



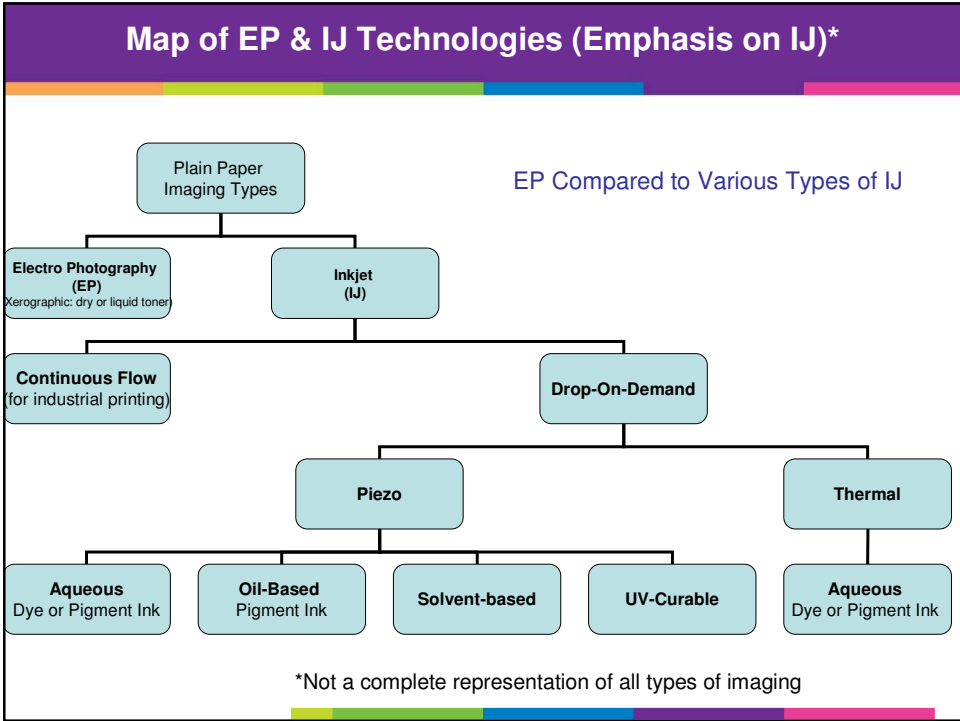
Inkjet or Toner? Assessing the Alternatives

David Murphy
Vice President of Marketing

RISO, Inc.

Outline

- Map of currently available alternatives for EP & IJ
- Technical description of the various processes
- Opinions: market viewpoints on EP vs. IJ
- The market potential of the inkjet
- Applications – what gets printed on what?
- RISO ComColor's fit in the market
- What about print quality?
- Summary - Trade-offs to consider with EP & IJ



Categories of Printers & Presses

Electrophotographic & Inkjet

Printer vs. Press		
	Printer	Press
Sheet size	1-up and 2-up	2-up, 4-up, and more
Speed	40–250 ppm	100–500+ ppm
Quality	Moderate–High	High

Digital production press (smaller sheetfed)

- Toner (e.g., Xerox iGen4)
- Inkjet (e.g., Fujifilm Jet Press 720)

Digital production press (larger sheetfed)

- Toner (e.g., Jodason QPress)
- Inkjet (e.g., Screen Truepress Jet SX)

Digital production press (roll-fed)

- Toner (e.g., Xeikon 8000)
- Inkjet (e.g., Agfa Dotrix Transcolor)

Small-format production (18–36 in.)

- Toner (e.g., HP Indigo ws4500)
- Inkjet (e.g., Nilpeter/FFEI Caslon Label Press)

Wide-format (36–64 in.)

- Inkjet (e.g., EFI Vutek)

Super-wide-format (64 in. or above)

- Inkjet (e.g., HP Scitex)

Source:
Printing
Industries
of
America

60+ ppm Digital Process Color Technology

InfoTrends

Source: InfoTrends
 "Choosing a Digital
 Production Color
 Device"
 July 2007

Very High
 Volume
 Production



High Volume
 Production



Mid-Volume
 Production



Light
 Production



Production Inkjet Printers & Presses

- Kodak Versamark, Prosper
- HP T300 Color Inkjet Web press
- Océ Jetstream
- InfoPrint 5000
- Screen TruePress Jet
- Agfa Dotrix & M-Press
- Atlantic Zeiser
- FujiFilm XP-200
- Nilpeter Caslon press

