FLAAR Reports

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Which inkjet printer is Good for Giclee, Fine Art Photography Portrait & Commercial Photography

Does the HP Designjet Z3100ps GP provide Better-than-average Color Print Quality?

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Introduction

This work could be titled "Questions to Ask During an Evaluation of a Printer".

This FLAAR Report could also be considered a "Wide Format Inkjet Printer Buyer's Guide in FAQs Format" because FLAAR evaluations are based on questions. In many cases questions are more important than the answers: you can get the answers at most trade shows, but sales reps tend not to provide you the really penetrating questions. So we at FLAAR work to provide you the questions. Be sure to ask these following questions before you buy any inkjet printer.

There is a separate set of questions to ask of a solvent, eco-solvent or mild/lite solvent printer. There is a longer set of questions to ask of a UV-curable flatbed inkjet printer because these cost from $80,000 to over half a million dollars.

Find a knowledgeable and experienced sales rep who actually knows the difference between giclee and décor, and the difference between giclee and fine art photography (and the difference between fine art photography and commercial photography). You will not likely find this level of knowledge on a catalog-based low-bid outlet mall type of dealer. If you are doing giclee, décor, fine art photography, or are a photo lab, or a serious photographer, it is so much better if you select (not only the appropriate printer) but also a company that already understands the complete giclee workflow, understands ICC color profiles, and a dealer who can explain the pros and cons of all the relevant printers that are available today.

HP Designjet Z3100ps GP performing a test print at Parrot Digigraphic.

This FLAAR evaluation is on-going, and will be updated periodically. Our evaluation of the HP 5000 and HP 5500 lasted the entire four year+ period that these models were still current models in the HP line-up. We still have the HP 5000 in daily use at the FLAAR+BGSU print facility in Ohio. The present report on the HP Z3100 is based on the first three weeks, and covers the arrival, installation, and initial print tests. We have months of tests ahead of us. But we wanted to get this report on the first stage available. The update will be available at no cost on all FLAAR web sites.

The HP Designjet Z3100 is designed to print for dozens of applications in addition to giclee, fine art photography and studio photography. This printer can do diverse kinds of signage and many other applications. But this initial evaluation is for the use of this printer for giclee, fine art photography, and photographers in general.

THE BASICS

1. Brand name, model?
This is an evaluation of the 24" HP Designjet Z3100ps GP.

2. If there are two or three (or more) widths of this printer, what differences exist other than the width?
Of each width, there are two versions:

- Z3100ps
- Z3100 with no ps.

PS means postscript which implies a RIP-like software function. The evaluation is of the high-end ps version.

3. What is the nature of the company behind the brand name? Is this company the manufacturer, distributor, or rebranding?

HP designs and manufactures the printer.

4. Is this same model(s) rebranded and sold under other names?

The HP Designjet 30 and/or HP 130 or similar HP desktop printers are rebranded and sold under Kodak color and occasionally rebranded by other companies, but the HP Z3100, so far, is not rebranded by anyone else, nor would this be expected.

5. What other printers are the same or similar chassis from this manufacturer or distributor?

The HP Z2100 and HP Z3100 are the identical chassis; main difference is that one has 8 inks the other has 12 ink lines.

6. When and where was this model first introduced?

I first noticed this printer at Photokina 2006 but I will have to go back into my notes to see where it may have appeared earlier. The 8-ink HP Z2100 had already been launched slightly before then.

7. Is this printer mature technology or still in alpha-stage or beta-stage?

The on-board spectrophotometer has been in development since at least 2001. Although this is the first product for HP with this feature, the HP test labs and HP color management specialists in Barcelona, HP San Diego, and other major HP research centers had color management projects well underway many years ago. On the basis of this knowledge I classify the HP Z-series on-board color management as long ago out of experimental or beta test stage. All technologies improve, and HP labs will produce additional breakthroughs in the near future, but for 2008, what is already available is light-years more advanced than what is lacking on all Epson and all Canon models.

8. How does this model compare with comparable previous printers?

The Z-series HP printers are significantly more advanced than previous models, such as the venerable HP 5000 and HP 5500. But in turn, that was the best-selling model of all time, with over 150,000 sold worldwide. At FLAAR we have three of them and we still use an HP 5000 every day. I have visited giclee ateliers that also still use an HP 5500 every day (Squirt Printing is the most notable since they have at least four of them; they bought them based on the FLAAR Reports based on our experience producing giclee on canvas for years with the same model).

9. List price?

If you buy by price alone you may end up with the wrong printer brand. If you buy by price alone you may buy from a dealer who does not know enough about giclee or fine art photography to be able to really help you. So knowing the price is only the first step.

	List price	Street price	Spectro-photometer	ICC profiling software	Training to learn how to do ICC profiles
24" HP Z2100	$3575	$2895	included	included	In effect is included, or if needed, is nor major.
44" HP Z2100	$5895	$4795	included	included	
24" HP Z3100	$4195	$3395	included	included	The system is simple enough that many people could handle ICC profiling with no training or at least with only a simple seminar.
24" HP Z3100ps GP	$5695	$4595	included	included	
44" HP Z3100	$6895	$5595	included	included	
44" HP Z3100ps GP	$8250	$6695	included	included	
24" Epson 7880	$2995	varies	Not available inside the printer	Not in the printer	
24" Epson 7880 with RIP (but it is only a lite RIP, not full-featured)	$3995	varies			
44" Epson 9880, with lite RIP	$4995				
44" Epson 9880	$5995				
24" Canon iPF6100	$3495		Not available	Not in the printer	
44" Canon iPF8100	$5995				

10. What is the street price?

Street prices for the 24" and 44" (with and without options) are in the comparative table above.

11. What comes with the printer: stand, network connection already installed, take-up reel?

There is no take-up reel on the original Z2100 or Z3100; only on the Z6100 because a normal photographer or artist tends to print one or two images at a time (so no take-up reel is needed). For large printshops, large photo labs, giclee ateliers, etc, the HP Designjet Z6100 is available with significantly faster speed, and a take-up reel.

12. Does a complete set of full-sized ink cartridges come with the new printer, or merely a "starter set" that is not as full as a regular set?

On the Z3100 both sizes, 24" and 44", come with ink in 130 ml cartridges.

13. How does the total cost compare with other Inkjet printers?

This table is intended for you to fill in yourself, but again the suggestion: buy what you need rather than merely what is cheap. Buy what you need for the next three years, not a printer that will be replaced tomorrow with a new model because today's model lacks key features.

The two empty columns are so you can add the other printers you are considering.

	HP Z3100 24"	HP Z3100 44"		
Base price				
RIP software, lite				
RIP, full version				
Transportation	Varies by location			
Installation	Depends on which "package" you negotiate with your dealer			
Training				
Ink	Full set of 12 inks, full size 130 ml each			
Warranty	12 months parts and labor			
Warranty printhead	18 months for nozzle failure (as long as not caused by end-user error)			
Total Cost				

PURCHASING

14. Are dealers national (most companies) or regional (Roland allows a dealer to operate only within a limited regional area)? Does a buyer have any choice in dealers?

If you are buying a plotter for CAD, GIS, or technical drawings, most Internet site or catalog-based store can handle these printers acceptably. However, some dealers, such as ColorDNA, ScarabGraphics, Global Imaging or larger regional resources such as Cannon IV, are definitely better than anonymous resellers who are primarily just an Internet web site. How do we judge these outlets? I actually visit them in person and inspect the facilities. I have visited Color DNA, ScarabGraphics, Cannon IV, and Parrot Digigraphic, as well as resellers in foreign cities, such as IB-ProCADD (in Ljubljana, in Slovenia, just south of Graz, Austria).

But recognize that only a few dealers specialize in printers for photographers and artists. Specialize means that these resources have personal experience. It is especially important that they know the complete workflow, from digitization to top coating at the end. The best of these places are the stores that have a wide variety of offerings: large format as well as 35mm, all brands (not just one brand of printer), scanners, etc. You can judge the seriousness of a company by the brands they sell: scanners is the easiest way to judge: if they offer CreoScitex (now Kodak) or Screen Cezanne, these are the top professional brands worldwide. Now you know how we select places to obtain printers, media, and color management interaction.

We thank John Lorusso, Parrot Digigraphic, and his capable staff, for providing recent training on the HP Z3100. I also thank HP printer world headquarters in Barcelona, for hosting my visit there last year to learn more about the HP Designjet Z-series printers which were still new at that time. Now, in 2008, an actual printer finally arrived, almost two years after it's launch. The evaluation that follows is a work-in progress, based both on our in-house evaluation at FLAAR+BGSU as well as interviewing other owners of the Z3100 (available in a separate report; free by filling out the FLAAR Inquiry/Survey Form).

SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

15. What is the delivery time, between the time I order the printer and it is delivered?

Delivery time depends on many factors, but can be next-day to 48 or 72 hours (more realistic), or can take up to two weeks.

16. What is the connectivity? Network, SCSI, FireWire, or other?

Network card has always been included on most HP printers. USB 2 is also available.

Connectivity area.

17. What about altitude? Some cities such as Guatemala City are at a high altitude?

Almost no spec sheet and not even many User Manuals mention anything about altitude. But Guatemala City is about 1500 meters above sea level (which is rather high; there are four volcanoes visible out my window as I write this), and other parts of the world have even higher elevation.

18. What about dust and cleanliness of the air?

Dust in the printing environment is an aspect that is often neglected. It is crucial that if a sign shop, that no sanding, sawing, routing, sandblasting, or grinding operations be nearby. The dust and debris from sawing and comparable operations are extremely unhealthy for a UV printer.

In other words, you need to ventilate away more than ozone and ink odors; you need to ventilate away everything

19. What is the size and weight of the printer?
"The packing slip that accompanied the arrival of the printer lists the freight weight at 230 pounds. Therefore, it would be quite a strenuous task to try and unload such a package without special equipment."

20. How many boxes arrive?
"The HP Z3100ps GP arrived in a large box at the BGSU Large Format Print Lab at 12:30pm on Monday, February 18, 2008."

21. How big are the boxes?
"The HP Z3100ps GP arrived in a large box with approximate dimensions of 57.5" x 30.25" x 24.5". The box was accompanied by a pallet of equal length and width which provided a sturdy base for the package. The package and pallet were adequately fastened by two shipping straps. The design of our facility rendered it impossible to use the forklift to move the box to our front office print lab. Therefore, it was necessary to manually relocate the printer and box. After cutting the straps with a pair of scissors or utility knife, the box and pallet were easily separated."

22. Does the printer come in one piece?
All these questions are answered in the Appendix.

23. How much assembly is required?
We describe and picture the assembly in the Appendix.

24. What comes in the box (and which is in which box)?
"Included with the HP 3100ps GP:

- 8.25"x11.5" instructions
- Printer stand including basket
- Rear sheet feed tray
- HP Dry Gloss sample roll
- HP Z3100ps GP inks (12)
- HP Z3100ps GP printheads (6)
- Power cable
- Network cable
- HP Start-Up Kit (software)"

An HP Colorimeter was also included in the smaller boxes.

25. What is setup of the printer like?
All these questions are answered in the Appendix.

INSTALLATION OF THE PRINTER

26. Can you install this printer yourself?
Yes, any person who is good at putting things together can assemble and install this printer on their own. But if you don't have the patience, or the time, to deal with unpacking and installing the printer, most HP dealers can provide an installation-and-training service of a half-day.

27. How many people does it take to lift the box?
"The weight of the box hindered two people from carrying it for any length of time so we decided to open the box in our connected warehouse where we initially received shipment."

28. Realistically, what expenses must you incur for the installation, such as a fork-lift truck or crane to lift the printer off the truck?
"The printer was delivered on a full-size 18-wheeler. Our facility is located in a building with a connected warehouse, so we had all the necessary facilities to unload the printer with ease. However, if someone was to receive this printer that was not equipped with the facilities similar to that of what we have available (warehouse dock and fork-lift truck), they may find unloading the printer to be rather difficult."

29. Is installation included in the purchase price?
Installation is not included in most water-based printers from HP, Epson, or Canon.

INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS

A User´s Guide and a Quick Reference Guide are among the literature that comes with the printer.

30. How many manuals are available?
"After removing the top of the box, we were able to easily find the packet of unloading instructions which were 8.5"x11.5" color printed on durable paper."

31. What is the rating of the usefulness of the Setup Instructions?
"These instructions were very easy to understand because they incorporated many visuals as well as descriptive text and symbols."

32. What is the rating of usefulness of the User's Manual and other associated materials?
"The installation process was very simple and easy to execute because all steps were outlined and clearly understandable."

INSTALLATION OF THE PRINTER: TRAINING

33. What training is included with the purchase?
Training is not included unless you ask for this option.

34. Is factory training available?
Factory training is primarily for complex printers. So I have been factory trained in China, Taiwan, Korea, Europe, and the US by Teckwin, Infiniti (Honghua factory), ColorSpan (Minneapolis), DURST (both Italy and Austria), Mutoh Europe, NUR, IP&I, Dilli, GCC, and other brands of solvent or UV-cured flatbed printers.

For HP Designjet printers, I have been "factory trained," in both Barcelona (Spain) and San Diego (California) in the sense of receiving an understanding of the printer from the team that designs and manufactures it. But this is so I can understand the overall system. An end-user does not need factory training in order to operate the printer. Besides, the actual factory is in Asia (no, it's not China).

