

A new ink that prints on rigid materials, on plastics,
on uncoated banner and uncoated billboard material:

*No primer needed; no UV-curing lamps;
and it is a water-based ink*



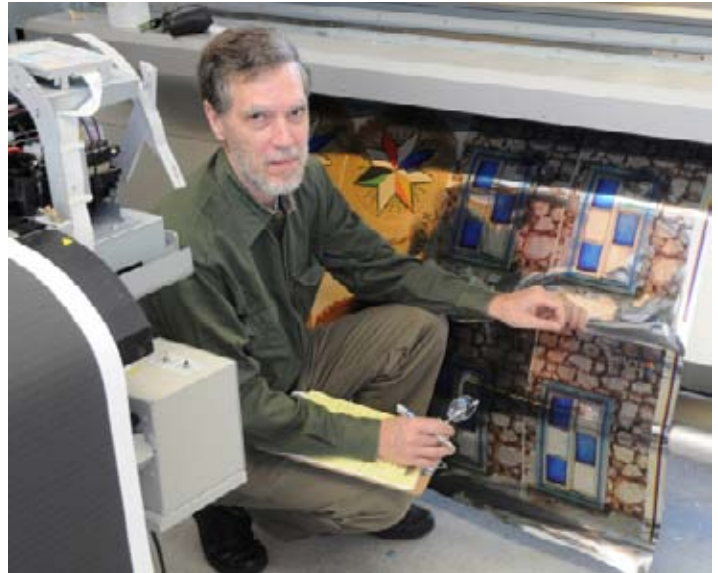
SEPIAX

a new Water-based Resin Ink

Nicholas Hellmuth

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Nicholas Hellmuth reviewing Sepiax Polyester chrome film at Graphics One at ISA 2010

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Introduction

This report is based on:

- Two days inspecting Sepiax ink company, at their world headquarters in Austria, after VISCOM Italy in 2008.
- Discussing Sepiax ink with other industry analysts and ink chemists, though so far the ink is very new to them.
- Discussion for several hours with the owner of GSW, the master distributor for Sepiax ink for (South) Africa.
- Discussion with the new distributor in USA and Latin America, GraphicsOne, at two launch trade shows (total of 5 days).
- Three days at Sign & Digital UK launch of Sepiax ink at (B&P)

GSW is one of the largest Mimaki distributors in Africa; they have 50 installations so plenty of feedback on the current generation of ink. GSW is also distributor for Matan, Keundo and other brands, including textile printing. In other words, they know printers, ink, and substrates for signage.

The inspection of the Sepiax company included speaking with both key managers (Karl Ebner and Franz Aigner) over a two day period, speaking with the printer operators who had been working with this ink for years, and also doing actual test prints on various materials. This visit was after VISCOM Italy 2008. Since then the ink has substantial feed-back from initial end-users in several countries. In other words, now the ink is out of the R&D lab and out in the real world.

At both Graphics of the Americas (Miami) and then at ISA sign expo in Orlando two months later I spoke at length with the printer operator. The printer operator knows an ink, and printer, inside out. Plus, they are not selling either the ink or printer; their job is technical.



Dr. Hellmuth and student Tina Košir at Sepiax headquarters, Austria, with Franz Aigner General Manager SEPIAX Ink Technology GmbH

History of Sepiax

Since FLAAR is not a PR agency, we prefer you get the history directly from the ink company, but for our purposes (evaluation) it is useful to indicate that the ink has been under development at least for eight years. Sepiax is owned by the Gernot Langes-Swarovski Group, one of the leading innovative conglomerates in Austria.

The goal of Swarovski is quite clear in their own words: "replacement of solvent inks by harmless water-based inks."

The goal of FLAAR is different: to provide print shop owners, managers, and printer operators independent information on the benefits and issues with new inks and especially to compare and contrast Sepiax ink with latex ink, eco-solvent inks, and various other "magic" inks that have appeared in the last five years. It is probable that the end-result will be the gradual replacement of other inks.

But Sepiax is an open ink; it is not a monopoly. Any and every printer manufacturer in the world can prepare a printer that works with this water-based resin Sepiax ink. So each company that offers eco-solvent, mild-solvent, bio-solvent or full-solvent inks today can simply and easily create a new printer in their own company to use Sepiax ink.

We see huge potential for resin-based water-based inks to gradually gain market share even compared with UV-cured inks. Why? We discuss UV inks compared with Sepiax inks in a separate FLAAR Report issued this month.



The Launch of Sepiax

Sepiax ink was first exhibited at FESPA Geneva 2008. Not too many people recognized the name in that year (it was not even mentioned in the first FLAAR Report on FESPA that year since, like everyone else, I had never heard of this ink at that early date).

Yet less than two years later, at the first US showing of Sepiax ink for 2010, virtually every printer manufacturer was visiting the booth of GraphicsOne to see the mystery ink (Sepiax). HP, Epson, Seiko, Mutoh, and other managers were inspecting the Sepiax ink being used in two printers.

Some of these industry people had noticed the news about Sepiax ink in the FLAAR web pages, or heard about it directly from FLAAR when Nicholas visited their booths at GraphicsOne.

At Graphics of the Americas, ISA and Sign UK I could see the reaction of people to learning about Sepiax. At FESPA there will be crowds of curious on-lookers.

Graphics One is a distributor of Sepiax ink in the USA



What is the reaction when people hear about Sepiix ink for first time?

The reaction is almost always the same. Total disbelief.

I just spoke on the phone long distance with one of the newest distributors of Sepiix ink (FLAAR was instrumental in introducing about half of the world distributors to this ink because we see resin ink as the new future).

This new distributor had heard my enthusiasm for over a year, but he had never made a move because he had also heard others bad-mouthing the ink. But he said that after visiting the Sepiix headquarters in Austria that he came away a believer.

The US distributor told me also that he felt the idea of an ink that can print on everything was totally unrealistic. But now after seeing the ink perform for month after month, he is now the largest distributor of this ink in the world.

Of course any manufacturer of grand-format inkjet printers would instinctively dismiss this as “no water-based ink can perform for a grand format printer.” But I bet that in less than two years we will see 104-inch printers with Sepiix ink



Several times during ISA 2010 Dr. Hellmuth brought people to the Sepiix distributor booth. By the time this ink is widely known in the market, FLAAR will already have plenty of documentation for those who want to learn more about Sepiix.

and before three years they will be up to 5-meters. It took FOUR YEARS for a 5-meter UV-printer to be launched (the NUR Expedio, at DRUPA 2004).

To be polite to competitors I will not quote the name and company of what one European manager told me about Sepiix ink at VISCOM Germany 2009. But in essence he said that "all the 'new inks' failed, one after the other. They all promised everything but never worked. And Sepiix ink clogs printheads terribly."

Later I found out that he had tested an early version of Sepiix ink. Plus, in these early years people were purging eco-solvent ink out of the printheads and then adding Sepiix ink. I bet that if you feed virgin Epson printheads this ink, and don't have to purge out Epson-based inks first, that the printheads will last much longer. In other words the problem is the Epson printheads, not the ink.

Besides, UV-cured ink clogs printheads so badly that you need to purge in some printers and some printheads every few passes !

Another possible cause of clogging was suggested by an experienced wide-format inkjet individual in the UK. He said that the sub-tanks in the Mutoh 1604 and 1614 could be an issue because "if it is an old machine and has (already) had third-party inks used in it, there is no telling what detritus is at the bottom of those sub tanks."

So once more, it is not necessarily Sepiix ink that is the source of the issue, it is the fact that the printers being used for testing tend to be old.

I will obviously know more once we have feedback from the first several thousand people who become early-adapters of Sepiix ink. But one thing I can say, that the first TWO generations of eco-solvent ink were a disaster. These inks were so bad that the US manager of Mimaki USA withdrew the Mimaki eco-solvent printer from the market: he told me, "Nicholas, if we try to sell printers with eco-solvent ink it will ruin the reputation of Mimaki for many years."

Roland and Mutoh went ahead, and had a nightmare of bad PR from all the people who demanded money back. But the third generation of eco-solvent ink was really much better and current generations of eco-solvent are great (other than requiring some media to be coated which is more expensive than uncoated). And now that the third generation eco-solvent ink is acceptable, naturally Mimaki also offers this improved ink.

So yes, with resin inks we are entering new territory. I am excited by the potential precisely because all the other innovative new inks did indeed fail. They either were inadequate chemistry or inadequate corporate understanding of how to bring a really unusual ink into the close knit wide-format printer world. I feel that Sepiix ink is the first ink since UV that is likely to become a phenomenon.

Comparison with reaction to latex ink from HP

One cause of disbelief about any new ink today is because HP latex ink was over-promised: too many promises that could not be fulfilled. And too little admission of the downsides of latex ink.

I have now run into one owner of the 104" latex ink printer who was really disappointed. And I was told elsewhere of a person who "bought latex because it sounded like the thing to do." But then found it was totally inappropriate for giclee (if he had asked FLAAR we could have saved him from this \$20,000+ mistake).

Latex ink is great for some kinds of textile substrates, is viable for vehicle wrap, is good for a few other applications, but too much costly PR pumped this insinuating that latex ink was a general solution for everything. Japan and other countries reportedly are especially disillusioned because of the difference between what they thought they were promised, and what they got in reality. FLAAR has found good features of HP latex ink for specific applications: these applications should be featured rather than repeating over and over again that it is a "green" solution.

Printable Materials

Obviously no one single ink can print on 100% of all materials (not even UV ink, because we define "printing on" as also adhering. So, you might not want to print on Teflon! Glossy offset paper is another material that is not (yet) easy to print on. Notice that even for an ink that we obviously are impressed with, it is our job to find the real-world reality: what will it not print on. Not many ink companies list that clearly. How many spec sheets for eco-solvent, or for latex ink, really list what cannot be printed on.

Dan Barefoot's team from GraphicsOne went to Lowes (the equivalent to Home Depot) and IKEA and brought back material to add to signage material that they had already printed on:

1. Coroplast
2. Drawer liner material
3. Shelf liner material
4. Glass mirror
5. Kraft paper
6. Plastics
7. PP
8. Polyester
9. wallpaper
10. wood

Plus of course foamcor (from Piedmont Plastics).

This is why GraphicsOne is calling this the "Direct to Anything" printer.



Realize that the adhesion, abrasion, and data on whether and when the ink may flake off are not yet available. With UV-cured printers (\$120,000 printers with very expensive UV-curing ink), the ink may flake off Coroplast in several months. So any performance by Sepiix on Coroplast could be better than expensive UV-cured printers.



