users of Windows applications. A navigation pane on the left gives a lengthy tree-structure view of the available menu choices for Device Management, Print Management and Application Management. Canon's home page, called the Portal Page, also offers a tree-structure view of Device, System, Task, Configuration and Communication menu choices. The main difference between these, however, is that virtually all tabs and modules within WJA are user-configurable, whereas in iWEMC they are not. Within WJA, users can easily reposition modules by "dragging and dropping," eliminate them by clicking on the red X, or add them by right clicking and selecting "Add Task Module." Canon's iWEMC software offers no such flexibility.
- + Web Jetadmin's All Devices list is the core of the utility's monitoring. Users can customize the list to include up to 23 different device attributes for display in default mode, and more than 600 in Advanced mode; among them are device name, model, IP address, MAC address, status (oddly called Severity), serial number, engine cycle count, et.al. The Severity field gives an iconic representation of the status of each device: a green checkmark indicating all is well, a yellow exclamation point indicating a warning condition or a red "X" indicating an error condition. By contrast, the imageWARE Enterprise Management Console's device list includes 14 different device attributes that are not configurable within the same window. Instead, users must navigate to Common Settings/Display Preferences to make changes. Among the device attributes available for display in iWEMC are status, which is not checked by default, IPv4 address, MAC address, serial number, location, total printed pages and comments, et.al. Here too, the status field gives an iconic representation of the status of each device.
- + Device monitoring within HP's Web Jetadmin occurred virtually instantaneously for all conditions that arose on the Designjet T770HD, providing user alerts in real time. In contrast, Canon's iWEMC does not provide feedback instantaneously; rather an administrator must open the device list window, select the device(s) to be monitored and click on Update Device Information to acquire the current status.
- + Also within HP Web Jetadmin, an administrator can conduct firmware upgrades or schedule future firmware upgrades by specifying the date and time at which the update will occur, a convenient feature to keep device firmware up-to-date. This feature is not available within Canon iWEMC.

- + Canon's iWEMC offers basic reporting features that include a system log that can be configured to save all logged events such as warnings, errors and security notices. The system log can be saved as a SCV file for export to Excel for analysis. Web Jetadmin, on the other hand, offers more advanced reporting features. Via the Group Policies menu, an administrator can set a device or group of devices to collect a range of information including user tacking, peak usage, page counts, supply usage and error history. Reports can be displayed within Web Jetadmin, stored to an archive or sent via e-mail. Summary reports, as well as more graphical report formats, are available so users do not have to export data to another application. Particularly noteworthy is the Device Utilization data-collection option, which provides more detailed tracking of device usage including page counts for color, black-and-white, simplex, duplex and total pages; plus page counts for copy, scan, digital send and fax pages.
- Common features available in both utilities include the ability to group devices, configure email alerts for various conditions and automatically turn devices on/off.

Supporting Test Data

JOB STREAM PRODUCTIVITY

	HP Designjet T770HD (Min:Sec)	Canon imagePROGRAF iPF755 (Min:Sec)
One Set (19 pages)	14:36	11:46

BLI's job stream consists of 10 files, including PDF, TIFF and DWF files totaling 19 pages, all at Arch D size. This test replicates the type of traffic a typical wide-format device might experience in a real-world, multi-user environment. All of the files are submitted to the printer in a specific order, while the print driver is paused. The stopwatch begins when all the jobs are queued and the print driver is released from the pause mode; timing ends when the last page of the last file exits the device. Both devices were loaded with 36 inch rolls, with each file set to auto-rotate to save media.

COLOR PRODUCTIVITY

HP Designjet T770HD (Min:Sec)		Canon imagePROGRAF iPF755 (Min:Sec)	
Fast	Normal	Draft	Standard
10:17	20:36	7:37	13:29

The 12-page DWF test file was printed using the device driver set to the plain paper/color setting. Both devices were loaded with 36 inch rolls with each file set to auto-rotate to save media. The actual time indicated is the time it took to RIP, image and deliver all pages of the test document to the collection bin.