The Epson 3800 is made in China, as is the Macintosh 17" laptop on which I am writing this report). The Mac laptop was misformed coming out of its original packing (looked like a gull-wing concept; literally deformed). Many of the pixels on the monitor have failed after two years, but otherwise it's better constructed than any Chinese-made inkjet printer that I have inspected.

35. What on-line training is available?
There are some training modules available from the HP web site. There are also items such as supplementary information, "Technical Newsletter", via Large Format Printing-HP Designjet Online. You can create an account or just visit. There is, for example, a paper on "How to get better Reds." There is a tip to consider using Kodak Pro Photo color space instead of the more usual Adobe RGB 1998. As a comment, try to avoid using sRGB; that is for the Internet or web pages; not for professional quality on a sophisticated wide-format printer.

36. What about follow-up training after you have had the printer a month and know enough to ask better questions?

The best time to receive training is after you have had the printer for about a month. At this point your questions are more focused. FLAAR provided this service for a photographer in Guatemala who had purchased a 44" HP Z3100. He was operating the printer okay, but had many questions on color management in general. Eduardo Sacayon from the FLAAR Mesoamerica staff went to help him get deeper into the capabilities of this printer.

37. Between the day the printer arrives, how soon is it realistic to achieve full productivity?

If you already know wide-format printers for years, you can be doing good work the first week. If this is your first printer larger than a desktop printer, it may take more practice. It also depends on what personal assistants you have available to answer your questions.

Prior experience with printers will be an important factor to determine time to reach full productivity. Dr. Hellmuth performed print samples on the HP Designjet Z3100ps GP at Parrot Digigraphic with photographies taken by FLAAR personnel in Guatemala.

The photographer in Guatemala was lucky to have the FLAAR office nearby. We assisted an artist in Vancouver with his selection of a printer because his Inquiry/Survey form happened to arrive the day I was in Vancouver myself as consultant for another giclee atelier that was just getting ready to open. Naturally we are not otherwise able to provide personal answers nor personal visits except on a professional consulting basis. If you need color management assistance, we also recommend the RIT-trained professor at BGSU, Chuck Spontelli.

If you do not yet have any printer, you can simply ask your questions directly to John Lorusso or Randy Ross at toll-free 877 727-7682 or 978 670-7766 if out of the US. They know color management, scanning, BetterLight large format cameras, Cruse reprographic scanners, Canon EOS cameras, artist's canvas, watercolor paper, photo paper (matte, satin, glossy), and all three brands of printers: Canon, Epson, and HP.

TECH SUPPORT & WARRANTY

38. What is the original warranty period?

12 months parts and labor.

39. How does this warranty period compare to warranties of comparable printers?

A printer company needs to provide 12 months by tradition, and in the European Union warranty regulations are quite strict.

40. Who does the repairs? Manufacturer? Dealer? Distributor? Third Party?

Only an authorized dealer or authorized distributor, or authorized third-party resource should be considered. Not all dealers intend to provide service or even tech support themselves: they are just box-pushers (the jargon for a low-bid company that exists primarily on the Internet rather than having an actual show room, demo room, etc. Most box pushers have only sales reps who push the low cost boxes out the door. They are not familiar with giclee or color management or media: they only sell it as cheaply as possible, so if it's cheap Chinese media, you may be stuck with junk.

CONSTRUCTION: Miscellaneous

41. Is the width enough for target applications?

Since most canvas and photo paper is not available over 60 inches, about the widest you need is 60", but this is mainly for large production shops. The 60" width is used primarily for ganging up (nesting) multiple smaller jobs. Rarely is giclee produced at an actual 60" width.

Obviously if you are a large photo lab, a large giclee atelier, etc, then you may prefer a 60" width. But the normal fine art photographer, the traditional artist, and the rest of the market for which this printer was designed, they find 44" as sufficient, since you can always print an image 44" by 60" simply by turning it sideways.

But the 24" width is not sufficient. I did not realize the printer we were receiving for testing was only 24" until it was already en route. The main reason 24" is not wide enough is because FLAAR specializes in large-format (BetterLight and Cruse) and in medium format (presently Phase One) so all our test images are large. Large test images reveal the true quality of a printer better.

42. What about heater or dryer?

The only water-based printers that had a heater or dryer were the last models of Encad. This is because their printheads jetted excess ink and so much ink would not dry easily without assistance. ColorSpan was comparable in its jetting of substantial quantities of ink (to achieve high color saturation which was considered desirable for signage). With most appropriate media, you do not need a heater or dryer. If you intend to produce mainly signage, you can easily purchase a well designed, practical, and efficient heater/dryer from Black Body, BBC Industries, in Fenton, Missouri. They exhibit at either SGIA or ISA (or both).

Dr. Nicholas Hellmuth holds another test sample at Parrot facilities. The media was full-width capacity (44 inches).

AESTHETICS

43. How can you describe the design of the printer?

The printer has a basic "corporate" design. It is neither a fashion statement nor is it Chinese-looking. It looks like the style of other current HP printers, which is a bit better than Epson models (which are even more uninspired). Canon printers have a bit of style in their design that sets them apart (favorably) from more typical corporate-looking printers. But what counts is the capability of the printer, not just its exterior appearance.

44. Can you easily tell which is the "front" and which is the "back"?

The front of the printer is the output side and where the LCD panel is. This usually means that the other side is where you feed the material in. I call that the back. But many printer companies call the feeding area the front. It makes no difference as long as you define what you mean in advance.

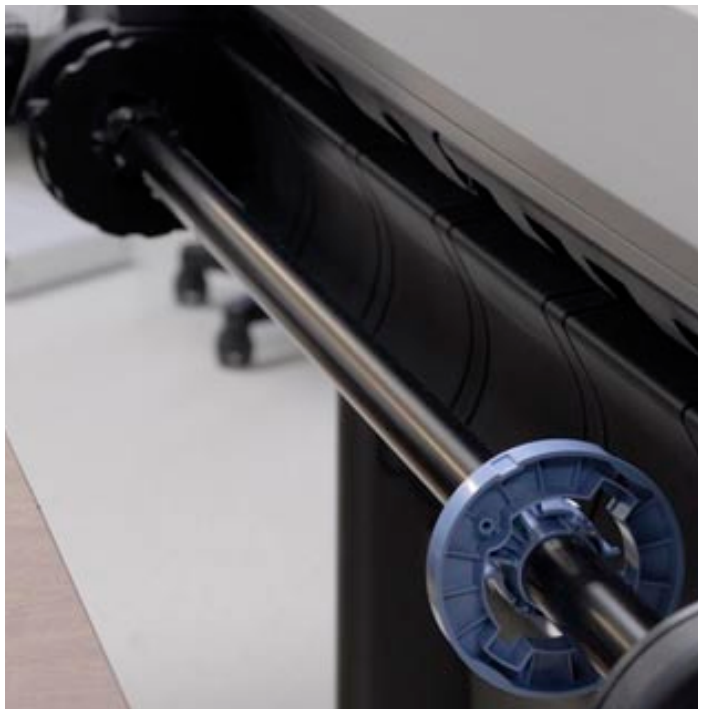
So yes, on all Z-series HP printers it is obvious which is the front and which is the back of the printer. A good example of a printer where all this is confusing is the Seiko ColorPainter 64S: it has no clearly defined front or back. Fortunately that does not affect print quality, which is excellent.

STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path

45. How is the roll held at the feeding position? On a spindle? On a saddle?

On a spindle.

A saddle is formed of two rolls with a slight space between them. You rest your roll of substrate on the saddle created by the two adjacent rolls. You don't need to run a spindle through the roll. You don't need to fumble loading the end of the spindle into two holders (one at each end). Loading a saddle is quicker as a result. But a saddle is primarily used on heavy-duty industrial printers 3.2 meters or wider where the weight of a roll may cause a spindle to sag. Plus, it's a headache to thread a spindle through a 5-meter long core.



Media roll is held on a spindle which has "roll stoppers" to fix rolls of different length.

"Once the printer finished the checks and preparation of the printheads, it was now ready for a printhead alignment. I was instructed by the front panel to load the paper that was supplied with the printer which was the 24"x15'HP Premium Instant-Dry Gloss Photo Paper. To load the paper, I removed the orange tape from the spindle/reel. I removed the spindle by lifting out the right-hand side first, then the left. I then removed the blue removable stop from the spindle.

I removed the sample roll of paper from the box and put it on the spindle, making sure that it would be unrolling from the top and into the printer correctly. I also made sure there were no gaps left between the paper and the removable stopper on the spindle. I then put the spindle back into its housing on the back of the printer."

46. How do you fasten roll-fed media to the take-up reel?

If you have the new optional take-up reel, then you either tape the media to the reel or run the media through the center slot.

47. Describe the overall path of the media through the system?

A simple path is neither a major benefit nor a defect. A simple path means that it's easier to load and there is less to go wrong. A more sophisticated system may have advantages for feeding some kinds of media.

"After loading the roll of paper onto the spindle, I then fed the leading edge into the printer. The printer automatically takes hold of the paper once fed to a certain point. As compared to other printers FLAAR has evaluated (Epson 7800, HP DesignJet 5000ps), loading a roll on the HP Z3100ps GP was extremely simple."

48. How much media is wasted during loading and feeding?

With some other brands and models of printers you suspect that they are deliberately designed to waste ink and media since this is how those companies get their profits. Media is moved too far out before you can cut it, resulting in media being wasted before and after cutting, etc.

49. Can you print on more than one roll of substrate simultaneously?

Being able to print on several different rolls of material simultaneously is common on grand format solvent-based printers but almost unknown (and unavailable) on printers less than 104 inches.

50. For handling ink that passes through the weave of fabrics or mesh, is there a trough? Or other mechanism to catch the ink?

A trough is a special option to catch the ink that passes through the open weave of an unpacked textile. Such a trough is possible only on a printer with a wide platen. Many quarter-million dollar solvent, dye sub, and UV printers have such a trough as an option. But no Epson, Canon, or HP printer that I am aware of has a tough. So if you intend to print on mesh or fabrics, they need to be paper-backed. You remove the paper backing after you print them.

51. Is there a cutter? Is it manual or automatic.

Most water-based printers 24" and wider have on-board cutters. These cutters are intended for standard photo papers, thin papers, etc. These cutters are not intended for thick artist's canvas or equivalent materials.

52. Is the cutter up near the platen (where cutting residue can eventually clog the printhead nozzles), or is the cutter further out, where detritus is not as much an issue?

This is the type of penetrating question that other reviews don't ask (because many are sham reviews or pseudo reviews). Left-over bits and pieces from the cutting knife are a major factor in printhead clogging and poor print quality. If you blow on this "dust" it makes it even worse since the detritus then scatters all over the nearby platen. This problem is not limited to HP; it is common on all printers. Giclee operators who use Epson tell me about their problems with their cutter detritus.

53. Is there a "knife guide," a slot where you can draw your knife down and across the width of the substrate?

Yes, there are actually two slits for a knife guide. One is across the front top, another is across the back top.

STRUCTURE: Miscellaneous

54. Does the printer have levels built into the structure of the printer?

The only entry-level or mid-range hybrid or combo printer where I have noticed levels actually incorporated into the structure of the printer are the UV-curable printers of Dilli.

55. Does the printer have leveling supports? How many, and how strong?

Most basic water-based printers do not have leveling supports. Leveling supports are found primarily on UV-cured flatbed printers, since they need to be absolutely level.

UPGRADES, Future Improvements?

56. Does the printer have wheels? How many, and how strong?

"Before moving the printer to any extent, it is essential to make sure that the wheels on the printer stand are locked. If these locks are unlocked, there is potential for an accident. After locking the wheels, we proceeded with the task of turning the printer upright."

57. What features have been added, or changed since the printer first appeared?

An after-market take-up reel is currently being tested.

The star-wheel system for helping to move media through the printer is to some degree unique on HP printers. Seven years ago the star-wheels were legendary for leaving spoke marks on some delicate media. The Z3100 printer also had to have it's star-wheels slightly re-designed, so if you have a model from the first months you might want to get your star-wheels replaced.

The stand has four wheels that can be locked.

Star-wheel system.

58. What features are being added, or changed, further out in time?

HP has shown prototypes of a giclee workflow at three trade shows in recent years (but not yet in 2008). Otherwise, HP policy has been to test a printer in-house long enough so that once a printer is actually launched, there are few additions, subtractions, or surprises on that same product. Same with Epson: they stick with what they produce at the launch, and don't change it (even if changes are needed). Canon is different: Canon reacts relatively quickly from feedback of end-users and tweaks their models within one or two years: so the Canon iPF5000 became the Canon iPF5100 in order to offer improvements.

Of course if the original printer is good from the go, there is not much need to quickly offer a new model. The HP 5000 is one exception; an upgraded version appeared after about 2 years (the HP 5500) but when it was launched, but the new features were primarily new firmware. So we treat the HP 5000 and HP 5500 as one model over its entire lifespan. This lifespan was longer than any Epson or Canon model primarily because the printer was ideal for its target market: we are still using our HP 5000 after all these years. It works fine, though naturally we would prefer to switch to evaluating the HP Z6100 with its many improvements.

OPERATING THE PRINTER

59. Can the operator manage print jobs via the Internet with this printer?

Many of the more sophisticated HP printers allow some remote management via the Internet.

