FLAAR Reports

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Flatbed UV with Roll-to-Roll UV-cured

Gerber Solara ion^{x}

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Contents

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INTRODUCTION

The Gerber Solera ion introduces cationic ink chemistry into a world that otherwise uses a UV-curing ink that is exclusively free-radical chemistry. There are now two other UV printers currently successfully using cationic ink (a KonicaMinolta prototype, using LED curing lamps, that was exhibited at DRUPA 2008 and the Scribe, a prototype exhibited at SGIA 2008). Every other UV-curing printer uses UV ink based on free radicals.

The other innovation that Gerber Scientific has put into this printer is that the UV curing lamps are on the front and back of the gantry. There is no UV lamp whatsoever on the printhead carriage (at least not that I have noticed). The only other wide-format UV printer with a page-width UV lamp is the Inca Spyder 150. This has LED lamps on the printhead carriage plus one page-width UV lamp. The Gerber has one lamp across the front and one across the back (but it is not LED at all).

Another benefit of this new UV-curing inkjet printer is that Gerber engineers have cleverly made an intelligent completely dual-use UV printer: a dedicated flatbed with a dedicated roll-fed adjacent. Genial. What more can I say, it's an excellent design concept. There is not much competition besides Oce. The Mimaki JF-1631 flatbed does not even come close. The Mimaki roll-fed "system" is just two simple hooks tacked onto the printer at the end to hold a spindle. The Teckwin Teckstorm add-on roll-to-roll system is too new so it has not yet been available for evaluation.

Now that I have expressed all my excitement at the innovations produced by the Gerber team, comes the blunt reality and assessment. As a professor of wide-format inkjet printer technology and marketing, I am interested in learning about all new advances, especially in ink chemistry and UV-curing. And also as a professor-type of person I enjoy providing both my students and the readers of the FLAAR Reports with the news of impressive new advances.

But so far the other two brands of printers that attempted to use cationic ink: the Durst Rho 350R (late 2005 early 2006) and the Zund 250-Combi (DRUPA 2004 for about six months), were catastrophic failures. The cost to Zund was roughly a million dollars a month for 2 years. Durst jettisoned cationic ink so fast that the losses to their company were mainly for a short period. Several web sites mention benzene by-products of the UV curing of cationic ink as one of the problems of early cationic ink but the undesired production of benzene was not the actual reason why the first two experiments were catastrophic failures. As a footnote: why did so few early reports on the use of cationic UV inks mention the benzene issue more openly?

I would guess that 50% of the international manufacturers of UV-curable printers have tried cationic ink in their labs and R&D departments. NUR's head ink chemist indicated to me in 2007 that "cationic ink still has many unresolved issues." About three other companies that I spoke with each indicated that they were not able to get cationic ink to function successfully.

So Gerber is atop the Continental Divide, so to speak: it will potentially be a breakthrough product and allow them to take over #1 position in sales of UV printers. Their flatbed (if the almost 200 units that have been sold so far all continue to function) could result in a surge in sales will match sales of the Oce Arizona 250 (which hoped to sell 1000 of their printers). The Gerber ion will also continue to cannibalize sales of the Mimaki JF-1631 flatbed. The only reason the Gerber ion won't obliterate market share of those two printers is because they both use Toshiba Tec printheads, so have impressive print quality (which they can use to "sell-against" any flatbed with a larger picoliter drop size, especially one without variable droplet capability). But ironically, the Toshiba Tec printhead is the weakest part of both the Arizona 250 and especially of the Mimaki JF-1631 (as described in three FLAAR Reports: one on the Oce, another on the Mimaki, and a third report on UV printheads in general). In other words, the Toshiba Tec printhead is the Achilles Heel of both those printers.

