Technical backgrounder
HP 60 and 901 ink cartridge technology

Easy and affordable printing for the home and office

Affordable new ink cartridge technology leverages success of HP's integrated printhead system to deliver:

- Low-cost, high-quality cartridges for Deskjet customers
- High-yield cartridges with lower cost and intervention for Officejet customers
- Outstanding document and graphic output
- Exceptional ease of use

HP is releasing affordable new ink cartridge technology that delivers laser-quality black text and vivid graphics, plus user-friendly printing features. Engineered for the home and small-business environment, this cartridge technology builds on the success of HP's integrated printhead system while leveraging HP leadership in supplies research and design. The new cartridge technology comprises a tri-color cartridge (containing cyan, magenta and yellow dye inks) with an integrated dual-drop-volume printhead, and a separate pigment black ink cartridge with an integrated printhead.

A new dye-based color and pigment-based black ink formulation delivers great results on a variety of plain papers, with excellent quality on specialty papers too. HP's dual-drop-volume technology—integrated in the cartridge—ensures finely detailed images and graphics, and an improved halftoning process enables smooth gradations and outstanding color accuracy. Smart Printing technology makes it easy for customers to monitor ink supplies with estimated ink-level status information and low-ink alerts, while an additional feature delivers improved technology to detect and inform customers when black ink may be low enough to impact print quality. HP has patented the ink set and components, as well as the enhanced ink monitoring technology included in the cartridge.

Used in Deskjet and Officejet products, this cartridge technology is designed to meet the needs of both users. Deskjet customers can enjoy low-cost, high-quality cartridges designed for home use—ideal for printing documents, letters and web pages. Officejet customers can benefit from high-yield cartridges that provide a lower cost per page and lower intervention. These cartridges are ideal for printing business documents, reports, correspondence, web pages and graphics. While both printing systems deliver quick print speeds, the Officejet system is slightly faster, making it perfect for the productive small-office environment.

Examples of standard and high-capacity cartridges

This cartridge technology is being introduced in both the HP 60 and 901 series ink cartridges in spring '08. The HP 60 Black and Tri-color Ink Cartridges with HP Vivera inks support the HP Deskjet D2560 Printer and HP Deskjet F4280 All-in-One and are designed for everyday home printing. High-capacity HP 60XL Black and Tri-color Ink Cartridges offer an even better value and fewer cartridge replacements for frequent printing.

HP 60 and 60XL Ink Cartridges with Vivera Ink

HP Deskjet D2560 Printer

HP Deskjet F4280 All-in-One

HP Officejet printing systems—such as the J4580—are supported by this technology with new HP Officejet sub-branded ink cartridges. Customers will find that, to support the high-volume printing needs of small business customers, the 901XL Black and 901 Tri-color Officejet Ink Cartridges have higher ink-fill levels than their HP 60XL Black and 60 Tri-color cartridge counterparts. These HP Officejet ink cartridges also deliver lower operating costs—up to 15 percent lower color cost per page than competing laser printers.[1]

HP 901 and 901XL Officejet Ink Cartridges

HP Officejet J4580 All-in-One

These impressive new ink cartridges benefit from tested, successful HP technology as well as a number of HP innovations. Read on to learn more about how HP is advancing print cartridge technology.

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[1] Compared with lasers under $750. More details, visit hp.com/go/officejet.

Print laser-quality documents and graphics in fine detail

For the new HP 60 and 901 cartridge family, HP leveraged ink chemistry used in compact photo printers, added a pigment black ink cartridge and optimized the new printing system for both versatile plain paper and porous photo media. With this ink set, customers enjoy laser-quality black text on plain paper and archival-quality output. Important correspondence, records and business documents can be archived for decades without fading.[2] Customers who use papers with the ColorLok logo will enjoy enhanced document quality—like bolder blacks for improved contrast and sharper text. On papers with the ColorLok logo, colors are uniform and vivid for vibrant graphics. Plus, documents dry faster, allowing customers to handle printed pages right away with less smearing.

With new inks optimized for porous photo media, customers get instant-dry prints with improved water and smudge resistance when using the recommended photo media, HP Advanced Photo Paper. They also get the exceptional image quality and long-lasting fade resistance[3] they expect from HP. Please refer to the technology backgrounder on HP's newest porous-optimized inks for details.