MONOCHROME PRODUCTIVITY

HP Designjet T770HD (Min:Sec)		Canon imagePROGRAF iPF755 (Min:Sec)	
Fast	Normal	Draft	Standard
10:11	19:59	7:31	13:30

The 12-page DWF test file was printed with the HP driver set to plain paper/grayscale and the Canon Garo driver set to plain paper/monochrome. Both devices were loaded with 36 inch rolls, with each file set to auto-rotate to save media. The actual time indicated is the time it took to RIP, image and deliver all pages of the test document to the collection bin.

FIRST-PAGE-OUT PRODUCTIVITY FROM READY STATE

	HP Designjet T770HD (Min:Sec)	Canon imagePROGRAF iPF755 (Min:Sec)
Time Before Printing Commences	0:16	0:20
First Print Out	0:58	0:46

FIRST-PAGE-OUT PRODUCTIVITY AFTER WEEKEND DORMANCY

	HP Designjet T770HD (Min:Sec)	Canon imagePROGRAF iPF755 (Min:Sec)
Time Before Printing Commences	1:13	0:37
First Print Out	1:55	1:13

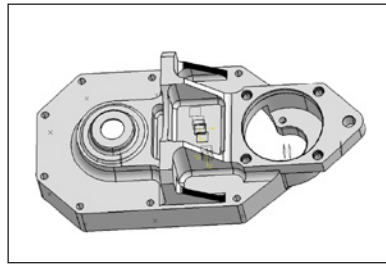
First-page-out times are achieved by sending an Arch D-size PDF file to print, timing from release to page out with the HP driver set to plain paper/grayscale and the Canon Garo driver set to plain paper/monochrome. Both devices were loaded with 36-inch rolls, with each file set to auto-rotate to save media.

Supplementary Print Productivity

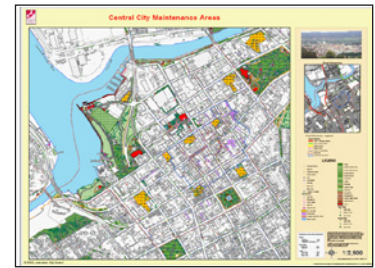
	File Name	HP Designjet T770HD Print Time	Canon imagePROGRAF iPF755 Delay + Print Time
1	BritishIslesTerrain.hpgl2	1:45	4:20
2	DSLOGO.hpgl2	0:54	1:46
3	Launceston.hpgl2	2:02	2:24
4	Madrone.hpgl2	2:42	12:31
5	Noruega.hpgl2	1:21	3:39
6	Pelotas.hpgl2	2:16	6:23
	Total Print Time:	11:00	31:03