Above, reflexive substrates are not recommended in a UV printer because the ink might bounce and cure inside the printheads. This is not the case with Sepiix ink. Below, some of the samples printed with Sepiix ink.



The First Printers

The GO RJ900 is only \$9,995 (GO = GraphicsOne). This is originally a Mutoh Drafstation, a water-based printer for CAD drawings. GO simply added a heater plate to the platen! So this model is for roll-to-roll material only. For the hybrid flatbed model, that did not require much modification since Mutoh already has a hot air hose installed to heat the top of a rigid substrate.

The ValueJet hybrid flatbed is the third generation of hybrid flatbeds from Mutoh. The Toucan hybrid and the "Light Board Printer" (Toucan LT) were unsuccessful early prototypes. They did not sell more than a few units because they lacked a manner to heat the top surface.

Mutoh learned from these years of experience and so added a heating hose that travels along with the printhead carriage. This heating hose blows hot air down on the top surface of the material during printing. This Mutoh ValueJet hybrid flatbed costs \$48,495.

Two different companies have told me, "Mutoh inadvertently built the perfect printer for Sepiix inks." And this is before Mutoh even knew Sepiix ink existed. Imagine how much better a printer could be if fourth generation and made specifically for the needs of Sepiix ink?

For example, sensors of most printers get confused with transparent or translucent material (in this case glass or acrylics). Nonetheless, GraphicsOne did print on a glass mirror.

Printing Speed

With the current generation of ink, and the current generation of printers, you need to run the printer at good resolution mode in order to allow time for the ink to dry off the water and begin to cure. Actually this is the same with HP latex ink, and is why latex ink printers can't be speedy: the ink takes time to cure.

Thus the Mimaki JV5 is presently too fast (however the JV5 has issues with its own solvent inks too, so the fault is as much the printer itself as it is the ink being used).



This is one of the Mutoh printers at Graphics One modified to print with SepiaX ink.

What does it take to handle Sepiax Ink?

A preheater alone is not quite enough. Sepiax ink needs heat as it prints. But no post-printing heater is currently used nor is a post-heater needed for most materials.

Temperature must be absolutely constant from one side of the platen to another. If you have an air-conditioning duct blowing on one side of the printer (but not on the other) this may affect half the print differently than the other half. So both the pre-heater and platen heater must be absolutely consistent from one side to another.

Presently there are plans being developed to retrofit any Epson printer that uses DX4 or DX5 heads with a platen heater. The Mutoh DrafStation is currently retrofitted in this manner. This Mutoh printer is comparable to an Epson 7800 (with a different chassis and sheet metal and brand name). To learn more about the conversion, contact GraphicsOne in the US or B&P in the UK or GSW in South Africa.

But if you are printing on thick or rigid material, it helps significantly to have a source of heat from above. This is why the Mutoh-modified ValueJet (modified to accept MuBio solvent ink) is presently the best printer to handle Sepiax ink. None of the Epson and no other Mutoh printer has the hot air source from the top (left) of the printer carriage.

For creating a dedicated flatbed system (true flatbed, not with grit rollers), you will just need to have heating units across the platform (on the gantry) and/or under the material. Engineers and ink chemists tell me this will not be a problem to develop. Likewise it should be possible to use Spectra (Dimatix) printheads.

Once source said that the Sepiax ink prefers 50 degrees in both Pre and Post heaters. But this depends on the material. Some porous materials are okay with perhaps 45 degrees; some rigid non-porous materials may need 60 degrees.

In comparison, in Greece when I attended the Athens Summer Olympics, I believe it was over 40 degrees C. In Saudi Arabia it is well over that in July through August.

- Preheating 35-45° C for absorbent materials
- Preheating 50-55° C for non-absorbent materials
- Platen area temperature up to 60° C for thick rigid material.

If you are retrofitting a printer that has used eco-solvent inks previously, it helps to change dampers. When I ask about changing the ink tubing (or connections) I get some saying yes, others say new tubing is not needed.

But frankly, I would prefer to offer Sepiax in a virgin printer that never had any Epson-related ink whatsoever. Purging one ink out of an Epson-printheaded printer is possible but it does wear out the printheads a bit. I found this out when I asked Yuhan-Kimberly whether people could change textile inks in their Mutoh printers. They said, "yes, in theory but it is best to buy a separate printer for the second textile ink, because purging an entire ink out does wear out the printheads."

This may be the cause of differential comments on the performance of printheads after installation of Sepiax ink. In other words, possibly it is not the ink itself that affects Epson heads, but the multiple purgings to get rid of the eco-solvent ink and get the Sepiax ink fully installed. Again, this is why I suggest to buy a virgin printer, with absolutely no ink installed whatsoever, and with virgin printheads also.

Ink comes in 2-liter bottles



What Printheads?

Epson Dx5 heads, hence those in the 4800, 7800, 9800 and more recent models too. So you can also use most Mimaki, Mutoh, and Roland printers also. But to be double-sure, check with SepiAx ink company.

Mutoh ValueJet printers tend to have the DX5 heads except for the “stretch” model 2606 which has some features of the earlier Toucan LT, such as DX4 printheads.

It is natural to expect to have to clean and purge printheads, within reason. Epson heads are infamous for needing purging: even their normal water-based ink requires purging the heads.

But so far, in five months with 50 installations, there have been no major episodes of sudden increase in printhead failure or need of replacing all the printheads. It is this kind of statistic that we will be looking for when we initiate site-visit case studies this summer.

Dimatix has 10 pl, 30 pl, and 80 pl Spectra (Sapphire) printheads available that can handle water-based inks. SepiAx ink should also work in Ricoh printheads.

Xaar printheads are not made for or intended for water-based inks.

Tests have not been done yet with other Xaar-licensed printheads, nor with printheads other than Spectra which are not based on Xaar-type systems. But there are plenty of printheads that will handle SepiAx in the future. This fact immediately offers benefits not available with other inks. UV-curing rarely has been successful with Epson printheads, for example. UV-curing is not normally successful with thermal printheads either (at least not publicly announced and exhibited at trade shows).

SepiAx ink does not require heating the head itself.

When is the Ink dry?

“The printed image is usually dry within 1 inch of the printhead; it is at this time and place dry to the touch.” You can laminate the print at this point. You can handle it.

But the image is not fully cured for another 24 hours; it can be scratched during early stages. But you can handle it in problem off the printer.

Remember, that not even the much hyped UV ink is really fully cured until 12 to 24 hours. And UV-ink set for a gloss mode may not fully cure for days or weeks.

Solvent ink also has to set for 12 to 24 hours (before it should be laminated). But with SepiAx ink you can laminate at any time.

Odor

Some UV-cured prints, if set for satin or gloss mode, will emit unpleasant odor for up to a month. This is because some inks, in order to make their normal matte appearance be a satin, you cure them less during printing.

The odor of latex ink (from 100 degree heat) is infamous on some materials.



Dr. Hellmuth evaluating the rate of smell in the printed material. Does not smell as bad as materials heated to 100 degees C on a latex printer

Abrasion & Adhesion

These tests are crucial: for example "soap is not a problem" But what about other cleansers? All this we need to test. Presently I have been told that with alcohol, if you really wipe very hard and wipe repeatedly, the ink will smear somewhat. But so would many other inks also.

The samples of prints on aluminum and metal foil; I have watched a dozen people try to scratch the same corner and the ink never scratched off. Yet if you go to most UV-cured flatbed printer booths, you can scratch the UV ink off several substrates.

Coroplast and other materials required a primer for Sericol UV inks at least through 2009 (used by Fujifilm and Oce). Sintra flakes at the edges when printed with Oce printers when you cut Sintra with a flatbed cutter. This needs to be tested for Sepiast ink.

Thus so far Sepiast ink seems better in most and potentially all respects than Staedtler Lumocolor ink.

SepiAx compared with MuBIO Ink

It is normal for inks to scratch off when freshly printed. Even UV inks take 24 hours to cure. So the fact that MuBIO ink scratches off even foam-core should not mean the ink is to be avoided. Most inks (including SepiAx) can be scratched when fresh. But when the ink is cured, then it should no longer scratch.

MuBIO ink was a great idea, but when I learned that VUTEK itself was no longer displaying a printer with this ink at any trade show booth, this answered the question better than any spec sheet.

MuBIO ink should be encouraged for anyone that wants and needs this specific ink, but there is simply no comparison between bio-solvent and SepiAx. Sorry, this is not my fault.

SepiAx has a potentially awesome future ahead of it. In comparison, no bio-ink has been a world-wide success (at least not so far).

Chemicals in the Ink

This is a water-based resin ink. I have heard it called both aqueous and also a play on words, as AquaRES ink.

There is no nickel in the yellow pigments. The MSDS will need to be available once the ink is launched in the EU and in US. Heavy metals are common in some ink color pigments.

Whether it has the same % of co-solvents as does HP latex ink is a question that is on my list. Many industry analysts (but only off the record) do not accept latex ink as a fully water-based ink. However I classify HP latex ink as water-based since it fits better in this category for a general classification.



The fact that the vehicle of the pigments is water-based implies that there are not as many dangerous vapors as in a solvent-based ink.

Ink Cost

Since the Sepiast ink is only now being sold, after eight years of R&D and testing, it is understandable at a realistic cost to begin with.

	Per unit	Per liter
Roland metallic ink, Silver	\$ 229.99, 220ml	\$1045.40
Water-based ink for Epson	\$ 128.23, 220ml	\$ 582.86
Water-based ink for HP Z	\$ 78.50, 130ml	\$ 603.84
Water-based ink for Canon iPF	\$ 265.00, 700ml	\$ 344.15
Cationic UV-cured ink	\$ 245.00, 1000ml	\$ 245.00
Agfa UV ink :Anapurna M	\$ 365.00, 1000ml	\$ 365.00
MuBIO ink	\$ 239.99, 880ml	\$ 272.71
Sepiast ink	\$ 197.50, 1000ml	\$ 197.50
HP latex ink	\$ 429.00, 3000ml average	\$143 average
Seiko Mild-solvent	\$ 340.00, 1500ml	\$ 220.00
Epson eco-solvent	\$ 240.00, 950ml	\$ 252.63
OEM solvent ink, HP Scitex	\$ 595.00, 3000ml	\$ 198.33

Ink-Per-Square-Unit Cost

You will want to reduce ink consumption by 35% to 70% because the ink stays on the surface (unless you reduce curing heat if you want to allow the ink to penetrate fabric).

