

Alternative Inkjet Ink

After-Market Ink
Third-Party Ink
Generic Ink

Solvent, Eco-Solvent, Bio-Solvent, UV-Curable

One example of all these inks:
Bordeaux Digital PrintInk



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It is well known that printer manufacturers make more profit on selling ink than they do selling printers. DuPont, for example, spent years trying to make printers in China just so there was a brand of printers that required their specific DuPont-branded ink.

Agfa was in the same situation. It made an eco-solvent ink and then had to buy printers from Mutoh to sell (as the Agfa Universal) in order to create demand for Agfa ink.

The Myth that the Manufacturer's Ink is better than After-Market Ink

The official party-line is that the manufacturer's ink is better than any and all after-market ink because the manufacturer can develop the ink together with the printer. But the aforementioned Agfa eco-solvent ink is a good example of the fiction involved in this myth.

The Agfa ink turned out not to work well with Epson printheads. The cost of replacing the printheads under warranty was one reason why Agfa had to completely abandon their eco-solvent ink project. With no significant public explanation, Agfa simply dropped out of the solvent ink market all-together.

So it's tough to claim that all manufacturer's ink is superior. Of course one reason in this case is that Agfa is not really the manufacturer of their own printers. Mutoh-Europe was the manufacturer of the Agfa Universal printers. The printers were fine; it was the ink that had issues.

Seiko had a period of serious problems with "their" ink for the ColorPainter 64S. At least one period's production run had serious issues and caused significant discomfort among end-users around the world for almost a year. Too much of this bad ink arrived in Guatemala, which is where I noticed the problem quite clearly. I was told that factory conditions during this period, including unusually high humidity, may have been a cause, but only Seiko's ink company knows for sure.

The point is that most printer manufacturers' own ink is not infallible. Besides, most printer manufacturer's don't really make their own ink anyway. If you bought an Iris proofing printer 5 years ago, and pulled off the Iris label on the ink cartridge you would see "Mutoh" underneath. If you pulled off the Mutoh label you found another brand name. Even that "original" company was not the actual chemical company that really made the ink.

For some Roland and Mutoh eco-solvent printers you can stick in Roland ink or Mutoh ink interchangeably, since it's the same ink from the same ink factory (obviously not all Roland and Mutoh inks are interchangeable, but plenty are). And back to the Seiko example, Seiko does not manufacture their own printers either: they are made by Mutoh Japan. Epson does not make it's own printers either, they are made by Mutoh.

Canon perhaps makes their own dye ink (or at least is involved), but most water-based pigmented ink was made by DuPont (for the early Encad printers and for the HP 5000 and HP 5500).

So most manufacturers do not necessarily have their own ink factories to begin with. But yes, OEM manufacturers do have their own ink labs and do specify the chemicals, and do work with media manufacturers to insure that the inkjet receptor layer can interact well with the selected ink. But with eco-solvent printers and especially with solvent printers, the printer manufacturer has no idea what substrates you will print on, so once again, the argument that their ink is tuned only works if you stick with the printer's official substrates, which not many sign makers do.

Roland even provides a free RIP software to encourage you to stick with their own ink and their branded media (because their software won't allow you to ICC profile alternative inks and alternative media!). But if you get Wasatch, Caldera, Shiraz or other equally capable RIP software, and X-Rite tools with Monaco color management software, you can use any third-party ink and all alternative materials. But printer manufacturers do not necessarily want to encourage you to become an independent expert in customized color management.





**Second Myth:
that all after-market ink is made in a garage in China, Korea, or Taiwan**

Unfortunately, this myth is half true and half untrue. Probably the majority of the after-market ink does come from China, Korea, and Taiwan. If it comes from China it has all the standard problems: same problems as Chinese toothpaste, Chinese dog food, Chinese tires, and Chinese toys: they use whatever chemical is cheapest, there is not adequate quality control because the sole goal is cheap, cheap, cheap.

Plus the general consensus of industry managers who have experience with China is that recipes for everything change. If you are buying Chinese printers, one month they come with one set of parts; another month the parts are different (imagine trying to get spare parts in the future). Other parts are counterfeit. If the supplier finds a cheaper source, or a chemical that can replace the spec, the cheaper chemical is used (irrespective of whether it actually functions). I would find it unlikely that an MSDS sheet for such ink would be reliable either.