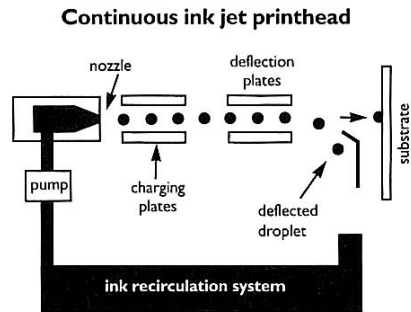
- HP CM8060 (Edgeline MFP)
- Silverbrook Memjet
- Xerox Color Qube
- RISO ComColor

Source: Frank Romano, Inkjet! 2, 2008



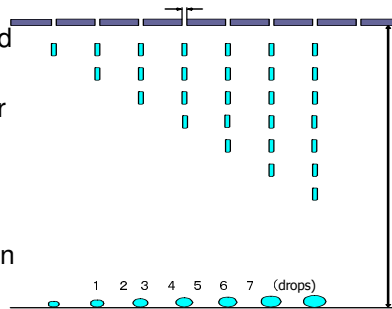
Continuous Inkjet

- Continuous stream of drops
- Drops have a charge and act like small magnets
- When an electric field is applied, drops are diverted to hit paper



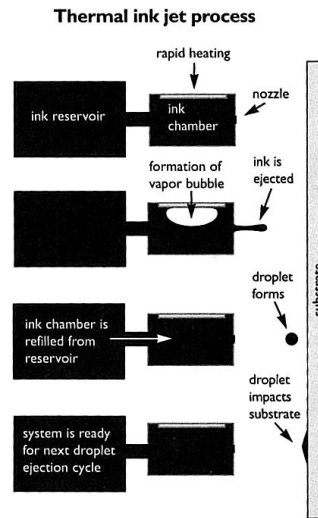
Drop-On-Demand Inkjet

- Drop-on-demand process
 - Applies various droplets of ink per dot and only where needed
 - Higher control of dot drop placement over thermal inkjet
 - Stationary heads - fast paper feed
 - Lower cost per impression
 - Robust construction for volume production
 - Long head life = high duty cycles



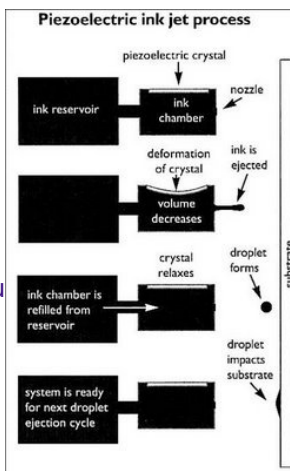
Drop On Demand Inkjet Thermal

- Also called 'bubble jet', heat is used to create bubble in inkjet head
- Bubble forces ink drop out of inkjet head
- Typical design for use on desktop inkjet printers
- Generally used in lower volume environments



Drop On Demand Inkjet Piezo

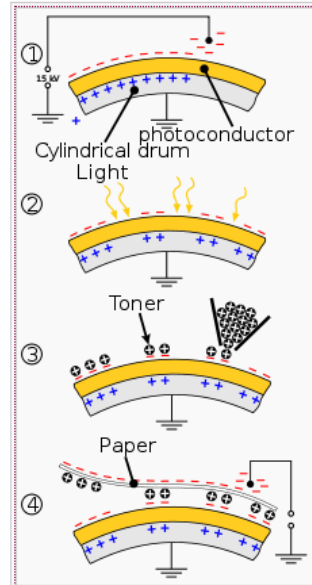
- Uses a Piezo crystal located at the back of the ink reservoir of the nozzle
- The crystal receives a tiny electric charge that causes it to vibrate
- When the crystal vibrates inward, it forces a tiny amount of ink out of the nozzle
- When the crystal vibrates out, it pulls more ink into the reservoir to replace the ink that was sprayed out



ElectroPhotography (EP)

EP: an imaging technique that uses electrostatic charges, toner, & light

1. A photoconductor drum is positively charged
2. A negatively charged toner is attracted to the positive image on drum
3. The toner is attracted to the paper, which is also positively charged
4. The final stage is fusing, which uses heat and pressure to cause the toner to permanently adhere to the paper
- fusing temperatures of up to about 400° F