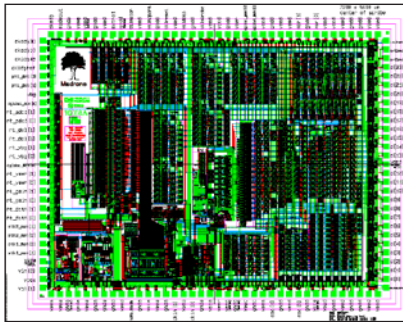
1. British IslesTerrain.hpgl2



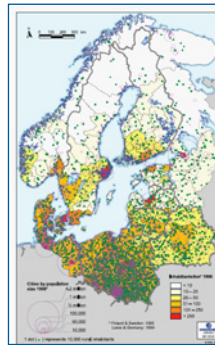
2. DS Logo.hpgl2



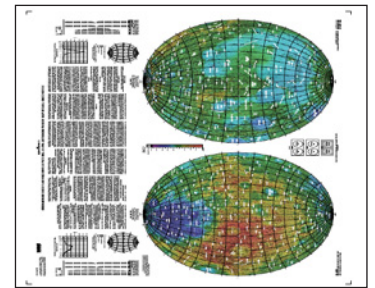
3. Launceston.hpgl2



4. Madrone.hpgl2



5. Noruega.hpgl2



6. Pelotas.hpgl2

Color Print Quality

HP DESIGNJET T770HD

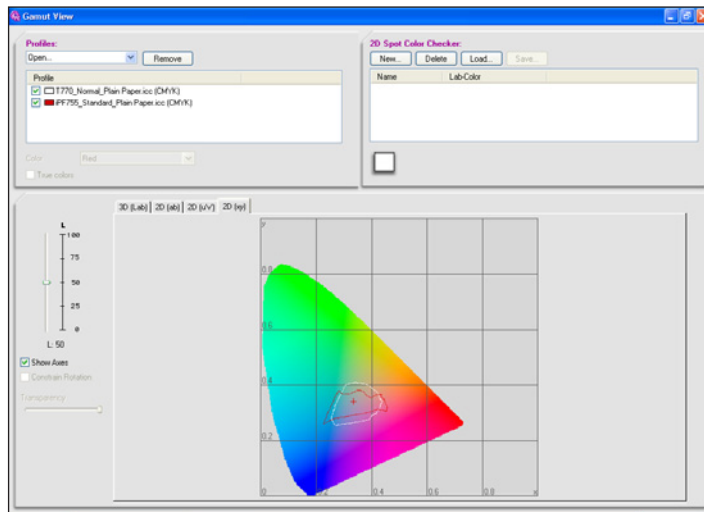
Plain Paper – Printer Managed Colors						
	Fast		Normal		Best	
	50%	100%	50%	100%	50%	100%
Cyan	0.41	0.71	0.54	0.75	0.57	0.80
Magenta	0.44	0.87	0.44	0.88	0.44	0.97
Yellow	0.39	0.65	0.34	0.80	0.36	0.80
Black	0.45	0.94	0.45	1.18	0.48	1.19

CANON IMAGEPROGRAF iPF755

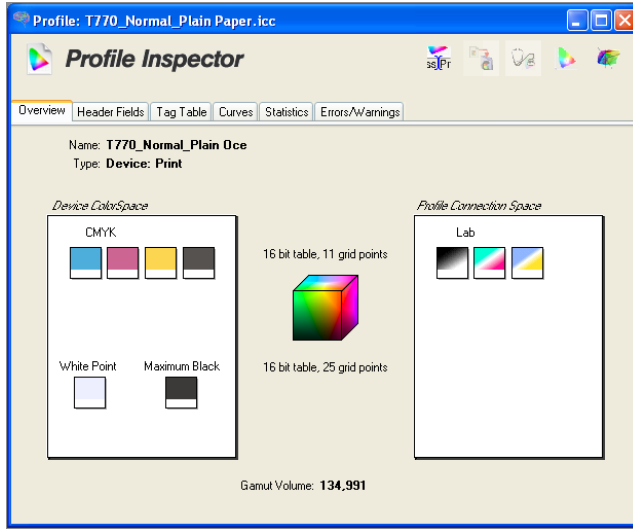
Plain Paper – Image Color						
	Draft		Standard		High	
	50%	100%	50%	100%	50%	100%
Cyan	0.52	0.98	0.67	1.03	0.65	1.04
Magenta	0.42	0.86	0.49	0.95	0.48	0.96
Yellow	0.19	0.70	0.31	0.80	0.30	0.81
Black	0.46	1.15	0.50	1.21	0.49	1.21

Color density readings were assessed by printing an IT8 test file on a third-party plain paper at all of the print drivers' quality settings and measuring the density of 100% dot-fill and 50% dot-fill using an Xrite 508 densitometer.

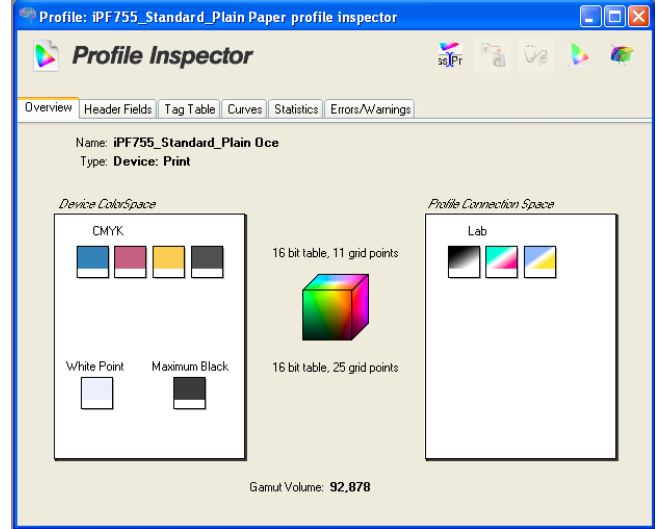
COLOR GAMUT COMPARISON



HP Designjet T770HD color gamut printed on plain paper/Normal setting (white) versus Canon imagePROGRAF iPF755 color gamut printed on plain paper/Standard setting (red).