Let's hope that this is not true with all brands, but so far, the track record of Chinese dog food and Chinese toys is rather clear. And every two months there is another adulterated product. Fortunately things do improve, and the first Chinese printer that is likely to pass muster with FLAAR inspections may well be the Teckwin. Their solvent ink printers did not pass muster with Gerber, Matan or 3M, but that was three years ago. Today Teckwin has European managers and they realize the only way their equipment will be accepted is if it actually functions and does not wear out and break down like other brands. So in the future Chinese ink may become acceptable, but at present, I can't imagine anyone who would recommend risking this kind of after-market ink.

In ink we are finding that there are indeed companies that make their own ink, in Europe, not China: Bordeaux and Sunflower are two. I have not yet visited Triangle, but this is the third brand that I respect and as soon as an inspection is possible I will report on the results. Marabu and other reputable ink companies, like Bordeaux, Sunflower, and Triangle, can't afford to adulterate their European-made ink with cheap junk from unknown sources.

While on the subject of reputable after-market ink companies, Sericol and Sun Chemical are both offering after-market inks today. I would hardly classify them with Chinese inks. So the point is that even the big-boys are getting into the market to provide alternative inks to what the OEMs offer. Thus the goal is not to distinguish OEM inks from after-market inks, but to separate the sheep from the goats within after-market inks.

Thus the crucial aspect of third-party ink is to distinguish between unknown Chinese ink and known brands of ink from outside China. However, merely because ink comes from outside China is no automatic guarantee of quality, and just because ink does come from China is not automatically a cause for concern that its adulterated junk. But the statistical chances of one, or the other, are rather high.

Changing Opinions of Generic Ink

Nine years ago there was a myth that a hardware RIP was significantly superior to a software RIP. There was so much PR for hardware RIPs in all industry trade magazines, and its superior features, that I naively believed it. Indeed I obtained two Fiery RIPs.

It took about three years before I dared even test a software RIP, simply because I was brain-washed that only a hardware RIP had what was needed.

Then I used PosterJet, subsequently Wasatch, and I tested BEST, PosterShop, and others. I quickly found out two things: software RIP had more features than hardware RIP. And the hardware RIP was mainly air, literally empty nothingness. It took HP several years of barrage of unhappy end-users of hardware RIPs for them to drop this concept. Encad dropped it. Epson held out the longest but finally they dropped hardware RIPs and switched to ColorBurst. In all cases I have found that the software RIP was better, easier, and had significantly improved technical support than hardware RIPs.

In other words, the myth that a manufacturer's product is perfect and superior is both highly unlikely, and in a few instances (that we cited above) is a bogus smoke and mirrors to distract you from reality.

For me the moment that I began to pay more attention to generic ink was when Digital Graphics magazine did an article that effectively indicated that after-market, third-party, and generic inks were in many cases quite acceptable. So I felt that FLAAR could do a service for its readers by studying the pros and cons of generic ink and reporting our results for our readers.

Since FLAAR has over a million readers a year, and since we recommended software RIPs now for seven years, we have helped provide a better understanding of software RIPs to many printshop owners and managers. For 2007 onward we intend to provide comparable information on alternative inks to our over million readers a year. But since FLAAR is read by more people than subscribe to all printer trade magazines in the world, we go cautiously. We try to be sure that we visit the ink company headquarters so we can inspect not only the ink factory, but also see the chemists, labs, and also the people behind the ink.