60. What controls are on either end?

There are no operating controls at either end.

PRINTHEAD TECHNOLOGY

61. What other printers use the identical printheads or a model very similar?

The HP Z3100 and HP Z2100 use the same identical HP thermal printheads.

62. If the printer you wish to purchase uses a thermal printhead, what are the pros and cons of each thermal printhead (Canon, HP for HP and ColorSpan, Lexmark for Encad) Is the printhead considered state of the art, or one generation behind?

The pros and cons of thermal printheads is an endless discussion. Epson used to promulgate endless statements about how awful thermal printheads were, that they were a dead-end technology, etc. But Epson tended to use examples based on Lexmark printheads, which were low-end and used by Encad. Epson clearly did not foresee the advances that both Canon and HP have made in thermal printhead technology in the last three years. So it is ironic that today thermal printheads are faster and have more potential for still further advances than do the piezo printheads of Epson.

Piezo printheads from Spectra, Kyocera, Panasonic, Xaar, Xaar licensees (Seiko, Toshiba Tec, KonicaMinolta, Brother) are industrial strength and not as limited as are the relatively cheap and simple piezo heads of Epson. Epson printheads are fine for desktop, home use, and simple office tasks: so they are okay for what they were designed for. But today digital technology is advancing rapidly, and thermal technology for Canon (Bubblejet) and for HP are doing well.

But no one single technology is perfect, and no one single technology is all bad. Epson has the best dithering software, for example. Epson printheads produce handsome quality for fine art photographs. Their downside is frequent clogging which requires too much purging which wastes expensive ink, wastes time, and the purging results in eventually needing new printheads (at over $1000 per head).

You do your best with the technology that you have. HP also has the X2 piezo MEMS technology and the Aprion printhead technology too.

PRINTHEAD DPI & FEATURES

63. How many printheads per color?

It is increasingly common to have a single printhead handle more than one color. The HPZ3100 and HP Z2100 have two colors per printhead. The Canon iPF systems have six colors per printhead in the iPF5000, 5100, 6100, 8100, 9000, 9100 (so they have two printheads). The HP has two colors per printhead, so six printheads. Thus to answer the question, a half a printhead per color. What counts is how many nozzles, not how many printheads.

64. Which materials can be printed at bi-directional settings?

All the test images at Parrot Digigraphic during the evaluation period in March were done in bi-directional mode.

65. How many passes can this printer achieve?

The test prints at Parrot Digigraphic (March 2008) were done with 8 passes on one HP Z3100 and with 16 passes on the other.

Note: we are testing the HP Z3100 in four locations:

- FLAAR at BGSU in Ohio
- An avid hobby photographer in Guatemala
- SFC Graphics in Toledo
- Two HP Z3100 printers at Parrot Digigraphic

A separate FLAAR Report covers the two end-user experiences together.

66. How many print modes are there?

Three: Fast, Normal, and BEST.

67. Which materials really ought to be printed at the uni-directional mode?

Randy Ross of Parrot Digigraphic, indicates that some media, such as polypropylene, if you get banding at bidirectional mode, then run it at uni-directional or switch to BEST mode, and in most cases the banding goes away with the combination of the higher resolutions and slower speeds.

Colorful heliconias photographies are always good to make printer tests.

If you have a client that is willing to pay the extra time for slowing down the printer, and if you are printing onto photo paper, you might want to print in uni-directional mode. But if you are printing onto any material with a rough surface, such as canvas or watercolor paper, the rough surface texture of the material will not allow you to easily see the difference between uni-directional mode and bi-directional mode. So most people opt for speed (printing bi-directionally).

PRINTHEAD LIFE EXPECTANCY

68. How long do your printheads really last? Do you have that written in a warranty? If your longevity specs are in drops, please translate that into liters of ink or square footage of media.

In the past you had to change your HP printheads every few months or so; it depended on how much ink you used. The new HP printheads can last as long as a year, or even two years; this depends on how many head strikes you have (the head rubbing against abrasive media) and depends how many hours a day that you use your printer.

The warranty for the HP printhead is 18 months for nozzle outages. But we will need to read the small-print and learn more about the reality of this, since this kind of a printhead warranty is new, and unique. In the past a printhead was warrantied only if it was DOA, dead on arrival.

69. How often can you expect head strikes? What causes them? Who will replace the printheads and at whose cost?

Head strikes are the most common cause of premature head failure (another cause is constant flushing; the flushing seemingly wears out the nozzle system). A single head strike may wipe out only a few nozzles, or may kill the entire printhead. Head strikes may be occasioned by a diverse variety of situations:

- Improper loading of the media, which make cause buckling, because the media is caught, or not going through the printer properly.
- Thin media can curl, thereby causing a head strike on the curled part
- Edge guards may help, but not all printer brands have edge guards
- If media is absorbent, too much ink can make the material bubble up
- If media is curled or bubbled by heat; the head can hit the raised part
- If media is defective to begin with, or uneven, the head can hit the raised part
- If adhesive pulls off the material (such as Controltak), the adhesive may get stuck on the nozzle plate of the head.

FLAAR personnel places printheads during a printer set-up evaluation at BGSU, Ohio, US.

Some material is like sandpaper to the nozzle plate).

70. Is there an alarm system to stop the head from hitting the substrate if head is not high enough?

Yes and no; if the head hits an obstacle, it will stop, but there is no bumper system such as on the Mimaki JV5 (one of the best such head crash avoidance systems I have seen).

71. Which of these causes of failure are covered by the warranty? Which causes of printhead failure are not covered by the warranty?

The printhead warranty appears better with the new HP printheads. I still have to learn more about what is covered and what is not covered, and how long.

72. What does each printhead cost to replace?

A completely new HP printhead costs about $70 each, and are usable replaceable.

A completely new Epson printhead costs over $1000 to replace because it can be replaced only by a trained service technician. Epson heads wear out primarily from the constant purging (with expensive ink) which is needed in their head system.

A new Canon printhead costs $645 but covers six of the ink lines. A single HP head covers two ink lines. So you need a total of six heads for an HP Z3100 and two heads for a Canon equivalent (iPF6100 for 24" or iPF8100 for the wider model).

73. Is the printhead user installable?

" I shook each of the 6 supplied printheads while still in the packaging for a few seconds. This is done to reduce the time the printer takes to check the printheads later in the setup process. After opening the printheads, I removed the two orange parts from each printhead. I then inserted the printheads into their respective positions one-by-one in the printhead carriage. After installation, the front panel told me that all printheads had been inserted correctly."

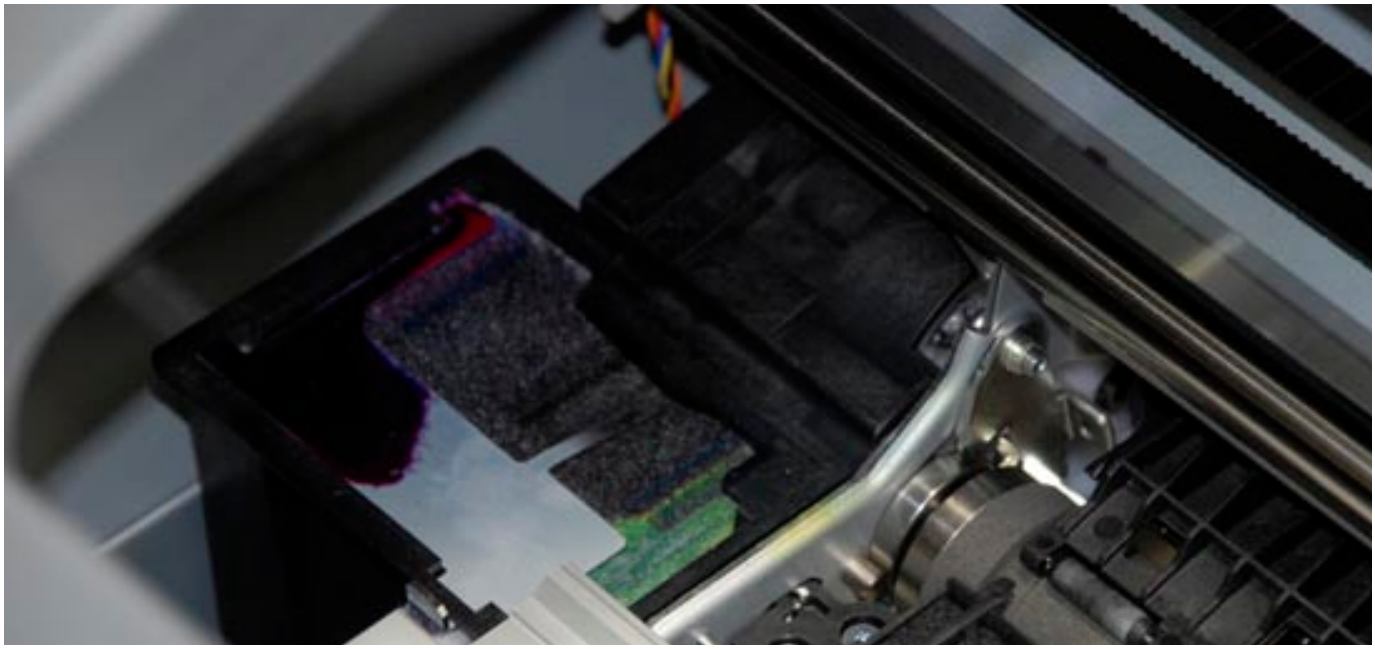
CLEANING & MAINTENANCE

74. How many levels (strengths) of printhead cleaning (purging and/or sucking) can be accomplished via the firmware (software?

I am only familiar so far with a single level of purging with the HP printer. Some other printers have a light purge and a heavy purge (such as Epson). Unfortunately all this purging wastes expensive ink, takes time, and wears out the printhead itself.

75. Is purging done with ink, or with a flush solution?

Most normal water-based printers (Epson, Canon, HP), purge only with ink and not with a special flush solution.



Purging is done at the left end of the priner.

76. Can you select which ink lines/printheads to purge, or can you only purge in clusters or all or nothing?

Yes, you can select either all printheads to purge or one individual printhead that has the specific color that you need to unclog (realizing that there are two colors per printhead).

77. Is there an off-printer dip-station or soaking station that is separate from the parking or maintenance station?

No, HP printheads are simply replaced if they get to a point that they are no longer providing perfect quality. With piezo heads, you can put them into an ultra-sound cleaner to vibrate solidified particles of ink out from the nozzles. This is not needed for any HP thermal head.

78. Does this printer spit, or "weep" ("flash") ink at regular intervals?

Solvent inkjet printers spit ink at the end of every pass in order to keep all printhead nozzles open. The reason is that if you are printing a banner with an area of pure cyan, then the other printheads will not be jetting ink (since their colors are not called for). In theory these nozzles will clog while not being used. So spitting allows all nozzles to eject ink occasionally.

Another way to allow all nozzles to squirt ink periodically is to have a band of CMYK or a band of six colors (CMYK light Cyan light Magenta) at one or both edges of the image, immediately outside the image area. This pattern causes every color to jet even if these colors are not being printed in the image itself.

The HP Z-series printers do an equivalent to spitting periodically when not being used, if left in Standby mode. So you should not turn your printer off at night or over the weekend; you should leave it in standby mode.

79. What part(s) of this printer tend to break down the most often?

Every printer has a few parts that fail more frequently than others. With the HP Z-series the paper sensor for feeding may fail after six months. But not on every machine; it's just like your car, or any other mechanical device. The HP Z3100 is still new, so we will keep our eyes and ears open to see what, if anything, fails. The HP 5000 was a real workhorse and not much on that failed even after many years. Yes, perhaps once every two years it needed a new part, but this is fewer service calls than my car.

80. How long can the printer sit unused? How should a printer be prepared for sitting unused for a long time?

You should leave your printer turned on in standby mode, so it can keep the printheads fresh.

CLEANING & MAINTENANCE: ROUTINE MAINTENANCE

81. What daily maintenance is required if you print the entire day long?

Be sure to keep the platen area and adjacent area clean of particulates (detritus from the media, both stuff that falls off naturally (mainly from canvas) and especially bits and pieces of material that fall off when cutting the media).

82. What other periodic maintenance is required by the operator?

You can occasionally wipe the nozzle plate or around the perimeter. Use special wipes with its special liquid. In the attached photo John , Parrot Digigraphic, shows how to do this. In the past such cleaning was not a normal practice. The new HP thermal heads are quite advanced compared to the heads in the HP Designjet 5000 and 5500.

83. What self-maintenance does the printer do on its own?
If left in stand-by the printer maintains the printheads on its own, by periodically spitting. Spitting uses considerably less ink than purging.

84. How often do filters have to be checked? Cleaned? Changed?
There are no user-replaceable filters that I have found so far.

85. Is a liquid flush cleaning solvent available as a separate on-board system?
Solvent printers and some UV printers have a solvent flush liquid that is moved through the entire ink system to clean it thoroughly. This kind of solvent flushing is not normally used on any Epson, Canon, or HP water-based printer.

CLEANING & MAINTENANCE: WASTE

86. How should you handle the drip tray, collection area, or waste bottle? How often?
In most normal usage of the Z3100 you would not need to collect or empty any waste ink collection area. But if you need to move the printer, you might need to have this area drained, because if you tip the printer on it's side, any small amount of ink that is in the waste collection area might leak out.