To manage the ink reduction it is essential to have a RIP that can easily handle the ink limit. Caldera, Wasatch, ErgoSoft would be RIPS that come to mind. Onyx can also handle this, but Caldera has a good reputation for color management and sophistication, Wasatch has reputation for ease of use, and ErgoSoft is a capable RIP as well.

By reducing ink consumption, you lower the cost of the ink per liter. Same with UV-cured inks: UV ink prints an estimated 40% more surface than solvent ink (since so much of the bulk of solvent ink are precisely the solvents which get driven off after printing by heaters and turn into VOCs!).

Color Management and ICC Profiles

You can best do profiling of transparent, translucent materials with BARBIERI Spectrophotometers. They can also handle textiles, fabrics, and thick rigid material.



Dr. Hellmuth showing one of the substrates at the Sepiix headquarters.

Sepiix Ink Compared with HP Latex Ink

This comparison we do in the separate FLAAR Reports. But to be easy: HP latex ink requires 93 to 100+ degrees to cure. Sepiix requires 45 to 60 degrees C to be cured.

Sepiix can be handled, and laminated, when it is printed. But for full scratch resistance, it takes 24 hours. This is potentially the one single benefit for HP latex ink.

Sepiix ink prints on uncoated Tyvek and uncoated canvas and Kraft paper and everything you can imagine.

Sepiix ink prints on rigid material. This is not yet possible for HP latex ink.

Sepiix ink is an open system; not a closed system. You can use Sepiix ink in any and many printers. You can use Sepiix ink on any and many substrates.

Still, HP latex ink is great for some applications. Even each form of solvent ink is useful for other applications. UV-curing is nice for other jobs. And Sepiix ink will become useful for other applications. Large printshops may prefer to have one of each to begin with. No one ink is perfect, but if you begin to weigh all factors, it is rather tough to dismiss the potential of Sepiix ink.

SepiAx Ink Compared with Eco-Solvent Ink

SepiAx ink is so totally different than eco-solvent ink it is not fair to compare them. It would be interesting to make a list of all the media that still require coating to be printable by Epson GS6000, Roland, Mimaki or other eco-solvent printers.

And then to test SepiAx ink on uncoated substrates that were the same or similar to the coated versions required by eco-solvent inks.

For example: Can SepiAx print on un-corona treated PE? To print with solvent inks requires corona treatment (tests on un-coated are still on-going).

Can any solvent ink print on uncoated or any Tyvek (a form of PE)? SepiAx ink prints on Tyvek just perfectly: uncoated Tyvek. Latex ink requires a treated form of Tyvek (which is thereby more expensive).

So you don't need to consider SepiAx as an after-market third-party ink. SepiAx is totally new and distinct. Besides, there are thousands of printshops around the world who will continue to use eco-solvent, mild-solvent, and even full solvent for several years.

Once SepiAx ink is available, why would anyone still want eco-solvent ink.

SepiAx Ink Compared with Mild-, Lite-, and Full-Solvent Inks

Seiko ColorPainter still has the best color saturation in the industry. Seiko inks outshine latex ink on almost every material. Indeed last week another printshop owner or distributor said that people specifically prefer the color pop of Seiko over the pretty but non-pop of latex ink.

But the color gamut of SepiAx ink will probably surpass the color gamut of latex ink.

Orange and special shades of blue are mentioned in the brochure. But Orange and Blue colors were never successful with Encad or Roland: sign shops simply wanted bright basic colors, period. The Epson GS6000 is a nice 8-color printer but the leading giclee atelier in France and Monaco said the color gamut of Epson eco-solvent ink was unacceptable for giclee. I also have now heard two companies that sell Epson products admit (off the record) that the color gamut is not as good as it should be.

I do both giclee and fine art photography, and although I prefer my HP Z3200, I find the colors of SepiAx better than UV-cured colors any day and better than latex ink (sorry, this is not my fault; I don't brew any of these inks).

It is unlikely that silver metallic ink is needed. Silver metallic ink costs are out of this world (and I was told can work only at the absolute slowest print modes). Roland has no viable wide-format UV printer (only narrow format for labels) and Roland has no viable alternative to either latex or SepiAx ink. So they pump up their PR on silver metallic ink since this is all they have that is new.

A tip: the one range of colors that UV-cured ink is good at is precisely metallic colors, and earth colors, plus hair and most skin colors. So you don't really need metallic colors (other than as a fad).

Sepiix Ink Compared with UV- Curable Inks

FLAAR is issuing a separate report that compares Sepiix ink with UV and with solvent and with HP latex ink. So it is best to learn the pros and cons of Sepiix compared with UV-cured inks in that separate FLAAR Report. Nonetheless, it is possible to hear today what was never openly talked about in past years: to hear the comment that “there is a gradually developing stigma for UV-curable inks.” Since the odor is still a factor, and odor may imply gasses.

Plus reportedly one or two brands of UV inks used to employ chemicals with significant health issues. I would hope these chemicals are no longer in that or those brands (most major brands did not use these chemicals).

And ozone is a consideration in some installations. Plus excess light leakage from the curing lamps is still the #1 factor potentially causing adverse health effects, especially in dedicated flatbed printers or hybrid or combo printers which lack hoods. Océ was a typical example of massive light blast on their Arizona models 250 and 350. The newer Arizona 550 is a slightly different design but still lacks skirts. There is no excuse for lack of protecting people’s retinas.

The answer I receive is, “Our UV lamp emissions meet EU regulations.”

My reply is straightforward: “Clearly the EU regulators never had to sit in front of a UV-curing flatbed printer; so clearly the EU regulations are embarrassingly inadequate.”

The Future

No one ink will disappear just because a new ink appears. No other ink disappeared just because latex ink was available. However I predict that by DRUPA 2012, there will be more Sepiix printer models being developed than for any ink chemistry being used today in 2010. I also predict that HP latex ink will still have its advocates; that there will still be over 30 manufacturers offering UV-cured printers; and Mutoh, Mimaki, Roland, and Seiko will still offer their kinds of solvent ink machines.

But I also predict that whichever Japanese companies come out this year, by SGIA in the autumn, with a “concept car” Sepiix printer and have this machine in beta stage by ISA 2011, this Japanese brand will take over market share from all other inks: eco-solvent, full-solvent, latex, and UV.



Mimaki solvent printer. The initial stage of the implementation of the ink is being done in solvent printers chassis.

How to insure that resin Ink survives and does not disappear like Lumocolor or have issues like Latex Ink

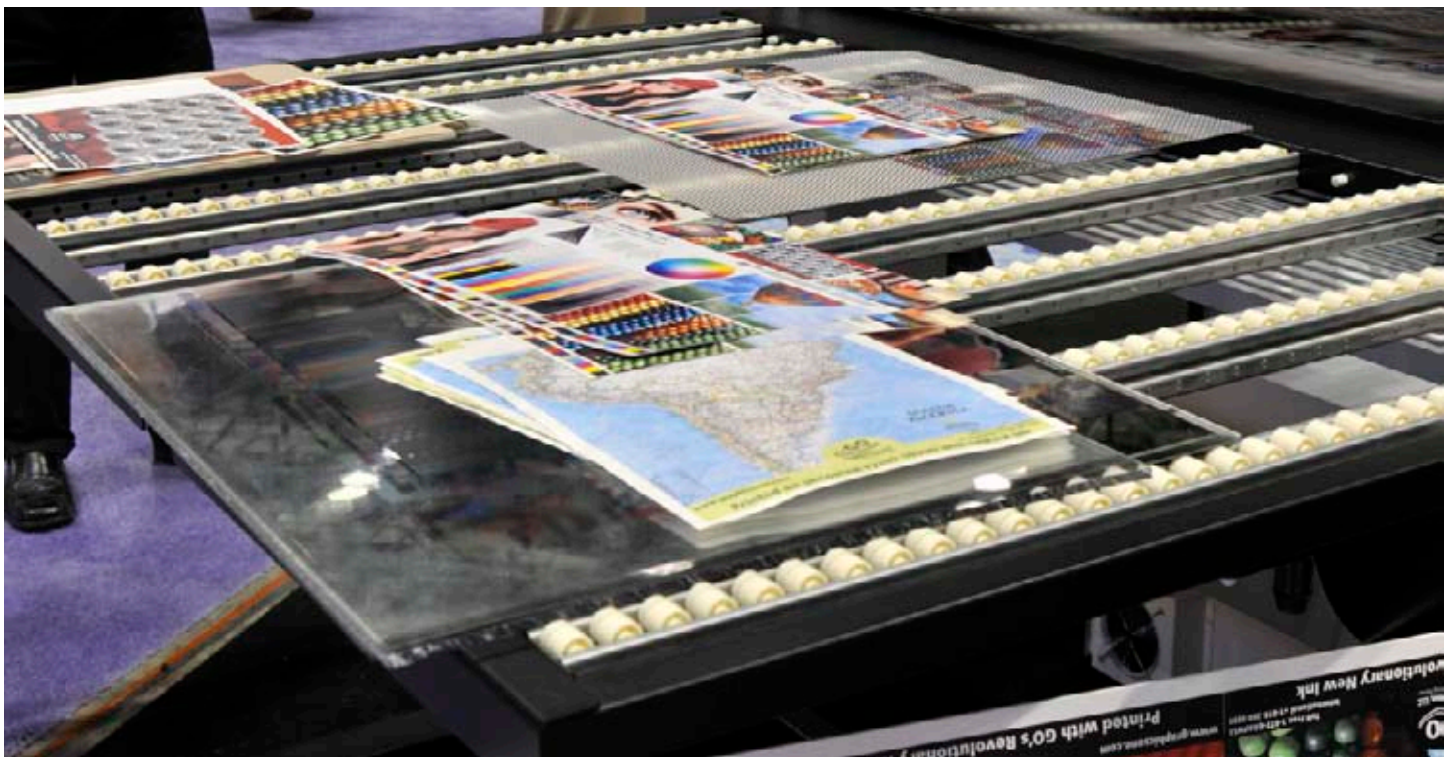
The main comment by analysts (again, off the record), and comments by end-users, is that latex ink was over-promised. Too much money was thrown at the eco-aspect and "replace eco-solvent" aspect for the L25500 and "replace lite-solvent" for the L65500.

People in the industry, with no vested interest in either latex or Sepiast ink, conclude the same as most other individuals within the industry: too much expectation from all the hype on latex ink. Too much was implied and not enough was delivered.