Some EP Advantages

- EP's ability to print...
 - Metallic inks
 - Neon colors
 - PMS colors
- EP offers higher resolutions and image quality
 - Trade-off: print speed and cost per page
- EP's ability to print heavy-coverage color at reasonable cost
 - Inkjet's running cost closely tied to consumables (more so than with EP); the more ink used, the higher the cost
 - Trade-off: service costs are generally higher with EP
- Piezo inkjet print heads require replacement to maintain production print quality
- Dry toner-based systems have some arguable benefits relative to VOC emissions and paper recyclability

– Source: Lode Deprez, VP, Toner & Developer Group, Punch Graphix
American Printer magazine, July 2008
<http://americanprinter.com/your-turn/Deprez-inkjet-72008/>

Some EP Disadvantages

- EP is reaching the limit of its speed capacity
- Most EP devices are limited to four colors
- Inkjet quality will improve over time
 - While speed, format, and running cost are still compelling
- What could stand in the way of inkjet?
 - print quality
 - available substrates (including cost-effective coated stocks)

The inkjet buzz...

The Potential of Inkjet

“Inkjet technologies pose a long-term threat to toner technologies.

Although this will take time, inkjet technologies will begin to impact toner’s long dominance in the print-on-demand market.

Barb Pellow, Director, InfoTrends



Source: Digital Publishing Solutions magazine, December 2007

The Potential of Inkjet

“There is no doubt that inkjet technologies will produce even faster speeds and higher levels of quality at a lower cost per page in the coming years.”

Inkjet has opportunities for “applications that were typically only feasible with offset or other conventional printing technologies.”

– Jim Hamilton, InfoTrends, August 2008



The Potential of Inkjet

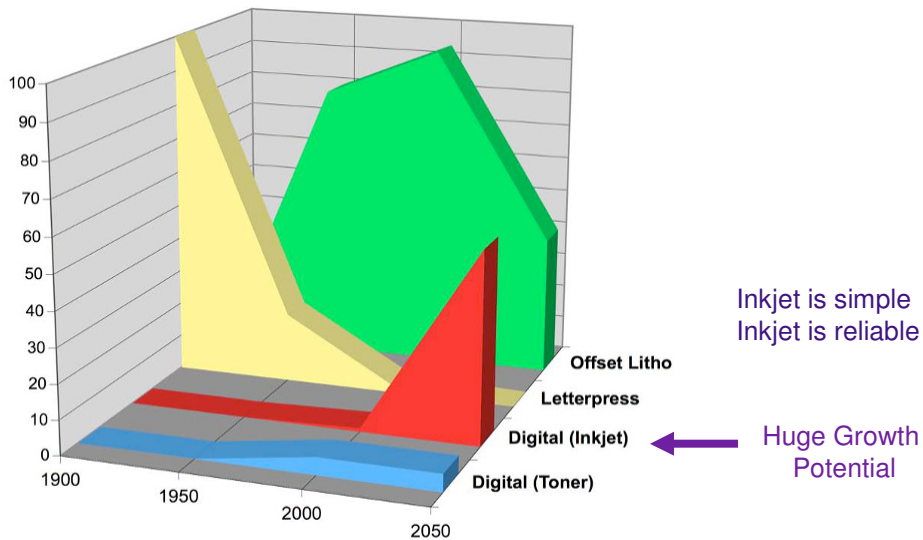
“Inkjet systems only comprise about 3-4% of the installed base of full-color digital systems.

But it's starting to gain momentum and will surely make a bigger impact in years to come.”

Gilles Biscos, INTERQUEST, Ltd.



The Potential of Inkjet



Inkjet is simple
Inkjet is reliable

← Huge Growth Potential

Source: Frank Romano - Professor Emeritus, Rochester Institute of Technology

Growth in Inkjet

- 2008 revenue: \$59 billion
- 2000 revenue: \$29 billion
 - Includes inkjet printers, media, and ink
- Consumption of all production inkjet inks:
 - 66 million liters in 2004 (\$32 billion)
 - Forecast to increase 8% annually

Source: Frank Romano, Inkjet 2!, 2008

Inkjet

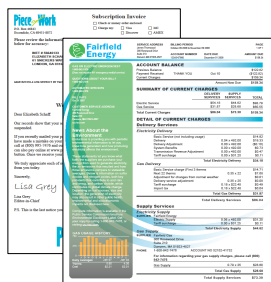
Inkjet won't totally replace toner

but...