If Gerber's printhead had variable droplet capability, if it can do 4-pt fonts flawlessly (the Daytona T600UV of Raster Printers (today EFI Rastek) can achieve 3 pt fonts in impeccable quality), and if the color gamut of it's ink matches that of Mimaki (which has an excellent gamut), and if the Gerber is faster than the Oce 250 (both the Oce 250 and Mimaki are very slow, in part due to using the Toshiba Tec printhead; yes, everything has plusses and minuses), then Gerber could outsell both the Oce and the Mimaki put together and outsell all Zund and ColorSpan sales records.

The printer presented at SGIA 2007 was an early prototype, but now as of February 2009, Gerber has more than 250 Solara ionX printers out in the field, and better quality control of incoming parts on the assembly line.

I sincerely hope that the Gerber ion is successful, because if this printer is successful it will create an unprecedented boom in UV printer sales. Innovative printers such as the Gerber ion are beneficial for everything at FLAAR, because we tend to write from a historical perspective, we list the pros and cons, and in general FLAAR provides a viewpoint that is unique. If there were no exciting new printers, we would have nothing to write about.

During mid-September it was possible to meet the head R&D scientist at Gerber and then to spend an entire day inspecting the ion inside out at the factory and undertaking demo printers. What I saw in their labs and demo rooms was much improved from the prototypes that I saw in the previous eighteen months (from autumn 2007 through DRUPA in May-June 2008).

At SGIA '08, GraphExpo '08, and VISCOM Germany '08, the Gerber Solara ion was printing every day in each trade show booth. In most cases the booth had two ion machines, each printing every day. This is due to the many improvements made since the initial launch. Gerber's engineers have ironed out the bumps and imperfections in the intervening months.

A crucial part of a high-level FLAAR evaluation of a printer includes an inspection of the printer inside-out inside the factory. This class of scrutiny is one of several factors that is crucial when doing the essential research to understand the pros and cons of any particular inkjet printer.

THE BASICS

1. Brand name, model?

This is the report for the Gerber Solara ion^{x}, the 8-printhead model.

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

There are two versions, the Solara ion^{X} which has 8 print heads, roll-to-roll capability, and is priced at $88,995, and the more affordable Solara ion^{V} which has 4 print heads, does not have the roll-to-roll capability, and is priced at $64,995.

3. What is the nature of the company? Is this company the manufacturer, distributor, or rebranding a machine made by someone else?

Gerber Scientific Products is a well known company. In Europe their original distributor is better known as Spandex.

In the era of solvent printers Gerber tried for about 3 or 4 years and never really was successful in this market: they tried some Mutoh solvent printers but then abandoned them quickly. Gerber then exhibited some Teckwin solvent printers year after year at trade shows.

A very similar Teckwin solvent printer was also exhibited by Matan at those same trade shows those same years.

Matan found that these Chinese solvent printers were not robust enough. 3M was also trying to sell Teckwin solvent printers but they gave up even quicker.

Gerber finally gave up with Teckwin solvent printers and came out with the Solara hybrid UV printer. Everyone in the industry assumed this was also from Teckwin. Indeed one RIP manufacturer and several industry consultants assured me that they knew it came from Teckwin.

But Gerber stated they manufactured the Solara hybrid in their own facilities in Connecticut. I know the Gerber Solara ion is made in the USA because I have spent a day at the manufacturing plant.

Gerber Scientific, as a company, is so much larger than I ever realized. Their factory space is probably as large as that of Gandinnovations. This is because Gerber makes cutters for leather and textiles (in addition to the Gerber Edge, Sabre cutters, etc). The leather cutters are huge combo-style machines (so Gerber has plenty of experience in manufacturing large machines).

Gerber factory and demo room is located in Connecticut. The assembly plant is as large as those of the biggest UV printer manufacturers in the world.

4. What other printers are the same or similar chassis from this manufacturer or distributor?
The ion is a completely new design and does not really share much with any previous printer, neither from Gerber nor other brands.

5. Is this same model(s) rebranded and sold under other names?
Presently the ion is not rebranded by anyone else (it's too new).

6. How does this model compare with comparable previous printers?
The new Gerber ion looks better in all respects than their previous hybrid model.