Ironic that the same problem caused the demise of the ColorSpan 5440uv and subsequent HP H45500 series. The original goal of this printer was to match the sales record of the truly great HP 5000 and HP 5500 (the best-selling wide-format printers in history). But the ColorSpan was oversold claiming it could print on anything and everything

when in fact grit rollers were not adequate for many rigid materials. Plus the Ricoh printheads were pinched in the middle row; the ink pump system was inadequate, and other issues that HP worked hard to overcome. But the exaggerations by over-enthusiastic claims finally caused this printer model to fail utterly (yet its predecessor was the best selling UV printer of all time during the years the UVX and UVR were available).

To summarize: it is crucial not to exaggerate, especially on speed. Speed will pick up once printers are made from the ground up to accept the Sepiast inks' heat temperature, location, and consistency preferences. So it is not a good idea to stress speed (other than be truthful and give measurements per quality mode). And at present, draft mode is not realistic (but draft mode is not realistic on any printer with eco-solvent ink either; probably too much banding).



Sepiast print samples at ISA 2010

Summary: yes, no Ink can do everything

Not a speed demon at present. But speed will increase once dedicated printers are constructed. In the meantime it prints fine on plenty of printers at an acceptable speed.

Since no ink is perfect, it would not be appropriate for a FLAAR evaluation to omit the fact that the ink prefers 24 hours to become fully scratch resistant. But you can reportedly laminate immediately after printing and you can handle the print after printing if you have set the ink limit and profiles correctly for the material you are testing on.

We are also checking on how the ink works on PE. PE is not printable on with HP latex ink without “treatment” (which HP skillfully avoids even hinting whether they mean a coating or a corona treatment). PE can’t be printed upon by some UV inks either (though other brands of UV-cured ink work well). And PE is infamous for requiring corona treatment to work with solvent inks. So we still need to do more tests with polyethylene materials.

Summary: no Primer Needed

The best way to summarize Sepiax ink is “no pre-treatment needed.” So you can avoid the high cost of treated or coated materials. But, if you have two versions of one material: one with no coating, and one coated, you may get nicer results with the coated version.

However for most materials you can avoid the extra step in the work flow of UV-cured where you need to spray paint or otherwise prepare and apply a primer.

Oh, and perhaps it was not widely known how many materials require a primer with UV ink? UV manufacturers are so busy claiming their printers print on everything they sort of somehow forget to warn you about the need to prime the material first.

Jetrix is the first UV manufacturer to admit this up front: they offer a priming printhead already on the machine. There are also other UV-curing wide-format inkjet printers under development that can also jet primer. This is a rather blunt admission of reality: UV INKS NEED PRIMER on more materials than is admitted.

However I am not yet fully convinced that a primer can be jetted and then 1 second later the ink hits it. Some primers may need to set and adhere first by themselves before they can help the ink?

With Sepiax ink no primer is needed on most materials (glass would be the only possible exception). If media is coated, naturally most inks work better: more color saturation and detail in some cases. But the point is that most of the samples in the Sepiax booth are raw uncoated substrates.



Sepiax print samples at ISA 2010

General summary

The best way to summarize Sepiix ink is the spontaneous comment by the owner of GSW when he was asked about the nature of Sepiix ink: "It's like a glue."

It is precisely this glue-like aspect that enhances adhesion and helps for scratch resistance. Of course you can scratch almost anything with a nail or the tip of a ballpoint pen, but most signage is not attacked with metal tools! But signage is rubbed against; signage is handled. This is what the ink has to survive for sure.

I was enthusiastic over the potential of Kiian's ink (alcohol-based, that printed on everything, thick and thin), but held off recommending Kiian because I could never get adequate information on how the ink functioned in the real world.

Magic Ink of Eastech was intriguing but again, without doing testing in-person I could not recommend it. And during testing I saw that the printers were very very slow and primers were indeed required on some materials. Plus the company behind this ink was a small regional company. Sepiix is a part of a giant billion-dollar conglomerate headquartered in Europe.

Staedtler Lumocolor ink had significant potential, but the ink company simply did not have the policy to interact with printer manufacturers, and lacked the funding to create partnerships with significant printer manufacturers. Plus the ink had enough downsides that it failed in the marketplace.

I have watched Bio-solvent ink fail to gain much market share. For the hundred or so people who have it and like it, it's a good ink for them. But for the traditional sign shop, I bet HP latex ink has outsold Bio-solvent 2-to-1 and by the end of this year 3 to 1. And I bet Sepiix ink in one year outsells three years of MuBIO ink: again as much to how each company handled the ink out in the real world. Sepiix was immediately open and brought two of the FLAAR team to their headquarters even when the ink was still in beta stage.

Sepiix ink has succeeded in each aspect compared with all the earlier inks. Durability is acceptable; longevity outside is normal. They state there are no known carcinogenic chemicals in the ink.

But most of all, in the 12 years that I have been studying wide-format inkjet printers, I have not yet found another ink that prints on more substances than this remarkable resin-based Sepiix ink. Glass mirrors are perhaps the only material that it would eventually wash off or be removable. Yet the glass mirror that is included in the print samples does not readily scratch off. And the ceramic tile in the print sample, if this really required no primer and has no top coat, frankly this beats any normal UV-cured ink I have seen anywhere.

If you are interested in commenting on your experience with Sepiix ink, start by filling out the Survey-Inquiry Form.

If you would like to bring Dr Hellmuth to your printing company (anywhere in the world), FLAAR is available as a consultant. Especially if you need suggestions on latex ink vs Sepiix ink compared with UV-cured inks.

Appendix A : *A Historical e-mail*

The following e-mail was received in 2010.

Hello Flaar Team,

I'm a signmaker near and I'm interested in the new HP25500 Latex Printer, but I'm not shure if I should get it or better be innovative and take a mutho ValueJet or so with Sepiax ink.

What do think is better?

I have samples here from Sepiax and from HP latex ink prints, and I think that the HP ink is very dim so if want to have it glossy and shiny, you must laminate it either. Even the heat you must have to dry the ink is amaysing, so also the printing speed for production is only 10m² per hour.

And the sepiax ink is very clear and sratch resistand and looks better, but the distrebutor says that they have still Problems with the Printheads of used Roland, Mutoh....., but not with new ones.

But you have to install a separate heatingsystem or modify the printers heating system which has an impact to your garanty.

So FLAAR what do you think is the better solution for next five years, if you want to start organic or bioprinting to stay healthy. ;-)

Comment by Nicholas: this is a historic e-mail. After umpteen million dollars in PR blitz by HP on their latex ink concept, the first printshop is openly asking for "the other side of the story."

This does not mean that latex ink is bad; and does not mean that Sepiax ink is what this printshop should buy. What is a milestone is that printshop owners are now asking the right questions.

Appendix B : *How SepiAx ink is avoiding what caused other new inks to fail*

Another cause of disbelief that any new ink will be successful is because all the other futuristic inks failed: Staedtler Lumocolor had inadequate adherence to non-porous materials. Plus the corporate policy was not conducive to alliances with printer hardware manufacturers. I spoke with one user of Lumocolor ink who said it worked in some instances but as an overall ink had no future. The other problem was lack of an adequate budget to improve the ink (and even more a lack of budget to interact with printer hardware manufacturers).

Magic Ink of Eastech was an ink that I was definitely interested in. But the manufacturer of the ink was never identified so I had no way to assist them. The one OEM user was stuck with Epson printheads which were too slow. And even the third generation ink required primer on some materials. Plus only one printer manufacturer used it and this company had not enough distributors around the world.

If the original ink source in Japan, Taiwan, or Korea had been identified, this ink might have had a future, including with Eastech. This is a kind of project that FLAAR enjoys working on: learning about an innovative new ink. But if we can't visit the ink manufacturer then it is not a viable project to speak about an ink that no one knows where it comes from.

Kiian Manoukian ink: the most fabulous exhibit at SGIA 2008 was Kiian Manoukian ink that printed on everything. Yet at FESPA 2009 no one in the Manoukian booth knew about the ink; at SGIA 2009 not even the supposed distributor in the US had samples or knew anything about it.

And the other new alcohol-based ink is too new to fail but if you can wipe it off easily with alcohol that will limit enthusiasm at the start.

SepiAx has already avoided virtually all the problems that sunk the other inks:

- The ink company has clearly identified who they are, where the ink comes from: no fuzzy questions of origin of anything.
- It is a European ink; it is made by a large reputable company.
- It is an ink under development for over eight years.
- Although today it works primarily with Epson printheads, I have encouraged other printhead manufacturers such as Dimatix to consider joint projects with the ink company and printer manufacturers.
- There are now distributors already around the world with more signing up every several months. Staedtler never had a distributor in the US who was really in the signage or even décor printing world. Their distributor was capable, for proofing RIP software (this is a polite way of saying that one major cause of the lack of success of Staedtler ink was that they had the wrong partners as distributors).

And most important

- There are manufacturers of printers already sending their engineers and CEOs and Presidents and managers to southern Austria, or having the SepiAx ink managers visit their factories around the world.

This never happened with Lumocolor ink, never with the ink out of Japan or Korea or Taiwan used by Eastech, or any of the alcohol-based inks (Kiian, Jetbest).

At SGIA last year (2009) we alerted manufacturers to what was coming. I visit pertinent booths at every trade show to provide helpful information in-person to the companies who have assisted my research. Then after Graphics of the Americas FLAAR sent out an alert to manufacturers that we know best, to alert them to the potential of this ink. Three of these manufacturers are already working on a Sepiax printer.

We are always on the lookout for new inks, new substrates, and new printing technologies. Indeed shortly as a result you will see FLAAR Reports on PE substrates.

Appendix C: *Rise in interest and need for consulting on Sepiavax compared with HP latex Ink*

During 2008, one person mentioned Sepiavax ink to us. He asked if we had ever heard of this ink.

During 2009, the major topic of conversation at SGIA 2009 was HP latex ink in 42 and 60" widths. People who came to SGIA to decide which eco-solvent printer to buy (Mimaki, Mutoh, or Roland) ended up wanting to buy an HP latex ink printer.

By 2010 printshop owners were sending requests that specifically asked for help sorting out the pros and cons of Sepiavax compared with latex ink (What we show in Appendix A). But by the time of ISA we were receiving e-mails from printshop owners and management asking for consulting assistance for Sepiavax vs latex ink.

During ISA 2010, people were actually cancelling orders for UV-cured printers once they heard about the capabilities of Sepiavax ink.

For all of these reasons we worked during April to prepare the several FLAAR Reports on Sepiavax ink and on HP latex ink.