...it will increasingly become a viable alternative
for certain applications and environments

Digital Printing Applications & Technologies

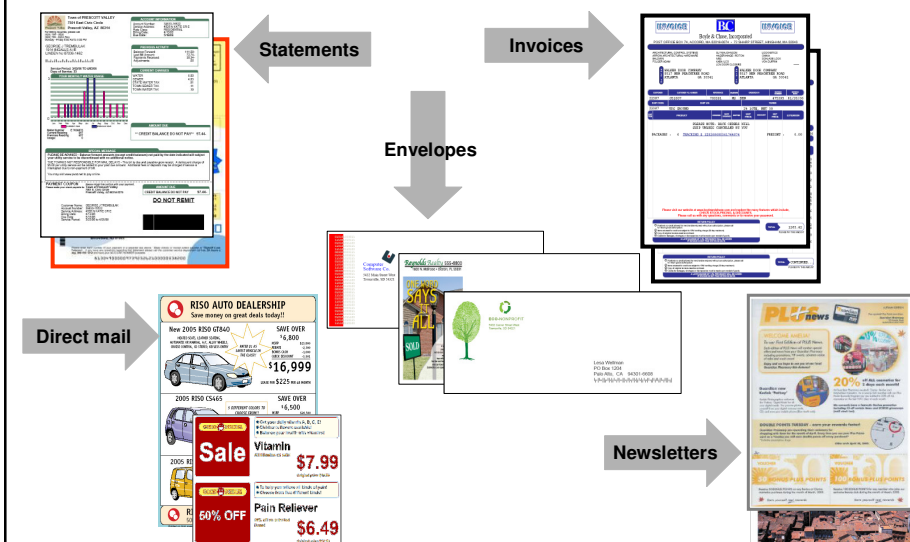
- | | | |
|------------------------|-------|-------------------------|
| • Books | 6.3% | • Mostly toner |
| • Brochures/Collateral | 5.1% | • Mostly toner |
| • Direct Mail | 14.3% | • Toner and inkjet |
| • Labels | 8.2% | • Toner, inkjet growing |
| • Others | 23.0% | • Toner and inkjet |
| • Point-of-purchase | 12.2% | • Mostly inkjet |
| • Transactional | 9.9% | • Toner and inkjet |



Source: Printing Industries of America



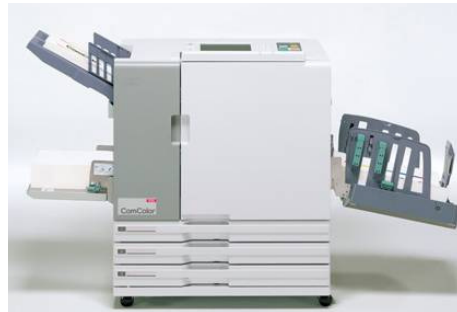
Sweet Spot Inkjet Applications



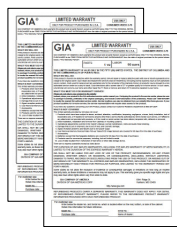
RISO Introduces a Piezo DOD Inkjet Printer Called ComColor

- ComColor = “Communications Color”
- Color printing for applications that require...
 - high-speed
 - low-cost
 - high reliability in mid- to high volumes

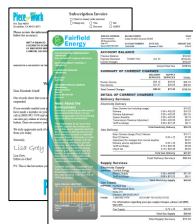
- 150-ppm A4 cut-sheet
 - Simplex or duplex
- 500k monthly duty cycle
- Hardware cost: \$25-60k



