



# Aftermarket Inkjets: True Economy

The article entitled “Off-Brand Printer Inks – False Economy,” which appeared in the May 2004 issue of *Consumer Reports* magazine, compared the performance of aftermarket inkjet cartridges to their original equipment manufacturer (OEM) counterparts. The testing centered on some of the most popular inkjet cartridges for HP, Canon and Epson. While an initial reaction to reading the article might indicate that no aftermarket inkjets offer worthwhile quality, this is not the case.

## What Products Were Tested?

- HP: 45 black and 78 color;
- Canon: BCI-3 black, cyan, magenta and yellow;
- Epson: T007 black and T008 photo color.

The actual printers used to test the cartridges were not listed.

The companies that had inkjet cartridges tested were:

- The OEMs (HP, Canon and Epson)
- Staples
- Office Depot
- InkSell
- 411Inkjets
- Rhinotek
- Carrot Ink
- Inkjet USA

The Canon and Epson products were compatible inkjet cartridges, which means they are a newly manufactured product. The HP 45 and 78 are remanufactured cartridges, which means they have been used at least once previously.

## What Were the Results?

While *CR* did find cartridges that did not perform at the OEM level for print quality and performance, not all of the aftermarket cartridges performed poorly, and in fact some may have equaled the OEM in performance, and at a cheaper cost per page.

An example of one of these is the 411Inkjet’s Epson T007/008. The criteria of “Excellent,” “Very Good,” etc., were used to rank the products.

That particular product received a “Very Good” for photo and text output, and a “Good” for graphics, all at a cost significantly lower than the OEM. It is likely that many people would find “Very Good” print quality at less than half the price per text page



(5.9 cents for the OEM and 2.3 cents for the 411Inkjet cartridge) a viable option.

The article only tested a sampling of the aftermarket inkjet cartridges available on the market. As in any industry, there are varying levels of manufacturing quality; unfortunately, a manufacturer that is less stringent in its manufacturing methods can lead to a generalization about the poor quality of all third-party inkjet cartridges, even when this is not the case.

## Defining ‘Quality’

The highest-cost component of a compatible cartridge is the ink. The highest cost component of the ink is the dye or pigment that is used as the colorant. Dyes that are fade resistant cost more than those that fade quickly. It is a fact that the current market for aftermarket inkjet cartridges is largely driven by lower prices, not ink quality; therefore higher-cost components such as fade-resistant inks, which would raise the end-user cost, are not part of a viable business model.

Interestingly, even if consumers would pay more for an aftermarket cartridge that had fade-resistant ink, that type of ink may not be available. Many of the primary dye manufacturers that produce fade-resistant dyes only produce them for the OEMs. This is because the OEMs invest large sums of money for research and development, and require their particular dye to be patented and sold only to them. This is a common practice in almost all industries, especially if the OEM is putting up the dollars for the research and is purchasing large quantities of the material.

Probably the more challenging aspect of quality for the aftermarket when compared to the original is consistently providing quality in manufacturing. Another significant area of the article pertains to the quality of the product's manufacturing process, not necessarily the quality of the ink. The primary objection is on Page 32 of the *CR* article and refers to a company that had failures in 10 out of 12 inkjets tested. The article mentions "... incorrect colors," which likely means either contamination or print-head failure. Both of these conditions can be related to product quality, but not to the nature of the inks themselves.

### Apples to Apples?

Another question to ask is whether the cartridges compared with one another were actually the same. Just as an automobile manufacturer may produce several versions of the same model that differ in cost and options, inkjet cartridges come in varying levels as well. There is a large discrepancy in the cost of the OEM HP 78 at \$49 compared to the other products, which are mostly in the \$20-\$30 range. This is because the \$49 price is likely for the HP

78A, which is a high-yield cartridge with a lower cost per page. It is likely that the aftermarket cartridges were the HP 78D, which is the lower-yield cartridge with a higher cost per page.

The Staples versions of the HP 45 and 78 cartridges demonstrated the same quality as the original at a lower cost per page for the black, but cost the same as the OEM for a photo page. The most reasonable explanation for why the Staples HP 78 costs the same for a photo print as the OEM is that *CR* is not comparing apples to apples.

If an OEM HP 78D, which sells for around \$32 to \$33, had been used, then the cost per page for photo printing would be higher than \$0.80 per page. The HP Web site lists the 78D at \$34.99 for 450 pages and the 78A at \$54.99 for 970. This gives a cost per page for the A of \$0.06 and a cost per page for the D of \$0.08, or 33 percent more. If *CR* had compared the OEM 78A to the Staples 78A, then the cost per page for the Staples photo would have been less, actually placing it above the OEM in the standings. It is strange that what appears to be such a blatant error wasn't recognized before the article was published. **□**

## The Science Behind the Ink

by **Mark Hibbard** | Recharger Magazine

Desktop inkjet printers have achieved common acceptance as essential media output devices, delivering hard-copy output in the form and fashion intended by the document originator. In the past decade, the print quality, print performance and hardware reliability of inkjet printers has dramatically improved; at the same time, the printers have continued to become less expensive. The inkjet printer has become the standard output device for millions of students, businesspeople and home users. The variable element of the print output process is ink control and ink.

Whether the target information is printed and distributed, distributed by computer and remotely printed on-demand using a desktop inkjet printer, the print quality is directly related to the quality of the print head and ink. The information source or publisher has no ability to determine the quality of the final output when there are many variables that can affect inkjet print output.

Most of the ink used in inkjet products is water-based or aqueous, which in the introductory years of 1989-1990 had image performance problems. Early inkjet printers were prone to smearing and bleeding. After 1990, many OEM black inks utilized pigmented formulations, which improved image performance and customer satisfaction.

Development of aqueous replacement inks for desktop printers has greatly progressed in the last few years.

Alternative solvent inks (non-aqueous), though available, are not used in thermal or piezo inkjet print systems for the desktop printer. There are some specialty inks for UV curable applications or accelerated drying that require more expensive hardware and higher maintenance costs. Today, many vendors sell replacement inks for the remanufacturing market that have reasonable initial print performance, but do not have good permanence, fade or complete fitness for use. The use of marginally performing inks in remanufacturing inkjet cartridges can be disastrous for the sustained growth of replacement inkjet products.

Currently, most inkjet systems use dye-based color inks and pigment-based black. The pigment molecules are much larger and more complex than dye-based ink molecules and therefore break down more slowly than dye molecules. This extends the archivability of the black text and graphics. Ink dyes are much more susceptible to UV damage and air-pollution effects. Inter-color bleeding and wicking are exacerbated to a greater extent than pigments because dye molecules are of a smaller size. **□**