PRINTER DRIVERS & RIP SOFTWARE: FEATURES

87. Does the printer software really handle 16-bit images? Or does it only accept 16-bit images and process them on the sly in 8-bit?
"Accepting" in 16 bit is no problem, but the printer converts this to 8 bit per color to print the images.

88. Is your printer and/or RIP Pantone certified?
You can see the Pantone label on the high-end version of the Z3100 printer.

89. Although we tend to use PCs, is your printer equally Mac friendly?
"While testing the printer's capabilities we encountered a minor issue. We were printing some posters for a BGSU department and noticed after printing one of the files that there was a mistake in the text. The original Photoshop file was on the Mac computer so this is where we made the corrections, resaved the file, and brought it over to the PC that is connected to the HP Z3100ps GP. When I tried to reprint the file I received an error from the printer stating that it was the "wrong file format" and it was unable to process the print job. I tried several more times just to make sure I had not made an error, I even went back to the Mac to resave the file, still no progress. Finally, I went to the Mac and saved the file under a different name. Placing this file on the PC, I was then able to print the poster. I can't explain why we encountered this problem but the solution was as simple as saving the file under another name."

PRINTER DRIVERS & RIP SOFTWARE: WHAT SHIPS WITH THE PRINTER

90. Does the price of your printer include a RIP? If a RIP is included or part of a package, is it a lite RIP or a full-featured RIP? Can this RIP be updated or run any other printer?

The "ps" version includes a RIP built into the system.

91. If no RIP is bundled with the printer, how many and which RIP brands can work with this printer? What is your rating of these various RIPs?

Since the printer is still rather new not many outside RIP companies have fully integrated their software with the on-board Eye1 color management system.

92. Can your printer function realistically with no RIP whatsoever? If so, what features are missing or slow down without the use of RIP?

Epson is the best with having a printer that does not need a RIP; Epson printers can function on their own internal drivers. A RIP, however, gives an Epson more advanced functionality. Most pros will use RIP software sooner or later.

The HP Z3100 printer, even the non-PS version will work without an internal or external RIP, but is limited by a lack of RIP software (as would be true with most printers). In other words, sooner or later you will need a RIP. We find Caldera, Wasatch, and ErgoSoft RIPs worth looking at. Many other RIPs are available, but these are the companies that are large enough to develop improved features every year. Some other RIPs are too complex or have a poor dithering pattern. Some other RIP companies are too small to have enough software engineers to handle the increasing complexity of today's printers with updates fast enough.

Randy Ross, Parrot Digigraphic.

COLOR MANAGEMENT FEATURES

93. What color management software is included?

What differentiates the HP Z-series printers from Canon and Epson is that the HP systems have color management inside the printer: both a spectrophotometer and associated software. Although ColorSpan has a similar system, it required a lot of end-user interaction. The HP system is both different, more user-friendly, and more thorough.

The color management aspects of the HP Z-series printers deserves an entire evaluation on their own. The present FLAAR Reports is a general introduction to the overall printer. As time and research funding is available, we will tackle evaluating the color management aspects of this printer.

"Upon inserting the software disc into the computer, the HP Advanced Profiling System for the HP Colorimeter automatically loads up on the computer. After clicking install, the software then led me to a step where I had to check a box to allow the software to connect to the internet to automatically download the latest version. I checked this box and clicked Download. The software attempted to open a page via an Internet browser. However, the site was down at this time. The page that loaded said "Page Cannot Be Displayed." I have tried numerous times over a week-long period, and have yet to be successful with the installation of the HP Advanced Profiling Solution.

Since I was unable to get the HP Advanced Profiling System to install on the computer that would be handling all operations from the HP Z3100ps GP, I decided to go on and calibrate the printer for the different types of media we received from Parrot Digigraphic. To figure out how to calibrate the printer for new media, I referred to the HP Z3100ps GP Photo Printer Quick Reference Guide. This guide was very easy to understand because it incorporated many visuals as well as descriptive text.

To begin the calibration, I navigated to the Image Quality Maintenance option through the main menu. At this point, I still had the sample roll loaded so there was no need to tell the printer what material would be calibrated. Once I clicked Calibrate Color through the front panel display, the HP Z3100ps GP began calibrating the loaded material. First, the printer prints a calibration chart which includes patterns of each ink used in the pritnter. Next, the chart is allowed to dry for approximately two minutes. Then, the HP Z3100ps GP rolls the printed chart back into the printer to be scanned and measured using the HP Embedded Spectrophotometer. After the printer has scanned the calibration chart, it makes the necessary adjustments based on the printer measurments to ensure consistent color printing on that specific material. This process also determines the maximum amount of each of the 12 inks that can be applied to that specific material.

INK

94. How many different kinds of ink are available?

In the past HP offered both dye ink and pigmented ink (for the HP 5000 and 5500, for example). You could switch from one to another (took about 30 minutes). But now the new pigmented form of Vivera ink is so advanced that dye ink is no longer needed. Dye ink has the problem that it is blemished if a drop of liquid hits it, and dye ink prints, in humid weather, deteriorate rapidly. Ozone also blemishes dye ink (and is probably not good for pigmented ink either).

95. What company makes the inks? Choices include DuPont, Jetrion (Flint), Sericol, Sun, Triangle, KonicaMinolta, Tetenal and several others.

HP does not identify who actually makes its ink. In the past it was leaked from other sources that DuPont made HP's pigmented ink for the HP 5000. There has not yet been any leak of who actually makes the Vivera dye ink nor the Vivera pigmented ink.

96. Does the printer itself have a means to keep track of ink usage? Is this a guestimate, or an actual count of droplets fired?

Yes, the HP Z printers can keep track of ink usage and media usage too. In most cases this is an educated estimate based on statistics.

97. Where are the printer's ink containers located? Front, back, or sides?

"To begin installation of the print cartridges, I began by shaking each cartridge as instructed, while still in the packaging, for about 10 seconds. I then placed the ink cartridges into each of their respective positions. Half of the print cartridges are housed in the right side of the printer (Light Magenta, Light Cyan, Photo Black, Light Gray, Matte Black, and Red), whereas the other half are located on the left side (Gloss Enhancer, Gray, Blue, Green, Magenta, Yellow)."

98. How much ink does the ink container in the printer hold?

130 ml.

99. How is new ink added? Pouring into the on-board container? Switching the container to the new ink container?

You take out the old ink cartridge and slip in the new ink cartridge. The software does the rest.

There are two ink compartments located at each end of the printer. As you can see, each cartridge holds 130ml.

100. Is your ink unique to your printer? The downside is that few media will be available.

That is the disadvantage of Epson's unique inks. Similar downside with Seiko and XES oil-based inks. The same problem is true with lite-solvent or eco-solvent inks. Because so few printers use the unique inks, not many media companies bother to make a low-cost paper for such a small market. So if you buy a printer with unique ink (Epson, etc), your media (and ink) costs may be substantially higher over the total cost of ownership. HP pigmented ink, in distinction, is a standard international ink used in ten times more printers than Epson (HP sold more than 150,000 of their HP 5000/5500 printers; that is probably more than all Epson 44 and 60" printers put together). This means that lots of economical media is available for these thermal printhead machines.

101. What kind of protective devices are on the ink system to keep you from using after-market ink?

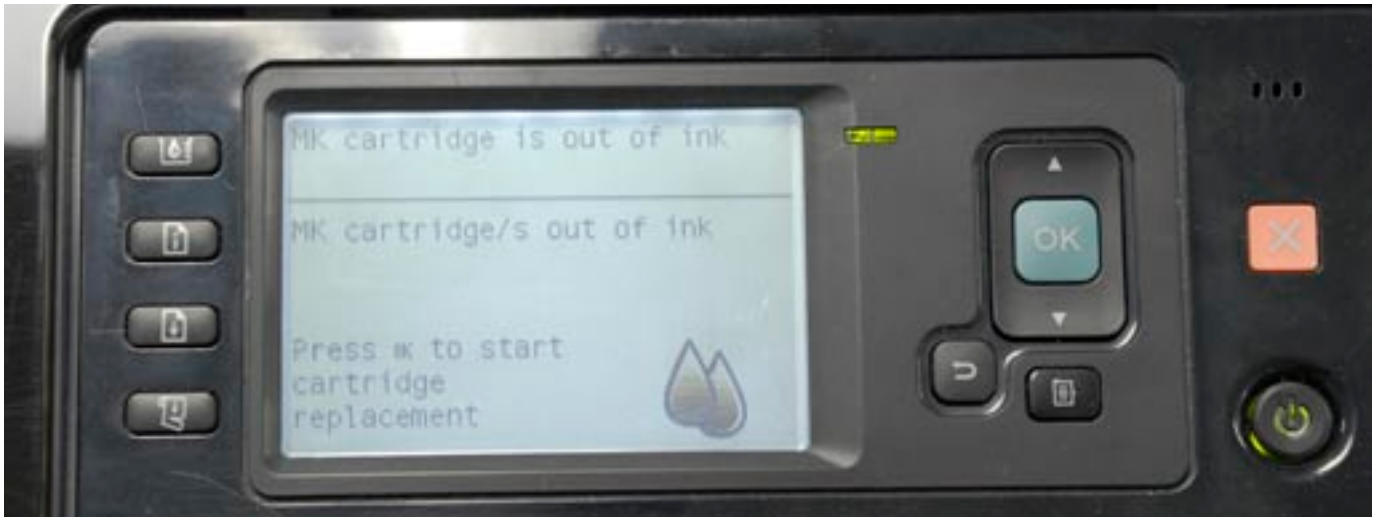
You can expect abundant and sophisticated protective devices on the ink system to deter you from using after-market ink.

102. Does the printer have or need a dryer? If not, why not? If not, how can you explain that other printers are adding dryers and that several after-market companies are now making dryers?

For most media, especially in a printer for mid-range usage, there is no specific need for a dryer.

103. Is there an ink-out alarm, or only a message on the monitor?

There is a notification but no blinking lights; no alarm as such.



You get ink and media usage notifications from the printer display panel and from the software.

104. Is the print usable when you have to refill ink halfway through printing?

If you run out of ink half-way through, the image will probably have a defect, and will most likely have to be redone from the beginning.

105. What color shift do your dye inks go through during their drying cycle?

All ink shifts color gamut as it dries. This is why you have to wait some minutes before you do your color management profiling. The new media and new ink are developed in order to make the color change resolve itself more quickly than in the past. In the past, color management pros would want to wait a longer time before attempting to do ICC profiles.

106. If you change ink, how much hands-on work is required to set up the ink system? Is hand priming or sucking the ink down the tubes required of the operator? Is head priming automatic, or operator initiated?

The Encad NovaJet printers were legendary for all the time and patience you had to waste every time you added new ink or a new printhead. With new printers in general, and especially with this new HP printer, you simply shake the ink, insert the new cartridge, and let the printer do its automatic routine to accept the new ink cartridge.

107. What other problems have people reported with your inks?

"I did run into a problem with the Yellow ink cartridge while installing. Each print cartridge is manufactured to have a certain shape on the bottom which fits into the track in that cartridges location where the ink is housed. The Yellow ink cartridge that was supplied with the HP Z3100ps GP did not fit into the slot that it was supposed to because it did not have the correct shape on the print cartridge. On the bottom of the Yellow cartridge I noticed the stamping of the letters LG and compared it to the Light Gray cartridge to confirm that the Yellow ink cartridge that did not fit was manufactured in a cartridge that was supposed to contain Light Gray ink. I opened an extra Yellow ink cartridge that was supplied by Parrot Digigraphic, and used it instead because it was manufactured in its correct cartridge. Every color/cartridge had a different die cut for that was supposed to en-

sure that it would only fit in its designated slot. I believe this is unnecessary because the printer itself has labels as well as the individual cartridges so confusing the ink cartridge locations would be difficult. Standardizing the design of the ink cartridges would make more sense. By incorporating a specific die cut for each cartridge, there is greater chance for human or machine error during the manufacturing process, I believe this is what we encountered with the Yellow cartridge."

INK: COST

108. Does ink come in cartridges or bulk? How large are the ink containers for replacement ink?
Ink comes only in 130 ml cartridges.

109. What is the cost per container? What is this cost translated to liters?
You can save a bit if you buy the ink in Twin Packs, $132 list price for 260 ml of ink (2 x 130 ml). Compare this with the cost of Epson ink for 220 ml, $112.

INK: LONGEVITY

110. Does the ink rub off?
If you have your ink limit set correctly, based on linearization and associated software, then your ink load should not be excessive enough to rub off. Of course this depends on what media you are using, and factors of ambient temperature and humidity and how long the image has had to dry.

INK: COLOR GAMUT

111. How many colors are used in the ink-set being evaluated here?
This and the Canon system are called "twelve color" but of course they are not really 12 colors. First, they each have matte black and photo black. Normally, you use one or the other, so this leaves you with 11 ink lines that you would use at one time. All flavors of black are still just black; technically they are not three different "colors". There is an upcoming FLAAR Report on multi-color ink sets: some ink sets have up to 14 different "colors."

- Light Magenta,
- Light Cyan,
- Photo Black,
- Light Gray,
- Matte Black,
- and Red at right;

- Gloss Enhancer,
- Gray,
- Blue,
- Green,
- Magenta,
- Yellow at left.