A Low-Cost Bridge From Monochrome To Color



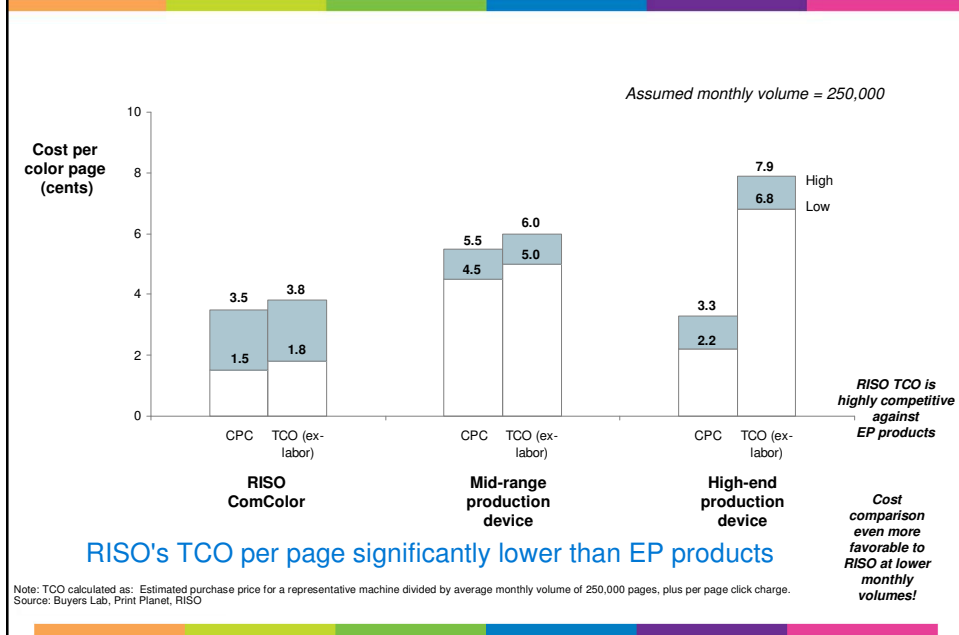
- Monochrome cost
 - As low as \$.0035 per page



- Color cost
 - Ranges from 1.5 to 3 cents per page (depending on ink coverage)



Cost Barrier Removed By Inkjet Technology's Lower Cost

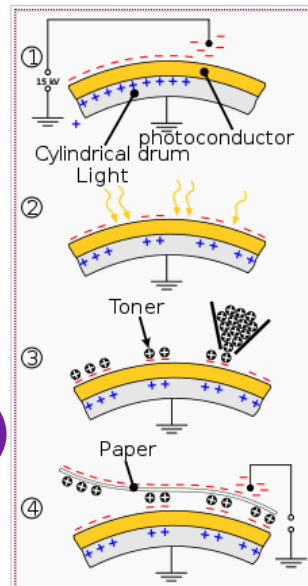


Remember the Heat?

EP: an imaging technique that uses electrostatic charges, toner, & light

1. A photoconductor drum is positively charged
2. A negatively charged toner is attracted to the positive image on drum
3. The toner is attracted to the paper, which is also positively charged
4. The final stage is fusing, which uses heat and pressure to cause the toner to permanently adhere to the paper

- fusing temperatures of up to about 400° F



'No Heat' means...

- No warping or distortion of paper
 - Printed paper feeds more reliably through inserting and finishing equipment
- No scuffing of images when run through postal barcode readers
- Reduced power/cooling costs; No heat means no need need for compensatory cooling
 - Reduces electrical & air conditioning loads, minimizing consumption/cost
 - Relieves strain on electrical grid
 - This further reduces greenhouse gas emissions and other pollutants

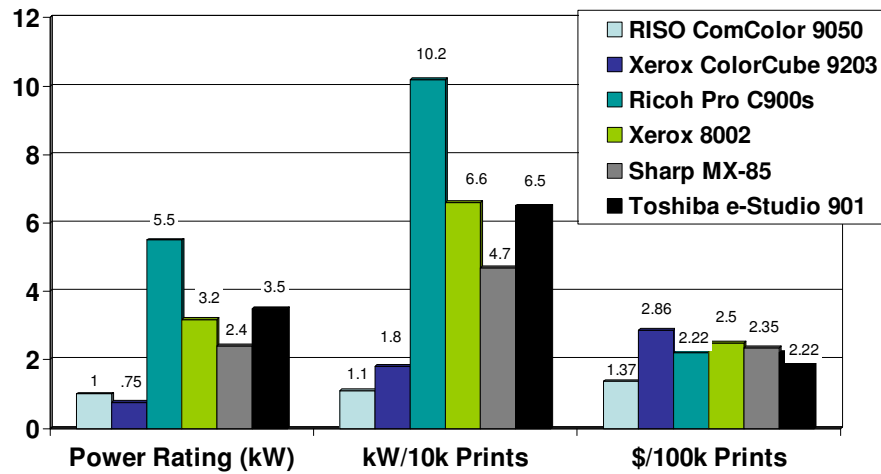


Low Power Consumption

Product	Rated Speed	Max Watts	Power Requirements	Special Wiring
RISO ComColor 9050	146	1000	120V/11A	No
Xerox ColorQube 9203	70	750	120V/11A	No
Ricoh Pro C900s	90	5500	240V/24A	Yes
Xerox 8002	80	3190	240V/24A	Yes
Sharp MX-85	85	2400	240V/16A	Yes
Toshiba e-Studio 901	90	3500	240V/20A	Yes