Info@FLAAR.org to ask for information on consulting opportunities with FLAAR.

Reality Check

Being a university professor for many years does not mean we know everything. But intellectual curiosity often leads us to enter areas that are new to us. So we do not shirk from entering areas where we are obviously not yet expert. If in your years of wide format printing experience have encountered results different than ours, please let us know at ReaderService@FLAAR.org. We do not mind eating crow, though so far it is primarily a different philosophy we practice, because since we are not dependent on sales commissions we can openly list the glitches and defects of those printers that have an occasional problem.

FLAAR and most universities have corporate sponsors but FLAAR web sites do not accept advertising, so we don't have to kowtow to resellers or manufacturers. We respect their experience and opinion, but we prefer to utilize our own common sense, our in-house experiences, the results from site-visit case studies, and comments from the more than 53,000 of our many readers who have shared their experiences with us via e-mail (the Survey Forms).

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Update Policy

Starting in 2008, updates on UV-curable wide-format inkjet printers are available for all individuals and companies which have a subscription, or to companies who are research project sponsors. If you are a Subscriber or manager in a company that is a research sponsor, you can obtain the next update by writing ReaderService@FLAAR.org. If you are neither a Subscriber or a research sponsor, simply order the newest version via the e-commerce system on www.wide-format-printers.NET. Please realize that because we have so many publications and many are updated so frequently that we have no realistic way to notify any reader of when just one particular report is actually updated.

There is a free PDF that describes the UV-curable inkjet printer Subscription system. Subscriptions are available only for UV-related wide-format printer publications.

FLAAR Reports on UV-curable roll-to-roll, flatbed, hybrid, and combo printers are updated when new information is available. We tend to update the reports on new printers, on printers that readers ask about the most, and on printers where access is facilitated (such as factory visits, demo-room visits, etc).

Reports on obsolete printers, discontinued printers, or printers that not enough people ask about, tend not to be updated.

FLAAR still publishes individual reports on solvent printers, and on giclee printers, but subscriptions on these are not yet available; these FLAAR Reports on solvent, eco-solvent, and water-based wide format printers have to be purchased one by one.

Please Note

This report has not been licensed to any printer manufacturer, distributor, dealer, sales rep, RIP company, media, or ink company to distribute. So, **if you obtained this from any company, you have a pirated copy.**

If you have received a translation, this translation is not authorized unless posted on a FLAAR web site, and may be in violation of copyright (plus if we have not approved the translation it may make claims that were not our intention).

Also, since this report is frequently updated, if you got your version from somewhere else, it may be an obsolete edition. FLAAR reports are being updated all year long, and our comment on that product may have been revised positively or negatively as we learned more about the product from end users.

If you receive any FLAAR Report from a sales rep, in addition to being violation of copyright, it is useful to know if there is a more recent version on the FLAAR web site, because every month new UV printers are being launched. So what was good technology one month, may be replaced by a much better printer elsewhere the next month.

To obtain a legitimate copy, which you know is the complete report with nothing erased or changed, and hence a report with all the original description of pros and cons, please obtain your original and full report straight from www.FLAAR.org.

Your only assurance that you have a complete and authentic evaluation which describes all aspects of the product under consideration, benefits as well as deficiencies, is to obtain these reports directly from FLAAR, via www.wide-format-printers.NET.

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If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to ask us first. FLAAR reports are being updated every month sometimes, and our comment on that product may have been revised as we learned more about the product from end users. Also, we noticed that one company cited the single favorable comment we made on one nice aspect of their printer, but neglected to cite the rest of the review which pointed out the features of the printer which did not do so well. For them to correct this error after the fact is rather embarrassing. So it is safer to ask-before-you-quote a FLAAR review on your product.

The material in this report is not only copyright, it is also based on years of research. Therefore if you cite or quote a pertinent section, please provide a proper credit, which would be minimally "Nicholas

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If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to license the report or otherwise notify us in advance. FLAAR reports are being updated every week sometimes, and our comment on that product may have been revised as we learned more about the product from end users. Also, we noticed that one company cited the single favorable comment we made on one nice aspect of their printer, but neglected to cite the rest of the review which pointed out the features of the printer which did not do so well. For them to correct this error after the fact is rather embarrassing. So it is safer to ask-before-you-quote a FLAAR review on your product.

Legal notice

Inclusion in this study by itself in no way endorses any printer, media, ink, RIP or other digital imaging hardware or software. Equally, exclusion from this study in no way is intended to discredit any printer.

Advisory

We do our best to obtain information which we consider reliable. But with hundreds of makes and models of printers, and sometimes when information about them is sparse, or conflicting, we can only work with what we have available. Thus you should be sure to rely also on your own research, especially asking around. Find another trustworthy end-user of the same make and model you need to know about. Do not make a decision solely on the basis of a FLAAR report because your situation may be totally different than ours. Or we may not have known about, and hence not written about, one aspect or another which is crucial before you reach your decision.

The sources and resources we may list are those we happen to have read. There may be other web pages or resources that we missed. For those pages we do list, we have no realistic way to verify the veracity of all their content. Use your own common sense plus a grain of salt for those pages which are really just PR releases or outright ads.

We are quite content with the majority of the specific printers, RIPs, media, and inks we have in the FLAAR facilities. We would obviously never ask for hardware, software, or consumables that we knew in advance would not be good. However even for us, a product which looks good at a trade show, sounds good in the ad literature, and works fine for the first few weeks, may subsequently turn out to be a lemon.

Or the product may indeed have a glitch but one that is so benign for us, or maybe we have long ago gotten used to it and have a work-around. And not all glitches manifest themselves in all situations, so our evaluator may not have been sufficiently affected that he or she made an issue of any particular situation. Yet such a glitch that we don't emphasize may turn out to be adverse for your different or special application needs.

Equally often, what at first might be blamed on a bad product, often turns out to be a need of more operator experience and training. More often than not, after learning more about the product it becomes possible to produce what it was intended to produce. For this reason it is crucial for the FLAAR team and their university colleagues to interact

with the manufacturer's training center and technicians, so we know more about a hardware or software. Our evaluations go through a process of acquiring documentation from a wide range of resources and these naturally include the manufacturer itself. Obviously we take their viewpoints with a grain of salt but often we learn tips that are worthy of being passed along.

FLAAR has no way of testing 400+ specifications of any printer, much less the over 101 different UV printers from more than 46 manufacturers. Same with hundreds of solvent printers and dozens of water-based printers. We observe as best we can, but we cannot take each printer apart to inspect each feature. And for UV printers, these are too expensive to move into our own facilities for long-range testing, so we do as best as is possible under the circumstances. And when a deficiency does become apparent, usually from word-of-mouth or from an end-user, it may take time to get this written up and issued in a new release.

Another reason why it is essential for you to ask other printshop owners and printer operators about how Brand X and Y function in the real world is that issues may exist but it may take months for these issues to be well enough known for us to know the details. Although often we know of the issues early, and work to get this information into the PDFs, access to information varies depending on brand and model. Plus with over 300 publications, the waiting time to update a specific report may be several months. Plus, once a printer is considered obsolete, it is not realistic to update it due to the costs involved. If you received a FLAAR PDF from a sales rep, they may give you an early version; perhaps there is a later version that mentions a defect that we learned about later.

For these reasons, every FLAAR Report tries to have its publication date on the front outside cover (if we updated everything instantly the cost would be at commercial rates and it would not be possible to cover these expenses). At the end of most FLAAR Reports there is additionally a list of how many times that report has been updated. A report with lots of updates means that we are updating that subject based on availability of new information. If there is no update that is a pretty good indication that report has not been updated! With 101 models of UV printers, several hundred solvent printers, and scores of water-based printers, we tend to give priority to getting new reports out on printers about which not much info at all is available elsewhere. So we are pretty good about reporting on advances in LED curing. But glitches in a common water-based printer will take longer to work its way through our system into an update, especially if the glitch occurs only in certain circumstances, for example, on one type of media. With several hundred media types, we may not yet have utilized the problem media. While on the subject of doing your own research, be sure to ask both the printer operator and printshop owner or manager: you will generally get two slightly different stories. A printer operator may be aware of more glitches of the printer than the owner.

If a printer is no longer a prime model then there is less interest in that printer, so unless a special budget were available to update old reports, it is not realistic to update old reports. As always, it is essential for you to visit printshops that have the printers on your short-list and see how they function in the real world.

But even when we like a product and recommend it, we still can't guarantee or certify any make or model nor its profitability in use because we don't know the conditions under which a printer system might be utilized in someone else's facility. For ink and media, especially after-market third-party ink and media, it is essential that you test it first, under your conditions. We have no way to assure that

any ink or media will be acceptable for your specific needs in your specific print shop. As a result, products are described “as is” and without warranties as to performance or merchantability, or of fitness for a particular purpose. Any such statements in our reports or on our web sites or in discussions do not constitute warranties and shall not be relied on by the buyer in deciding whether to purchase and/or use products we discuss because of the diversity of conditions, materials and/or equipment under which these products may be used. Thus please recognize that no warranty of fitness or profitability for a particular purpose is offered.

It is also crucial to realize that an ink (that we inspect, that works well where we inspect it), your printer, your printhead, the heat, humidity and dust conditions in your printshop, may cause that ink to react differently in your printer. And, there are different batches of ink. Even in the really big multi-national billion-dollar ink companies, occasionally one batch will have issues. There are over 100 ink companies; six colors per company, many flavors of ink per company per color. We have no realistic manner of testing each ink. The same is true of media and substrates. One production run can have a glitch: chemical or physical, even in the best of companies. A major Swiss-owned media company, for example, had several months of media which were almost unusable. Yet other kinds of media from the same company are okay (though we stopped using that brand and stopped recommending them after all the issues we ourselves experienced).

The user is advised to test products thoroughly before relying on them. We do not have any special means of analyzing chemical contents or flammability of inks, media, or laminates, nor how these need to be controlled by local laws in your community. There may well be hazardous chemicals, or outgassing that we are not aware of. Be aware that some inks have severe health hazards associated with them. Some are hazardous to breathe; others are hazardous if you get them on your skin. For example, some chemicals such as cyclohexanone do not sound like chemicals you want to breathe every day. Be sure to obtain, read, and understand the MSDS sheets for the inks, media, and laminates that you intend to use. Both solvent, eco-solvent, and UV-curable inks are substances whose full range of health and environmental hazards are not yet fully revealed. It is essential you use common sense and in general be realistic about the hazards involved, especially those which are not listed or which have not yet been described. FLAAR is not able to list all hazards since we are not necessarily aware of the chemical components of the products we discuss. Plus, there is no way to know if all MSDS sheets are honest to begin with! Our reports are on usability, not on health hazards.