HP Designjet Z3100ps GP. Linearization test patch.

112. What kinds of media provide the best color gamut?

Some photo papers have an inkjet receptor layer that facilitates a better color gamut than other materials. And media that is tested, evaluated, and has it's specifications set by the same company that provides the ink, will tend to be better than a random or miscellaneous media that attempts to be "all things to all people."

This truism is because print quality is a result of an ink+media interaction. A good printer is only the first step. If the ink and media are developed together, then the results will be significantly better than if an outside company develops a media without access to HP labs. I have visited the HP labs in San Diego; I have visited HP large format printer world headquarters in Barcelona three times. By the time you read this, I am already getting a plane ticket for a fourth visit to Spain for additional training, testing, and evaluation, this time of the new latex ink, which will allow giclee, décor, and fine art photographs to be exhibited outside as well as in sunny rooms inside.

FLAAR uses after-market media; always has, but some of this media turned out to be so bad we stopped using that brand. Sihl was one; other people have also mentioned they stopped using Sihl for comparable reasons. But by no means is all Sihl media unacceptable; it's just that they tried importing from China, and clearly even from their European mills had some coating issues in past years. We will consider experimenting with current Sihl media if our staff has time and resources; for the present evaluation, we are using primarily media tested and approved by HP simply because it costs money to test and evaluate media from other companies.

113. What kinds of media provide the lowest color gamut?

Randy Ross (Parrot Digigraphic) comments that some kinds of canvas provide the lowest color gamut. This is because artist's canvas is, by its very nature, inherently not pure white. And many giclee ateliers prefer not to use media with artificial whiteners. All these issues are precisely why we recommend resellers who know canvas inside out, who stock a diverse range of canvas, and who don't sell predominantly canvas from China. There have been repeated issues of canvas from one previously world famous reseller in California whose canvas has been a scandal for over a year now. They went from being famous to infamous.

Since canvas varies batch by batch, we do not currently certify individual brands (we will be testing canvas as soon as FLAAR Europe office is opened; we are currently negotiating with a university there). In the meantime, if you buy low-bid you may end up with junk canvas, butt rolls (the leftovers from converting plants), or canvas from China or even other countries with an even worse reputation. The canvas that we use at FLAAR comes from HP and from Parrot Digigraphic.

114. For media that provides restricted color gamut, can you rescue some of the missing pop with a top coat?
Yes, there are two major brands: Premier Art and Clearstar (Clearshield). You can ask Randy Ross of Parrot Digigraphic about the pros and cons of each brand, and how to apply a clear coat (top coat). If you are a major production shop, you can also consider a liquid coater or liquid laminator. If you are a million-dollar giclee facility you might wish to look at a UV coater (not a UV printer, that is something else).

115. How about a large black fill area? Can your printer achieve an acceptable black without banding tracks? What about puddling?
In the test prints at Parrot Digigraphic, both with 8-pass and 16-pass, there was no banding. In the past banding was an instant give-away that a print was from an inkjet system. Banding is simply not acceptable, period. So far there are no banding defects on the HP Z3100 test prints. If you put it in FAST mode, then you may get banding, but as a photographer I would always want my photos at quality rather than speed.

MEDIA

116. Is this printer intended to accept canvas and watercolor paper?
The HP Z3100 is specifically designed to accept thick materials such as canvas and watercolor paper.

117. Can the on-board cutter handle canvas or thick water-color paper?
Yes, the on-board cutter of the Z3100 can handle several grades of water-color paper. But most on-board cutters are not intended to even attempt to cut canvas. For canvas you need to utilize the knife-slot with an X-acto knife.

118. What about printing on textiles?
HP printers can handle backed-textiles. But otherwise, HP has not yet fully entered the world of textiles in the same sense as has Mutoh, Mimaki, Roland, Yuhan-Kimberly, d-gen and many Italian printer retrofitters.

119. What about aftermarket media (brands other than the printer name brand)? HP, Encad, ColorSpan, and Canon can use about any and all media available. Some printers can print on newsprint for proofing) and Kraft paper for artistic effect. What about your printer? Ignore the claim "it prints on a wide range of media." That is just a smokescreen. The real question is, "Can Printer X print on as many media as can Printer Y?" Printer Y is the one that can actually truthfully print on almost everything.
Roland went to considerable effort to make sure that buyers of their Roland printers did not even try to utilize after-market media: Roland dropped using Wasatch RIP (which allowed end-users to handle add-on ICC profiling software for after-market media). Roland created their own RIP that accepted profiles only Roland-branded media. This is a backwards policy.

FLAAR supports and encourages printer manufacturers to allow people to experiment with diverse media. For example: wallpaper. If HP offers no wallpaper media it is not productive if a print service provider can't EASILY profile and print on wall paper.

So we give positive grade to HP for not attempting to foil the use of after-market media.

IMAGE QUALITY ISSUES

120. What sort of things causes image quality issues?
Dust is a potential problem for quality output in all printers. Bits of the cut media (that is cut by the auto-cutter) is such a problem on the Epson that most professional users don't or can't use that auto-cutter.

121. Is there banding in areas of solid black?
So far the HP Z3100 gets a rating of Excellent for solid areas of black: no banding.

APPLICATIONS

122. Does the manufacturer address the overall workflow, or do they just try to sell you the printer and then sort of abandon you?

HP is one of the first companies to address the entire workflow, at least the color management aspect. At ArtExpo and DecorExpo trade shows in 2006, HP also addressed the digital capture part of the workflow for giclee. But the giclee software has not yet been implemented. It is being used only in beta test sites.

123. Can you print fine art photos, giclee, or décor?

Yes, this printer is specifically made for photographers, artists, photo labs, and anyone who likes to produce photographs with attractive color and professional quality (which means no banding).

124. Can you print on textiles or fabrics? How do you handle the ink that gets through the weave?

You can print on paper-backed fabrics. But otherwise, at present HP is not oriented to printing on textiles. But HP is quite knowledgeable in textile printing, just that it has not yet decided to produce a printer specifically for textile printing.

125. What other kinds of applications can you print?

The Z3100 can print signage, trade show graphics, POP (point of purchase), as well as anything else in color. Applications are limited only by your imagination. But so far this evaluation is concentrating on photography and art reproduction (giclee).

ADVERTISING CLAIMS: realistic, exaggerated, or misleading?

126. Is there enough new on this printer to make it worthwhile buying it if I already have another recent model?

The Z-series printers are significantly improved over all previous 6-color HP Designjet printers. So the answer to this question is a definite YES. The Z3100 produces gorgeous color at professional quality, and you do not need a PhD to operate all this.

If you already have an Epson 4800, 7800 or 9800, there are no substantial improvements with the Epson 4880, Epson 7880, or Epson 9880 (at least none I have noticed so far). Yes, of course the advertisements list all kinds of illusionary improvements, such as admitting that the inks on the earlier models were so bad that they had to brew new magenta inks and pretend to create a whole new printer. All that changed was the model number, adding a network card (that used to cost extra), and a few other miscellaneous changes. I was very disappointed. I have spoken to several people who use the Epson printers. If they are fans of Epson, they tend to say they are content, though in the same breath they list all the deficiencies. But this is not a bad printer; it produces good results. It's just that today is the year 2008, and the HP and Canon moved into the market for giclee, décor, and photography of all kinds. Epson is no longer the king of the mountain; there are now energetic challengers.

I use a Mac laptop in my home office, and a Mac desktop in the university. I know that a PC offers other advantages, but I feel at home with a Mac. However I encourage my staff to use whichever platform they prefer and most use Dell PCs.

It is comparable with printers. If you want an Epson you will buy an Epson. I am content with the quality of the Epson 7800 that we have used for years. If an Epson 7880 were available, we would test to document what is new and improved (surely there is something). FLAAR has plenty of gorgeous test images of orchids, bromeliads, heliconia, and cacao fruits, as well as architectural photography and images in B&W taken with the MegaVision (the only B&W-only dedicated medium format camera that I am familiar with). We have a 22-megapixel PhaseOne P25+, a 48-megapixel BetterLight, an 80-megapixel Cruse to produce test images, plus a new Nikon D300 and a Canon EOS 5D.

Acknowledgements

I thank Wendy Like for organizing to receive, unpack, and set up the evaluation of this printer. I thank Darren Lamb, a student of VCT (Visual Communications Technology) in the College of Technology at BGSU for his helping with the unpacking and set-up of the HP Z3100 printer. Wendy Like is the manager of the BGSU printing facility that uses the printers provided to FLAAR for evaluation. Two or three other BGSU students have also assisted.

All text that is based on their use of the printer is from them. All text that is based on testing the printer at Parrot Digigraphic is based on my work there with John Lorusso and Randy Ross.

This text was turned into a PDF by the graphic designers of the FLAAR office in Guatemala, including Jose Melgar. Our staff at this office currently numbers 18 people and growing. Since all this labor appreciates their monthly salaries, we appreciate the research stipend that made the production of this full-color PDF possible.

The web sites on which this report is distributed include

- www.FineArtGicleePrinters.org, read by over 162,000 people last year
- www.digital-photography.org, read by over 380,000 photographers last year
- www.wide-format-printers.org, read by over half a million printshop owners, managers, printer operators and other people interested in FLAAR comments on Epson, Canon, and HP printers

To maintain all these pages requires that each site have their own full-time web designer, in-house, on the FLAAR staff. So again, we appreciate funding from industry that makes it possible to assist printshop owners and managers with having access to our experience, our comments, and our photographs of these printers in action via the FLAAR Reports.

We cover solvent-based, eco-solvent, mild/lite solvent and UV-cured flatbed printers on www.large-format-printers.org, read by over 278,000 people around the world last year.

PROS

If you buy your own professional level ICC profiling hardware, and your own pro level ICC profiling software, and if you take professional training, your costs for all of this will be potentially over $5500. For about the same price you can purchase an entire HP Z series printer that has most of this already included INSIDE the printer.

HP offers intelligent assistance in the form of PDFs on their web site. The few PDFs that I have seen are educational.

A major plus of the HP Z series is that clearly thermal printheads still have potential. I can remember five years ago when Epson booth personnel spun their myth of the supposed superiority of piezo printheads. They listed all the downsides of thermal printheads (usually based on Lexmark thermal heads used by Encad). But Epson clearly did not foresee the reality of thermal printhead technology advancements that first Canon and now HP has demonstrated

The new generation of HP printheads are advanced in many aspects, for example, they last longer, they are warrantied for 18 months, and you can wipe them to assist in cleaning them. In the past you simply threw the heads away if they gave you trouble. It is more practical and less cost now to maintain the heads.

A specific attribute of these new improved heads is that they maintain themselves by occasionally spitting. But you need to leave the printer in Standby mode (in other words, don't turn it off completely).

CONS

No printer is perfect. One limitation that has been mentioned is that the budget version of the Z3100 (the non-ps version) has a limit on file size acceptance of under 600 megabytes. Some of my panoramic photos are well over this, but fortunately I have the Z3100ps GP model.

One glitch that our evaluators ran into was identical to a problem that the operator of another HP Z3100 faced (this is where I did a separate inspection, evaluation, and review, a separate FLAAR Report). He found that the HP web site that he needed to access for some aspect, was done continually, and was very frustrating to him. My visit to his printshop was several weeks

before our team at BGSU ran into a similar problem. I do not know if they were attempting to access the same page, or the same website, but that web site support system definitely is a weak feature.

One ink cartridge seems to have been mis-labeled during manufacturing. This should be helpful for HP to receive this cartridge back, and find out where, when, and why this happened. It would not be good for an entire ink batch to be in the wrong ink package. We are finishing this report on a weekend and as soon as the print lab opens again I will check on this issue.

As soon as we experience additional downsides, issues, problems, I will update this evaluation. We have interviewed two other owners of the Z3100: one is a seasoned printer operator in a million-dollar digital printing company in Ohio. For him this printer was easy to operate from Day One because he has years of background in color management, inks, inkjet media, etc.

The other owner was a much better test: he is an experienced pro-sumer photographer (an advanced enthusiast). He can handle complex equipment (such as a LearJet and helicopter). But color management was new for him, so he sent an e-mail and we sent over Eduardo Sacayon to assist him further into the mysteries of color management on the HP Z3100. I myself have had to have multiple training sessions in color management, from RIP companies and from HP as well as many conferences and seminars. So I can understand how a person, facing color management for the first time, would understandably seek a consultant.

So in the future, it might be useful for FLAAR to initiate a project to prepare some training modules that could be arranged to be made available to past, present, and future buyers of the HP Z2100, HP Z3100, and HP Z6100.

General Comments

But what is most telling about reading the printer blogs and user groups is that naturally some users simply prefer their Epsons and will always buy Epsons (note: at FLAAR we have Epsons at both our offices). It is the same way with Macintosh: some people will buy Mac no matter what (second note: I write all FLAAR Reports on a Mac and we have Macs in both our offices, but we also use Dell PCs in both our offices). FLAAR also has Canon inkjet printers (and Mimaki and in past years had ColorSpan DisplayMaker).

Most of the "cons" listed on user groups are the mantra that "this is the first photo printer that HP made, whereas Epson has experience through four generations of models." Yes, but also no. Epson has four models because the early models needed significant improvement. And the new various x880 models are the same as the old 4800, 7800, 9800, with only a new ink and a few other minor features, such as including a network card that used to be an option for more $$$. This comment comes from a person that has experience with previous generations of Epson printers, who now has the new 9880 and who also knows both Canon and HP.