1 Electric consumption while printing only
 2 12 cents/kW Hr. Aug/2009, US Dept of Energy
 3 Product information sources: Respective product specification sheets
 4 Assumes Color Cube standard print mode

Low Power Consumption

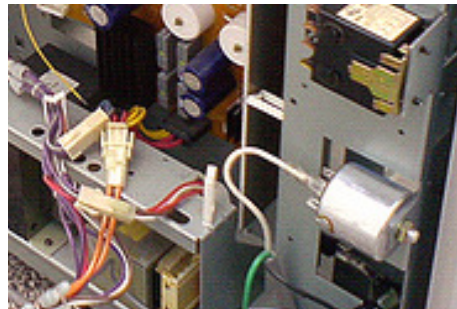
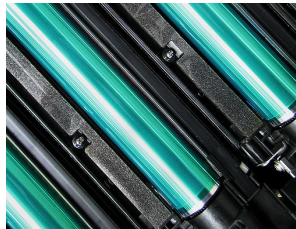


- 1 Electric consumption while printing only
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No Hazardous Emissions

Piezo inkjet printers release no...

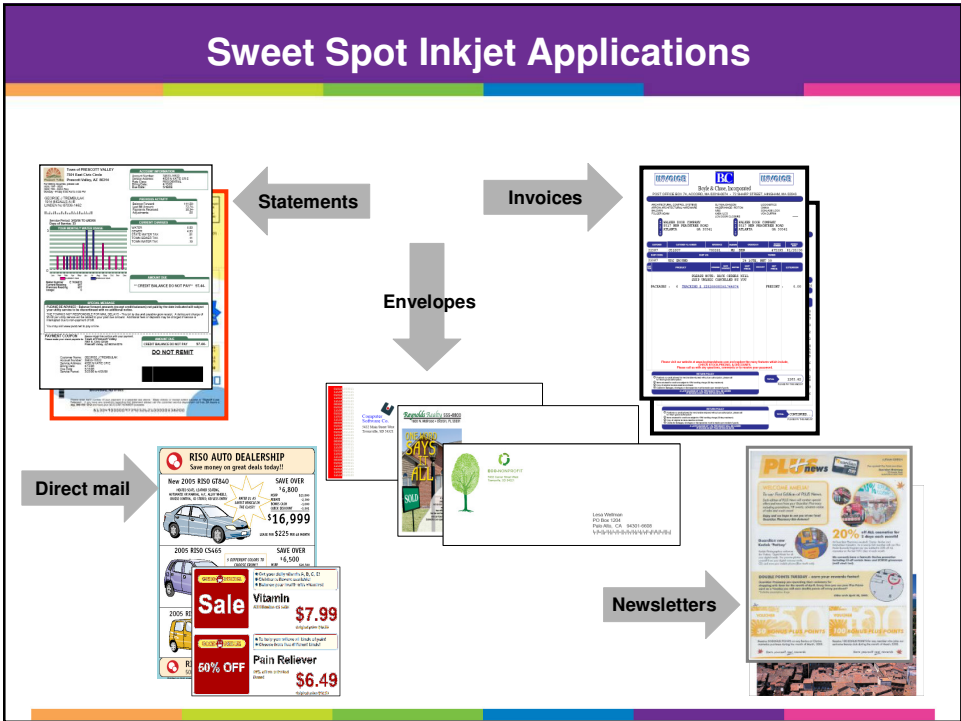
- Ozone
- Airborne toner particle emissions
- Silica dust
- Greenhouse gas emissions
- Other air pollutants



