

Readers offer a number of suggestions for improving their ability to print onto textiles. (Image courtesy of Mimaki USA).

Editor's note: The purpose of this series is to generate open dialogue among industry practitioners regarding the strengths and weaknesses of current inkjet printing technology, with the long-term goal of improving equipment to better meet the needs of the wide-format digital printing community. The first report in the series (*Digital Graphics*, April) presented end-user comments about outdoor-capable printers. Part II examines digital fabric printers. The third report is planned for flatbed printers.

Seeking Textile Printing Perfection

Part II in our Perfect Printer series examines wide-format textile printers.

By Alan Anderson, Rich Adams, Michael Flippin and Ken Mergentime

In Part I of the three-part "Quest for the Perfect Printer" series, industry colleagues expressed their thoughts about inkjet printers capable of producing outdoor graphics. We were delighted to receive so many insightful comments about the good and not-so-good aspects of inkjet printers currently in use. And as we had hoped, we also received great comments on how manufacturers can improve the next generation of outdoor-capable inkjet printers so they can move closer to being the "Perfect Printer."

In Part II we continue our Quest with a look at machines used to print fabric or textile graphics. But just what are they?

FABRICS VS. TEXTILES

According to the Glossary of Terms published by the Specialty Graphic Imaging Association (SGIA), a *fabric* is defined as "a cloth; textile – a planar structure produced from weaving, knotting, felting, knitting, binding or otherwise combining natural or synthetic fibers or filaments. And a *textile* is defined as (1) a woven cloth or fabric; (2) fiber or yarn for weaving into fabric."

Generally in its surveys, Web Consulting applies a very broad definition to the word "textiles" for use in the printing industry, defining nine specific textile/fabric segments. These include everything from finished garments and apparel fabrics, to technical textiles, as well as flags and banners, carpets and textile-reinforced graphics.



Alan Anderson works with Web Consulting, where he manages online market research programs and oversees custom projects. Contact Allan at alan.anderson@web-na.com.



Michael Flippin is president of Web Consulting Inc., a Boston-based consultancy to the digital printing industry and provider of primary market research and industry reports. Visit Web Consulting at www.web-na.com or contact Michael at michael.flippin@web-na.com.



Rich Adams, Ph.D., is an assistant professor of Graphic Communications Management at Ryerson University in Toronto, Canada. Contact Rich at richard.adams@ryerson.ca.



Ken Mergentime is executive editor of *Digital Graphics and Sign Business* magazines.

Top Wide-Format Manufacturers

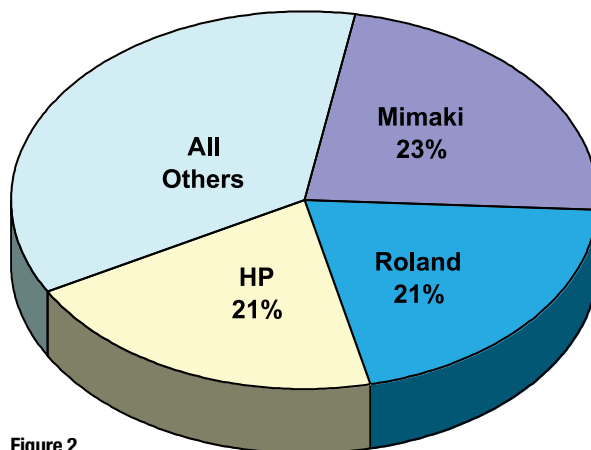


Figure 2
The leading textile printer manufacturer in our sample is Mimaki, by a slim margin.

For purposes of this discussion, we will use the terms *fabric* and *textile* interchangeably to define inkjet printed graphics serving a promotional, informative or identifying purpose that happen to be printed onto a textile. These products are sometimes called “soft signage,” but because of regional differences in the definition of “signage” we tend to describe them as promotional textiles or fabric graphics.