Most inks are clearly not intended to be consumed. Obviously these tend to be solvent inks and UV-curable inks. Yet other inks are edible, seriously, they are printed on birthday cakes. Indeed Sensient is a leader in a new era of edible inks. Therefore the user must assume the entire risk of ascertaining information on the chemical contents and flammability regulations relative to inks, media or laminates as well as using any described hardware, software, accessory, service, technique or products.

We have no idea of your client's expectations. What students on our campus will accept may not be the same as your Fortune 500 clients. In many cases we have not ourselves used the products but are basing our discussion on having seen them at a trade show, during visiting a print shop, or having been informed about a product via e-mail or other communication.

Results you see at trade shows may not be realistic

Be aware that trade show results may not be realistic. Trade shows are idealized situations, with full-time tech support to keep things running. The images at a trade show may be tweaked. Other images may be “faked” in the sense of slyly putting on primer without telling the people who inspect the prints. Most UV inks don't stick to all materials; many materials need to be treated.

Or the UV prints may be top-coated so that you can't do a realistic scratch test.

Both personnel have many standard tricks that they use to make their output look gorgeous. In about half the cases you will not likely obtain these results in real life: in most cases they are printing uni-directional, which may be twice as slow as bi-directional.

Trade show examples tend to be on the absolutely best media. When you attempt to save money and use economy media you will quickly notice that you do not get anywhere near the same results as you saw in the manufacturer's trade show booth, or pictured in their glossy advertisement. Five years ago we noticed Epson was laminating prints to show glossy output because their pigmented inks could not print on actual glossy media. The same equipment, inks, media, and software may not work as well in your facility as we, or you, see it at a trade show. All the more reason to test before you buy; and keep testing before you make your final payment. Your ultimate protection is to use a gold American Express credit card so you can have leverage when you ask for your money back if the product fails.

Images printed at trade show may be in uni-directional mode: so you may not realize the printer has bi-directional (curing) banding defects until you unpack it in your printshop. Bi-directional curing banding is also known as the lawnmower effect. Many printers have this defect; sometimes certain modes can get rid of it, but are so slow that they are not productive.

You absolutely need to do print samples with your own images and the kind provided by your clients. Do not rely on the stock photos provided by the printer, ink, media, or RIP manufacturer or reseller. They may be using special images which they know in advance will look fabulous on their printer. Equally well, if you send your sample images to the dealer, don't be surprised if they come back looking awful. That is because many dealers won't make a serious effort to tweak their machine for your kind of image. They may use fast speed just to get the job done (this will result in low quality). Check with other people in your area, or in the same kind of print business that you do. Don't rely on references from the reseller or manufacturer (you will get their pet locations which may be unrealistically gushy): find someone on your own.

Factors influencing output

Heat, humidity, static, dust, experience level of your workers (whether they are new or have prior years experience): these are all factors that will differ in your place of business as compared with test results or demo room results.

Actually you may have people with even more experience than we do, since we deliberately use students to approximate newbies. FLAAR is devoted to assisting newcomers learn about digital imaging hard-

ware and software. This is why Nicholas Hellmuth is considered the “Johnny Appleseed” of wide format inkjet printers.

Therefore this report does not warranty any product for any quality, performance or fitness for any specific task, since we do not know the situation in which you intend to use the hardware or software. Nor is there any warranty or guarantee that the output of these products will produce salable goods, since we do not know what kind of ink or media you intend to use, nor the needs of your clients. A further reason that no one can realistically speak for all aspects of any one hardware or software is that each of these products may require additional hardware or software to reach its full potential.

For example, you will most likely need a color management system which implies color measurement tools and software. To handle ICC color profiles, you may need ICC color profile generation software and a spectrophotometer since often the stock pre-packaged ICC color profiles which come with the ink, media, printers and/or RIPs may not work in your situation. Not all RIPs handle color management equally, or may work better for some printer-ink-media combinations than for others. Please be aware that our comments or evaluations on any after-market ink would need the end-user to use customized ICC profiles (and not merely generic profiles).

Be aware that some RIPs can only accept ICC color profiles: you quickly find out the hard way that you can't tweak these profiles nor generate new ones. So be sure to get a RIP which can handle all aspects of color management. Many RIPs come in different levels. You may buy one level and be disappointed that the RIP won't do everything. That's because those features you may be lacking are available only in the next level higher of that RIP, often at considerable extra cost. Same thing in the progression of Chevy through Pontiac to Cadillac, or the new Suburbans. A Chevy Suburban simply does not have all the bells and whistles of the Cadillac Escalade version of this SUV.

Don't blame us... besides, that's why we are warning you. This is why we have a Survey Form, so we can learn when you find products that are inadequate. We let the manufacturers know when end users complain about their products so that the manufacturers can resolve the situation when they next redesign the system.

Most newer printer models tend to overcome deficiencies of earlier models. It is possible that our comparative comments point out a glitch in a particular printer that has been taken care of through an improvement in firmware or even an entirely new printer model. So if we point out a deficiency in a particular printer brand, the model you may buy may not exhibit this headache, or your kind of printing may not trigger the problem. Or you may find a work-around.

Just remember that every machine has quirks, even the ones we like. It is possible that the particular kind of images, resolution, inks, media, or other factors in your facility are sufficiently different than in ours that a printer which works just fine for us may be totally unsatisfactory for you and your clients. However it may be that the specific kind of printing you need to do may never occasion that shortcoming. Or, it may be that your printer was manufactured on a Monday and has defects that are atypical, show up more in the kind of media you use which we may not use as often or at all during our evaluations. Equally possibly a printer that was a disaster for someone else may work flawlessly for you and be a real money maker for your company. So if we inspect a printer in a printshop (a site-visit case study), and that owner/operator is content with their printer and we mention this; don't expect that you will automatically get the same results in your own printshop.

In some cases a product may work better on a Macintosh than on a PC. RIP software may function well with one operating system yet have bugs and crash on the same platform but with a different operating system. Thus be sure to test a printer under your own specific work conditions before you buy.

And if a printer, RIP, media, or ink does not function, return it with no ands, ifs or buts. Your best defense is to show an advertising claim that the printer simply can't achieve. Such advertising claims are in violation of federal regulations, and the printer companies know they are liable for misleading the public.

But before you make a federal case, just be sure that many of the issues are not user error or unfamiliarity. It may be that training or an additional accessory can make the printer do what you need it to accomplish. Of course if the printer ads did not warn you that you had to purchase the additional pricey accessory, that is a whole other issue. Our reviews do not cover accessories since they are endless, as is the range of training, or lack thereof, among users.

The major causes of printer breakdown and failure is lack of maintenance, poor maintenance, spotty maintenance, or trying to jerry-rig some part of the printer. The equally common cause of printer breakdown is improper use, generally due from lack of training or experience. Another factor is whether you utilize your printer all day every day. Most solvent and UV printers work best if used frequently. If you are not going to use your printer for two or three days, you have to put flush into the system and prepare it for hibernation (even if for only four or five days). Then you have to flush the ink system all over again.

Also realize that the surface of inkjet prints are fragile and generally require lamination to survive much usage. Lamination comes in many kinds, and it is worth finding a reliable lamination company and receiving training on their products.

Also realize that no hybrid or combo UV printer can feed all kinds of rigid materials precisely. Some materials feed well; others feed poorly; others will skew.

Although we have found several makes and models to work very well in our facilities, how well they work in your facilities may also depend on your local dealer. Some dealers are excellent; others just sell you a box and can't provide much service after the sale. Indeed some low-bid internet sales sources may have no technical backup whatsoever. If you pay low-bid price, you can't realistically expect special maintenance services or tech support later on from any other dealer (they will tell you to return to where you paid for the product). This is why we make an effort to find out which dealers are recommendable. Obviously there are many other dealers who are also good, but we do not always know them. To protect yourself further, always pay with a level of credit card which allows you to refuse payment if you have end up with a lemon. A Gold American Express card allows you to refuse payment even months after the sale. This card may also extend your warranty agreement in some cases (check first).

Most of the readers of the FLAAR Reports look to see what printers we use in our own facilities. Readers realize that we will have selected the printers that we like based on years of experience and research. Indeed we have met people at trade shows who told us they use the FLAAR web site reports as the shopping list for their corporate purchases.

Yes, it is rather self-evident that we would never ask a manufacturer to send a product which we knew in advance from our studies was no

good. But there are a few other printers which are great but we simply do not have them in our facilities yet.

So if a printer is not made available by its manufacturer, then there is no way we can afford to have all these makes and models in our facility. Thus to learn about models which we do not feature, be sure to ask around in other print shops, with IT people in other corporations, at your local university or community college. Go to trade shows.... but don't use only the booth...ask questions of people in the elevator, in line at the restaurant, anywhere to escape the smothering hype you get in the booth.

Realize that a FLAAR Report on a printer is not by itself a recommendation of that printer. In your local temperature, in your local humidity, with the dust that is in your local air, with your local operator, and with disorientation of the insides of a printer during rough shipment and installation, we have no knowledge of what conditions you will face in your own printshop. We tend to inspect a printer first in the manufacturing plant demo room: no disjointed parts from any shipment since this printer has not been lifed by cranes and run over a rough pot-holed highway or kept in smelting heat or freezing cold during shipment.

Taking into consideration we do not know the conditions in which you may be using your hardware, software, or consumables, neither the author nor FLAAR nor either university is liable for liability, loss or damage caused either directly or indirectly by the suggestions in this report nor by hardware, software, or techniques described herein because.

Availability of spare parts may be a significant issue

Chinese printers tend to switch suppliers for spare parts every month or so. So getting spare parts for a Chinese printer will be a challenge even if the distributor or manufacturer actually respond to your e-mails at all. Fortunately some companies to have a fair record of response; Teckwin is one (based on a case of two problematical hybrid UV printers in Guatemala). The distributor said that Teckwin sent a second printer at their own expense and sent tech support personnel at their expense also. But unfortunately both the hybrid UV printers are still abandoned in the warehouse of the distributor; they were still there in January 2009. But Teckwin has the highest rating of any Chinese company for interest in quality control and realization that it is not good PR to abandon a client or reseller or distributor all together.

