



Test of Epson Genuine Ink Cartridges vs. Non-Epson Ink Cartridges and Refill Kits

Second Summary Report

1. Objective

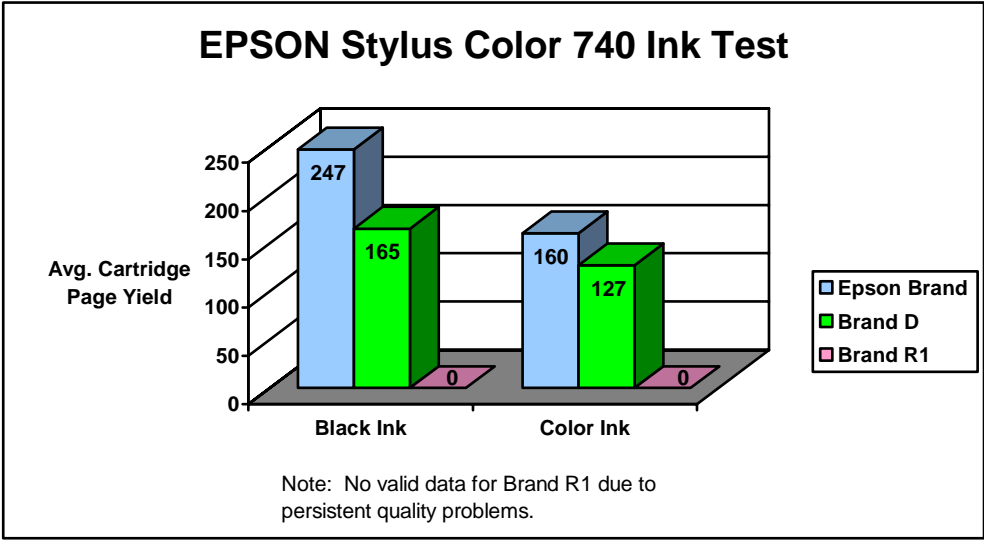
To evaluate the performance of Epson genuine ink cartridges against other brands of ink cartridges and refill kits for EPSON Stylus C60, Stylus Color 740, Stylus Color 777, and Stylus Photo 780 ink jet printers. (Ink brand descriptions are provided in the Appendix.) Non-Epson ink cartridges were tested as is, while third-party refill kits were tested by injecting the ink via syringe into empty Epson cartridges. Testing gauges how well the different inks work with the printers from the perspective of an average user. The key measurements are:

- **Page Yield** – pages printed per cartridge. Higher yield is desirable because it allows users to print more pages from each cartridge. Higher yield also means less frequent cartridge replacement or refills.
- **Head Cleaning** – users of inkjet printers initiate print head cleaning to restore good quality output by depressing the print head cleaning buttons. Fewer head cleanings are desirable because it means there are fewer pages printed with defects, less user intervention, and less ink and paper waste.

