

A WHITE PAPER PREPARED BY PRESSTEK, INC.

Growing Your Business by Going Green

*How Presstek DI® Presses Combine
Environmental Responsibility
with Economic Advantages*





Contents

SECTION ONE: INTRODUCTION

The Printing Industry Goes Green 1

Definitions 3

SECTION TWO: PRESSTEK DI PRESSES

Presstek DI Digital Offset Presses 4

A closer look at their key environmental and economic advantages

1. Chemistry-free Platemaking 4

2. Waterless Printing 6

3. Automated Blanket and Roller Wash 7

4. Ink/Toner 8

5. Paper 9

6. Deinkability of Paper 11

7. Footprint 12

SECTION THREE: CONCLUSION

Going Green, Looking Ahead 13

Explore the environmental and economic advantages

Endnotes 13



The Printing Industry Goes Green

Major market forces and economic realities are changing the way the world prints



Green printing. Sustainability. Environmental impact. Carbon footprint.

These concepts were all but unheard-of a decade ago, and now they dominate much of the discussion of the future of printing. Dozens of industry conferences, new partnerships promoting sustainability, white papers, webinars, and articles point toward one clear fact—there is a groundswell of interest in sustainability.

The prominence of this topic is causing printers to take a closer look at green initiatives and evaluating the cost/benefit for their businesses:

- Saving energy
- Reducing paper waste
- Reducing toxic emissions
- Relieving regulatory burdens
- Discovering new ways to drive out operational inefficiencies
- Differentiating from the competition
- Delivering incremental business with new and existing clients

“Using green, sustainable practices has the potential to cut the costs printers are currently facing. And if that’s not reason enough to jump right in, consider this: surveys suggest that consumers are paying greater attention to the manner in which products are produced, and some large corporations have taken notice.”

— Gary Jones and Joe Deemer, PIA/GATF
Becoming a Green, Sustainable Printer, August 2007

The Scope of this White Paper

This white paper explores the specific economic opportunities and environmental benefits of Presstek DI® digital offset presses. The Presstek DI press redefines printing and integrates new innovations, which lower its environmental impact while creating new business opportunities, as users are quick to point out.

This report highlights the specific areas where Presstek DI presses offer environmental and economic advantages over conventional offset, digital electrophotographic (dry-toner or liquid-toner) and inkjet printing technologies. But first, let’s take a look at the overall industry—and define what we mean by going green.

An Overview of Market Forces

Many forces combine to inspire the strong interest in new, more environmentally friendly approaches to printing:

- **Environmental concerns:** The public (including print buyers and print consumers) is increasingly aware of printing’s environmental impact, and interested in minimizing waste and toxins. They’re demanding that printers do more than simply print on recycled paper stock—they’re looking for printers to produce print materials in a more efficient and sustainable manner, from start to finish.
- **Rising commodity prices:** Escalation of core printing commodities such as electricity, paper, water, ink, plates, and fuel (e.g., for shipping) put pressure on printers to cut costs and increase efficiency.
- **Shorter print runs:** The ongoing demand for shorter runs requires a rethinking of the core business model

of selling print, new profit margin calculations, and new marketing strategies. Today, 80 percent of four-color jobs are already at less than 5,000 press runs.¹

- **New equipment options:** Printers are rethinking the nature of the print business—and revisiting their core equipment base. Making the right equipment and workflow decisions has become even more vital. Printers are no longer simply replacing one traditional offset press with another or adding another of the same when additional capacity is needed. They have other equipment options including: DI digital offset presses, inkjet, dry toner-based and liquid toner-based digital printing, and more. They're looking for new ways to compress the entire production cycle, use less materials, and produce less waste—all while ensuring profitability, quick turnaround and high quality. In essence they need to ensure that they have the right tools to cost effectively meet their customer's requirements. The move toward environmentally friendly printing is the latest iteration of the ongoing struggle to drive inefficiency out of the printing process. Equipment choices are central to this effort.
- **Increased competition:** Printers are under increased competitive pressure, and are looking for new ways to serve their customers, who are more environmentally aware than ever.
- **Regulations/legislation:** CO2 legislation is becoming mainstream in Europe. In North America, there are certain geographies that are enforcing environmental rules and regulations. One example is the California South Coast Air Quality Management District Rule 1171 that dramatically reduces emissions—from 650 grams to 100 grams of VOC per liter—for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties.

These forces are not necessarily a threat to today's printers. They're simply part of the ever-evolving printing marketplace. Innovative leaders are turning these forces to their advantage, creating new, viable business models based on these economic and environmental realities.

What Do We Mean by "Going Green"?

The overwhelming amount of information about printing and its environmental impact has led to a great deal of confusion among print buyers, difficult-to-prove claims by vendors, and an overall murkiness in the industry dialog. What does environmental sustainability or "going green" really mean? When print

buyers want to specify green printing, what are they really asking for?

For our purposes, we define going green as redefining printing and its related processes.