HP Designjet T770HD



Canon imagePROGRAF iPF755

Black Print Quality

Density Block	HP Designjet T770HD			Canon imagePROGRAF iPF755		
	Fast	Normal	Best	Draft	Standard	High
1	1.45	1.51	1.43	1.40	1.49	1.46
2	1.48	1.50	1.44	1.42	1.46	1.46
3	1.49	1.51	1.43	1.41	1.46	1.48
4	1.49	1.48	1.43	1.41	1.45	1.48

Note: Solid black density measurements are based on four readings taken from a BLI proprietary PDF test target file that was printed on a third-party plain paper. The output was assessed at all print drivers' quality settings, with the HP driver set to plain paper/grayscale and the Canon driver set to plain paper/monochrome. Density was measured using an Xrite 508 densitometer.

Ink Consumption/Waste

TABLE 1: HP DESIGNJET T770HD

Day	1	2	3	4	5	6
Weight of cyan cartridge at start of day	191.6	190.8	190.1	168.8	148.0	147.2
Weight of cyan cartridge at end of day	190.8	190.2	169.7	148.2	147.4	146.7
	0.8	0.6	20.4	20.6	0.6	0.5
Weight of magenta cartridge at start of day	191.9	185.8	179.7	168.6	157.8	156.7
Weight of magenta cartridge at end of day	185.9	179.8	169.5	158	156.9	155.9
	6.0	6.0	10.2	10.6	0.9	0.8
Weight of yellow cartridge at start of day	193.1	188.7	184.4	171.3	158.9	155.6
Weight of yellow cartridge at end of day	188.9	184.5	172.6	159.1	155.8	152.5
	4.2	4.2	11.8	12.2	3.1	3.1
Weight of MK cartridge at start of day	192.8	161.4	130.5	118.5	107.3	81.0
Weight of MK cartridge at end of day	161.7	130.6	119.9	107.4	81.3	55.4
	31.1	30.8	10.6	11.1	26	25.6
Weight of PK cartridge at start of day	191.3	184.8	178.4	174.8	172.1	167.0
Weight of PK cartridge at end of day	185.0	178.6	175.9	172.4	167.1	162.1
	6.3	6.2	2.5	2.4	5.0	4.9
Weight of gray cartridge at start of day	189.3	185.3	181.6	139.8	98.8	81.8
Weight of gray cartridge at end of day	185.5	181.7	140.9	98.9	81.9	64.6
	3.8	3.6	40.7	40.9	16.9	17.2
Total Daily Ink Weight Used:	52.2	51.4	96.2	97.8	52.5	52.1
Total Ink Weight For Each Document Set	103.6		194.0		103.6	
Combined Total Ink Weight Plus Waste	104.6		201.4		106.8	
Total Ink Used	401.2					
Total Ink Used Plus Waste	412.8					