Where RISO ComColor Fits



Sweet Spot Inkjet Applications



Full Color Personalized Envelopes in a Single Pass

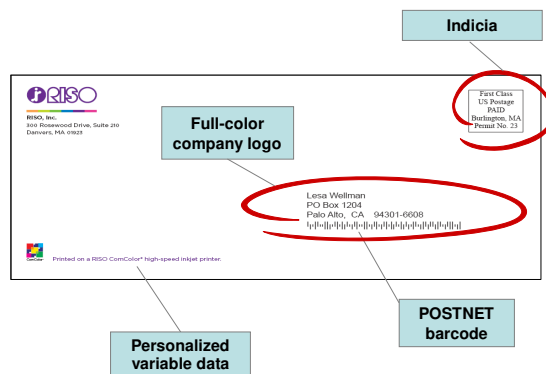
- Continuous 'top-load, bottom-feeding' architecture
 - Modular design – rolls away when not in use
 - Optional conveyor for high-capacity stacking at exit
- Speed: 5,100 color variable-data envelopes per hour
 - 85 envelopes per minute
- Envelope sizes - to 10" x 13"



Full Color Personalized Envelopes in a Single Pass

Print full-color static & variable data in a single pass

print all envelope details, including barcodes and indicia in the same single pass

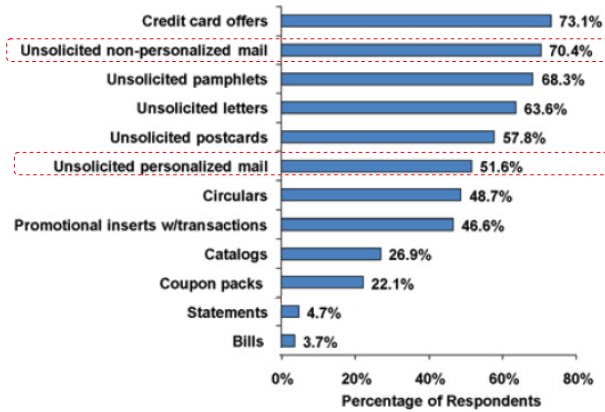


Full Color Personalized Envelopes in a Single Pass

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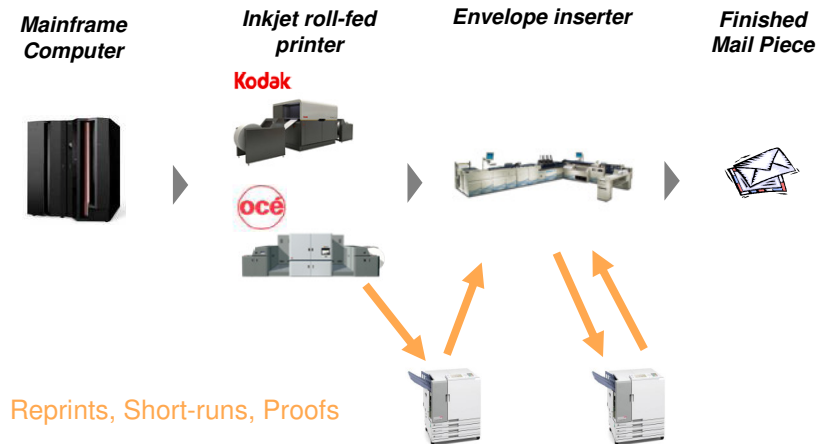
Envelopes with personalized messages increase open-rate

Which of the following mail do you discard without opening or reading?



Source: Trans Meets Promo... Is It More Than Market Hype?, InfoTrends, 2008

Complementary Solution To Roll-fed Inkjet Printers



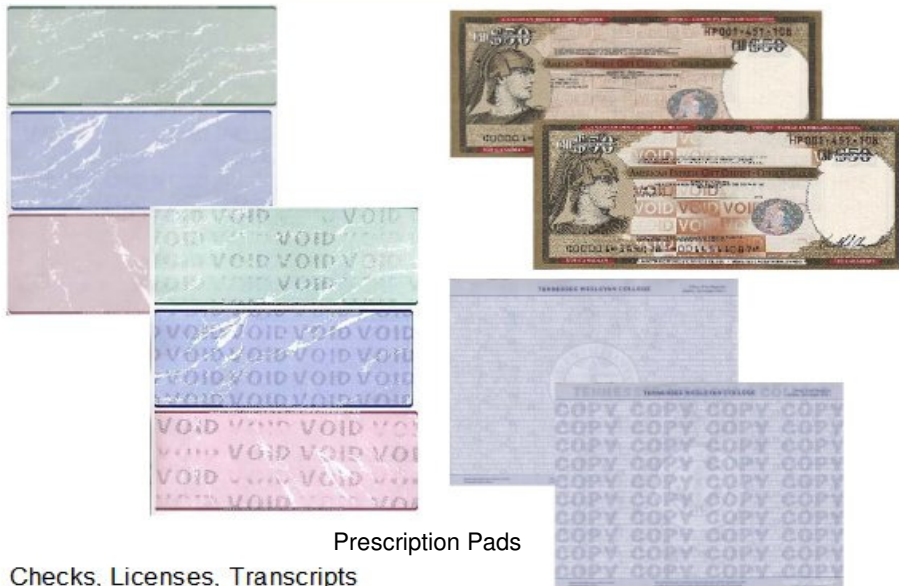
MICR-Mate® Inline MICR Inkjet Printing System