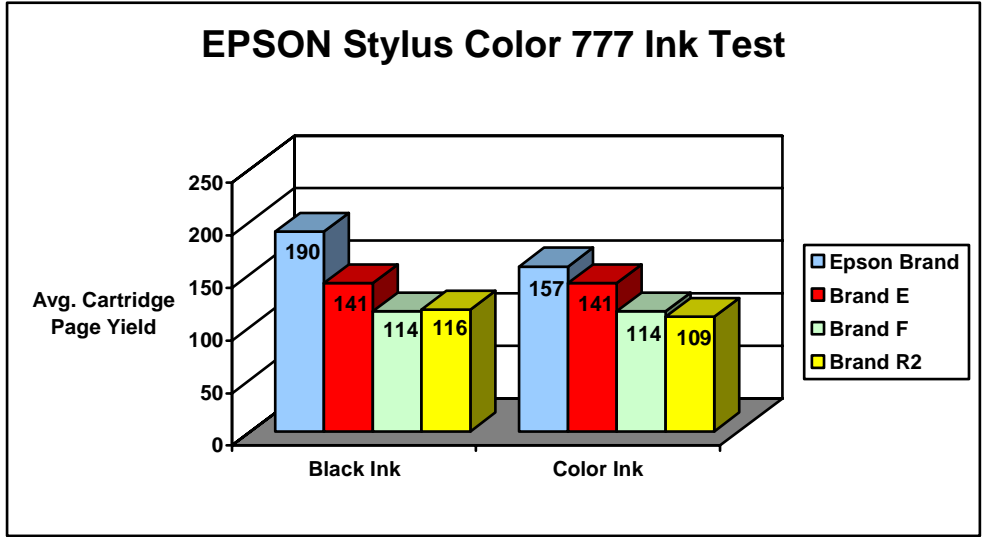
2. Results

As in the first tests recently reported by Torrey Pines Research, Epson cartridges consistently outperformed other brands with higher page yields and much fewer head cleaning. With one of the two ink refill brands, print quality problems were so persistent that valid data is unavailable.

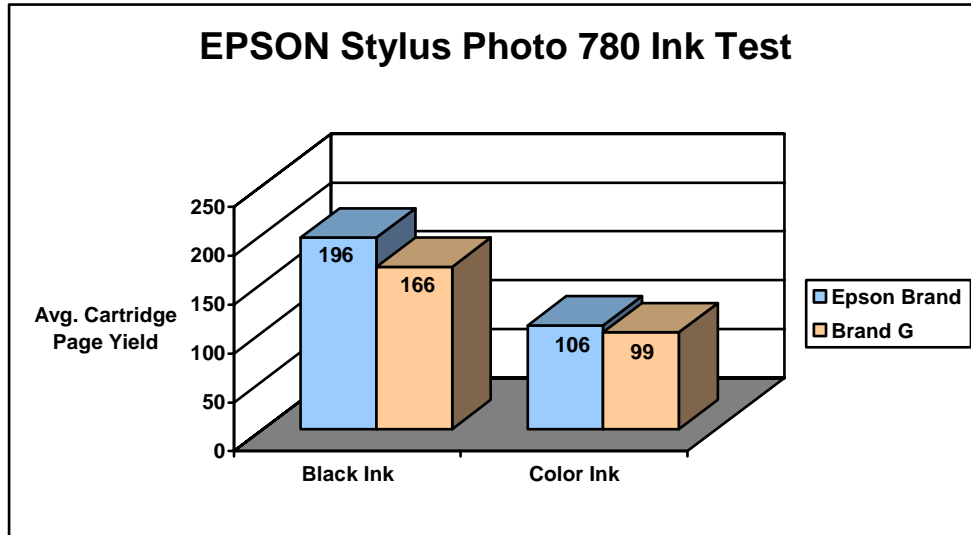
Page Yield: In each test, yield was the average number of pages printed from printers that successfully expended 3 ink cartridge sets. A yield of 0 for any test indicates that all five printers using cartridge sets of that brand suffered print quality problems that could not be resolved by print head cleanings.



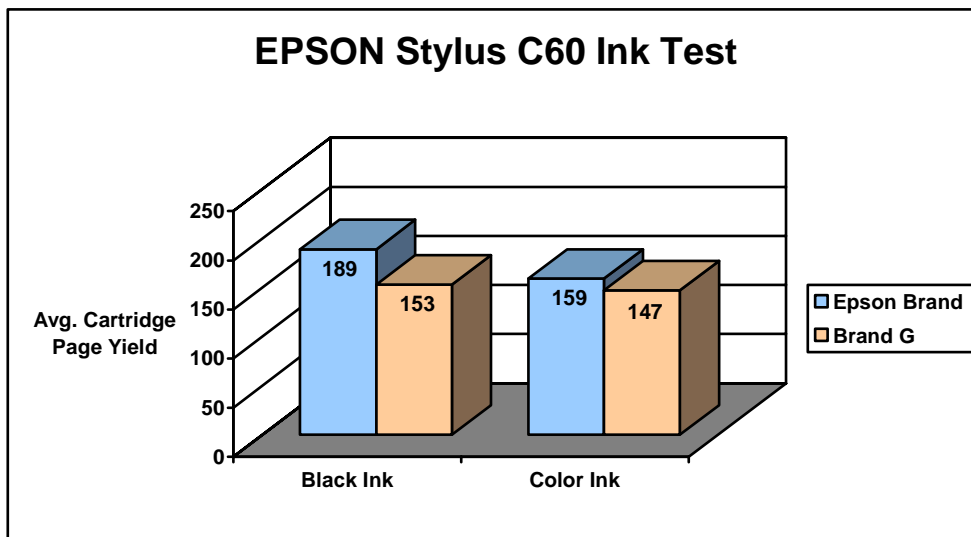
Comments: For Stylus Color 740 printers, Epson ink cartridges outperformed Brand D ink cartridges in both black and color page yields. On average, Epson black cartridges yielded 54% more pages than Brand D, while Epson color cartridges yielded 26% more. Brand R1 refill ink performed so poorly that no comparisons were possible.