- **Volatile Organic Compounds (VOCs):** Minimize or eliminate chemistry usage and other toxic by-products from the prepress and printing production process, including spent chemistry and chemically tainted wastewater from chemistry-based platesetting, conventional offset printing wastewater, fountain solution, roller wash and blanket wash, as well as hazardous toner-based waste materials.
- **Reduce solid waste to landfill and better utilize resources: conserve paper, electricity, water, physical and environmental footprint:**
 - Use recycled paper
 - Reduce production waste; i.e., makeready paper waste
 - Create materials in usable quantities, reducing waste at the customer level
 - Eliminate water usage for prepress and print production
 - Streamline the amount of required equipment; for reduced environmental impact and more efficient space utilization

In short, sustainability has to encompass the entire printing continuum, including the core materials you buy (i.e., inks, paper), the printing process, the overall facilities where you print, and the life cycle of the printed piece. Actions to achieve sustainability can be summarized in these words: remove, reduce, recover and recycle.

Concerns About Cost

Despite the forces pointing toward greener printing processes, many printers feel that green printing is inherently more expensive. In fact, a recent survey by InfoTrends discovered that expense was cited as the most common reason for not choosing to investigate green printing.² In short, going green is perceived as requiring more green—more investment of capital, higher expenses, and more time commitment.

In the next section, we'll dispel this perception by taking a closer look at Presstek's DI digital offset presses and their environmental and economic strengths.



Presstek DI digital offset presses not only reduce material consumption and waste for printers, they provide print buyers with an opportunity to make environmentally-sustainable purchasing choices without compromising quality.

Definitions:

Key terms used in this white paper

Carbon Footprint: A measure of the impact human activities have on the environment in terms of the amount of green house gases produced, measured in units of carbon dioxide. It is meant to be a useful metric for individuals and organizations as they conceptualize their personal (or organizational) impact on global warming.³

Chain of Custody (CoC): A tracking and certification system for products made of pulp or paper that ensures that these products are created with sustainable practices. The end product is tracked from their origin through all phases of ownership, processing and transportation to the end consumer. It also takes into account the environment, the people and communities that depend on the forest for their livelihood. The CoC logo is often included on the final printed sheet to verify the claims for certified or recycled content. There are different agencies; with slightly different approaches to CoC standards, such as: Forest Stewardship Council (FSC), Sustainable Forest Initiative (SFI), Programme for the Endorsement of Forest Certification schemes (PEFC) CoC standards, and generic CoC standards such as the PricewaterhouseCoopers CoC.

Deinkability: Before printed paper can be processed into recycled graphical paper grades, and to sustain the on-going supply of quality recycled stock, inks and toners must be easily removed from the paper. Some inks and toners are more difficult to remove than others. Removal difficulties can result in poor quality or unusable recycled stock, and enlarges the recycling process' carbon footprint

by increasing the energy, chemistry and fiber consumed in the recycled papermaking process.⁴

Digital Electrophotographic Presses: This term will be used to refer to production volume color devices, which utilize either dry-toner or liquid-toner (sometimes referred to as liquid-ink) as their printing medium. In this paper we will refer to them as "digital electrophotographic" presses to distinguish them from "digital offset" presses, which are digital presses that employ waterless offset inks as their printing medium.

Post-Consumer Materials/Waste: Use of materials or finished products that have served their intended use and have been diverted or recovered from waste destined for disposal, having completed their lives as consumer items. Post-consumer materials are part of the broader category of recovered materials.

Sustainability: The ability to achieve continuing economic prosperity while protecting the natural systems of the planet and providing a high-quality of life for people.⁵

Volatile Organic Compounds (VOCs): Any organic (carbon-containing) compound that evaporates readily to the atmosphere at room temperature. VOCs are significant contributors to ozone depletion, global warming, smog, and health issues. VOCs in printing include platemaking chemistry; solvent-based press, roller and blanket wash solutions; petroleum-based offset inks; and toner-based materials, including liquid-toner inks and imaging oil.

Presstek DI® Digital Offset Presses

A closer look at their key environmental and economic advantages



“We have been able to secure additional business from clients who require environmentally friendly printing, including a 50 percent increase in business from an existing client who has been thrilled to be able to take advantage of the environmental benefits of the Presstek DI press and its accompanying high quality printing.”

— Gottfried Hildenbrand, General Manager,
Swiss Print International, Toronto ON, Canada

Presstek DI presses (Presstek 52DI and Presstek 34DI) are highly automated four-color digital offset printing presses that offer significant benefits over conventional offset and electrophotographic (liquid-toner or dry-toner) digital printing solutions. Presstek DI users know its core advantages well—easy to use and easy to integrate into a digital workflow, highly automated, lower cost short run superior-quality printing (up to 300 lpi and FM screening), on-press chemistry-free platemaking, waterless operation that eliminates the need for fountain solution, and final results that exceed the expectations of even the most critical customer. And they also appreciate the many environmentally friendly innovations of Presstek DI presses—which reduce environmental impact and offer significant bottom-line advantages.

Here we take a look at the areas where the Presstek DI press combines environmental and economic benefits.

1. Chemistry-free Platemaking



Chemistry-based platemaking is widely acknowledged as a major source of VOCs and waste within the printing process. Plates, plate processing chemistry and other related materials (e.g., gum) all contribute to a complex, toxin-

heavy process rife with wastes. For example, industry data compiled by J Zarwan Partners indicates that worldwide more than 31 million gallons of chemistry are used to process printing plates every year.⁶ Plus, chemistry-based platemaking requires water for plate processing, introducing another source of water-based toxins and waste. This method of platemaking also takes an economic toll with associated costs for the purchasing, storage, disposal and reporting of chemistry and its related wastes.