- Speed: 6,000 to 9,000 3-up checks per hour (in color with MICR)
- Full ANSI compliance
- Optional Verification Module verifies continuity, ensures data integrity



Capability To Print Digital Void Pantographs

Certified by Arcis Digital Security



Prescription Pads

Checks, Licenses, Transcripts

What About Image Quality?

Independent Study on Inkjet vs. Toner

Objective: to measure the difference in response rates in mailers produced on toner-based printers as compared to inkjet printers

WHITE PAPER

Digital Color Printing for Mid-Volume Direct Mail Applications

Comparing the Costs & Response Rates for Inkjet & Toner Technologies

Prepared by INTERQUEST, Ltd.



Independent Study on Inkjet vs. Toner

10,585 postcards mailed to marketing directors in 10 commercial vertical markets
 Half were printed on 65-ppm toner-based MFP; half were printed on RISO ComColor

Card code ID



Take our online direct mail marketing survey and receive a \$20 gift certificate!

We want to know what you think! Take our 10-minute survey and we'll give you a \$20 Amazon gift certificate for your time.

But hurry! Surveys must be completed by December 14, 2009 to qualify!

Go to snipurl.com/t62sc to take our 10-minute survey today!

Limited to the first 200 survey respondents. One \$20 gift certificate per name/address/organization.

PO Box 6368
 Charlottesville, VA 22906
 Tel: 434-979-9945
 Fax: 434-979-9993
www.inter-quest.com



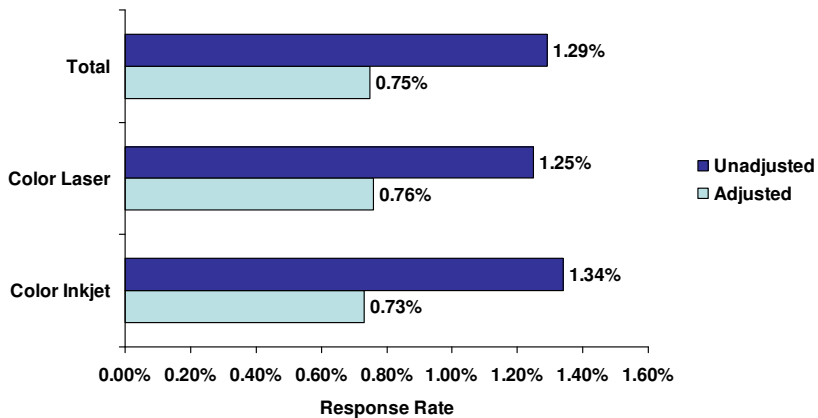


We'll give you \$20 for 10 minutes of your time...



...when you take our online direct mail marketing survey!

Response Rate

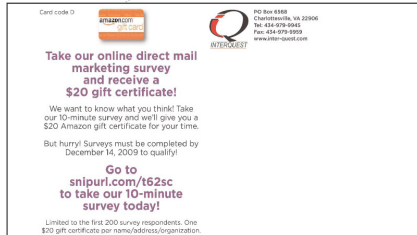


Operating Cost

EP-printed postcard
Operating cost: \$.049



Inkjet-printed postcard
Operating cost: \$.018



Trade-Offs & Questions To Consider

- Image quality
- Paper stocks
 - Envelopes
 - Affordable coated stocks
- Print speed
- Total cost of ownership
 - Hardware cost
 - Operating cost
 - Yield on supplies cartridges
 - Power consumption
- Footprint on production floor
- Applications
 - Graphic arts applications?
 - Light-coverage color applications?
 - Full-color, personalized envelopes in a single pass?

Inkjet or Toner: Which Technology is Better For You?

- The answer depends on your...
 - Applications
 - Environment
 - Workgroup
 - Production
 - Volume
 - Low, Medium, High
 - Expectations
 - Speed
 - Costs
 - Quality
 - Reliability

