XEROX®



WorckCentre® C2424
Solid ink MFP

Phaser® 8500
Solid ink printer

# the solid advantage

Introduced over thirteen years ago, Xerox's exclusive solid ink technology is not only a viable, affordable option for those companies looking to add color to their business documents, but it has also become a competitive force in the industry. Other companies have tried to compete with Xerox's long history of color expertise, but none have come close to matching the convenience and quality offered by solid ink technology.

Solid ink adds value to businesses. It is the only printing technology that can create brilliant, vibrant prints on a wide range of media. It is the easiest technology on the market to use. It is the only technology that produces minimal waste. And, with a low entry price and cost per page, solid ink printers truly give customers the most value for their money.

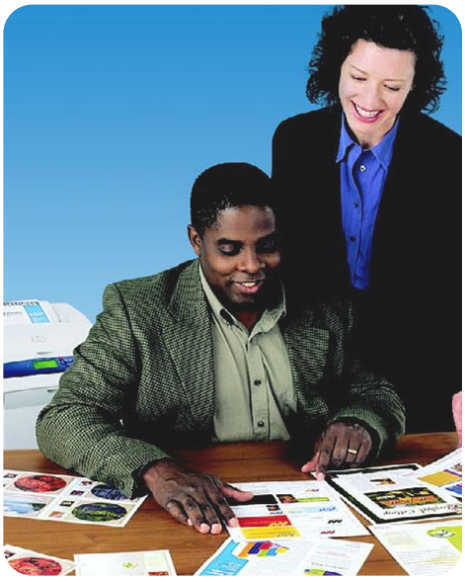
This white paper takes a closer look at the technology that continues to make Xerox stand apart from the rest.

### Today's Business Office

Office color printers need to address a broad range of applications and serve diverse teams. While one group may demand flawless rendering of complex PostScript® files and detailed photographs, another team may want fast printing of text documents or quick business presentations. The need for color and versatility is everywhere.

Considerations include:

- How can I get black & white and color at the same time?
- What does the typical user need to know to successfully use the printer day in and day out?
- How quickly can consumables be replenished?
- How many users can share the printer before print times become unacceptably long?
- How well does the driver software integrate the printer into the user's workflow?
- If the printer is shared among groups, can it account for usage?



### Solid Ink Hits the Mark

Solid ink technology addresses key user requirements, expectations and human factor issues by how it works. Its excellent image creation method, simplicity, and ease of use set it apart from other printers.

Moreover, it offers remarkable print quality on the broadest range of print media, including cardstock, envelopes, and transparencies, as well as recycled paper and custom page sizes. For example, solid ink printers can accommodate media from 16 lb. bond to over 80 lb. cover cardstock. Laser printers vary and can be limited to 58 lb. cardstock. Inkjet printers generally require specially treated media which is not always available in a wide range.

With a small footprint, solid ink printers offer versatility in the office, as they work well on desktops, credenzas or small tables.

Solid ink printers are also easy to use and maintain. Ink loading is simple—each color has a unique shape-coded and numbered ink stick which ensures there's no mix up. The right color goes only in the right place. And, because solid ink is solid, there's no mess. The only other consumable is a maintenance kit, which takes less than a minute to replace, about once a year.

### Designed for Color Printing

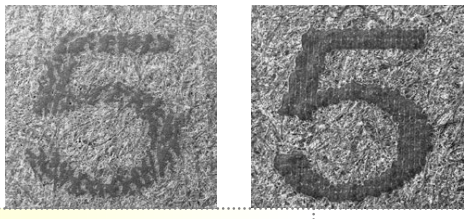
Physics, chemistry, electronics and manufacturing expertise all come together behind the scenes in solid ink printing technology. Solid ink has the critical property of remaining in solid form until heated to a very specific temperature whereupon it turns to liquid, then instantly turns back to solid when printed.

The solid ink is applied through a precise stainless steel print head with tiny holes smaller than a human hair. It uses 1,236 nozzles jetting more than 30 million drops per second. Years of investment, research and experience have yielded inks and print heads that work together as a system.

The ink is jetted from the print head to a heated drum where it remains in a malleable state that ensures precise transfer to the paper. This reduces the amount of ink that can wick into the paper fibers and controls dot spread.

The Phaser controller is based on a 600Mhz processor and high-speed 64 bit bus. This heavy duty hardware is powerful enough for sophisticated graphic arts, so it can make short work of general business printing.

Xerox's constant evolution of solid ink and single-pass technologies has resulted in a printer that today is very fast and very economical. With print speeds up to 30 pages per minute (ppm), and first-page-out within six seconds, the solid ink printer can be three times faster than a comparably priced laser printer.



**Highly magnified views of color laser (left) and solid ink (right). Note the gaps in the printed areas in the laser image vs. the dense, crisp appearance of the solid ink image.**

### Reliable Engineering

A solid ink printer consists of only three major assemblies: the print head (applies ink to print drum), the print drum (transfers image to paper) and the controller (the brain of the printer that converts data from the computer to information required to print the image on paper). Add a cabinet and a paper tray and you have a solid ink printer.