The on-press thermal plate imaging design of DI presses eliminates the need for chemical plate processing, film-based platemaking, separate offline CTP system used for plate imaging/developing and the water associated with each of these processes. Plates are imaged simultaneously and in precise register right on the DI press via a reliable, highly accurate thermal laser imaging process.

Environmental Advantages

Presstek DI:

- Eliminates chemistry-based platemaking with its associated chemistry and waste (including waste water) and VOCs—a major environmental advantage
- Reduces remake waste due to errors with automated

simultaneous chemistry-free on-press platemaking versus the variable-laden chemical process of imaging plates off-press and then manually having to mount them on the press.

- Reduces footprint by not requiring offline equipment for platemaking and plate processing

Economic Advantages

Presstek DI eliminates a complete, major, and labor-intensive step from the printing process, which offers significant bottom-line benefits; lowers overhead and boosts productivity via streamlined workflow and better utilization of staff:

- Eliminates the capital costs (purchasing, storing, disposing and reporting) of platemaking chemistry and other materials
- Eliminates the cost of using platemaking chemistry (see Figure 1)
- Automated platemaking reduces time and material costs by:
 - Increasing labor efficiency by eliminating the manual production steps and need for skilled platemaking personnel

- Reducing remakes due to improved accuracy and better registration
- Minimizing time between changeover
- Dispenses with the need for a special lighting environment with daylight-safe plate handling and imaging
- Time savings means printing more jobs in less time

“Our Presstek DI helped us get rid of the 8 gallons of chemicals used monthly with traditional offset presses.”

— Randy Herron, President, Herron Printing & Graphics, Gaithersburg, Maryland

“We can print a job on the Presstek DI in the same amount of time it takes to make a set of plates for our traditional offset press. That makes all the difference because our customers know that they can come to us with last minute jobs and we can turn them around in short time while others cannot.”

— Jonathan Bradley, Partner, Rich Print, Worcester, UK

Figure 1. Lost Material Value* of Platemaking Chemistry: Conventional Offset Press vs. Presstek DI Digital Offset Press

Printing Technology:	Heidelberg Speedmaster 74 Conventional Offset Press				Presstek DI Digital Offset Press	
	Total Waste Quantity (kg)		Lost Material Value (\$US)		Total Waste Quantity (kg)	Lost Material Value (\$US)
Platemaking chemistry waste costs:	Short Run: 500 letter-size pages	Long Run: 3,000 letter-size pages	Short Run: 500 letter-size pages	Long Run: 3,000 letter-size pages	Any Run Length	Any Run Length
a. Developer waste	0.380 kg	0.380 kg	\$3.66	\$3.66	0	\$0.00
b. Replenisher waste	0.383 kg	0.383 kg	\$4.02	\$4.02	0	\$0.00
c. Finisher/gum waste	0.264 kg	0.264 kg	\$2.00	\$2.00	0	\$0.00
Total cost of platemaking chemistry on average per job (not including plates):			\$9.68	\$9.68	0	\$0.00

Source for conventional offset data is based on a case study conducted by the Printing Industry Center at RIT and documented in: *A Comparative Study of the Environmental Aspects of Lithographic and Digital Printing Processes*, A Research Monograph of the Printing Industry Center at RIT; No. PICRM-2005-01, May 2008.

* Lost material value is the value of materials used to produce the printed piece (one set of plates) in this case study. Calculations based on average usage over 3-month period. The printed test file was designed for heavy coverage; included images that demonstrate rendering of fine detail and tonal gradations, along with standard quality measurement targets: grayscale, solids, etc.

2. Waterless Printing



Conventional offset printing presses use significant amounts of chemistry and water for the press dampening system. The dampening system employs fountain solution which produces a volume of VOCs.

Presstek's DI waterless press design does not use a dampening system, which eliminates the need for both fountain solution and water. This significantly reduces the environmental impact of the printing process. In fact, recent testing determined that waterless printing alone reduces VOCs by 75 percent compared to conventional printing environments.⁷

Reducing VOCs isn't the only environmental consideration; water use is a growing international environmental issue, and a major concern for printers, particularly those in areas where water is scarce, expensive, or highly regulated. The August 2006 United Nations Water Thematic Issues report, *Coping with the Scarcity of Water*, speaks to the importance of maintaining and preserving our water supply and projects that 1.8 billion

people will be living in countries or regions with absolute water scarcity by 2025 if water use continues at its current rate.

The DI's waterless press design also improves press efficiency, print quality, and operating costs. There is no need to constantly manage ink/water balance, which results in the press coming up to color quickly; producing sellable color within 20 sheets and maintaining color consistency throughout the run. In addition, waterless printing combined with the DI's on-press thermal plate imaging results in sharp dots and easily produces 300 lpi and FM screening. Other benefits include reduced drying time and better quality with an expanded color gamut that offers a 20 percent larger color space and 20 percent higher average ink densities achieving better color saturation as compared to conventional offset.