It is important to note that although the majority of banners (by volume printed) would actually fall under a definition of “textile-reinforced graphics” (which includes scrim vinyl, coated mesh, and other flexible face materials and similar non-woven substrates), we are focusing on those printed applications imaged onto conventional textile media such as woven and knitted polyester and polyamide/nylon. Examples of these products include fabric banners, trade-show signage, flags, backdrops and point-of-purchase hangings made of materials like poly-silk, satin and poplin.

Producers of fabric graphics tend to be very enthusiastic about their craft and gladly voiced their opinions about the current crop of production machines. Due to the challenges of imaging onto porous, flexible and often unstable materials, their comments offer a new perspective of the “Perfect Printer.”

THE FINE PRINT OF SURVEYING

This survey consisted of 48 questions and was left open for an eight-day period from April 24 to May 1. We received 142 responses, which is considerably fewer than the 328 responses received for Part I of the Perfect Printer project, but this is no-doubt due to the smaller number of players involved in the inkjet fabric-printing market.

The majority of responses came from the U.S., but a number came from Canada, Australia and Latin America as well. Of the 142 responses, 111 (78.2%) said that they use a wide-format inkjet printer, and 49 (34.5%) use a wide-format digital printer

to image textiles or other treated fabrics, including cotton, polyester, silk, and the like. In the end, 39 respondents stated that they use a wide-format digital printer for “soft signage.” This group represents our target audience. They completed the entire survey. The small sample size reflects the niche market of fabric printing, but is more than sufficient to provide valuable insights into our “Quest for the Perfect Printer.”

THE STATUS OF E-STAT

Only one respondent indicated his company is using an electrostatic (e-stat) printer for imaging textiles, and stated that it represents a good dye sublimation solution for multiple fabric imaging applications. This is certainly very true, and there are still

many e-stat printers in use today. However, over the years the popularity of inkjet printers has far surpassed e-stat machines due to many challenges in properly operating and maintaining e-stat printers. In our “Quest for the Perfect Printer” we are focusing on the use of wide-format inkjet printers because they are by far the most popular digital imaging system currently in use for this market.

TWO IN ONE?

Versatility is usually a strong selling point for expensive machinery. If a device can be used for several different types of work, we might save money and space by using the same machine to do different jobs. At least one manufacturer of digital printers is offering a device that allows the user to quickly change ink types without requiring a full system purge; thus allowing the machine to print on fabrics and then other materials not usually associated with fabric printing.

We asked our respondents if they see advantages in having such a system and found that only a slim majority thinks it’s a good idea (see **Figure 1**). These people tended to have small shops where space

Two In One - Machine Versatility
Using one machine with a quick-change ink system

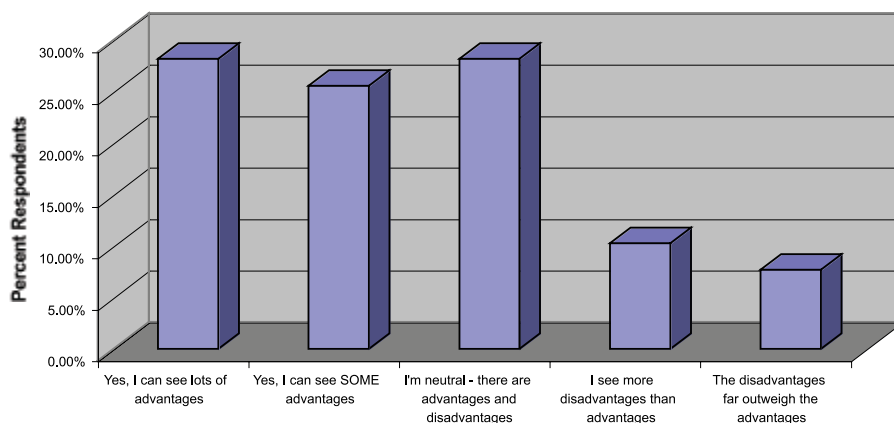
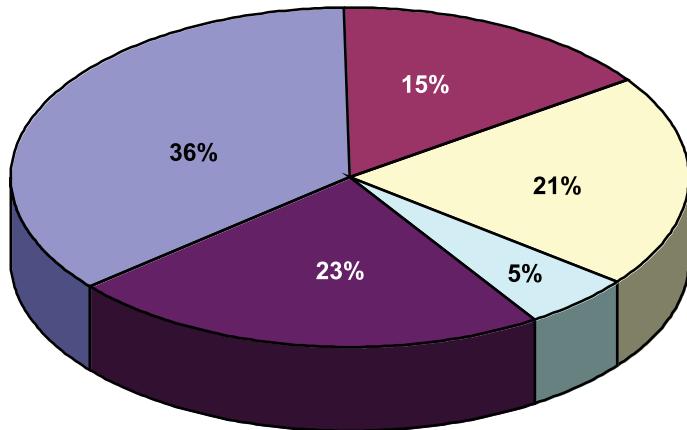