My comment would be that HP has been making wide-format inkjet printers longer than most other manufacturers but Encad (Encad was before HP for serious wide-format inkjet printers). Encad had no printhead patents and their printer did not advance much after the 1990's; Kodak bought what was left and their last attempt withered in the face of better printers from Epson, HP, and Canon.

Plus HP has had their desktop photo printer now for over two years. So the HP Z-series are second generation. Plus I have printed entire photo exhibits with my HP 5000 and my HP 5500. The most successful giclee atelier in California (Squirt Printing) uses exclusively the HP 5500 for many years. The first giclee atelier ever (the one that gave the name giclee to the industry) was using HP printers for fine art three years ago; and ColorSpan for larger images on watercolor paper or canvas: he said he preferred them all over Epson. Naturally he also had several venerable Iris printers. FLAAR had an Iris giclee printer too; we junked it last year but still use our HP 5000 and several Epson printers.

During 1999-2002, most printshops used Roland printers for giclee and fine art, but the risk was banding, and color drop-out (heads would clog half-way through a print, ruining it). By roughly these years Epson had gradually begun its long climb into this arena. By 2003-2004 Epson had taken over the proofing, fine art photo, and giclee market probably over 75%, with a small percent still with Roland, and a few with Mimaki. Mutoh dropped out quickly. But an equal small percent used HP 2800, 3500, etc before the HP 5000 came out. Epson peaked in 2005-2006; their trade show booths were filled in these years.

But then Squirt Printing was given the opportunity to showcase HP capability in giclee: in 2006 especially (ArtExpo and DecorExpo, both in New York and in Atlanta). During this period the HP booth attracted more visitors than ever before; the Epson booth in the same show was physically and literally empty most of the day. Yet just two years before, the HP booth at a photo show was also almost totally empty, hour after hour. In that same earlier show so many people wanted to get into the Epson booth you had to wait in line up to half an hour.

Today even Canon is a player in this field. Canon, and HP, have deep pockets. Epson has a shrinking market share precisely at the awkward moment that it has two huge competitors sud-

denly appear in the fine art photo, giclee, and décor markets. Although Epson is holding on to the proofing market, a growing percent of photographers and artists are switching to HP. Some have switched to Canon but got a bit disappointed with the dithering pattern (a field where Epson is still #1). Canon has worked to correct that aspect, but we do not yet have any iPF "100" printers (iPF6100, iPF8100, iPF9100).

HP comes from the world of plotters for CAD, GIS, and technical drawings. HP held 90% market share in these applications for years. Even with Canon's attempt to gain market share with their iPF 500, 605, 610, 710, and 720 printers for CAD and GIS, HP still has probably over 70% of these markets in most countries (Canon success varies considerably depending on country).

The most popular inkjet printer in the world over 36 inches is the HP Designjet 5000/5500 (identical printer, just slight update for the 5500). FLAAR was provided three for testing and our evaluations documented the impressive capabilities of this printer in multiple applications, including giclee, décor, and fine art photography. Indeed the most successful giclee atelier in California, Squirt Printing, went all-HP (and all HP 5000/5500) after reading FLAAR reviews.

Then Canon came out with a 12-color printer, and giclee ateliers in Greece, Monaco, the US all wrote telling me they bought Canon iPF printers on the basis of FLAAR (this was before the HP Z3100 was available).

It is nice to see that HP has recognized the market potential for printing fine art photos, giclee, and décor: indeed enough recognition to have produced two models: Z2100 and Z3100, especially for individuals and companies who are just entering this market (the 60-inch Z6100 is for larger companies that need to print all day every day).

All these HP Z-series printers can also print indoor signage as well as outdoor signage that needs to last a reasonable time, such as outdoor banners at trade shows and POP in mall store windows that face the outside. Soon HP latex ink will also be available for these applications, and lite-solvent is already available, but most print service providers don't want the smell and VOCs even of an eco- or lite/mild solvent.

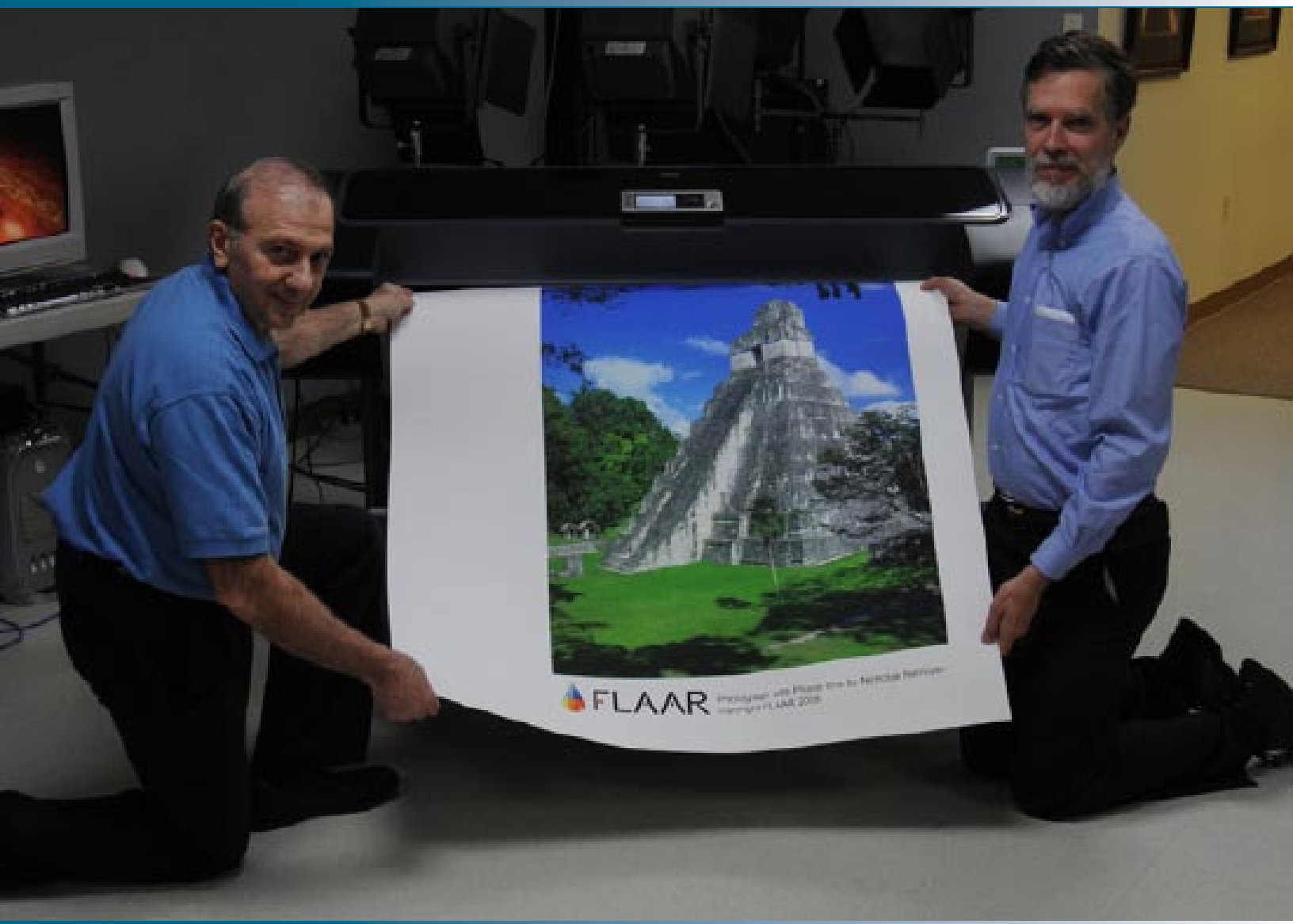
So it's been a long journey from the world of plotters in past decades. As I was sitting in the demo room of Parrot Digigraphic, I looked out at all the images we printed that day and asked out loud "who, and why, would anyone want any printer other than this." I was half dead with jet lag from having just been four days in Israel for the first technical briefing on the new latex inks from Dr Ross Allen and his team from HP San Diego (Dr Nils P. Miller, Senior Scientist, Research/New Technology, Inkjet Media Division) and specialists from the Barcelona HP inkjet world headquarters (Tomas Martin, Product Manager, who has briefed me on several previous trips to Barcelona on pending new product developments). But although suffering from sleep deprivation from the 14-hour flight from Tel Aviv then 2 hours to Boston from Atlanta, the adrenalin that was brought into action by seeing the test prints kept me awake (though I will admit that two bottles of Coca-Cola helped also).

The only negative thing I can say about the Z3100 is that it's too bad I have only the 24" model. The 44" model would have been so much nicer to showcase the diverse color gamuts of the FLAAR test photos from medium format, BetterLight large format, and Cruse large format digital cameras.

The best way to conclude this evaluation is to suggest that you test the HP Z3100 yourself, with your own images.

Apendix

HP Z3100ps GP Printer Evaluation



By: Darren Lamb
BGSU Co-op

Purpose

The purpose of this report was to evaluate the level of difficulty at which a HP Z3100ps GP could be assembled and connected using only the documentation that came with the printer.

Assignment Background

The HP Z3100ps GP was to be assembled and setup by an individual who had no relationship to any printer manufacturer. The individual, a Bowling Green State University(BGSU) co-op student, was to use only the printer's user manual or other included documentation that initially came with the printer. Technology support was available through HP, however the assignment stipulated that technical support was not to be initiated.

Note: The purpose of FLAAR evaluations is to see whether an individual with minimal technical background could setup a HP Z3100ps GP as easily as setting up a home office inkjet printer.

Printer Arrival

The HP Z3100ps GP arrived at the BGSU Large Format Print Lab at 12:30pm on Monday, February 18, 2008. The printer was delivered on a full-size 18-wheeler. Our company is located in a building with a connected warehouse, so we had all the necessary facilities to unload the printer with ease. However, if someone was to receive this printer that was not equipped with the facilities similar to that of what we have available (warehouse dock and fork lift), they may find unloading the printer to be rather difficult. The packing slip that accompanied the arrival of the printer lists the freight weight at 230 pounds. Therefore, it would be quite a strenuous task to try and unload such a package without special equipment.

Unpacking the Contents

Included with the HP 3100ps GP:

- 8.25"x11.5" instructions
- Rear sheet feed tray
- HP Z3100ps GP inks (12)
- Power cable
- HP Start-Up Kit (software)
- Printer stand including basket
- HP Dry Gloss sample roll
- HP Z3100ps GP printheads (6)
- Network cable

The HP Z3100ps GP loaded up in the delivery truck.

Delivery driver pulling the HP Z3100ps GP off of the trailer.

Project Manager, Wendy Like, moving the HP Z3100ps GP up to the front the FLAAR+BGSU lab by fork lift.

The HP Z3100ps GP arrived in a large box with approximate dimensions of 57.5"x30.25"x24.5". The box was accompanied by a pallet of equal length and width which provided a sturdy base for the package. The package and pallet were adequately fastened by two shipping straps. The design of our facility rendered it impossible to use the forklift to move the box to our front office print lab. Therefore, it was neccessary to manually relocate the printer and box. After cutting the straps with a pair of scissors or utility knife, the box and pallet were easily separated. The weight of the box hindered two people from carrying it for any length of time so we decided to open the box in our connected warehouse where we initially received shipment.


Wendy Like getting ready to unpack the contents.

After removing the top of the box, we were able to easily find the packet of unloading instructions which were 8.5"x11.5" color printed on durable paper. These instructions were very easy to understand because they incorporated many visuals as well as descriptive text and symbols. All smaller boxes within the main box were placed in a manner that would not allow them to move during shipment. The actual printer was set inside two large pieces of Styrofoam to ensure that the device would not be damanged in a normal delivery. Everything we unpacked from the main box was in perfect condition because the packaging was efficient.


BGSU cooperative education student, Darren Lamb, assisting with the unpacking.

We began unpacking the box by taking the smaller boxes, which were within the larger, out and walking them up to our lab in the front of the building. These boxes had no restricting weight factors so there were no problems carrying these boxes for any distance. Included in these smaller boxes was a networking and power cable, the rear printer tray, HP Start-Up Kit software, a HP Colorimeter, alternate ends


All components were packed in an organized and efficient manner.


HP Z3100ps GP included items and materials.

for the printer reel, several different sets of instructions in different languages, as well as a sample roll of HP Premium Instant-Dry Gloss Photo paper. Also in the box including the sample roll of media were the 6 required printheads and 12 ink cartridges (69ml) required to initially set the printer up. A box including the HP Z3100 ps GP printer stand was also included. This box included all the parts required for the assembly as well as a special screwdriver to put it together.

The 12 included HP print cartridges.


The 6 included HP printheads.

After we unloaded all of the smaller boxes that were included within the larger box, we decided that we would attempt to carry the actual printer into the lab. The included instructions directed us to take the box apart by removing the built-in handles. However, because we keep all packaging materials that come with each piece of equipment we evaluate at FLAAR and we were out in the warehouse part of our building, we elected to carry the fully constructed box into our main print lab. We left the printer within the box to make this task easier with use of the built-in handles. The handles enabled us to easily lift and carry the box to its final destination in our print lab. The width of the box was fairly close to that of a standard doorway, however, it had a couple inches to spare so we were able to get the box through the door successfully.