Environmental Advantages

Presstek DI:

- Reduces VOCs by 75 percent with DI's waterless press design versus conventional printing environments⁸
- Preserves water

Figure 2. Fountain Waste Disposal Cost for Conventional Offset Press vs. Presstek DI Digital Offset Press

Printing Technology:	Heidelberg Speedmaster 74 Conventional Offset Press				Presstek DI Digital Offset Press	
	Total Waste Quantity (kg)		Waste Disposal Cost (\$US)		Total Waste Quantity (kg)	Waste Disposal Cost (\$US)
Waste Category— Fountain waste disposal:	Short Run: 500	Long Run: 3,000	Short Run: 500	Long Run: 3,000	Any Run Length	Any Run Length
a. Fountain concentrate waste	0.097 kg	0.118 kg	\$ 0.44	\$ 0.54	0	\$0.00
b. Fountain substitute	0.085 kg	0.103 kg	\$ 0.39	\$ 0.47	0	\$0.00
c. Wastewater	3.782 kg	4.585 kg	\$ 17.26	\$ 21.11	0	\$0.00
Total cost per job			\$18.09	\$22.12		\$0.00
Total disposal cost per useable sheet			\$ 0.04	\$ 0.01	0	\$0.00

Source for conventional offset data: *A Comparative Study of the Environmental Aspects of Lithographic and Digital Printing Processes*, A Research Monograph of the Printing Industry Center at RIT; No. PICRM-2005-01, May 2008.

* Recirculation of fountain solution was not taken into consideration. Waste disposal costs were calculated by multiplying the waste quantities by unit costs for the corresponding waste disposal methods.

- Eliminates chemically tainted wastewater generated by traditional offset presses and keeps this chemically tainted water out of the water treatment system
- Provides a truly waterless printing process (Not all “waterless” printing processes eliminate chemistry-based platemaking, which also relies on water and introduces VOCs to the printing process.)
- Improves employee working conditions
- Significantly reduces paper waste with efficient makeready and consistent color quality

Economic Advantages

Presstek DI:

- Eliminates the time and expense of purchasing, storing and disposing of fountain solution and associated wastewater
- Saves on the disposal cost of the fountain waste associated with conventional printing. DI presses can deliver an average savings of up to 4 cents for every sellable sheet per 3,000 run length as compared to a conventional press that is not recirculating its fountain solution (see Figure 2)
- Lowers regulatory burden
- Lowers water bills
- Frees up the press operator from having to maintain the subtle balance between water and ink; along with easier overall press maintenance
- Enables getting more jobs out in less time with faster makeready (no ink/water balance issues) and faster drying inks
- Saves on material costs per job: reduces paper waste by coming up to color quickly
- Holds color consistency over the entire run
- Drives more business with superior quality color
- Increases business according to InfoTrends, Inc. September 2008 survey⁹
 - 80 percent of DI users surveyed cite that they brought in new customers or are winning customers from their competition based on the expanded capabilities offered by DI presses
- Eliminates the expense of installing plumbing for DI presses
- Creates business opportunities with print buyers who have environmental mandates and concerns

“Our customers ask for waterless printing, but the Presstek DI goes beyond waterless to eliminate chemistry-based platemaking and all of its materials and waste. Our DI press creates less toxins and waste, consumes less energy, and provides the high quality and fast speeds that let us be more profitable.”

— Sal Indovina, President, MacLaser Printing, Mississauga, ON, Canada

“As for our Presstek DI, the fact that we don’t have to buy and dispose of chemicals is invaluable; and fast drying without solvents means faster finishing and delivery.”

— Javed Dadabhoy, Owner, Neon Graphics, Walthamstow, East London, UK

3. Automated Blanket and Roller Wash



Conventional offset presses use solvents to wash printing blankets and to perform other press maintenance; including roller washing. These solvents—primarily different types of alcohol substitutes—are major contributors to the VOCs created during printing.

Are digital electrophotographic presses the environmental cure-all? Not necessarily. These devices generate a volume of solid waste that requires disposal. For instance, liquid-toner solid waste includes blankets, impression film and photo imaging plate (PIP) replacements.¹⁰ There are also toner cartridges and toner bottles that need to be disposed of. Some toners contain hazardous substances and the cartridges must be treated as hazardous waste.

Presstek DI digital offset presses, like any other offset press, require blanket and ink roller cleaning. However, the washing is automated, which reduces waste and cost. The Presstek 52DI uses cloths mounted on-press as part of the automated blanket wash system. These cloths are impregnated with blanket wash, controlling the amount of wash used. In addition, what was once a manual process now happens with the push of a button.

Environmental Advantages

Presstek DI:

- 80 percent reduction in blanket wash is cited by DI customers

- Low-VOC blanket wash solvents can be used, including types that contain no more than 100 grams of VOC per liter
- Minimizes wash amount used by eliminating manual intervention through automated washing of ink rollers and blankets

Economic Advantages

Presstek DI:

- Faster, simpler automated process saves time and money by streamlining the makeready and changeover process
- Reduces waste to dispose of (and pay for)
- Lowers labor costs
- Lowers maintenance, and cost of maintenance
- Uses significantly less materials, such as 80 percent less blanket wash

“Our estimates indicate that with our Presstek DI press, we’ve seen an 80 percent reduction in blanket wash.”

— Rick Wilson, Owner, The CRN Group,
Calgary, AB, Canada

“The Presstek DI has eliminated the need for chemical developers. There are no toxic chemicals to store, and we have less waste to dispose of.”