Comments: For Stylus Color 777 printers, Epson ink outperformed Brand E and F cartridges and the Brand R2 refill kit in both black and color page yields. On average, Epson black cartridges yielded 35% more pages than Brand E, while Epson color cartridges yielded 11% more. Versus Brand F, Epson black cartridges yielded 67% more pages and Epson color cartridges yielded 39% more pages. Versus Brand R2 refill ink, Epson black cartridges yielded 64% more pages and Epson color cartridges yielded 44% more pages.

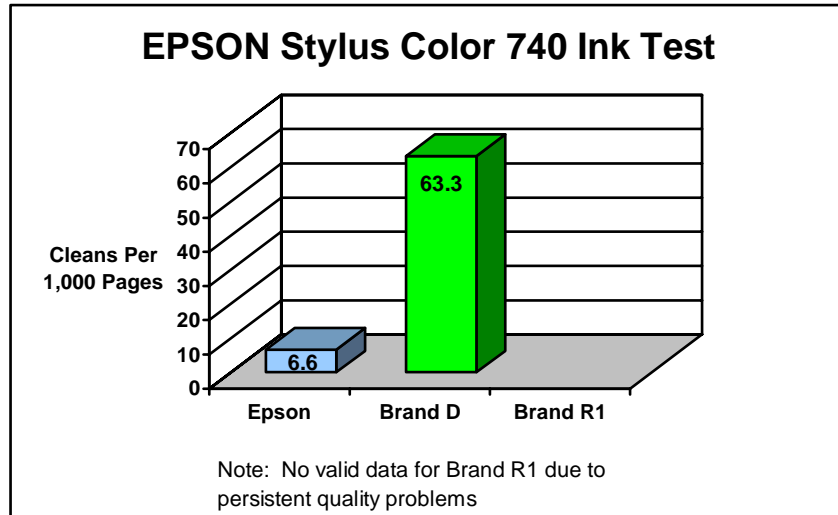


Comments: For Stylus Photo 780 printers, Epson ink cartridges outperformed Brand G ink cartridges in both black and color page yields. On average, Epson black cartridges yielded 18% more pages than Brand G, while Epson color cartridges yielded 7% more.