> **New inks and HP Advanced Photo Paper deliver:**
> - 60+ years of light-fade resistance under glass*
> - 11 years of ozone-fade resistance*
> - Scratch and water resistance
>
> ** Light- and ozone-fade resistance based on preliminary testing.*

Another advancement included in HP 60 and 901 cartridges is new, dual-drop-volume technology. This HP technology enables finely detailed graphics and images, up to 4800x1200 dpi, without the need for the lighter, photo dye-load inks used in 6-ink printing.

In dual-drop-volume printing, the tri-color ink cartridge contains specially formulated full dye-load color inks that are fired onto the page in two different ink droplet volumes. These ink droplets can be as small as 1.3 picoliters (pl) and as large as 5 pl. About 3.8 *billion* of these 1.3 picoliter droplets would fit in a teaspoon. In dual-drop-volume modes, the printer can fire any combination of small or large ink droplets on a given print position—small and large droplets together, just small drops or just large. These combinations of ink droplets are determined by the printer in order to provide the optimum print quality and speed. Dual-drop-volume printing is used when printing in Normal, Best and Maximum-dpi print modes on select HP photo and brochure papers.[4] Customers can enable the Maximum dpi setting in the Advanced tab of the printer driver software when printing on HP Advanced Photo Paper.

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[2] Based on paper-industry predictions for acid-free papers and Original HP inks; colorant stability data at room temperature based on similar systems tested per ISO 11798 and ISO 18909.
[3] Based on preliminary display-permanence testing under glass by Wilhlem Imaging Research. For details, visit http://hp.com/go/printpermancence.
[4] HP Brochure and Flyer Paper, HP Premium Paper, HP Everyday Photo Paper and HP Advanced Photo Paper.
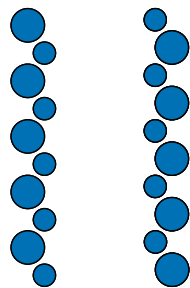
Micrograph of single-drop-volume image   Micrograph of dual-drop-volume image

The new ink cartridge technology also uses high-quality, high-resolution halftoning to deliver enhanced gradient tones for smooth, uniform color output. Halftoning is the process used by inkjet printers to lay down different combinations of ink droplets and create the range of colors seen on the printed page. Generally speaking, color print quality is improved when small ink drops are distributed evenly, with minimal overlap between ink dots. Printers with new cartridge technology achieve these optimal dot-placement patterns using improved halftoning algorithms, updated for optimal performance with HP's new dual-drop-volume technology. Customers see a large color gamut, enjoy outstanding color accuracy and get smooth transitions while using fewer inks and eliminating the need for optional photo cartridges. Customers benefit from HP advanced halftoning methods in all print modes. Previously, advanced halftoning was available only with the Maximum dpi setting.

The new printing system includes resistor innovation that is a key enabler for the high-frequency firing speed (24 kHz compared with 18 kHz in earlier generations). This resistor innovation also enables a high nozzle count on the tri-color cartridge—with 1,248 nozzles firing at 24,000 drops per second, the tri-color cartridge can deliver 29.95 million drops per second. The black cartridge has 336 nozzles that fire at 24,000 drops per second, delivering 8 million drops per second. Customers can print a durable, 4 x 6-inch photo in as few as 71 seconds.

1.3 pl   4.7 pl

Diagram of dual-drop-volume printhead nozzles, which fire 1.3 and 4.7 picoliter ink droplets.
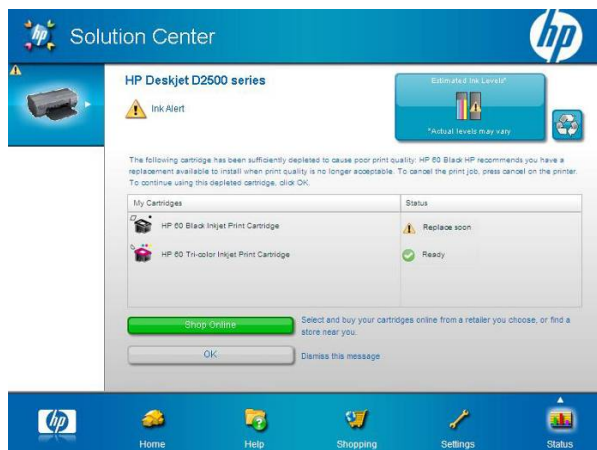
Enjoy features that make printing easy

The printer is able to produce deep, rich blacks for laser-quality text, as well the vibrant colors essential for graphics and lab-quality photos—all from a single set of ink supplies. Dual-drop-volume printing offers customers an effortless photo printing experience on HP photo and brochure papers. Customers don't have to swap out ink cartridges to print brilliant graphics or lab-quality photos.