Recently we have heard many reports of issues of getting parts from manufacturers in other countries (not Asia). So just because you printer is made in an industrialized country, if you are in the US and the manufacturer is X-thousand kilometers or miles away, the wait may be many days, or weeks.

Lack of Tech Support Personnel is increasing

The recession resulted in tech support issues: some manufacturers may need to skimp on quality control during a recession, or switch to cheaper parts suppliers. Plus they are not hiring enough tech support during a recession. So the bigger and more successful the company, in some cases the worse these particular problems may be.

Any new compiled printer may take a few months to break in

Any new printer, no matter who the manufacturer, or how good is the engineering and electronics, will tend to have teething issues. Until the firmware is updated, you may be a beta tester. This does not mean the printer should be avoided, just realize that you may have some downtime and a few headaches. Of course the worst case sce-

nario for this was the half-million dollar LUSCHER JetPrint: so being "Made in Switzerland" was not much help.

Counterfeit parts are a problem with many printers made in China

Several years ago many UV printers made in China and some made elsewhere in Asia had counterfeit parts. No evaluation has the funding available to check parts inside any printer to see if they are from the European, Japanese, or American manufacturer, or if they are a clever counterfeits.

Be realistic and aware that not all materials can be printed on equally well

Many materials don't feed well through hybrid (pinch roller on grit roller systems) or combo UV systems (with transport belts). Banding, both from poor feeding, and from bi-directional (lawnmower effect) are common on many UV-curable inkjet printers.

It is typical for some enthusiastic vendors to claim verbally that their printer can print on anything and everything. But once you unpack the printer and set it up, you find that it requires primer on some materials; on other materials it adheres for a few weeks but then falls off.

And on most hybrid and many combo printers, some heavy, thick, or smooth-surfaced materials skew badly. Since the claim that the printer will print on everything is usually verbal, it is tough to prove this aspect of misleading advertising to a jury.

Not all inks can print on all materials. And at a trade show, many of the materials you see so nicely printed on, the manufacturer may be adding a primer at night or early in the morning: before you see the machine printing on this material.

We feel that the pros and cons of each product speak more than adequately for themselves. Just position the ad claims on the left: put the actual performance results on the right. The unscrupulous hype for some printers is fairly evident rather quickly.

Be sure to check all FLAAR resources

Please realize that with over 200 different FLAAR Reports on UV printers, you need to be sure to check the more obscure ones too. If a printer has a printhead issue, the nitty gritty of this may be in the FLAAR Report on printheads. The report on the model is a general introduction; if we discussed the intimate details of printheads then some readers might fall asleep. And obviously do not limit yourself to the free reports. The technical details may be in the reports that have a price to them. Our readers have said they prefer to have the general basics, and to park the real technical material in other reports that people can buy if they really want that level of information.

So it may be best to ask for personal consulting. The details of the problems with the ColorSpan 5400uv series are rather complex: namely the center row of the Ricoh printheads. This would require an expensive graphic designer and consultants to show the details. And the design of the printhead would probably be altered by the time we did any of this anyway. So it is essential to talk with people: with other end-users, and with FLAAR in person on a consulting basis.

Acknowledgements

With 19 employees the funding has to come from somewhere, so we do welcome project sponsorship, research grants, contributions that facilitate our educational programs, scholarships for co-op interns

and graduate students, and comparable project-oriented funding from manufacturers. The benefit for the end-user is a principle called academic freedom, in this case,

- The freedom of a professor or student to speak out relative to the pros and cons of any equipment brought to them to benchmark.
- The freedom to design the research project without outside meddling from the manufacturer.

Fortunately, our budget is lean and cost effective as you would expect for a non-profit research institute. As long as we are not desperate for money we can avoid the temptation to accept payment for reprinting corporate PR hype. So the funding is used for practical research. We do not accept (nor believe) and certainly do not regurgitate corporate PR. For example, how many manufacturer's PR photos of their products have you seen in our reports or on our web sites?

Besides, it does not take any money to see which printers and RIPs function as advertised and which don't. We saw one hyped printer grind to a halt, malfunction, or otherwise publicly display its incapacities at several trade shows in a row. At each of those same trade shows another brand had over 30 of their printers in booths in virtually every hall, each one producing museum quality exhibits. Not our fault when we report what we see over and over and over again. One of our readers wrote us recently, "Nicholas, last month you recommended the as one of several possible printers for our needs; we bought this. It was the best capital expenditure we have made in the last several years. Just wanted to tell you how much we appreciate your evaluations...."

FLAAR is a non-profit educational and research organization dedicated for over 36 years to professional photography in the arts, tropical flora and fauna, architectural history, and landscape panorama photography.

Our digital imaging phase is a result of substantial funding in 1996 from the Japanese Ministry of Public Education for a study of scanning and digital image storage options. This grant was via Japan's National Museum of Ethnology, Osaka, Japan. That same year FLAAR also received a grant of \$100,000 from an American foundation to do a feasibility study of digital imaging in general and the scanning of photography archives in particular.

The FLAAR web sites began initially as the report on the results of these studies of scanners. Once we had the digital images we began to experiment with digital printers. People began to comment that our reports were unique and very helpful. So by 1999 we had entire sections on large format printers.

FLAAR has existed since 1969, long before inkjet printers existed. Indeed we were writing about digital imaging before HP even had a color inkjet system available. In 2000 FLAAR received an educational grant from Hewlett-Packard large format division, Barcelona, Spain, for training, for equipment, and to improve the design and navigation on the main web sites of the FLAAR Network. This grant ran its natural course, and like all grants, reached its finishing point, in this case late 2005.

In some cases the sponsorship process begins when we hear end-users talking about a product they have found to be better than other brands. We keep our ears open, and when we spot an especially good product, this is the company we seek sponsorship from. It would not be wise of us to seek sponsorship from a company with a sub-standard or otherwise potentially defective printer. So we usually know which printers are considered by end-users to be among

the better brands before we seek sponsorship. After all, out of the by now one million readers, we have heard plenty about every single printer out there.

We thank MacDermid ColorSpan (now part of HP), Hewlett-Packard, Parrot Digigraphic, Color DNA, Canon, Gandinnovations, and other companies for providing funding for technology training for the FLAAR staff and our colleagues at Bowling Green State University in past years and for funds to allow us to attend all major international trade shows, which are ideal locations for us to gather information. We thank Caldera, EskoArtwork, EFI Rastek, EFI and VUTEK, OTF (Obeikan), Drytac DigiFab, Barbieri electronic, Seiko II, Parrot Digigraphic, AT Inks, Sepiast inks, Sam-Ink, Dilli, Grapo, and WP Digital for providing funds so that we can make more of our publications free to end-users. During 2000-2001 we had grants to cover all the costs of our publications, and all FLAAR Reports were free in those early years. As that early grant naturally expired after a few years, we had to begin charging for some of our reports to cover costs. Now (in 2010), we are seeking corporate sponsorship so we can gradually make another 20% of our publications free to our readers.

Since 2006 we do a major part of our evaluations at a factory and headquarters demo room. Since the university does not fund any of these trips, it is traditional for the manufacturer to fund a research sponsorship. In the US this is how most university projects are initiated for decades now, and it is increasing. In fact there is a university in Austria that is not an "edu" but is a "GmbH", funded by the chamber of commerce of that part of Austria. In other words, a university as an educational institution, but functioning in the real world as an actual business. This is a sensible model, especially when FLAAR staff need to be on the road over a quarter of a million miles per year (roughly over 400,000 km per year total for the staff). Obviously this travel is hosted since unless money falls from heaven there most realistic way to obtain funding to get to the demo rooms for training is direct from the source.

It has been helpful when companies make it possible for us to fly to their headquarters so we can inspect their manufacturing facilities, demo rooms, and especially when the companies make their research, engineering and ink chemistry staff available for discussions. When I received my education at Harvard I was taught to have a desire to learn new things. This has guided my entire life and is what led me into wide-format digital imaging technology: it is constantly getting better and there is a lot to learn every month. Thus I actively seek access to improving my understanding of wide format printer technology so that we can better provide information to the approximately quarter-million+ readers of our solvent and UV printer web site (www.large-format-printers.org) and the over half a million who read either our wide-format-printers.org site or our roughly half million combined who read our digital-photography.org and www.FineArtGicleePrinters.org sites.

Barbieri electronic (color management), Caldera (RIP), ColorSpan, DEC, Durst, EFI, EskoArtwork, Gerber, Grapo, IP&I, Mimaki USA, Mutoh, Obeikan, Dilli, Drytac, GCC, NUR, Oce, Shiraz (RIP), Sky AirShip, Sun, Teckwin, VUTEK, WP Digital, Xerox, Yuhan-Kimberly, Zund have each brought FLAAR staff to their headquarters and printer factories. AT Inks, Bordeaux, InkWin, Sepiast, Sam-Ink, and Sunflower ink have brought us to inspect their ink manufacturing facilities and demo rooms. Notice that we interact with a wide range of companies: it is more helpful to our readers when we interact with many different companies rather than just one.

We have visited the world headquarters and demo rooms of HP in Barcelona and received informative and helpful technology briefings

from HP about every two years. We are under NDA as to the subjects discussed but it is important that we be open where we have visited. Mimaki Europe has had FLAAR as their guest in Europe to introduce their flatbed UV printer, as have other UV-curable manufacturers, again, under NDA as to the details since often we are present at meetings where unreleased products are discussed. Xaar has hosted an informative visit to their world headquarters in the UK. You don't get this level of access from a trade magazine writer, and I can assure you, we are provided much more detailed information and documentation in our visits than would be provided to a magazine author or editor. Companies have learned that it's a lot better to let us know up front and in advance the issues and glitches with their printers, since they now know we will find out sooner or later on our own. They actually tell us they realize we will find out on our own anyway.

Contributions, grant, sponsorships, and project funds from these companies are also used to improve the design and appearance of the web sites of the FLAAR Information Network. We thank Canon, ColorSpan, HP, ITNH, and Mimaki for providing wide format printers, inks, and media to the universities where FLAAR does research on wide format digital imaging. We thank Epson America for providing an Epson 7500 printer many years ago, and Parot Digigraphic for providing access to their digital equipment, also for providing three different models of Epson inkjet printers to our facilities on loan at BGSU (5500, 7600, 7800). We thank Mimaki USA for providing a JV4 and then a Mimaki TX-1600s textile printer and Improved Technologies (ITNH) providing their Ixia model of the Iris 3047 giclee printer.