Figure 1
A small majority believe it’s a good idea that a printing device allow the user to quickly change ink types without requiring a full system purge. However, few believe the disadvantages are significant.



**Special Report:
Perfect Textile Printer**

Number of Wide-Format Digital Printers Owned



■ One ■ Two ■ Three ■ Four ■ Five or more

Figure 3

It's interesting to note that the largest percentage of those participating own only one printer, nearly one quarter of respondents own five or more.

and investment capital for equipment are at a premium.

So why would nearly half of our respondents not see advantages in greater machine versatility? The answer may lie in economies of scale. Large companies can generally afford equipment and space for dedicated product lines and therefore see no advantage in this area of savings. Also worth noting is that versatility is often accompanied by compromise. Image quality settings, material handling, production speed and many other factors that *are* important

to producing quality graphics in one area are not the same for another.

LEADERS OF THE PACK

The leading textile printing machine manufacturer in our sample is Mimaki, by a slim margin (see **Figure 2**). Roland and HP followed close behind and were in a tie for second place in terms of popularity. Epson, Mutoh and VUTEk were the next most popular, while Encad, MacDermid ColorSpan, Scitex, Gandinnovations and Seiko were also mentioned.

IS EVERYBODY HAPPY?

Survey respondents report that they are generally happy with their fabric printers. Approximately 80 percent are either satisfied or very satisfied with their equipment.

We divided the "best feature" responses into the following sub-categories: *quality*, *productivity*, and *reliability*.

Print quality is mentioned by 38 percent of our respondents as their machine's best feature. The best attributes included image resolution, image quality, color, solids and automatic compensation for misfiring or clogged nozzles.

Productivity was also cited by 38 percent of our respondents. This includes the ability to print on a variety of substrates, print width, speed, simplicity, ease of use, and use of common supplies.

Reliability was mentioned as the top feature by nearly 24 percent of users. Attributes include dependability, ease of maintenance, and accessibility of parts and systems.

Just less than 13 percent of our respondents said they are neutral about their printers, and the remaining 7 percent were unsatisfied or worse. Manufacturers should take note when nearly 20 percent of a survey sample is not happy with their equipment. Of course, some dissatisfaction may be directly related to user error and other causes over which the manufacturer has no control. But some dissatisfaction is justified.

When asked about their printer's "worst feature," six users said "None", "Nothing bad I can say," or "I love my printer." Other users (16) hoped their printers could be engineered for greater productivity. Features they would like to see include faster print speeds, lower initial investment and operating costs, better operating software, better media handling capabilities (including a take-up reel), smaller printer size and footprint, and quieter operation.

| Table 1. Summary of Machine Attributes | | | |
|---|-------------------------------|----------------|------------------------------|
| | Unsatisfied / Very Un. | Neutral | Satisfied / Very Sat. |
| Warm-up time | 1 | 6 | 29 |
| User interface | 3 | 8 | 28 |
| Media cutting & handling | 7 | 8 | 24 |
| Maintenance requirements | 5 | 2 | 32 |
| Quality settings | 1 | 1 | 37 |
| Print optimization | 1 | 3 | 35 |
| Head crash recovery | 1 | 8 | 30 |
| Media handling | 2 | 3 | 34 |

*Please note that all respondents did not answer each question

Some users (7) wished that their printers had higher quality, including higher resolution or clarity, a larger color gamut, less tendency to band, better printing on paper, and less need to profile multiple media and ink combinations. Three users said they would like their printers to be more reliable by having sturdier printheads, easier alignment procedures, and better technical support from the manufacturer.