This simplicity is responsible for the high reliability, ease of use and low cost of solid ink. With fewer parts, there's simply less that can go wrong. In short, solid ink printers do a lot more with a lot less.

### Built Better

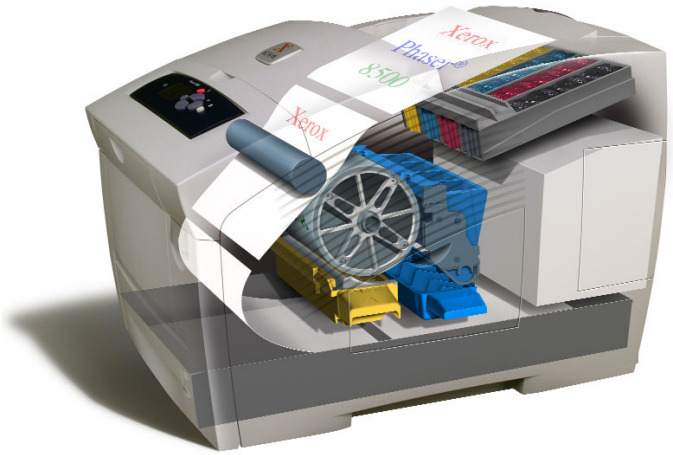
Rather than using the more common bent sheet metal, Xerox uses a one-piece, injection molded frame in its solid ink printers. This allows for tighter mechanical tolerances that yield both improved mechanical reliability and print quality. The solid construction also contributes to the printer's durability and long haul robustness.

Solid ink printing technology requires a much lower parts count than laser technology. Lifetime components with a high duty cycle give a clear maintenance and operating advantage to solid ink.


### Stringent Manufacturing

Xerox manufactures the solid ink print head in clean rooms to ensure performance, consistency and reliability. Xerox operates a world-class chemical plant to produce solid ink, with a state-of-the-art controller to ensure batch consistency. To deliver the reliability that solid ink has become known for, Xerox employs 100 percent inspection rather than the common statistical sampling—every ink batch must meet specifications before it is shipped to the customer.

### Design Advantage




For many organizations, limited floor and desk space gives the compact design of solid ink printers a distinct advantage. Compared to color lasers, solid ink printers require only half the space. Further, Xerox has designed its solid ink printer to minimize the space needed to access print trays and perform routine printer maintenance. Solid ink printers can be integrated into more environments with less impact than color laser printers.

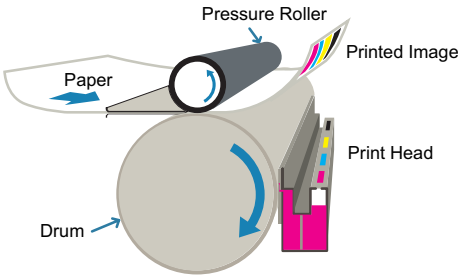
Additionally, the new generation of solid ink printers include a configuration card, making hot-swaps and feature upgrades a no-hassle process. Just install the card into another printer and it takes on all the attributes of the first.

Xerox is committed to this technology for one simple reason: it delivers user benefits that no other color printer technology can provide.

### Laser Printing Options

Color laser printers create an image by fusing powdered toners to paper — the toner is melted onto the paper. Depending on the architecture, lasers can have almost three times as many parts as solid ink printers. Traditional color laser printers typically include parts such as photoconductors, transfer rollers, fuser rollers, fuser oilers, waste toner bottles and four toner cartridges, all of which wear out or whose contents are consumed during printing. The life expectancy of these components is tied to either the number of pages or the amount of each color printed. Frequently, these parts need to be replaced independently of each other so there are more times when the printer needs maintenance.

The simplicity of the solid ink imaging process is an advantage itself. In addition to fewer places where things could go wrong, solid ink accepts a wide variety of print media, which can be fed through one of the printer's main trays. All of these attributes contribute to an exceedingly simple automatic two-sided printing capability. After printing the first side of the sheet, the paper is re-fed from the exit rollers back into the printer through a very short path. It then quickly passes through the high-speed imaging process a second time and is delivered to the output bin.




Major Components of a Solid Ink Printer


### Vivid, Saturated Colors

With Xerox's introduction of 2400 FinePoint™, solid ink printing delivers photo quality images. This technology enhances images by using complex algorithms to intelligently select and substitute dots. Its software uses halftone and post-processing techniques to optimize the image as it is applied to the print drum while smoothing out fills and transitions to eliminate disruptive patterns.

Because solid ink is transferred from the print drum to paper in precise state, the ink does not spread into the paper. This makes its color quality far less dependent on the paper's surface allowing it to maintain excellent color quality on the broadest range of media types.

Xerox solid ink printers offer four print modes for the utmost flexibility in quality and speed. Users choose settings that range from High Resolution/Photo Mode to Fast Color Mode.

From page-to-page solid ink has exceptionally consistent color quality, an important attribute for long print jobs or multiple prints of the same page. The quality of the image depends on consistent dot size and placement. Solid ink does both extremely well.