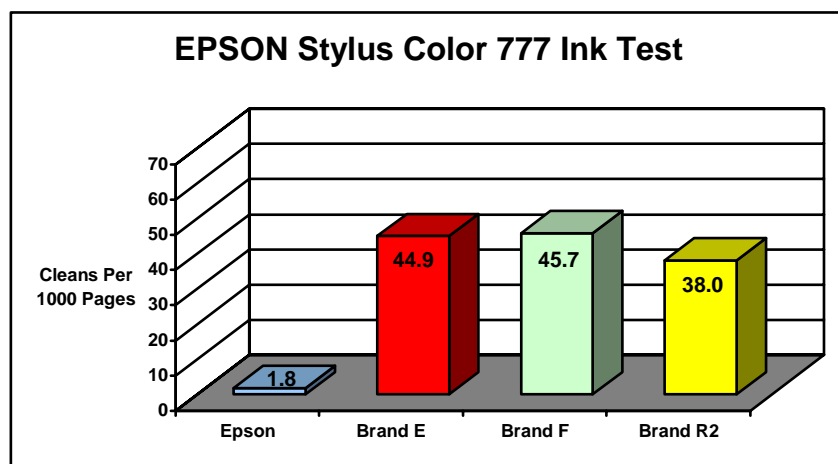


Comments: For Stylus C60 printers, Epson ink cartridges outperform Brand G ink cartridges in both black and color page yields. On average, Epson black cartridges yielded 24% more pages than Brand G, while Epson color cartridges yielded 8% more.

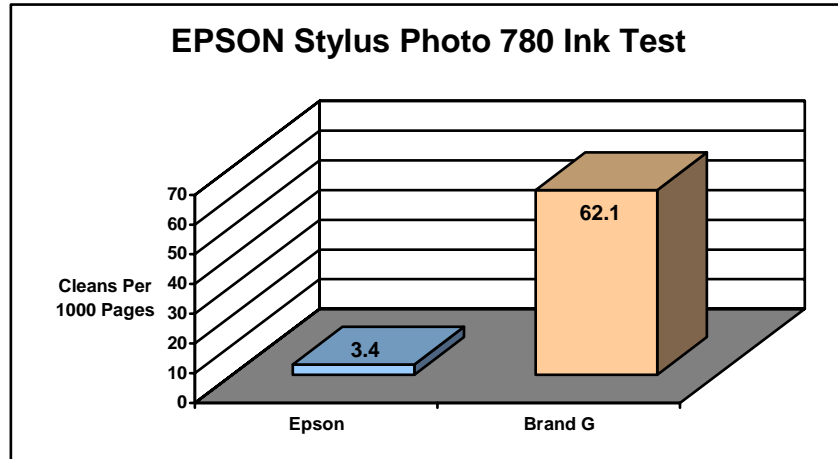
Head Cleanings: Overall, the Epson cartridges tested had more reliable performance with much lower rates of user initiated head cleanings. Data was normalized by page yield to show cleaning frequency per 1,000 pages to provide a consistent comparison between brands.



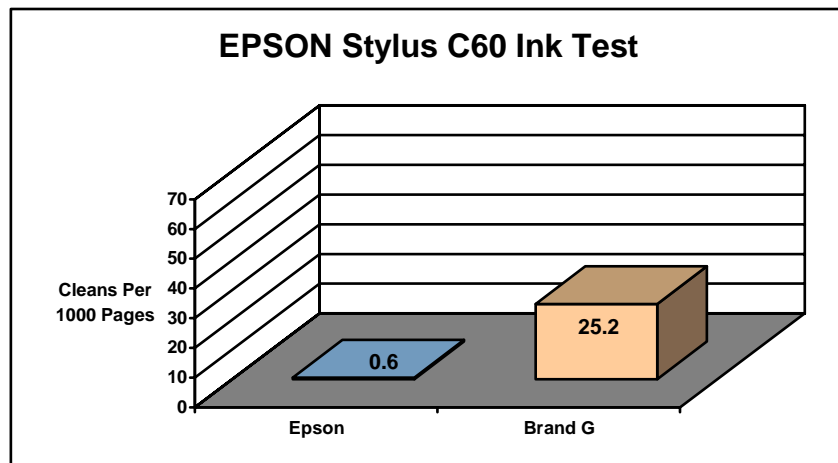
Comments: For Stylus Color 740 printers, significantly fewer head cleanings were required with Epson cartridges than with Brand D cartridges. Combining black and color cleaning, Brand D cartridges required over 9 times more head cleaning than Epson cartridges. All five printers using Brand R1 refill ink could not be restored to good print quality with multiple head cleanings, so valid comparisons of cleaning rates were not possible.