SATISFIED OR NOT, THAT IS THE QUESTION

Respondents were asked specific questions about their level of satisfaction or dissatisfaction with various printer parameters such as warm-up time, user interface, print optimization, and other features listed below in **Table 1**. The table combines user responses for “Very Unsatisfied”, “Unsatisfied”, “Neutral”, “Satisfied”, and “Very Satisfied.”

As the data shows, most users are quite satisfied with the performance of their printers. Users have the fewest complaints about quality-related features, including quality settings, print optimization, and media handling.

The area where users feel there is the most room for improvement is media cutting and handling. This should not come as a surprise to most people familiar with imaging fabrics on any type of machine, be it a digital system, screen press, rotary screen press or other. Fabric is difficult to handle because it is compressible, dimensionally unstable, difficult to cut, and can range from very slick to terribly abrasive, to name a few challenges. It's no wonder that users would like a fool-proof media handling system.

The bottom line is that respondents want a printer with both excellent material handling ability and a built-in cutter that

cuts quickly and can handle both thick media and delicate fabric — a tall order indeed!

The second area targeted for improvements is machine maintenance requirements. Users would like a sturdy printer that seldom breaks down, made with more user-replaceable parts, and with printheads that operate smoothly. In other words, our respondents are looking for a machine they can count on to perform well day after day so they can concentrate on other tasks. When a machine is down for maintenance or repair it's not making money.

Minimizing machine down-time is essential to maximizing profits and productivity in any production process. Profitability, productivity and customer delivery times plummet when a shop must let a machine sit idle for days, weeks or even months while waiting to be repaired. Dependability and parts that are user-replaceable will be a strong selling point for new machines.

The third greatest area for improvement is the printer's user interface. Users want features like a larger control screen, more intuitive menus and controls, easier to understand instruction manuals, and easier operation. Need we say more?

VISIONS OF PERFECTION

When we asked people to tell us about their personal vision of the “perfect printer”, we expected a wish list something like the following:

The perfect printer will be inexpensive to purchase; never need maintenance, or be self-repairing; use very inexpensive ink; load itself; print and self-adjust to any type of substrate; print faster than production delivery time requires; and be self-cleaning. It would not require an operator; could self-correct color;


have an unlimited color gamut; take up almost no floor space; always produce 100 percent saleable goods with no waste; order it's own supplies; call the customer when each job is done and answer all customer questions automatically; and maybe sell jobs in its spare time...

Thankfully, our respondents wish list is much more realistic. Some of the quality features they would like to see include: better print quality (including better color profiles), a larger color gamut for more vibrant colors, improved ink adhesion for better wear and washability, a two-year or better outdoor durability, and accurate media alignment for two-sided printing. One specific request was for eight printheads, including red and green inks, for a wider color gamut.

Productivity attributes requested were faster print speeds, easier setup, faster drying times, the ability to adjust to different media thicknesses, and easy layout of images for multiple prints. Of course, the ability to cut a wide variety of media accurately and quickly would be a plus. Other desired features mentioned include a media loader to help lift heavy rolls and adding a work table to the printer.

While none of the respondents made specific requests related to reliability, maintenance issues topped the list of questions for user dissatisfaction.

Fortunately, our industry can expect improvements in virtually all areas mentioned. We must remember that the digital imaging industry is just a “teenager” and is still in the early stages of technical development. As demand for digitally imaged products continues to increase, the financial benefits that fuel technical development will also increase.

Who knows, the “perfect printer” may come to be sooner than we think! 

Reprinted from *Digital Graphics* 2007

© 2007 National Business Media, Inc. all rights reserved

Please visit [Digital Graphics Magazine](http://www.digitgraphics.com) web site