Color laser printers frequently fail to maintain precision. The dot size varies (laser dots are clumps of toner particles that can scatter on the paper) and there's sufficient jitter in the laser system so that misplacement of dots occurs. As a result, color shifts occur with laser, as well as banding within areas of solid fill color.

During printing, the print drum in a solid ink printer smooths the solid ink, creating a flat surface that transmits light well, making for dense, saturated colors. Laser toner has a rougher surface that fails to transmit light as well, resulting in less vibrant color.

### Solid Ink is Fast

The most complete measurement of print speed is called “throughput” — the time between clicking the “print” button and seeing the print job arrive in the printer’s output tray.

The combination of color-optimized architecture and fast controller/processor gives the most important advantage for typical office color printing: fast first-page-out time. With single copies of small documents, the time it takes to print the first page can be a significant factor in total printing throughput.

Solid ink excels in overall throughput by delivering fast first-page-out time. The first page shows up in six seconds, which is more than twice as fast as most color lasers. At full speed, the solid ink engine prints 24 ppm versus 12 to 17 ppm for many color lasers. Speeding up the process even further, the Intelligent Ready feature monitors usage history and warms up the ink just before the first page of the day is anticipated.

A color laser printer must synchronize its imaging components, warm up its fuser roller, and set the paper path which lengthens the print time. In fact, color lasers typically achieve their rated speed only on multiple copies of the same image.

Xerox solid ink printers require no synchronization. They have a very short paper path so the page travels a minimal distance to receive the image. By contrast, color lasers frequently require more than one sheet of paper in the paper path to achieve optimum timing, however the same is not true with solid ink, one page is all it takes.

Solid ink printers are designed from the ground up to be color-optimized. Color laser technology is essentially a monochrome (single color) print technology that has been adapted to print with four colors, using cyan, magenta, yellow and black toners. In many ways, it is like putting the complexity of four printers into one cabinet.

### Reloading: Couldn't Be Easier

The unique, shape-coded ink sticks are simply dropped into specified slots on the top of the printer. Even a child could easily match the solid ink colors and shapes to drop them in the appropriate slot. There’s nothing to spill or vacuum out of the carpet. Inks can be replenished at any time, even during printing.

Reloading on the fly is not possible with any other printing technology because they store ink or toner in sealed containers inside the printer. When the ink/toner is exhausted, printing is interrupted.

Color laser printers have up to nine different mechanical consumables (assemblies that are depleted during printing), while Xerox high performance solid ink printers have only one.

### How Long is a Print Job?

Xerox tabulates solid ink customer usage. Most jobs are under 5 pages and many are 2 pages or less!

These attributes make solid ink the best choice for the majority of users, who are concerned about getting their prints, not about maintaining their printers.

Solid ink printers require few user interventions for maintenance. The skill level required is a fraction of that required by even the simplest of color lasers. The only mechanical consumable in solid ink printers is a long-life maintenance roller that supplies the oil for the imaging drum. The environmentally friendly replacement rollers last up to 30,000 pages and can be installed in less than a minute.

These features make solid ink the best choice for the majority of users, who are concerned about getting their prints, not about maintaining their printers.

### Green Technology: Environmentally Friendly

Solid ink printing produces 90% less waste than laser printing, giving it a much lower environmental impact. Solid ink printers have only one consumable item, compared to numerous consumables in color laser printers.

The result is dramatic: after 100,000 prints, a color laser can produce 157 pounds of waste, while a solid ink printer produces only 5 pounds.


**Comparison of waste between HP LaserJet 4600 and the Xerox Phaser 8500**

### Affordable Performance

Solid ink printing technology follows the standard rule of computers — performance improves while prices decline. Today, a solid ink color printer costs no more than a network monochrome laser printer with similar features.

### Focused On Office Productivity

For a printer to be truly productive in a busy office it must be easy to set up, easy to use and easy to share. The hidden costs of printer downtime, user frustration, and delayed print jobs can be enormous. For example, purchasing a low-cost but underpowered or hard-to share color inkjet or color laser printer can be far more costly in the long run than investing in the right tool for the job. Likewise, the complexity of using and maintaining a high performance color laser can have significant productivity costs.

### Solid Ink is Smart Business

By virtue of its unrivaled simplicity and unique strengths, solid ink technology satisfies a broad range of user expectations and requirements.

- Low acquisition cost for superior quality
- Fastest printing of most common office print jobs
- Low cost for consumables
- Unsurpassed ease of use
- Bright, vivid colors
- Handles the broadest range of paper types
- Small size allows printers to fit in almost any environment from desktop to credenza to small table
- Minimal environmental impact

### What about Liquid Ink Jet?

Liquid ink jet technology does not work well in multi-user network environments. The major issues are slow print speed, low consumables capacities, high levels of user intervention and high print cost. Low acquisition cost might make liquid ink jet printers appear attractive, but they present a case of false economy for workgroup use as organizations discover how much attention they require and how surprisingly expensive they can be to operate. These printers require special, expensive, coated paper to deliver their best print quality.

### About the Author

Cheryl Currid and Andy Gibbs of Houston-based Currid & Company research emerging technologies and techniques for a better workplace.

### For More Information

To request printer information and a print sample, go to: www.xerox.com/office