— René Constantin, Co-founder, J’imprime,
Plérin, France

“Waterless offset lithographic presses have taken the industry into a new era of low VOC emissions.”

— RIT Printing Industry Center Research
Monograph, *A Comparative Study of the
Environmental Aspects of Lithographic and
Digital Printing Processes*

“Obviously, removing the dampening system from the press and eliminating the need for the toxic substances found in blanket wash solutions will not only ease the burden on our air, soil and water, it will help protect our most precious natural resource: Mankind.”

— Waterless Printing Association

4. Ink/Toner



The inks or toners used during printing are a major element of the process, and must be considered from several key perspectives. Are they created from sustainable materials?

Do the inks or toners introduce toxins into the environment?

The lithographic (or conventional offset) process has traditionally used petroleum-based inks, which are not environmentally friendly. However, digital electro-photographic printing may not always leave a smaller “environmental footprint” than offset technologies either. The inks and imaging oil are the major VOC contributors in liquid-toner presses. The VOCs from the imaging oil in these devices can be reduced to a certain degree with recirculation.

However, there are other choices that can further reduce VOC emissions. For instance, Presstek DI digital offset presses provide the flexibility to use a wide range of waterless offset inks, including vegetable-based (i.e. linseed oil), and other types of sustainable inks. According to the Waterless Printing Association, vegetable-based inks eliminate almost all of the VOCs in waterless ink, and some ink manufacturers claim that there is less than 1 percent VOCs in vegetable-based ink.

Plus, Presstek DI press’ automatic ink key setting feature provides additional environmental and economic benefits. During on-press plate imaging, the ink coverage is calculated for each ink zone. This information is sent to the DI’s color console, where each ink fountain key is automatically adjusted according to the ink key curves. The ink fountains use a segmented ink key system, allowing for precise color control. The ease of ink volume set up dramatically reduces press set up and waste sheets. Paper and ink waste are minimized, which effectively increases the profitability on each job.

As discussed previously, there are additional benefits to the waterless ink printing process; such as fast makeready, excellent color quality and consistency, and quicker drying times versus conventional offset inks.

Environmental Advantages

Presstek DI:

- Enables use of vegetable-based waterless offset inks and other “renewable” inks; reducing toxins in the waste stream
- Provides a less toxic method for printing versus VOC emissions from traditional petroleum-based offset or liquid-toner digital printing methods
- Faster makeready means less makeready waste, which reduces paper and ink usage

Economic Advantages

Presstek DI:

- Eliminates the expense of hazardous ink waste disposal
- Delivers more jobs in less time, due to fast drying waterless inks vs. conventional offset inks
- Produces high-quality, high-value printing, since its color space is 20 percent larger and average ink densities are 20 percent higher vs. conventional offset¹¹
- Enables higher-quality printing with vegetable-based inks, which perform better with waterless presses than conventional presses
- Increases productivity, even with less skilled workers, due to DI’s automated ink key setting feature. This feature is normally associated with larger format presses at a much higher price point.
- Expands capabilities by printing consistent, high-quality on a wide range of substrates—from 0.06 mm to 0.5 mm thick (including recycled paper), as compared to a toner-based device or conventional press

“Waterless inks on our Presstek DI press have several advantages. In addition to reducing our water consumption, the printed product dries faster and the color quality is better, more vivid.”

— Bill McCutchen, Partner, SouthPrint of Georgia, Alpharetta, Georgia (U.S.)

“The Presstek DI’s environmental credentials and waterless printing has helped us win work and will no doubt continue to do so as more companies demand ‘green’ solutions.”

— Jonathan Bradley, Partner, Rich Print, Worcester, UK

5. Paper



Paper manufacturing relies on energy, forests, and water, so the choice of paper and the efficiency of its use can have a major impact on the environment. Choosing recycled or renewable paper stocks is often the first move toward green printing. Another important step is to reduce the amount of paper waste.

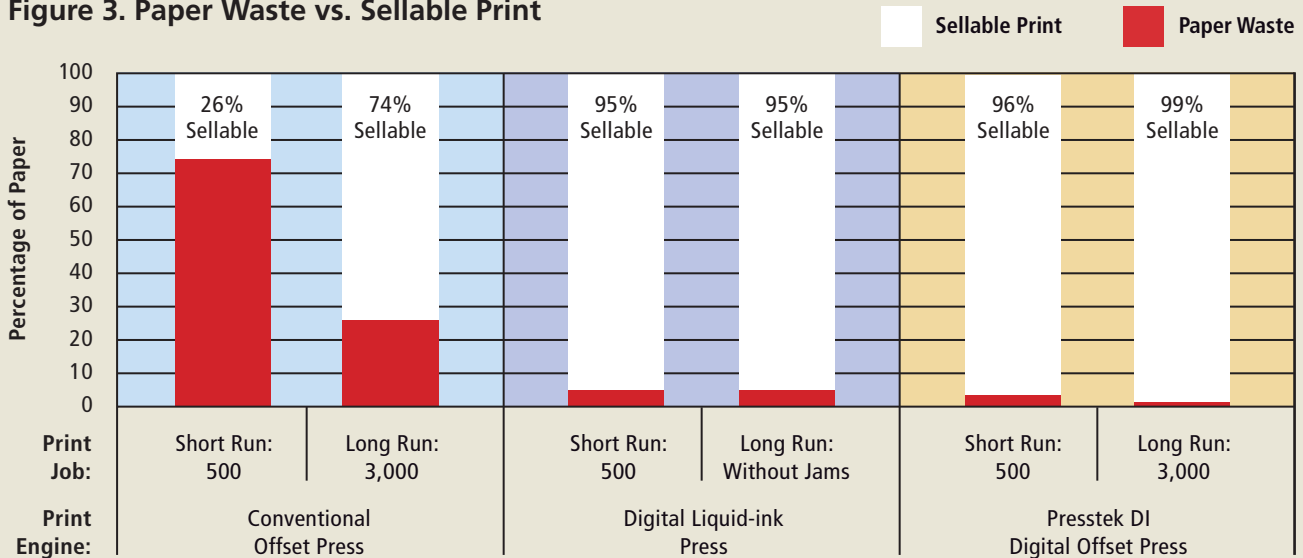
It is a known fact, that conventional presses generate makeready waste during press setup. In addition, print buyers will typically order more than they need to get a better price on the job. As for digital toner-based presses, it is assumed that they generate minimal or no makeready paper waste in setup and minimize over-runs with short-run print-on-demand economics. However, they do generate some paper for setup and have been found to waste a volume of paper in routine and non-routine digital printing maintenance.¹²