Comments: For Stylus Color 777 printers, significantly fewer head cleanings were required with Epson cartridges than with Brand E and F cartridges and Brand R2 refill ink. Combining black and color cleaning, Brands E, F and R2 required between 21 to 25 times more head cleaning than Epson cartridges.



Comments: For Stylus Photo 780 printers, significantly fewer head cleanings were required with Epson cartridges than with Brand G cartridges. Combining black and color cleaning, Brand G cartridges required over 18 times more head cleaning than Epson cartridges.



Comments: For Stylus C60 printers, significantly fewer head cleanings were required with Epson cartridges than with Brand G cartridges. Combining black and color cleaning, Brand G cartridges required over 42 times more head cleaning than Epson cartridges.

3. Test Plan

Evaluate Epson ink cartridges and 6 brands of non-Epson ink cartridges and refill kits on 4 different Epson ink jet printer models. The testing involved 55 printers, hundreds of new and refilled ink cartridges, and tens of thousands of printed pages.

Epson Printer Model and Ink Cartridges	Ink Brand (Brands A, B and C were tested previously)
EPSON Stylus Color 740 S020189 (Black), S020191 (Color)	Epson - Original Equipment Manufacturer Brand D Brand R1 (refill)
EPSON Stylus Color 777 T017201 (Black), T018201 (Color)	Epson - Original Equipment Manufacturer Brand E Brand F Brand R2 (refill)
EPSON Stylus Photo 780 T007201 (Black), T008201 (Color)	Epson - Original Equipment Manufacturer Brand G
EPSON Stylus C60 T028201 (Black), T029201 (Color)	Epson - Original Equipment Manufacturer Brand G

To ensure accurate and fair testing:

- Each of the 11 tests above utilized 5 brand new printers. All 55 printers were tested using the same methodology.
- To simulate real-life usage, each printer was first primed with a genuine Epson ink cartridge set. An ink cartridge set consists of a black and a color cartridge.
- After initializing the printer, each printer had to use 3 cartridge sets of a specific brand to complete test. Performance results were based on data from these 3 cartridge sets.

Basic test steps were:

1. Initialize new printer with Epson cartridge set to prime the printer. Print nozzle check to confirm nozzle function and print head alignment.
2. Install new cartridge set from one brand (D, E, F, G, R1, R2 or Epson).
3. Print test pattern shown in Appendix.
4. Continue printing test pattern pages. If print quality is poor, perform a head cleaning. Examples of poor print quality are missing lines or colors (see Appendix). A nozzle check print out is performed after cleanings to determine if good print quality has been restored. Testing is stopped if acceptable print quality could not be restored with 5 successive head cleanings.
5. When each cartridge is expended, continue steps 2-4 of the same brand until 3 sets are expended (i.e. 3 black cartridges and 3 color cartridges).
6. Testing is complete when the 3 sets are expended. Data from incomplete tests is not considered.

4. Conclusion

This second reported testing again confirmed the superiority of Epson cartridges over the other brands tested. The performance of the Epson ink cartridges tested was far superior to Brand D, E, F and G ink cartridges and Brand R1 and R2 refill kits.

Epson ink cartridges consistently yielded more pages than non-Epson cartridges and refills, up to 67% more. Each non-Epson brand also required significantly more head cleanings than genuine Epson ink cartridges, up to 42 times more.

EPSON Stylus Color 740 Tests: Epson cartridges consistently outperformed Brand D cartridges, with higher yields and fewer cleaning cycles. The yield differences were most noticeable with black ink cartridges, with Epson cartridges yielding 54% more pages than Brand D. Brand D cartridges also required many head cleanings to maintain good print quality, with 9 times more head cleaning than Epson cartridges. Brand R1 refill ink consistently performed so poorly that no comparisons were possible.

EPSON Stylus Color 777 Tests: Epson cartridges consistently outperformed Brand E and F ink cartridges and the Brand R2 refill kit with higher yields and fewer cleaning cycles. The yield differences were most noticeable with black ink cartridges, with Epson cartridges averaging 54% more pages than the 3 non-Epson brands. Brand E, F and R1 also required much more head cleaning to maintain good print quality, with an average of 24 times more head cleaning than Epson cartridges.