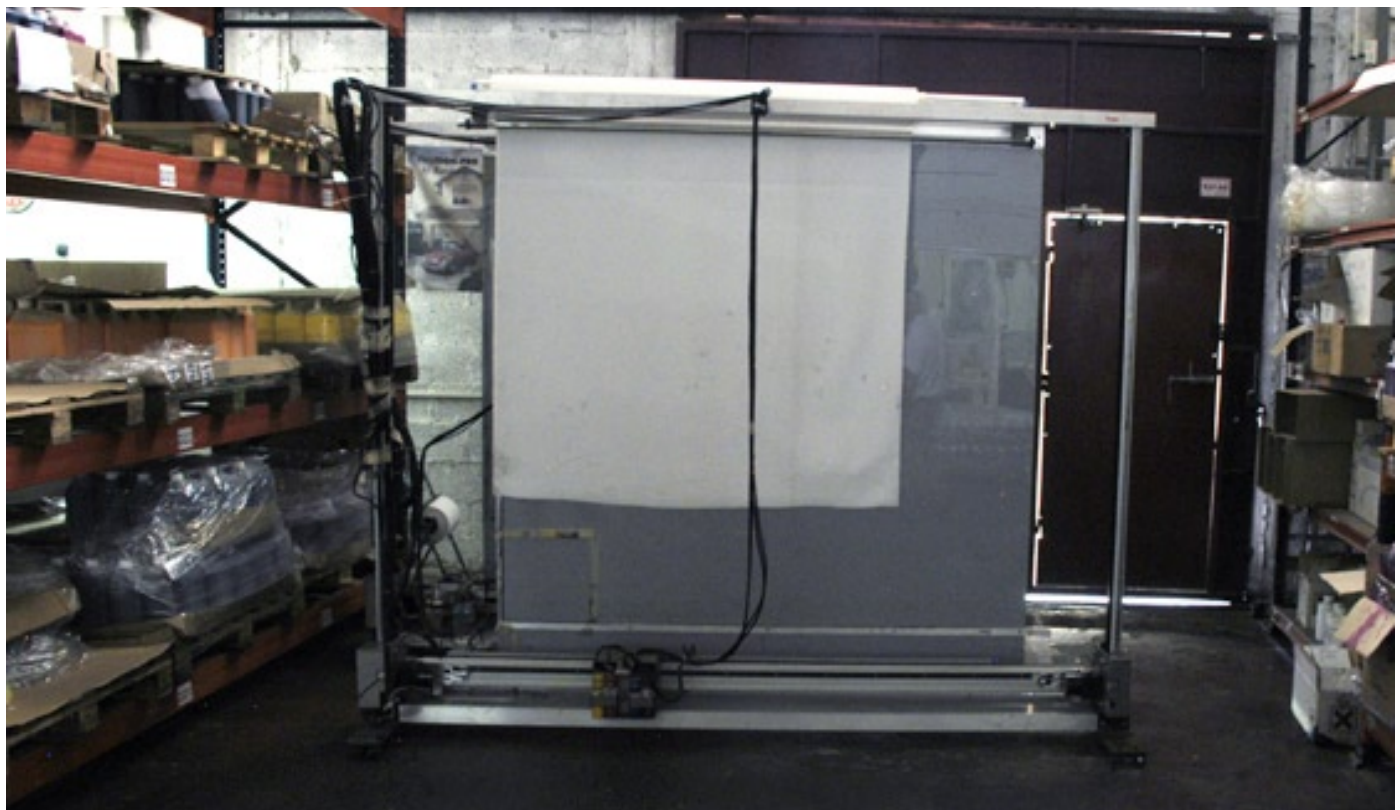
Our first step is to visit the ink companies, one by one. A second step (when additional funding is available) is to test the ink. Lab tests are expensive beyond belief, indeed our university phased out funding for all such work. So now the only way we can fund research is the same way that other universities do: obtain the funds directly from industry.



Learning by visiting the ink companies

Our first step has been to raise our antennae and get feedback from end-users. We quickly learned that the better known names that had respect in the industry were Triangle and Bordeaux. A third ink company came to our attention at a trade show in Dubai, and we saw the same ink company exhibit again at FESPA '07. What was of interest is that their UV ink could be cured with LED uv lamps. So I spent a week at their facilities in Novosibirsk. On the same long trip I spent a week in Israel in order to inspect the world headquarters of Bordeaux DigitalInk.

Gradually we are becoming familiar with other ink companies at trade shows in Europe and across the USA. But rather than waiting two years until we have visited all the ink companies, I felt it would be helpful for readers to see the results of our first factory visits.