7. When and where was this model first introduced?
This printer was not shown at VISCOM Germany nor VISCOM Spain '07; it was launched at SGIA '07 and was first presented to European audiences at VISCOM Italy in Milan in early November.

8. Is this printer mature or still in alpha-stage or beta-stage?
The printer was still rudimentary at launch at SGIA 2007, was in action only a few hours per day, and was barely out of prototype stage.

It is rare to show a printer at this early a stage to an audience that is spoiled with 101 other UV printer models from over 45 different manufacturers.

By DRUPA 2008 the roll-fed portion was moving and printing, but there were still bugs that needed to be worked out.

Advantage Sign Supply, Inc. is one of the distributors that exhibited the ion^x at SGIA 08. Being distributed by other companies shows there is confidence on this printer in the market.

Other companies who experimented with cationic ink said that the chemical formula for the ink had to be changed significantly to avoid ionizing the metal in the printheads and printer, and that once the ink was debilitated, it no longer offered most of the benefits of cationic ink. Either way, the general opinion of industry analysts is that cationic ink will work in the future, but it will take substantial investment of time, money, plus lots of trial-and-error experimentation to come up with a printer that functions adequately outside a print lab.

These are the reasons I classify this printer as in beta stage through July, since many things may need to be changed to make it work as well as the advertisements have claimed since last autumn (2007).

As mentioned earlier, the printer (TWO per trade show) was doing fine at all trade shows in September, October, and November 2008. Gerber had two units in most of their booths that Autumn, and in all cases both units were printing acceptably. The Gerber Solara ion was printing nicely every day at trade shows in 2009, such as Dubai Sign & Digital Imaging show in February, and at Fast Signs trade show in January.

Dr. Nicholas Hellmuth evaluating the Ion^x at the Gerber factory demo room. The test prints were taken by Nicholas with a 22 megapixel Phase One P25+ digital camera back on a Hasselblad. The test image at the left shows a ballcourt marker from the 8th century Maya culture of Copan, Honduras, with permission to photograph in the museum courtesy of IHAH.

The test image at the right is a cacao pod in an orchard in Alta Verapaz area of Guatemala.

The test images on the Gerber table are 7th century ceramic effigy containers of cacao pods from pre-Columbian Guatemala, photographed by FLAAR in the registered collection of Foundation La Ruta Maya.

9. List price?

The current price (April 2009) is $88,995 for the Gerber ion^x . The original price up to ISA 2008 was $80,000, which is a lot less than any comparable printer. In October 2008, the price of the Gerber ion^X was $79,995.

The Oce Arizona was originally $140,000. The Mimaki JF-1631 was in that price range too. The price of the Mimaki only collapsed (summer-autumn 2008) when its problems were not totally resolved. So the Gerber printer is a good price. Then the price of the Gerber rose, and the prices of the Arizona 250 dropped to below $110,000. The price of the Mimaki JF-1631 literally collapsed during autumn to reduce inventory.

The printshop that bought the Gerber Solara ion in November said that "time saved from not having to mount Roland solvent prints by hand onto foam cor, this time saving alone will pay for the machine."

10. How does the total cost compare with other UV printers?

	Gerber ion^{X}	Gerber ion^{V}	
Base price, chassis and print engine	$88,995	$64,995	
RIP, full version	additional	additional	
transportation	additional	additional	
installation	not included	not included	
training	not included	not included	
ink	Not included	Not included	
warranty	1 year	1 year	
spare parts kit	not necessary	not necessary	
table(s)	It's already a table by itself	It's already a table by itself	
roll to roll option	included (There is a version of the ion^{x} without the roll-to-roll option for $79,995. (roll-to-roll option available for $13,995))	Available for $13,995	
Total cost			

You will also need to buy the computer to run the RIP software.

The Gerber Ion^{x} is considerably cheaper than other competitor printers, but a wise buyer would also consider other factors, such as ink price, production speeds, energy consumption, etc.