Assembling the Included Printer Stand


Darren Lamb, co-op student, beginning assembly of the included printer stand.

After completing the preliminary unpacking, I decided to focus my attention on assembling the stand for which the printer would be connected to. After consulting the printer assembly instructions, I found that the stand could be found in the largest box out of the assortment of boxes we removed from the main box. I then opened the box containing the pieces that would eventually become the printer stand.


Attaching the printer stand legs to the cross-brace.

Upon opening the printer stand box, I was greeted with another set of instructions. These instructions were specifically designated to aid the assembly of the printer stand as well as setting the printer in the upright position. To begin the initial construction of the stand, I removed all of the material included within the box. When I removed the contents of this box, I noticed two triangular pieces of cardboard that were included in the box and simply assumed they were included to package the contents effectively. Referring back to my set of instructions, the triangular pieces of cardboard were to aid the process of assembly by acting as sawhorses.

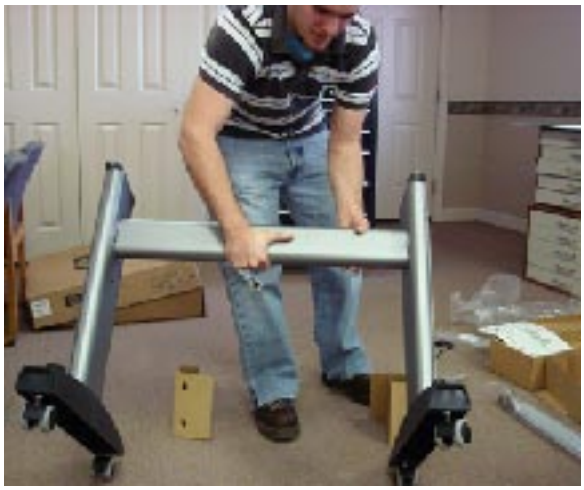
Setting up the triangular pieces of cardboard and then setting the

cross-brace across the two triangles provided me with a sturdy work foundation. After getting my workspace setup, I began to remove the plastic bags from all the other contents of the box. I also located the provided screwdriver and screws.

After preparing my work area, I began construction. I located the two legs and was able to figure out which way they were to be attached to the cross-brace by consulting the provided instructions. The legs were also labeled effectively so I had no problem figuring out how they were suppose to go together. The only problem I had when assembling this part of the stand was the provided screwdriver handle seemed to be a bit too long because it kept hitting the cross-brace as I tried to turn the screws into the inside of the legs. However, with a bit of an angle, this problem was eliminated.

After attaching the legs to the cross-brace, I attached the feet to the legs of the stand. The provided screwdriver came in handy here because the tip of it was magnetic. The feet of the stands had deep holes for which the screws were suppose to go through so I had no trouble getting the screws into their respective holes. I completed the stand assembly in ten minutes or less. We were now ready to attach the stand to the bottom of the HP Z3100ps GP.

Attaching the feet to the printer stand.



Completing the assembly of the HP Z3100ps GP stand.

Attaching the Printer Stand

It was very simple to attach the assembled printer stand to the HP Z3100ps GP. The printer stand, once assembled, has two shapes, a cirle and a square, cut out of the top of the legs to ensure that it is mounted to the printer correctly. The shapes on the top of the stand were then matched to those on the bottom of the printer. At this point, the holes in the printer stand were aligned with the holes in the bottom of the printer. Two included screws were used to attach each leg of the printer stand to the printer using the supplied screwdriver. We were now ready to stand the printer upright.

Mounting the printer stand to the HP Z3100ps GP.

Turning the Printer Upright

To turn the HP Z3100ps GP upright, it is necessary to have at least two, if not three people for assistance. When we performed this task, we had a total of three people. We decided to place two people on each end of the printer with one person in the middle to aid support. Before moving the printer to any extent, it is essential to make sure that the wheels on the printer stand are locked. If these locks are unlocked, there is great potential for an accident. After locking the wheels, we

proceded with the task of turning the printer upright. The two people on the ends of the printer lifted the printer by the Styrofoam attached to the side while the person in the middle helped to take some of the burden of the weight away as we maneuvered the legs underneath of the printer. The printer was now standing upright on its stand, so we removed the Styrofoam from the ends of the printer as well as the transparent covering to unveil the printer.


Turning the printer to the upright position.

Attaching the Included Basket

The only thing left from the box including the printer stand was the drop basket for the HP Z3100ps GP. The assembly for the basket was very simple. First, a basket support is inserted into each leg of the printer stand. Next, a short tube is connected to each of the printer stand feet by clipping into place. Then, the backet's front tube is connected to the two short tube. To finish assembly, the basket's rear tube is placed in the supports now clipped into printer stand's legs. The backet should drape down and function to catch prints after they have been cut by the HP Z3100 ps GP.


Attaching the drop basket to the HP Z3100ps GP.

Preparing the Printer

It was now time to begin preparation of the printer. To start, I removed the orange tape to allow the printer window to open. I then opened the printer window to find the cardboard support which was attached inside the printer. I removed the orange tape from the support, and then removed it by turning it clockwise 90º and pulling it out. Also inside the printer was an orange carriage stopper. To remove it, I lifted the lever and it popped out. Even though removal of the carriage stopper was successful, the instructions were a bit misleading because it said that the carriage stopper lever was wrapped in light blue paper which was not the case for this particular printer.


Removing the cardboard support from the printer.

After removing the carriage stopper, I moved to the rear of the printer to fit the rear tray back of the printer. There was no indication in the instructions where this tray was suppose to come from but it can be found in the contents that were included with the printer in other boxes. The tray slides into grooves on the back of the printer. I then folded the back of the tray into the closed position as directed. I then attached the supplied 6 foot network cable to the printer. I also secured the cable in the clip provided to prevent accidental unplugging. The supplied network cable seemed to be too short. When setting up our printer, it was right next to the computer that was designated to run all operations on the HP Z3100ps GP and it would barely reach the


Removing the orange carriage support.

back of the tower. I would recommend that the minimum length be at least 8 feet if not 10 considering the printer is 4 feet in width. Even though I tested the cable to see if it would reach the tower, I did not connect to the computer at this time. I read ahead in the directions and was informed that connecting the printer at this time could present printing problems. However, this detail was not included in the directions related to plugging the network cable in this portion of the instructions.

Next, I connected the provided power cable to the printer's power socket as well as to a power outlet. I then flipped the power switch to the on position and waited for the printer to boot up.


The supplied 6 foot network cable.

Installing the Ink Cartridges

Once the HP Z3100ps GP booted up I was prompted to select a language for the printer. There were twelve languages offered including English, French, Italian, Spanish, Portuguese, among others. Upon selecting English as the language, the printer checked for the presence of ink cartridges. Being that the printer was new, no ink cartridges were found. I then opened the cover on the right-hand side of the printer to begin installing the supplied ink cartridges (69ml).


Prompt for language selection on the front display.

We also receieved 24 extra ink cartridges (130ml) and an assortment of medias for the HP Z3100ps GP from Parrot Digigraphic.
Parrot Digigraphic is a resource that is devoted to all brands of water-based printers that are good for printing giclee, decor, fine art photography, proofing, and indoor work in general. We have also evaluated several Epson printers provided in previous years by Parrot Digigraphic.


Installing inks in the right panel.

To begin installation of the print cartridges, I began by shaking each cartridge as instructed, while still in the packaging, for about 10 seconds. I then placed the ink cartridges into each of their respective positions. Half of the print cartridges are housed in the right side of the printer (Light Magenta, Light Cyan, Photo Black, Light Gray, Matte Black, and Red), whereas the other half are located on the left side (Gloss Enhancer, Gray, Blue, Green, Magenta, Yellow).


Installed inks in the left panel.

I did run into a problem with the Yellow ink cartridge while installing. Each print cartridge is manufactured to have a certain shape on the bottom which fits into the a track in that cartridges location where the ink is housed. The Yellow ink cartridge that was supplied with the HP

Z3100ps GP did not fit into the slot that it was suppose to because it did not have the correct shape on the print cartridge. On the bottom of the Yellow cartridge I noticed the stamping of the letters LG and compared it to the Light Gray cartridge to confirm that the Yellow ink cartridge that did not fit was manufactured in a cartridge that was suppose to contain Light Gray ink. I opened an extra Yellow ink cartridge that was supplied by Parrot Digigraphic, and used it instead because it was manufactured in its correct cartridge. Every color/cartridge had a different die cut for that was suppose to ensure that it would only fit in its designated slot. I believe this is unnecessary because the printer itself has labels as well as the individual cartidges so confusing the ink cartridge locations would be difficult. Standardizing the design of the ink cartridges would make more sense. By incorporating a specific die cut for each cartridge, there is greater chance for human or machine error during the manufacturing process, I believe this is what we encountered with the Yellow cartridge.

Yellow ink cartridges supplied from Parrot Digigraphic (left) and Hewlett Packard (right).

After each installation of a print cartridge in the HP Z3100ps GP, the printer beeped to ensure that the cartridge was loaded correctly. After all ink cartridges have been installed, I pressed the OK key on the front panel of the printer to initiate the preparation of the ink.


Front panel display of ink levels.

After doing some reaseach, I have realized that the HP Z3100ps GP inks are very reasonable in relation to other major competitors in the business. At the end of this document, I have included an ink comparison chart showing my findings.

Installing the Printheads

After installing the print cartridges, it was now time to install the supplied printheads. To open the printhead cover, the blue lever was pulled forward to unlatch the cover. The cover then pulls up to reveal the printheads. Underneath the cover, were 6 orange pieces of plastic which were the setup printheads. These were removed to continue installation of the actual printheads that would be used for printing. After removing all the setup printheads, the front panel then instructed me to install the new printheads.


Removing the printhead plugs to install actual supplied printheads.

As instructed, I shook each of the 6 supplied printheads while still in the packaging for a few seconds. This is done to reduce the time the printer takes to check the printheads later in the setup process. After opening the printheads, I removed the two orange parts from each printhead. I then inserted the printheads into their respective positions one-by-one in the printhead carriage. After installation, the

front panel told me that all printheads had been inserted correctly. The cover was then latched and put back into place to cover the printheads that were installed. The printer window was closed and then the printer started to check and prepare the new printheads. I was instructed that this process could take quite a bit of time, so I decided to go ahead with another task.


Installing the supplied printheads.

Installing the Software

While the printer was checking and preparing the newly installed printheads, I inserted the provided HP Start-Up Kit CD into the DVD-Rom of the computer that would be taking care of all operations associated with the HP Z3100ps GP. Upon insertion, the installation menu opened and I began installing all components necessary to running the printer. The installation process was very simple and easy to execute because all steps were outlined and clearly understandable.


The HP Start-Up Kit software.

Loading the Sample Roll

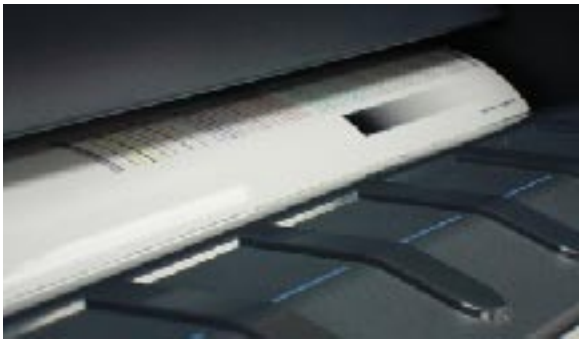
Once the printer finished the checks and preparation of the printheads, it was now ready for a printhead alignment. I was instructed by the front panel to load the paper that was supplied with the printer which was the 24"x15' HP Premium Instant-Dry Gloss Photo Paper. To load the paper, I removed the orange tape from the spindle/reel. I removed the spindle by lifting out the right-hand side first, then the left. I then removed the blue removable stop from the spindle.

I removed the sample roll of paper from the box and put it on the spindle, making sure that it would be unrolling from the top and into the printer correctly. I also made sure there were no gaps left between the paper and the removable stopper on the spindle. I then put the spindle back into its housing on the back of the printer.

After loading the roll of paper onto the spindle, I then fed the leading edge into the printer. The printer automatically takes hold of the paper once fed to a certain point. As compared to other printers FLAAR has evaluated (Epson 7800, HP DesignJet 5000ps), loading a roll on the HP Z3100ps GP was extremely simple. The printer does most of the work itself. After the printer lines up the paper, it then asks whether the paper is in roll or sheet format on the front panel. I selected roll then


Loading the supplied HP Premium Instant-Dry Gloss Photo Paper sample roll.

designated which type of paper the printer would be using. Being the printer was new, it then printed a piece to align the printheads since they were recently installed.



First print off the HP Z3100ps GP to align the printheads.

Installing the Included HP Colorimeter

Upon inserting the software disc into the computer, the HP Advanced Profiling System for the HP Colorimeter automatically loads up on the computer. After clicking install, the software then lead me to a step where I had to check a box to allow the software to connect to the internet to automatically download the latest version. I checked this box and clicked Download. The software attempted to open a page via and Internet browser. However, the site was down at this time. The page that loaded said "Page Cannot Be Displayed." I have tried numerous times over a week-long period, and have yet to be successful with the installation of the HP Advanced Profiling Solution.