As for paper choice, digital electrophotographic presses require specific paper choices/substrates. “Paper used in digital electrophotographic printing requires more exacting tolerances for chemical composition, spatial distribution and thickness uniformity than those papers used in other printing processes.”¹³ Conventional offset presses are restricted to the substrates that can tolerate traveling from tower to tower.

Whereas, Presstek DI presses with their central impression cylinder can accommodate a wider range of paper stocks—from recycled substrates to onion skin to heavy card stock and synthetics—offering greater flexibility of choice with the range of recycled substrates on the market.

In addition, DI presses uses paper extremely efficiently, including very short makeready times. Precise registration is easily achieved by Presstek’s ProFire Excel laser imaging technology, combined with a central impression cylinder and single gripper system using Zero Transfer Printing process—where all four colors are laid down onto the sheet without any sheet transfer between grippers. In fact, the efficiency of the Presstek DI digital offset press delivers a 50 percent cost savings on average per letter-size page when compared to a production volume toner-based digital equipment, according to InfoTrends U.S. *Print On Demand Market Forecast: 2005-2010*. InfoTrends also found that job profitability is more than 13 percent higher on a DI press compared to conventional offset.

Figure 3. Paper Waste vs. Sellable Print



Source of data for conventional offset (Heidelberg Speemaster 74) and digital liquid-toner (Indigo 3000) presses: *A Comparative Study of the Environmental Aspects of Lithographic and Digital Printing Processes*, A Research Monograph of the Printing Industry Center at RIT; No. PICRM-2005-01, May 2008.

Note: the digital liquid-toner long run is based on an estimate due to repeated paper jams that occurred during the long run. The device was not serviced during the testing, so an estimate was determined based on the short run waste volume.

Environmental Advantages

Presstek DI:

- Creates less waste by using paper more efficiently; delivering sellable color in 20 sheets or less (see Figure 3)
 - DI: 96 percent of the paper utilized is sellable at 500 impressions; 99 percent for 3,000 impressions
 - Digital liquid-toner device: uses 1–4 percent more paper than a DI press to achieve sellable color
 - Conventional offset presses can use up to almost 4 times more paper than DI to achieve sellable color for print runs of 500 and 1.3 times more for 3,000 impressions
- Eliminates overrun paper waste and its required floor space storage by printing on an “as needed” basis with economical run length quantities as low as 250
- Can use range of substrates, including recycled stocks, chain-of-custody (CoC) paper, etc.

- Reduces operator time adjusting registration compared to conventional offset
- Eliminates the cost of special proprietary paper
- Expands services that can be offered with wider range of substrate choices
- Saves on storage costs of print overruns and preprinted shells; by printing “as needed” with the DI’s fast turnaround, low cost per page
- Enables on-demand, just-in-time printing in an automated digital workflow, and efficient Web-to-print service offerings

“The cost of paper can account for 22 percent of a printer’s sales revenue.”

— PIA/GATF’s *Navigating Print Markets in 2007-2008*

Economic Advantages

Presstek DI:

- Lowers overall paper costs due to faster makeready, delivering sellable color in 20 sheets or less, whether it is a short run or longer run job

6. Deinkability of Printed Matter



Printing on recycled paper is a responsible step in the right direction for conserving our resources. However, the manufacturing of recycled paper from post-consumer waste depends on the success of the deinking

process. The paper mill must be able to remove the ink from the paper in order to produce recycled paper. This is true for recycling virgin fiber or previously recycled stock. In order to sustain the on-going supply of quality recycled stock, inks and toners must be easily removed from the paper.