Bordeaux Ink

During the process of asking other people about each brand of ink I quickly noticed that few end-users were aware of actually where the ink came from. Most people assumed that after-market ink came from China. So this was the first question I posed with Bordeaux, "how much of your ink comes from China."

They smiled and took me into their ink factory: it was producing dozens and dozens of kinds of ink: eco-solvent, full-solvent, water-based, and UV-curable. I did not see anything that looked like Chinese ink. As far as I can determine, their ink is made in Israel. They are not rebranding junk chemicals that arrive in containers from China (if they are we will definitely report this in the future).



Furthermore, we quickly learned that they have been making ink since 2000, and have experience with wide-format inkjet printers since 1996. They still had their two test printers from those early years: two Data Mate Rembrandt printers, with Sharp printheads. These are among the first flatbed inkjet printers made. This historically important Data Mate Rembrandt printer is now the subject of a separate photo essay in our FLAAR Reports series.

Quality Control

Most alternative ink companies are quickly learned that printshops don't really want a better ink, they want an alternative ink to be identical in color gamut and properties to the original OEM ink. Customers primarily prefer an ink that costs less. Bordeaux said they could easily make a larger or different color gamut, but that's not what end-users wish. End-users want an ink with the identical color gamut as their OEM ink so that they don't have to switch ICC color profiles. Plus, if you printed 50 copies of one job three months ago, and the same client needs 25 more, the new prints have to match the color of the old prints exactly. If you have changed to an ink with a different color gamut, then matching past jobs is tougher.

However I would suggest that after-market ink companies occasionally showcase better gamut and higher color saturation at trade show booths. Sort of like a "concept car." American Imaging Corp. does this with their 14 impressive colors. If you ever are lucky enough to run into Scott Saltman at a trade show or industry event, you can see his remarkable ink colors. You can also see the AIC ink gamut at any DigiFab booth at trade shows in the USA.

Plus, when you change from a horse-and-buggy to a car, and a client wants a ride in your buggy three years later, you might let him know that there are new and better technologies, and switching to the new color gamut is better than reproducing a less-perfect older chemistry. But FLAAR can afford to be experimental; whereas a client may demand the same old colors no matter what.

Experienced and Capable Staff

This company has been in business for many years and in the last several months has doubled the managerial staff. One by one I interviewed the managers to learn their background and experience. These are not the kind of people who have any interest in simply rebranding cheap Chinese chemicals and passing it off as ink.

Bordeaux is a family owned company (Moshe Zach, his brother, and Ruth Zach (wife of Moshe)). There is now a third partner added as the company is experiencing a boom. Their web site is www.c-m-y-k.com







What's Next

In Guatemala probably 90% of the printshops use after-market ink. In the US printshops tend to use the manufacture's ink until the warranty runs out (so for at least a year). Printshops switch to after-market media and substrates first, after a few months; but generally wait a year to switch to another ink.

Our next step is to locate end-users who are already using Bordeaux ink so we can interview them and learn the results. For example, did they attempt to use cheap junk in first, find that it did not work, and then tried Bordeaux? Or did they switch directly to Bordeaux?



Conclusions

So far I have inspected the factories and testing facilities of two alternative inks: Sunflower in Russia and Bordeaux in Israel. There is a separate FLAAR Report on each visit. My goal is to visit several more ink factories as sponsored research projects become available. FLAAR is independent and neutral, plus it is in everyone's interest that we visit as many ink factories as possible. All together I spent almost a week in Israel and a week in Russia. This is an amount of research that a trade magazine would have difficulty undertaking. FLAAR is non-profit, and as a university professor my interest is learning new facts. So if it takes more than a quick inspection at a trade show booth, then I will do it, even if it involves a 14,000 mile round trip flight. Merely changing flights between the two Moscow airports was an experience; only the airport in Kuwait en route to lecturing in Dubai have I had comparable confusion.



Sunflower ink factory

Bordeaux ink factory

FLAAR is open to being invited to visit Epson, Canon, and other ink facilities as well. I am already slightly familiar with HP but NDA confidentiality agreements mean I can't go into more detail or specifics. But the world of inkjet chemistry changes constantly, and the inks being offered by HP today are different than inks I may have experienced in the past (FLAAR has ten HP inkjet printers but none of the newer Z-series).