TABLE 2: CANON IMAGEPROGRAF IPF755

Day	1	2	3	4	5	6
Weight of cyan cartridge at start of day	175.3	173.0	170.1	128.0	97.4	86.3
Weight of cyan cartridge at end of day	173.2	170.1	129.1	97.9	86.6	76.8
	2.1	2.9	41.0	30.1	10.8	9.5
Weight of magenta cartridge at start of day	178.3	167.7	156.7	126.8	108.2	93.8
Weight of magenta cartridge at end of day	167.7	156.7	127.9	108.2	94.1	81.9
	10.6	11.0	28.8	18.6	14.1	11.9
Weight of yellow cartridge at start of day	173.5	169.3	164.5	137.6	121.2	109.7
Weight of yellow cartridge at end of day	169.4	164.8	138.6	121.3	109.9	98.9
	4.1	4.5	25.9	16.3	11.3	10.8
Weight of MBK(1) cartridge at start of day	174.0	157.3	139.6	122.5	116.6	97.8
Weight of MBK(1) cartridge at end of day	157.5	139.8	123.7	116.2	98.2	80.5
	16.5	17.5	15.9	6.3	18.4	17.3
Weight of MBK(2) cartridge at start of day	174.2	157.4	139.4	122.3	116.1	97.5
Weight of MBK(2) cartridge at end of day	157.6	139.4	123.6	116.3	97.8	79.8
	16.6	18.0	15.8	6.0	18.3	17.7
Weight of BK cartridge at start of day	175.7	174.2	171.7	160.8	160.1	157.8
Weight of BK cartridge at end of day	174.2	171.8	161.4	160.1	158.0	155.8
	1.5	2.4	10.3	0.7	2.1	2.0
Total Daily Ink Weight Used:	51.4	56.3	137.7	78.0	75.0	69.2
Weight of waste tank at start of day	667.7	672.9	679.2	715.3	715.8	720.2
Weight of waste tank at end of day	673.9	679.4	733.8	718.2	722.3	723.4
Daily weight accumulated in waste tank	6.2	6.5	54.6	2.9	6.5	3.2
Total Ink Weight For Each Document Set	107.7		215.7		144.2	
Combined Total Ink Weight Plus Waste	108.4		222.6		146.3	
Total Ink Used	467.6					
Total Ink Used Plus Waste	477.3					

TABLE 3: Amount of Ink in Each HP Designjet T770HD Cartridge

	Cyan	Magenta	Yellow	Matte Black	Photo Black	Gray
Weight of cartridge prior to installation	191.6	191.9	193.1	192.8	191.3	189.3
Weight of cartridge at end of life	55.3	55.3	56.0	55.9	55.3*	53.9
Net weight of ink	136.3	136.6	137.1	136.9	136.0	135.4
Total Ink Weight across 6 cartridges						818.3

* Because the photo black ink cartridge could not be depleted during testing, an average was taken of the weights of the five other 130 ml cartridges to arrive at the black cartridge weight

TABLE 4: Amount of Ink in Each Canon imagePROGRAF IPF755 Cartridge

	Cyan	Magenta	Yellow	Matte Black (1)	Matte Black (2)	Black
Weight of cartridge prior to installation	175.3	178.3	173.5	174.0	174.2	175.7
Weight of cartridge at end of life	36.6	36.3	42.5	37.5	36.9	38.0*
Net weight of ink	138.7	142.0	131.0	136.5	137.3	137.7
Total Ink Weight across 6 cartridges						823.2

* Because the black ink cartridge could not be depleted during testing, an average was taken of the weights of the five other cartridges to arrive at the black cartridge weight

TABLE 5: Ink Used in 200-Print Run of BLI's Arch D Line Art Architectural Test Document on the HP Designjet T770HD

	Cyan	Magenta	Yellow	Matte Black	Photo Black	Gray
Net weight of ink used in print run	1.4	12.1	8.6	62.2	12.7	7.6
Net weight of ink in cartridge	136.3	136.6	137.1	136.9	136.0	135.4
Percentage of ink used in test	1.0%	8.9%	6.3%	45.4%	9.3%	5.6%
Overall weight of ink used						104.6
Total Ink Weight across 6 cartridges						818.3
Percentage of total ink used averaged across all colors						12.8%

TABLE 6: Ink Used in 200-Print Run of BLI's Arch D Line Art Architectural Test Document on the Canon imagePROGRAF IPF755

	Cyan	Magenta	Yellow	Matte Black (1)	Matte Black (2)	Black
Net weight of ink used in print run	5.2	21.6	8.7	34.2	34.8	3.9
Net weight of ink in cartridge	138.7	142.0	131.0	136.5	137.3	137.7
Percentage of ink used in test	3.7%	15.2%	6.6%	25.1%	25.3%	2.8%
Overall weight of ink used						108.4
Total Ink Weight across 6 cartridges						823.2
Percentage of total ink used averaged across all colors						13.2%

TABLE 7: Ink Used in 200-Print Run of BLI's Arch D GIS Test Document on the HP Designjet T770HD