Attempting to install the HP Advanced Profiling Solution Software for the included HP Colorimeter.

Calibrating the Printer for Materials

Since I was unable to get the HP Advanced Profiling System to install on the computer that would be handling all operations from the HP Z3100ps GP, I decided to go on and calibrate the printer for the different types of media we receieved from Parrot Digigraphic. To figure out how to calibrate the printer for new medias, I referred to the HP Z3100ps GP Photo Printer Quick Reference Guide. This guide was very easy to understand because it incorporated many visuals as well as descriptive text.

To begin calibration, use the front panel to navigate through the Image Quality Maintenance option.

To begin the calibration, I navigated to the Image Quality Maintenance option through the main menu. At this point, I still had the sample roll loaded so there was no need to tell the printer what material would be calibrated. Once I clicked Calibrate Color through the front panel display, the HP Z3100ps GP began calibrating the loaded material. First, the printer prints a calibration chart which includes patterns of each ink used in the pritnter. Next, the chart is allowed to dry for approximately two minutes. Then, the HP Z3100ps GP rolls the printed chart back into the printer to be scanned and measured using the HP Embedded Spectrophotometer. After the printer has scanned the calibration chart, it makes the necessary adjustments based on the printer measurments to ensure consistent color printing on that specific material. This process also determines the maximum amount of each of the 12 inks that can be applied to that specific material.

Calibration chart printed when calibrating any specific media.

First poster printed using the HP Z3100ps GP.

I continued to perform calibrations on each of the materials we have for the HP Z3100ps GP. The entire process for each material takes approximately 8-10 minutes. This process is extremely faster than using a manual spectrophotometer, therefore, being able to perform this internally is a great asset to have with any printer.

Testing Prints

After all of the calibrations were completed, I began testing different images on the HP Z3100ps GP to get a good idea of where it stood on quality. Everything that has come out of the printer thus far, has met or exceeded the quality of all of our other current printers (including the HP DesignJet 5000ps and Epson 7800). Not only does the printer outperform those printers, but it also does it at a very fast pace. In a test we conducted against the Epson 7800 using ColorBurst rip software, the HP Z3100ps GP was nearly three times faster than the competition. We selected a colorful image to print with dimensions of 34" x 23". The HP Z3100ps GP clocked in at 9 minutes and 50 seconds and the Epson 7800 at 46 minutes and 53 seconds for the same print.

HP Z3100ps GP test print.

Epson 7800 test print.

The test prints were printed on similar media. The HP Z3100ps GP was loaded with the HP Premium Instant Dry Satin Photo and the Epson 7800 was loaded with the Epson Premium Luster Photo. It is difficult to tell from the above photos due to the location of the printers in the laboratory and the lighting in each area but the color and quality is almost identical. It would be difficult to discern which print was printed on the Epson 7800 or the HP Z3100ps GP.

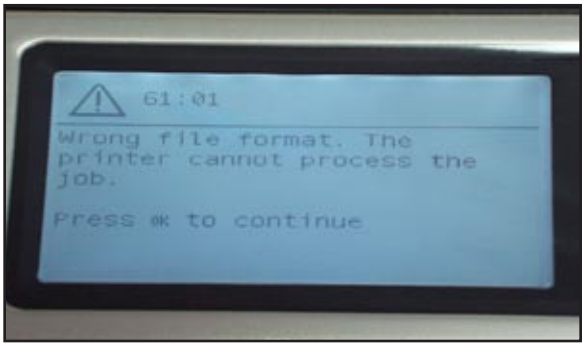
After conducting the 34"x23" test print, we decided to do another test involving all of our major printers, the HP DesignJet 5000ps, Epson 7800, and the new HP Z3100ps GP. This test was conducted only to compare quality between the three printers. We decided to run this particular test on matte paper, simply because we had not tested it previously. After printing the test prints on all the printers, there were definitive quality differences. The HP Z3100ps GP looked to be the most accurate of the three, with the HP DesignJet 5000ps coming in second.

The Epson 7800 had serious color management issues. We ran several test prints to find the solution to this problem. We determined that the extreme color variation could be blamed on the new ink formula that Epson is using in their K3 inks. Before running the three printer test comparison, we had replaced the photo black ink cartridge. Several weeks back, we ran into a similiar situation with colors deviating far from what they should be in prints, around the same time we replaced the magenta ink cartridge. Wendy Like, the lab project manager called the vendor where the ink had been purchased and questioned why the part number on the Epson K3 ink cartridge was different. We thought that maybe the vendor had shipped the wrong ink cartridge. The vendor informed us that Epson had changed the formula of their ink and therefore had changed the part number, he assured us there should be no difference in the ink quality. Unfortunately both times that we replaced an old ink cartridge with the new formula we experience color management isssues on our printer with the next four to five print runs we process after changing the cartridge. Therefore, we have determined that the changing of ink cartridges and the new Epson ink formual is what has contributed to this problem. Even though the initial prints seem to look completely off base with their color, after a few prints, the outputs on the Epson 7800 return to their best quality. It seems that the new formula incorporated in the Epson inks definitely causes limited problems after installing the inks.

While testing the printer's capabilities we encountered a minor issue. We were printing some posters for a BGSU department and noticed after printing one of the files that there was a mistake in the text. The original Photoshop file was on the Mac computer so this is where we made the corrections, resaved the file, and brought it over to the PC that is connected to the HP Z3100ps GP. When I tried to reprint the file I received an error from the printer stating that it was the "wrong file format" and it was unable to process the print job. I tried several more times just to make sure I had not made an error, I even went back to the Mac to resave the file, still no progress. Finally,

Darren Lamb and Wendy Like comparing the prints between the HP Z3100ps GP (left) and the Epson 7800 (right).

Wendy Like and Nicholas Hellmuth comparing quality betweein the Epson 7800 (left) the Epson 7800 (middle), and the HP Z3100ps GP (right).



HP Z3100ps GP print error message.

I went to the Mac and saved the file under a different name. Placing this file on the PC, I was then able to print the poster. I can't explain why we encountered this problem but the solution was as simple as saving the file under another name.

The Gloss Enhancing feature of the HP Z3100ps GP produces a smooth sheen on the finished prints. This is most noticeable on images that have been printed on a gloss or semi-gloss photo paper. The gloss enhancer appers to act as a buffer smoothing the surface of the finished print. According to the HP web site the gloss enhancer reduces metamorism and negates gloss differential.

HP Z3100ps GP test print.

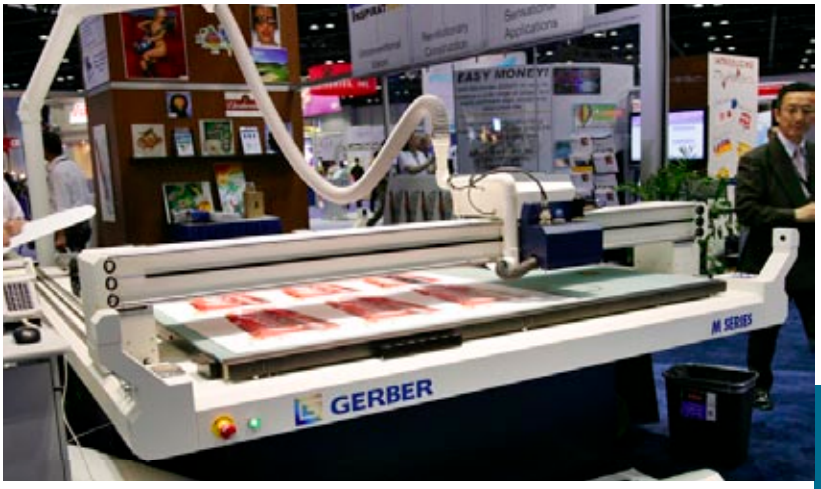
As soon as you have your UV-flatbed printer, your printshop will desire to have a cutter or trimmer.

First you need to trim. Simple cutting of the edges of your board so the edges are neat and clean. Then of course some clients will ask if you can do contour-cutting. This means you can offer additional services and earn additional income.

The best way to learn about trimmers is to ask a distributor who has more than one brand. This way they do not push their house brand and denigate brands that they do not carry. Also, you want a real person that actually has experience. Otherwise you get a "box pusher" who is simply an Internet sales person, who does not know trimmer from dimmer.

The person we suggest is **Mike Lind** because his company, **Reprographic Designs**, handles all leading brands: KeenCut, Neolt, Meteor Metoschnitt, RotaTrim, etc. You can contact him at 1 281 492 2714 or malind@msn.com.

His company is also the Master Distributor for Cruse reprographic scanners in the US and adjacent countries.



We have seen Gerber cutters at work during major trade shows, both in Europe and in the US. Gerber has dealers all across the US and Canada, and in Europe is served by Spandex.

XY Cutter Options

In a period of economic recession printshops will tend to ask about options that are priced lower than high-end prices. Thus we suggest a possible solution at mid-range price: Gerber M class cutters. I have inspected two huge factory complexes of Gerber Scientific in 2008 (especially their cutters for fabrics) and will be visiting their facilities again in 2009.

To contact Gerber:
Phone (US): 800-222-7446, email: cservice@gspinc.com
Fax: 800-227-6228 or 860-648-8064
Phone (Intl): 860-648-8028, email: gspinternational@gspinc.com

When you acquire a UV-curable wide-format printer you will eventually learn that an XY flatbed cutter is a useful accessory for thick rigid materials. The advantage of having an XY cutter is that you are selling not just the print, but a finished work. To stay ahead of the competing printshops in your city it helps to offer your clients a solution for every step of the printing workflow.

Dr. Hellmuth shows a sample processed by the Gerber M Series cutter exhibited at GraphExpo '08.

Gerber M Series cutter at ISA '08.

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 that 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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To distribute this report without subscription/license violates federal copyright law. To avoid such violations for you, and your company, you can easily order additional copies from www.wide-format-printers.NET.

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.

Citing and Crediting

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, 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.

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.

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.

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 make 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.

Booth 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 unidirectional, 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 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.

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 smeltering 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 book of sales in the third quarter of 2008 resulted in many tech support problems.

The recession resulted in even more: 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 ane 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 scenario 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 incapabilities 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 (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 Sun LLC, Caldera, EskoArtwork, Raster Printers (EFI Rastek), DEC LexJet, DigiFab, Barbieri electronic, Seiko II, Mutoh Europe, IP&I, Dilli, Yuhan-Kimberly, GCC, Grapo, Durst, 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 2009), 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, EskoArtwork, Gerber, Grapo, IP&I, Mimaki USA, Mutoh, Dilli, 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. Bordeaux, InkWin 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 roughly 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 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. 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 Heweltt-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, 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 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 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.

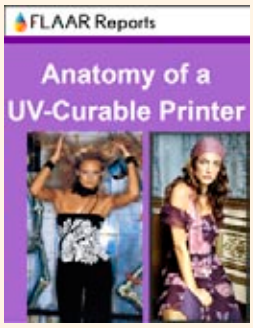
A modest portion of our income comes from our readers who purchase the FLAAR series. All income helps continue our tradition of independent evaluations and reviews of inkjet printers, RIPs, media, and inks.

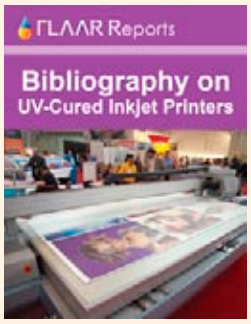
These are some of the most

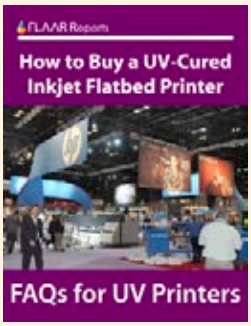
Recent FLAAR Reports (2007-2009)

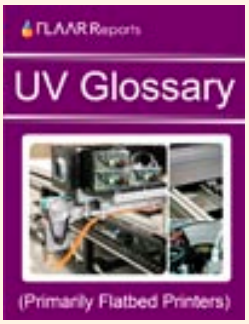
You can find these and more reports at: www.wide-format-printers.NET

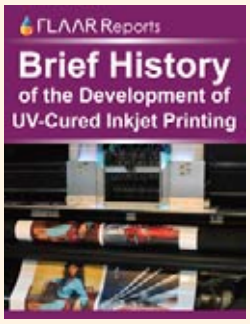
Introduction to UV Curable Inkjet Flatbed Printers

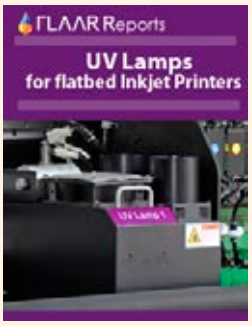


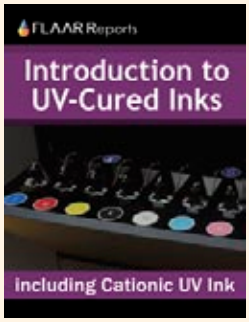




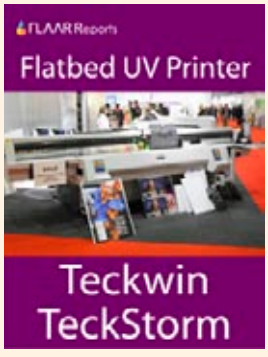








Most recent UV Printers



These are some of the most

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

UV Printers Manufactured in China, Korea and Taiwan