As you can see yourself from the photographs in this FLAAR Report, the Bordeaux ink is not made in China. Indeed they are doing most of the milling of the pigments themselves in Israel.

All ink is tested, batch by batch. They have a complete ink test lab, and clearly have experienced chemists.

Bordeaux exhibits at ISA in the US and at FESPA in Europe. Their distributors may exhibit at regional or local shows such as VISCOM. Bordeaux ink is especially strong in market share throughout Russia and republics that were previously part of the USSR.

This year is clearly a time when more end-uses will be asking about alternative inks. Inkjet chemistry is a major international industry, and FLAAR is interested in learning for our own increase in awareness, and once we teach ourselves, our goal is to share this information with our readers.

Acknowledgements

I thank the following individuals at Bordeaux for assisting me to learn more about their ink, past, present, and future.

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Axel Benishou, laboratory
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Reality Check

Being at a university absolutely 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 that ours, please let us know. We do not mind eating crow, though so far it is primarily a different philosophy we practice, 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 the university 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 41,000 of our many readers who have shared their experiences with us via e-mail (the Survey Forms)



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.

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.

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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A license from FLAAR is required to use any material whatsoever from our reports in any commercial advertisement or PR Release.

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 Hellmuth, year, www.FLAAR.org." If the quote is more than a few words then academic tradition would expect that a footnote or entry in your bibliography would reference the complete title. Publisher would be www.FLAAR.org.

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 workaround. 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, usually 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 courses 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.

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.

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. 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.

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. Trade show examples are 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. Four 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.

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, 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 our two universities.

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 hardware 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.

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.

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 it is 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.

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.

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. For example there are three Mimaki printers we would love to have (their 8-color JV22, their newest textile printer, their new UV-curable ink printer).

Now that Symphonic inks offers a special version of a Roland, combined with Evolution RIP, offers a 12 color version of Epson's 10000 printhead generation which offers 32 passes, wider than Epson's 44 inch limit and less banding than previous Roland models, that would be the ultimate fine art giclee printing factory. But since that printer is not available to our university, and as these inks are not easily obtained, the art students on our campus use our HP DesignJet 5000ps, HP 5500ps, HP 130, Epson 4800, Epson 7600, and Epson 7800. The art department does museum exhibits and wins awards with the output. We are also looking at the newer 12-channel Canon iPF and HP Z-series printers.

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.

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.

Acknowledgements

Fortunately the university covers some of the operating costs of FLAAR on their campus. Thus we do not really have much incentive to pocket hush money from producers of lousy products. 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 is fairly evident rather quickly.

With 9 employees the funding has to come from somewhere, so although the universities cover the core expenses, 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 photographic 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, 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 and for funds to allow us to attend all major international trade shows, which are ideal locations for us to gather information. We thank Drytac, Sun LLC, Bordeaux Digital Printlnk, Mutoh Europe, IP&I, VUTEK and Zund 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. Currently our reports on lamination tips are sponsored by Drytac and our publications on eco-solvent ink printers are sponsored by Mutoh Europe. Now (in 2007), we are seeking corporate sponsorship so we can gradually return to making at least 20% of our publications free to our readers.

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 350,000+ who read either our [wide-format-printers.org](http://www.wide-format-printers.org) site or our roughly half million combined who read our digital-photography.org and www.FineArtGicleePrinters.org sites.

ColorSpan, Grapo, IP&I, Mutoh, NUR, Sun, Teckwin, VUTEk, Xerox, Zund have each brought FLAAR staff to their headquarters and printer factories. Bordeaux and Sunflower ink have brought us to inspect their ink manufacturing facilities and demo rooms. We have visited the world headquarters and demo rooms of HP in Barcelona and received informative and helpful technology briefings. 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 to our facilities while at Francisco Marroquin University and Parrot Digigraphic 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. and Bogen Imaging for helping to equip our archaeological photo studios at the university and its archaeology museum in Guatemala. Heidelberg 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 are universities employees (as is 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 two manufacturers of piezo printers (Epson 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.

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 presence 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 university 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, and inks.