Offset inks and dry toners can generally be deinked without difficulty. Inkjet or liquid-toner printing processes are not generally suitable for deinking, according to the International Association of the Deinking Industry (INGEDE).¹⁴ The inkjet inks and liquid inks cannot be removed during the recycling process. The INGEDE cautions that inkjet and liquid inks should not be used for longer print runs such as newspapers, magazines, direct mail or inserts.¹⁵

Environmental Advantages

Presstek DI:

- Prints on recycled paper
- Utilizes waterless offset inks which enables deinking of printed materials

Economic Advantages

Presstek DI:

- Enables new business opportunities, especially with clients who have environmental concerns or requirements

“[We] recommend not to invest in liquid toner or inkjet technologies for production unless the deinkability questions have been solved.”¹⁶

— March 2008, INGEDE press release entitled, “Dry toners far better deinkability than liquid toner; Incorrect claims in HP brochure at drupa”

“Direct mail or newspapers printed with inkjet act like a sponge full of ink—and even in small amounts this kind of printed product can cause the system of graphic paper recycling to collapse. Even a single [establishment] investing in this kind of equipment could severely harm paper recycling all over Europe.”¹⁷

— Axel Fischer, Press Officer, International Association of the Deinking Industry (INGEDE)

Presstek: Green from the Start

When buying paper, printers now take a look at its origins to determine whether it was created in a responsible, sustainable manner. Key press equipment merits the same level of scrutiny. After all, a seemingly environmentally friendly press might appear less so if the manufacturing process that created it also created tons of waste, VOCs, and wastewater.

Visitors to Presstek’s state-of-the-art 150,000-square-foot DI plate manufacturing facility in Hudson, New Hampshire quickly notice that this is not a traditional operation.



It’s quiet, efficient, and spotless. “We’ve designed all of our manufacturing processes to have minimal emissions

associated with them,” says Steve Degon, who leads Presstek’s plate manufacturing operation. Any VOCs created during the manufacturing process are turned into heat that, in turn, fuels the emission reduction process—a remarkably self-perpetuating, environmentally friendly innovation. All aluminum, polyester, and paper scrap is recycled. And all water used in the facility is captured in an aqueous holding tank and is sent out to be recycled.

7. Footprint



The integration of automated chemistry-free platemaking into the Presstek DI waterless press design provides an all-in-one compact footprint, which is smaller than a comparable conventional four-color press with its associated platemaker and processor.

This compactness extends into the carbon footprint of the DI press when it comes to the maintenance of the press as compared to a production volume digital electrophotographic (dry-toner or liquid-toner) color press. On average, it costs almost 6 times more to service a production digital electrophotographic press than it does a Presstek DI press, according to InfoTrends *U.S. Print on Demand Market Forecast: 2006-2011*. This leads one to believe that either the manufacturers of digital electrophotographic presses can command 5.7 times higher service fees, or it indicates that digital electrophotographic presses require a lot more maintenance than DI presses. More maintenance correlates to more labor, materials and energy (fuel) expended to provide this level of support.

Environmental Advantages

Presstek DI:

- More efficient use of space with almost 50 percent smaller footprint than a comparable conventional four-color press with its associated platemaker and processor (see Figure 4)
- Reduces expenditure of labor, materials and energy (fuel) to maintain as compared to a digital electrophotographic press

Economic Advantages

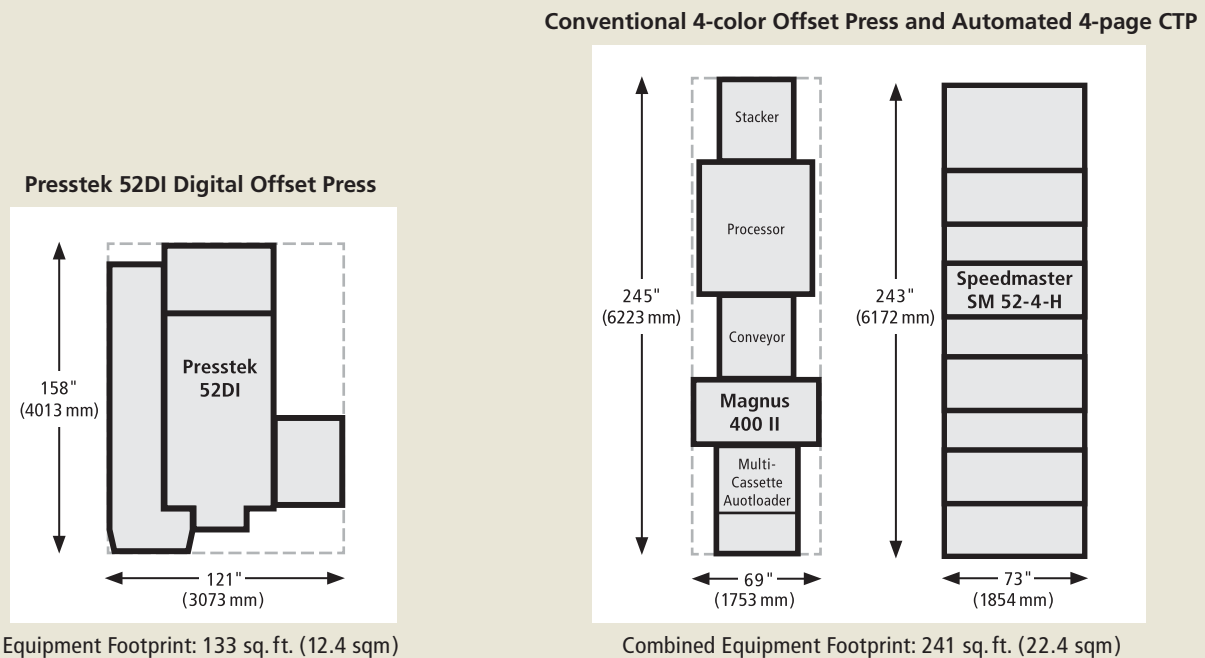
Presstek DI:

- Costs 5.7 times less, on average, to service than a high volume digital electrophotographic color press¹⁸
- Frees up almost 50 percent more floor space than conventional press with associated platemaker and processor

“The Presstek DI fit easily into our facility, which is located in a prime downtown area. A larger machine would have forced us to move to a new location.”