	Cyan	Magenta	Yellow	Matte Black	Photo Black	Gray
Net weight of ink used in print run	42.0	21.8	25.4	23.2	6.2	82.8
Net weight of ink in cartridge	136.3	136.6	137.1	136.9	136.0	135.4
Percentage of ink used in test	30.8%	16.0%	18.5%	17.0%	4.6%	61.2%
Overall weight of ink used						201.4
Total Ink Weight across 6 cartridges						818.3
Percentage of total ink used averaged across all colors						24.6%

TABLE 8: Ink Used in 200-Print Run of BLI's Arch D GIS Test Document on the Canon imagePROGRAF iPF755

	Cyan	Magenta	Yellow	Matte Black (1)	Matte Black (2)	Black
Net weight of ink used in print run	72.2	48.5	43.5	23.6	23.1	11.7
Net weight of ink in cartridge	138.7	142.0	131.0	136.5	137.3	137.7
Percentage of ink used in test	52.1%	34.2%	33.2%	17.3%	16.8%	8.5%
Overall weight of ink used						222.6
Total Ink Weight across 6 cartridges						823.2
Percentage of total ink used averaged across all colors						27.0%

TABLE 9: Ink Used in 200-Print Run of BLI's Arch D CAD Test Document on the HP Designjet T770HD

	Cyan	Magenta	Yellow	Matte Black	Photo Black	Gray
Net weight of ink used in print run	1.5	2.1	6.6	52.0	10.3	34.3
Net weight of ink in cartridge	136.3	136.6	137.1	136.9	136.0	135.4
Percentage of ink used in test	1.1%	1.5%	4.8%	38.0%	7.6%	25.3%
Overall weight of ink used						106.8
Total Ink Weight across 6 cartridges						818.3
Percentage of total ink used averaged across all colors						13.1%

TABLE 10: Ink Used in 200-Print Run of BLI's Arch D CAD Test Document on the Canon imagePROGRAF iPF755

	Cyan	Magenta	Yellow	Matte Black (1)	Matte Black (2)	Black
Net weight of ink used in print run	21.1	26.3	22.4	35.7	36.5	4.3
Net weight of ink in cartridge	138.7	142.0	131.0	136.5	137.3	137.7
Percentage of ink used in test	15.2%	18.5%	17.1%	26.2%	26.6%	3.1%
Overall weight of ink used						146.3
Total Ink Weight across 6 cartridges						823.2
Percentage of total ink used averaged across all colors						17.8%

Ink Consumption/Waste Test Methodology Overview

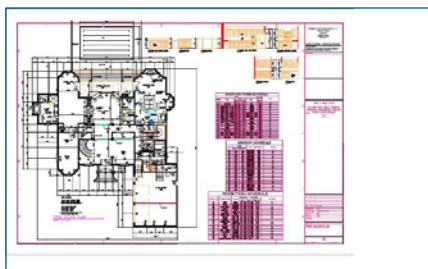
Buyers Lab's ink consumption and waste analysis was conducted using three color document types (Line Art, GIS and 3D CAD), each formatted as a PDF and sized to Arch D (24" x 36").

The HP Designjet T770HD was installed in BLI's lab with the latest level of firmware (v. 2.0.0.3) and connected to a Windows XP Workstation using a 100BaseT TCP/IP connection. The device was left in default configuration throughout testing. The following HP-GL/2 print driver settings were used – Color Management was set to “Application Managed Colors;” Print Quality was set to “Normal;” and Paper Type was set to “Plain Paper.”

Canon set up the imagePROGRAF iPF755 in BLI's lab with firmware version 1.06 installed. It was connected to a Windows XP Workstation using a 100BaseT TCP/IP connection. The device was left in default configuration throughout testing. For the line art and 3D CAD documents, the Garo print driver settings were as follows – Print Priority was set to “Line Drawing/Text;” Print Quality was set to “Standard (600 dpi);” Color was set to “Color (CAD);” and Paper Type was set to “Plain Paper.” For the GIS document Print Priority was set to “Image;” Print Quality was set to “Standard (600 dpi);” Color Mode was set to “Color;” and Paper Type was set to “Plain Paper.”