We thank 3P Inkjet Textiles and HP for providing inkjet textiles so we could learn about the different results on the various textiles. IJ Technologies, 3P Inkjet Textiles, ColorSpan, Encad, HP, Nan Ya Pepa, Oracal, Tara and other companies have provided inkjet media so we can try it out and see how it works (or not as the case may be; several inkjet media failed miserably, one from Taiwan, the other evidently from Germany!). We thank Aurelon, Canon, ColorGate, ColorSpan, ErgoSoft, HP, PerfectProof, PosterJet, Onyx, Ilford, CSE ColorBurst, ScanvecAmiable, Wasatch and many other RIP companies for providing their hardware and software RIPs.

We thank Dell Computers for providing awesome workstations for testing RIP software and content creation with Adobe Photoshop and other programs. We also appreciate the substantial amount of software provided by Adobe. As with other product loaned or provided courtesy of ProVar LLC (especially the 23" monitors which makes it so much easier to work on multiple documents side by side).

We thank Betterlight, Calumet Photographic, Global Graphics, Westcott, Global Imaging Inc. Phase One, and Bogen Imaging for helping to equip our archaeological photo studios at the university and its archaeology museum in Guatemala. Heidelberg, Scitex, CreoScitex (now Kodak) and Cruse, both in Germany, have kindly provided scanners for our staff to evaluate.

We really liked some of the results whereas some of the other products were a bit disappointing. Providing samples does not influence the evaluations because the evaluators are students, professors, and staff of Bowling Green State University. These personnel are not hired by any inkjet printer company; they were universities employees (as was also true for Nicholas Hellmuth). The testing person for the HP ColorPro (desktop printer) said he frankly preferred his Epson printer. When we saw the rest results we did not include this Hewlett-Packard ColorPro printer on our list of recommended printers, but we love our HP DesignJet 5000ps so much we now have two of them, one at each university.

Sometimes we hear horror stories about a printer. The only way we can tell whether this is the fault of the printer design, or lack of training of the operator, is to have the printer ourselves in-house. Of course some printer manufacturers don't understand the reasons we need to have each make and model; they are used to loaning their demo units for a week or so. That is obviously inadequate for a serious review.

Some of the media provided to us failed miserably. Three printers failed to meet common sense usability and printability standards as well (HP 1055, one older desktop model (HP Color Pro GA), and one Epson). Yet we know other users who had better results; maybe ours came down the assembly line on a Monday or Friday afternoon, when workers were not attentive. One costly color management software package was judged "incapable" by two reviewers (one from the university; second was an outside user who had made the mistake of buying this package).

So it's obvious that providing products or even a grant is no shield from having your products fail a FLAAR evaluation. The reason is clear: the end user is our judge. The entire FLAAR service program is to assist the people who need to use digital imaging hardware and software. If a product functions we find out and promulgate the good news. If a product is a failure, or more likely, needs some improvement in the next generation, we let people know. If a product is hyped by what an informed user would recognize as potentially false and misleading nonsense, then we point out the pathetic discrepancies very clearly.

This is what you should expect from an institute which is headed by a professor.

Actually, most of our reviews are based on comments by end users. We use their tips to check out pros and cons of virtually every product we discuss. You can't fool a print shop owner whose printer simply fails to function as advertised. And equally, a sign shop owner who earns a million dollars a year from a single printer brand makes an impact on us as well. We have multiple owners of ColorSpan printers tell us that this printer is their real money earner for example. We know other print shops where their primarily income is from Encad printers. Kinkos has settled on the HP 5000 as its main money maker production machine, and so on.

Yet we have documentation of several print shop companies whose business was ruined by specific brands that failed repeatedly. It is noteworthy that it is always the same brand or printer at both locations: one due to banding and printheads then simply no longer printing one color; the other brand due to pokiness of the printer simply not being competitively fast enough. Same with RIPs, we have consistent statements of people using one RIP, and only realizing how weak it was when they tried another brand which they found substantially better. Thus we note that companies which experiment with more than one brand of product tend to realize more quickly which brand is best. This is where FLAAR is in an ideal situation: we have nine RIPs and 25 printers. Hence it is logical that we have figured out which are best for our situation.

Grant funding, sponsorship, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. We receive support from three manufacturers of thermal printheads (Canon, ColorSpan and HP) and also have multiple printers from three manufacturers of piezo printers (Epson, Seiko, Mutoh, and Mimaki). This is because piezo has definite advantage for some applications; thermal printheads have advantages

in different applications. Our reviews have universal appeal precisely because we feature all competing printhead technologies. Every printer, RIPs, inks, or media we have reviewed have good points in addition to weaknesses. Both X-Rite and competitor GretagMacbeth provided spectrophotometers. Again, when all sides assist this program there is no incentive to favor one by trashing the other. Printer manufacturer ad campaigns are their own worst enemy. If a printer did not make false and misleading claims, then we would have nothing to fill our reviews with refuting the utter nonsense that is foisted on the buying public.

It is not our fault if some printers are more user friendly, print on more media than other brands. It is not our fault that the competing printers are ink guzzlers, are slow beyond belief, and tend to band or drop out colors all together. We don't need to be paid by the printer companies whose products work so nicely in both our universities on a daily basis. The printers which failed did so in front of our own eyes and in the print shops of people we check with. And actually we do try to find some redeeming feature in the slow, ink gulping brands: they do have a better dithering pattern; they can take thick media that absolutely won't feed through an HP. So we do work hard at finding the beneficial features even of printers are otherwise get the most critique from our readers. Over one million people will read the FLAAR Information Network in the next 12 months; 480,000 people will be exposed to our reports on wide format printers from combined total of our three sites on these themes. You can be assured that we hear plenty of comments from our readers about which printers function, and which printers fail to achieve what their advertising hype so loudly claims.

An evaluation is a professional service, and at FLAAR is based on more than 11 years of experience. An evaluation of a printer, an ink, media, substrate, a software, laminator, cutter or whatever part of the digital printing workflow is intended to provide feedback to all sides. The manufacturers appreciate learning from FLAAR what features of their printers need improvement. In probably half the manufacturers FLAAR has dealt with, people inside the company did not, themselves, want to tell their boss that their pet printer was a dog. So printer, software, and component manufacturers have learned that investing in a FLAAR evaluation of their product provides them with useful return on investment. Of course if a printer manufacturer wants only a slick Success Story, or what we call a "suck up review" that simply panders to the manufacturer, obviously FLAAR is not a good place to dare to ask for such a review. In several instances it was FLAAR Reports that allowed a company to either improve their printer, or drop it and start from scratch and design a new and better one.

And naturally end-users like the opportunity to learn about various printers from a single source that covers the entire range from UV through latex through all flavors of solvent.

We have also learned that distributors often prefer to accept for distribution a printer or other product on which a FLAAR Report already exists.

We turn down offers of funding every year. These offers come from PO Box enterprises or products with no clearly visible point of manufacture. Usually the company making the offer presumes they can buy advertising space just by paying money. But that is not what our readers want, so we politely do not accept such offers of money.

Contributions, grants, sponsorships, and funding for surveys, studies and research is, however, open to a company who has an accepted standing in the industry. It is helpful if the company has a visible pres-

ence at leading trade shows and can provide references from both end users and from within the industry. Where possible we prefer to visit the company in person or at least check them out at a trade show. Obviously the product needs to have a proven track record too. Competing companies are equally encouraged to support the FLAAR system. We feel that readers deserve to have access to competing information. Competition is the cornerstone of American individualism and technological advancement.

FLAAR also covers its costs of maintaining the immense system of 8 web sites in three languages and its facilities in part by serving as a consultant such as assisting inkjet manufacturers learn more about the pros and cons of their own printers as well as how to improve their next generation of printers. It is especially useful to all concerned when manufacturers learn of trends (what applications are popular and for what reasons). For example, manufacturers need to know whether to continue designing software for Mac users, or concentrate software for PC users. So the survey form that you fill out is helpful to gather statistics. You benefit from this in two ways: first, you get the FLAAR reports in exchange for your survey form. Second, your comments bring (hopefully) change and improvement in the next generation of printers. When we do survey statistics, then the names, addresses, and telephone numbers are removed completely. A survey wants only aggregate numbers, not individuals. However, if you ask about a specific brand of printer, and do not opt out, we forward your request to a pertinent sponsor so you can obtain follow-up from that brand, since we ourselves do not have enough personnel to respond to each reader by telephone. But we do not provide your personal information to outsiders and our survey form has an opt out check-off box which we honor.

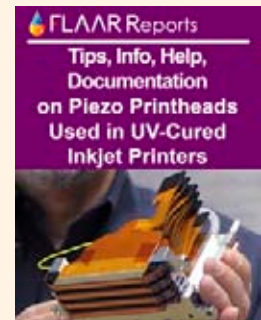
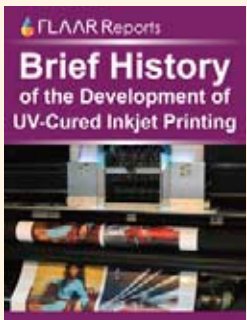
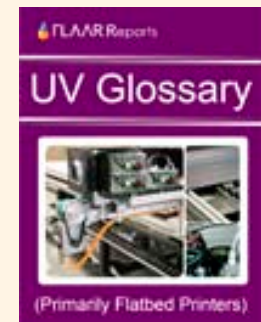
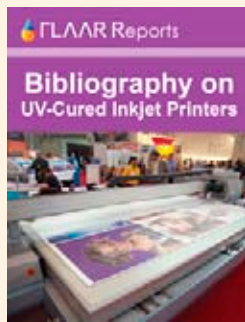
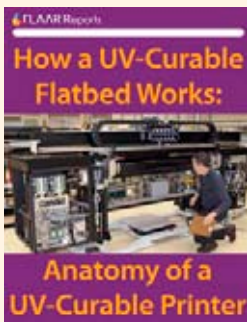
FLAAR also serves as consultants to Fortune 500 companies as well as smaller companies and individuals who seek help on which printers to consider when they need digital imaging hardware and software.

A modest portion of our income comes from our readers who purchase the FLAAR series. All income helps continue our tradition of independent evaluations and reviews of inkjet printers, RIPs, media, inks, cutters, laminators, and color management systems.

These are some of the most
Recent FLAAR Reports (2008-2010)

You can find these and more reports at: www.wide-format-printers.NET

Introduction to UV Curable Inkjet Flatbed Printers



Most recent UV Printers



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Comments on UV Inkjet Printers at Major Trade Shows 2007-2009



UV Printers Manufactured in China, Korea and Taiwan