— Harry Körber, Partner, Altstadt-Druck GmbH, Rostock, Germany

Figure 4. Presstek DI Presses: More Efficient Use of Floor Space



The Presstek 52DI all-in-one footprint provides an almost 50 percent smaller footprint than a comparable 4-color offset press and automated CTP system. These calculations are based on the physical dimensions of equipment and do not include: required working space around the equipment, the Speedmaster console, Magnus controller workstation or the Magnus Universal Debris Removal Cabinet.

Going Green, Looking Ahead

Explore the environmental and economic advantages



We've described and quantified some of the main environmental and economic advantages of the Presstek DI press. We've heard from Presstek DI press users that are finding that the press has significantly less impact on the environment—while having a measurably positive impact on their bottom line. But there's more to the story. Contact Presstek today to find out more about Presstek DI and how you can make it part of your printing operation.

"Makeready waste of 25 sheets or less, waterless printing, and chemistry-free on-press platemaking give the Presstek DI press an extremely small environmental footprint while at the same time delivering the client advantages of very high quality, fast turn printing."

— Matthew Doran, President, Anstadt,
York, Pennsylvania

"The Presstek DI is the perfect solution to meet the need for cost-effectiveness, increased productivity, superb print quality and reduced waste. We've achieved these advantages at an affordable price, and have found that the press is already paying for itself and allowing us to move into new markets."

— René Constantin, Co-founder, J'imprime,
Plérin, France

ENDNOTES

- 1 Dr. Joe Webb, President. Strategies for Management, Inc. Research. N.d.
- 2 InfoTrends Inc., *Emerging Strategies Quarterly Survey*, Q1 2008.
- 3 As defined by the Sustainable Green Printing Partnership (SGP Partnership), a registration organization for the printing industry that provides criteria and direction for what constitutes a sustainable green printing facility. www.sgppartnership.org
- 4 The International Confederation for Printing and Allied Industries (INTERGRAF), The Environmental Council of Swedish Printing Industries, Milgraf AB, TNO The Dutch Institute of Industrial Technology, with support from the European Commission, *Recycling of printed products: What can the printing industry do to make it easier?*, revised by INTERGRAF in 2008.
- 5 As defined by the United States Environmental Protection Agency.
- 6 Results based on information compiled by industry expert and consultant, John Zarwan of J Zarwan Partners. 2007.
- 7 Waterless Printing Association; testing conducted by Katsuaki Terada, Japan, 2006.
- 8 Waterless Printing Association; testing conducted by Katsuaki Terada, Japan, 2006.
- 9 InfoTrends, Inc., *Presstek DI Printing Study*, September 2008.
- 10 RIT Printing Industry Center Research Monograph, *A Comparative Study of the Environmental Aspects of Lithographic and Digital Printing Processes*; PICRM-2005-01, May 2008.
- 11 Based on data compiled by the Waterless Printing Association.
- 12 RIT Printing Industry Center Research Monograph, *A Comparative Study of the Environmental Aspects of Lithographic and Digital Printing Processes*; PICRM-2005-01, May 2008.
- 13 RIT Printing Industry Center Research Monograph, *An Investigation into Papers for Digital Printing*, No. PICRM-2005-06.
- 14 INGEDE, the International Association of the Deinking Industry, is an association of leading European paper manufacturers founded in 1989. INGEDE aims at promoting utilization of recovered graphic paper (newsprint, magazines and office paper) and improving the conditions for an extended use of recovered paper for the production of graphic and hygiene papers.
- 15 Technical Committee Deinking, *Deinkability of printed matter, Facts about recycling*.
- 16 This is the concluding statement from the technical paper, *Deinkability of printed matter, Facts about recycling*, by the German committee and agreed upon by the German Printing and Media Industries Federation and other members of the paper chain in Germany, who together with INGEDE have set up this "Technical Committee Deinking".
- 17 INGEDE press release, *Inkjet Prints Are Not Deinkable: Newspapers and Direct Mail by Inkjet Heads towards Ecological Dead End, INGEDE warns against problems in the paper recycling process*, January 2008.
- 18 InfoTrends, Inc., *U.S. Print on Demand Market Forecast: 2006-2011*, June 11, 2007.



A Sustainable Future

For over 20 years, Presstek has been an innovator in changing the way printing is manufactured. Presstek led the industry with the world's first DI digital offset presses and thermally-imaged chemistry-free printing plates. Today, Presstek's digital offset solutions continue to lead the industry to a more profitable, responsive and sustainable future.

For information about Presstek digital solutions, visit:

www.presstek.com

**or call +44 20 8745 8000 (Europe)
or 1-603-595-7000 (North America)**