Before installing the ink cartridges, the Canon's ink sub-tanks were ensured to be at their maximum capacity, as an older set of cartridges was inserted and removed eight times, thereby filling the sub-tanks. The old set of cartridges was discarded and each new ink cartridge was then weighed and inserted. To replicate a typical printer usage scenario, a start/stop method was employed for this portion of the test. The Arch D-size line art document was printed 10 times followed by a wait of at least 10 minutes. This procedure was repeated until 100 documents were printed on each of two days. The same procedure was then followed for printing 200 Arch D-size GIS documents. And lastly, 200 Arch D-size 3D CAD documents were printed. At the start and end of each day, the cartridges were weighed and the weight of ink used for the test run was calculated for each document printed. In addition, the amount of wasted ink for each cartridge was calculated by subtracting the daily start weight from the previous day's cartridge end weight. Also, since the Canon imagePROGRAF iPF755 employs a waste ink collection tank, technicians weighed this at the start and end of each day's testing.

A second calculation method for ink consumption was conducted for this evaluation based on each cartridge in both printers having identical volumes (130 ml). After the 600 page print run, five of the six ink cartridges from both the HP Designjet T770HD and Canon imagePROGRAF iPF755 were totally depleted and the empty cartridges were weighed. These results are found in Tables 3 and 4. An average of the five empty HP cartridge weights was applied for HP's photo black cartridge as that could not be depleted during the test period. Likewise, an average of the five empty Canon cartridge weights was applied for the Canon black cartridge. For each 200 page print run, the percentage of ink used per cartridge was calculated by dividing the net weight of ink used by the overall weight of ink in each cartridge. These results are found in Tables 5-10.



Line Art Test Document



GIS Test Document



3D CAD Test Document

Test Environment

Test Environment

These products were tested in BLI's 10,000-square-foot U.S. test lab, in an environment monitored by an Extech RH S20 Digital RH/Temperature Recorder and Honeywell Model 61 Seven-Day Temperature/Relative Humidity Chart Recorder. All products lab tested by BLI are powered by dedicated circuits that are protected by ESP (Electronic Systems Protection, Inc.) surge protectors to prevent transient power and communication disturbances from impacting equipment under test. All paper used in testing was allowed to acclimatize inside the lab for at least 12 hours before being used.

Test Equipment

BLI's dedicated test network, consisting of Windows 200 and Microsoft Exchange server, Windows XP workstations, 100BaseTX network switches and CAT5 cabling.

Test Procedures

The test methods and procedures employed by BLI in its lab testing include BLI's proprietary procedures and industry-standard test procedures. In addition to a number of proprietary test documents, BLI uses industry standard files including an IT8 test file and an ASTM monochrome test document for evaluating color and black image quality, respectively. In addition to a visual observation, color print quality and gamut size are evaluated using an X-rite Eye-One spectrophotometer and Gretag's Profile Maker 5.0 software. Density of black and color output was measured using an Xrite 508 densitometer.

About Buyers Laboratory Inc.

For 48 years, Buyers Lab (BLI) has been the leading independent office-equipment testing lab and business consumer advocate. In addition to publishing the industry's most comprehensive and accurate test reports on office document imaging devices, each representing months of exhaustive hands-on testing in BLI's US and UK laboratories, the company has been the leading source of competitive intelligence for industry professionals on copiers, printers, fax machines, scanners, duplicators, wide-format devices and multifunctional products. The company's databases cover over 12,000 products globally and have a long-standing reputation for being the industry's most trustworthy and complete source for specifications and side-by-side comparisons, all of which are available as part of bliQ, BLI's web-based encyclopedic resource. Subscribers also have access to BLI's renowned Lab Test Reports, First Look Reports, Solutions Reports, Environmental Reports, news articles and a complete library of manufacturer's product literature, as well as valuable tools including a Product Configurator and Total Cost of Ownership (TCO) Calculator.

Business consumers and manufacturers can also select from a vast array of confidential for-hire private testing services that include document imaging device beta and pre-launch testing, performance certification testing, consumables testing (such as toner, ink and photoconductors) and software solutions and print media testing (including virgin and recycled papers).