These cartridges incorporate HP Smart Printing technology, which makes it easy for customers to monitor ink supplies with estimated ink-level status information and low-ink alerts. Customers can view graphical representations of ink levels in installed cartridges, displayed in 10 percent increments, using their printer software. Low-ink alerts enable customers to plan ahead and have replacement cartridges on hand. However, if a customer needs to finish a critical job but is low on ink, printing may be completed with the remaining color or black cartridge.

The HP Deskjet D2560, Deskjet F5280 and Officejet J4580 printers also offer an additional HP Smart Printing feature that delivers improved technology to detect and inform customers when the black ink may be low enough to impact print quality. This feature pauses printing and allows users to assess print quality and consider replacing the ink cartridge before continuing. In this way, customers may reduce the number of wasted pages that can result from printing with a depleted cartridge.

When it's time to order replacement ink cartridges, HP SureSupply makes it easy to find the cartridges that work with a customer's installed printer. Customers can simply access HP SureSupply from convenient ink alerts, and then view a list of compatible HP ink cartridges and shop from a variety of online sources.[5] Installing ink cartridges is also quick and easy. Cartridge technology ensures that customers load the right cartridge into the printer; an electronic sensor will detect and lock out any integrated print head cartridges other than the HP 60 or 901 series. Additionally, two unique shapes on the black and color cartridge labels can be matched to corresponding shapes on the printer to ensure proper cartridge installation.

Example of ink alert screen that links SureSupply online shopping experience.

Affordable value and HP reliability

This cartridge technology is an affordable choice for the home or small business. Deskjet customers can enjoy low-cost, high-quality cartridges designed for home use. Optional HP high-capacity supplies provide three times more black and two times more color pages than standard supplies for the Deskjet printers.[6] Officejet customers can benefit from high-yield cartridges that offer lower cost per page and lower intervention—perfect for the productive small-office environment. In fact, the HP 901 Officejet Ink Cartridge delivers up to 15 percent lower color cost per page than competing laser printers.[7] For Officejet, a high-capacity black cartridge (HP 901XL Black Officejet Ink Cartridge) is available. It delivers three times more black printed pages.[8]

Customers also enjoy the quality and reliability of Original HP products. HP proprietary inks are formulated to prevent corrosion and clogging of the printhead, ensuring the best prints. HP inks and ink cartridges are designed and tested together with HP printers, inks and papers. Customers can count on HP to deliver superior technology that produces consistent results and uncompromised performance with every print.

Environmental responsibility

This cartridge technology builds on HP's leadership and innovation in environmental stewardship and recycling. The HP 60 and 901 cartridges' resister design lowers the printer's power requirements because it takes less energy to fire ink drops. The resistor also uses less silicon and flex area, which lowers the cartridges' environmental impact. And as it does with other cartridges of its class, HP offers free and easy cartridge recycling through the HP Planet Partners program, available in 42 countries and territories around the world. HP ensures that all collected HP print cartridges are recycled responsibly. HP never refills them, resells them or sends them to a landfill.[9] Finally, HP believes it can make a positive impact on the environment by using recycled plastics. HP 60 cartridges are newly molded from recycled plastic resins while still meeting demanding HP standards for quality and reliability. More than 70 percent of each cartridge body (by weight) is recycled content from used HP cartridges collected through HP Planet Partners return and recycling program, and other sources such as water bottles.

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[6] Compared with the HP 60 Black or Tri-color Ink Cartridges with HP Vivera Inks.
[7] Compared with lasers under $750. For more details, visit hp.com/go/officejet
[8] Compared with HP 901 Black Officejet Ink Cartridges; no high-capacity HP 901 Tri-color Officejet Ink Cartridge available.
[9] HP ink cartridge return and recycling is available in 42 countries and territories around the world, covering 88% of the addressable market; see www.hp.com/recycle for details.