EPSON Stylus Photo 780 Tests: Epson cartridges consistently outperformed Brand F cartridges, with higher yields and fewer cleaning cycles. The yield differences were most noticeable with black ink cartridges, with Epson cartridges yielding 18% more pages than Brand F. Brand F cartridges also required much more head cleaning to maintain good print quality, with 18 times more head cleaning than Epson cartridges.

EPSON Stylus C60 Tests: As with Stylus Photo 780 cartridges, Epson cartridges again outperformed Brand F cartridges for the Stylus C60. Page yields were higher and cleaning cycles less frequent. The yield differences were most noticeable with black ink cartridges, with Epson cartridges yielding 24% more pages than Brand F. Brand F cartridges also required much more head cleanings to maintain good print quality, with 42 times more head cleaning than Epson cartridges.

Additional Comments Regarding Cartridge Refilling: The tests of two brands of refill kits indicate that the use of these kits can result in serious user problems. Refilling cartridges is messy and time-consuming. Ink spills are common so that gloves and protected surfaces are required. Some ink leakage occurred while the refilled cartridges were in use, which should be remedied quickly to prevent print defects and potential damage to the printer. The printers using refilled cartridges printed many more pages with visible print defects which required time-consuming cleaning cycles and wasted paper. While refill kits are often represented as economical and environmentally friendly, with these refill kit's print defects, paper waste and extra cleaning were so persistent that most consumers would predictably be highly dissatisfied.

In summary, testing confirmed that genuine Epson inks offer these advantages:

- More quality prints per cartridge.
- Less user intervention due to fewer print quality problems.
- Cartridge savings because of higher page yields and less ink used overall for cleaning.

- Paper savings because less paper is wasted on poor-quality output and nozzle check print outs.
- Protection of printer investment because poor performance is a persistent problem with some of the non-Epson cartridges.
- Better for the environment: less ink and paper waste, fewer cartridge replacements, longer printer life.

5. Appendix

Thumbnail of test pattern is shown below. Actual size is 8.5" x 11".



Common examples of print defects are shown below. These image problems are the result of an absence of ink being sprayed where intended, including color drop out from many clogged nozzles or missing lines from one or more clogged print head nozzles.

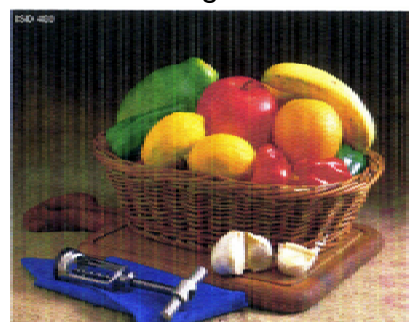
Normal



Yellow Ink Dropout



Missing Lines



Print sample includes ISO/DIS 1240 image.

Footnotes:

- 1) Brand D cartridges are made by a US-based company that distributes cartridges in the US under its own brand name and other brand names on the internet and through mass merchandise stores, office supply superstores, and office supply catalogs. These cartridges are also distributed by some Canadian and Latin American resellers.
- 2) Brand E cartridges are made by a Japan-based company that distributes cartridges in the US under its own brand name and other brand names on the internet and at mass merchandise stores, consumer electronic stores, and office supply superstores. These cartridges are also distributed by some European, Canadian and Latin American resellers.
- 3) Brand F cartridges are distributed by a US-based company in the US and Canada through the internet and some retailers. These cartridges are also distributed by some European and Latin American resellers.
- 4) Brand G cartridges are made by a US-based company and distributed in the US and Canada primarily through internet resellers. These cartridges are also distributed by some Latin American resellers.
- 5) Brand R1 refill kits are distributed in the US and Canada on the internet and through some retailers by a US-based distributor of diverse computer accessories.
- 6) Brand R2 refill kits are distributed primarily on the internet in the US and Canada by a US-based company.