STRUCTURE OF THE PRINTER: Vacuum

11. Is there a vacuum function?

Yes, there has to be a vacuum to hold materials down on the table. Even though the gantry moves at a crawl, the printhead carriage moves a bit faster and could in theory create an airflow that would cause thin small sheets to be pulled upward.

12. Is the vacuum created by simple fans, or by an air pump?

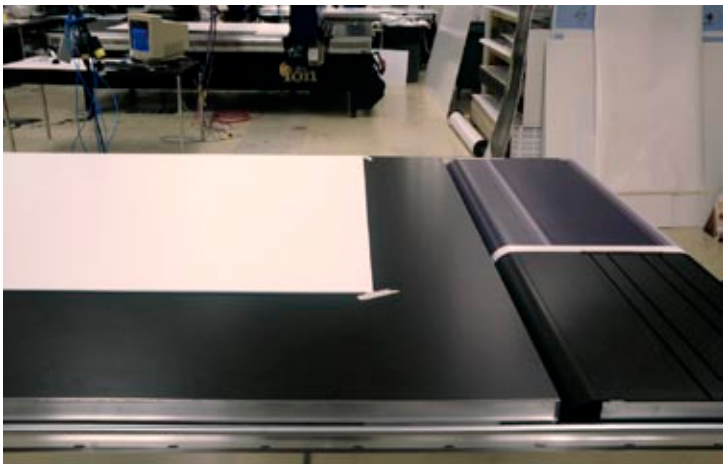
The roll-to-roll section has three vacuum blowers. The 64" x 100" rigid table has two vacuum blowers.

13. In how many sections?

There are no zones in the vacuum channel design concept.

14. Is the vacuum too weak for some materials? Does this mean you have to waste your time and tape materials down to the top of the flatbed table?

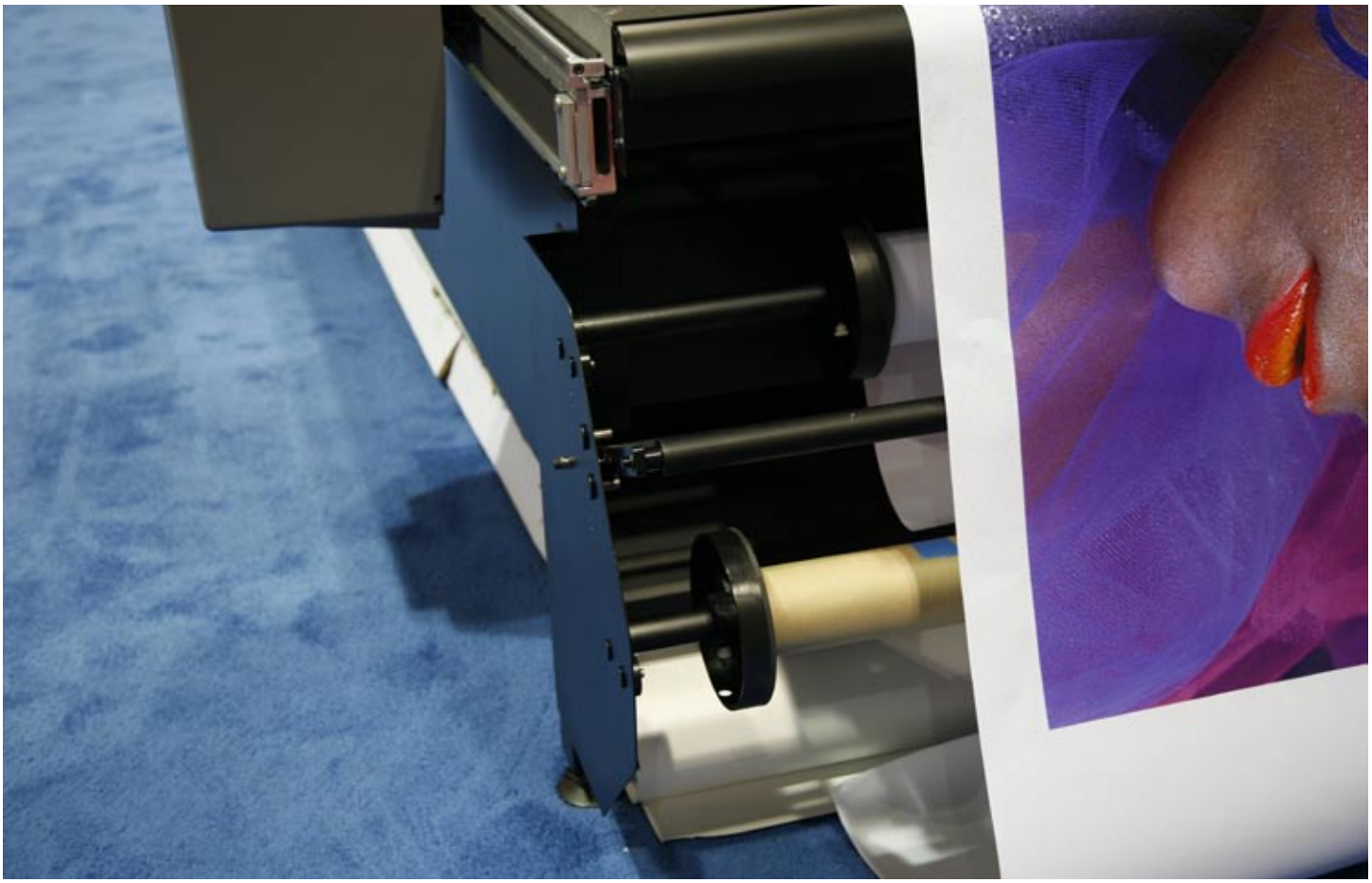
With the Mimaki JF-1631, 1610 and the Oce Arizona 250, it is necessary to put paper or thin foam core material on top of the entire flatbed area where you are not printing. If you don't do this, the vacuum holes will suck open air and there will not be enough vacuum under the piece of material on which you are printing. With the Gerber Solara ionX, thin, flexible materials and warped rigid materials may necessitate putting paper or thin foam core on top of the entire flatbed area to increase vacuum pressure in the two zones, but I have seen flatbed printers costing $300,000 that also require this, such as Gandinnovations Jeti flatbeds.



STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path

15. Is this a dedicated flatbed with no roll-to-roll capability? Or is this a true flatbed or just add-on feeder platforms at front and back?

This is the world's first dedicated flatbed printer with a complete dedicated roll-fed unit attached from the beginning. Oce attempted an add-on solution which unfortunately failed to function adequately the first year (but now is working to some degree). The reason the Mimaki attempt is inconsequential is because they attempt to run the roll-fed material across the entire flatbed area. Gerber intelligently skipped that and runs the roll-fed material over its own dedicated platen. In effect you have two completely independent printers: they simply share the same gantry and printhead carriage. Very clever. The person or team that conceived this deserve a Nobel Prize for innovation.



16. Was this printer made originally as a UV-curable ink printer, or is it retrofitted with UV-curing? If retrofitted, what was the original brand or model?

This printer was designed from the ground up as a UV-curable inkjet printer. This is not a retrofitted solvent printer like most early UV printers were (ColorSpan 72uvR was a UV version of their Gator solvent printer. VUTEk, Keundo, and still today even Roland, their early UV printers were based on solvent flatbed prototypes. 90% of the Chinese UV printers are also based on solvent printers.).

It is more reliable if a printer is based from the beginning on UV-curing chemistry.

17. Describe the platen.

The platen is unusually wide so it can fit within the printer platform. This allows the roll-to-roll function to reduce waste and save money by only requiring a 12" leader, versus the 36" leader that other printers require.

FLATBED ASPECTS (for dedicated flatbeds)

18. How much weight can the table hold?
The weight limit for the table is 200 lbs.

19. Is pin registration present? How many pins? What is their position(s)?
Gerber said the reason they decided not to use registration pins was because overspray could gunk up the pin holes and cause them to stick. Overspray is natural when doing edge-to-edge printing.

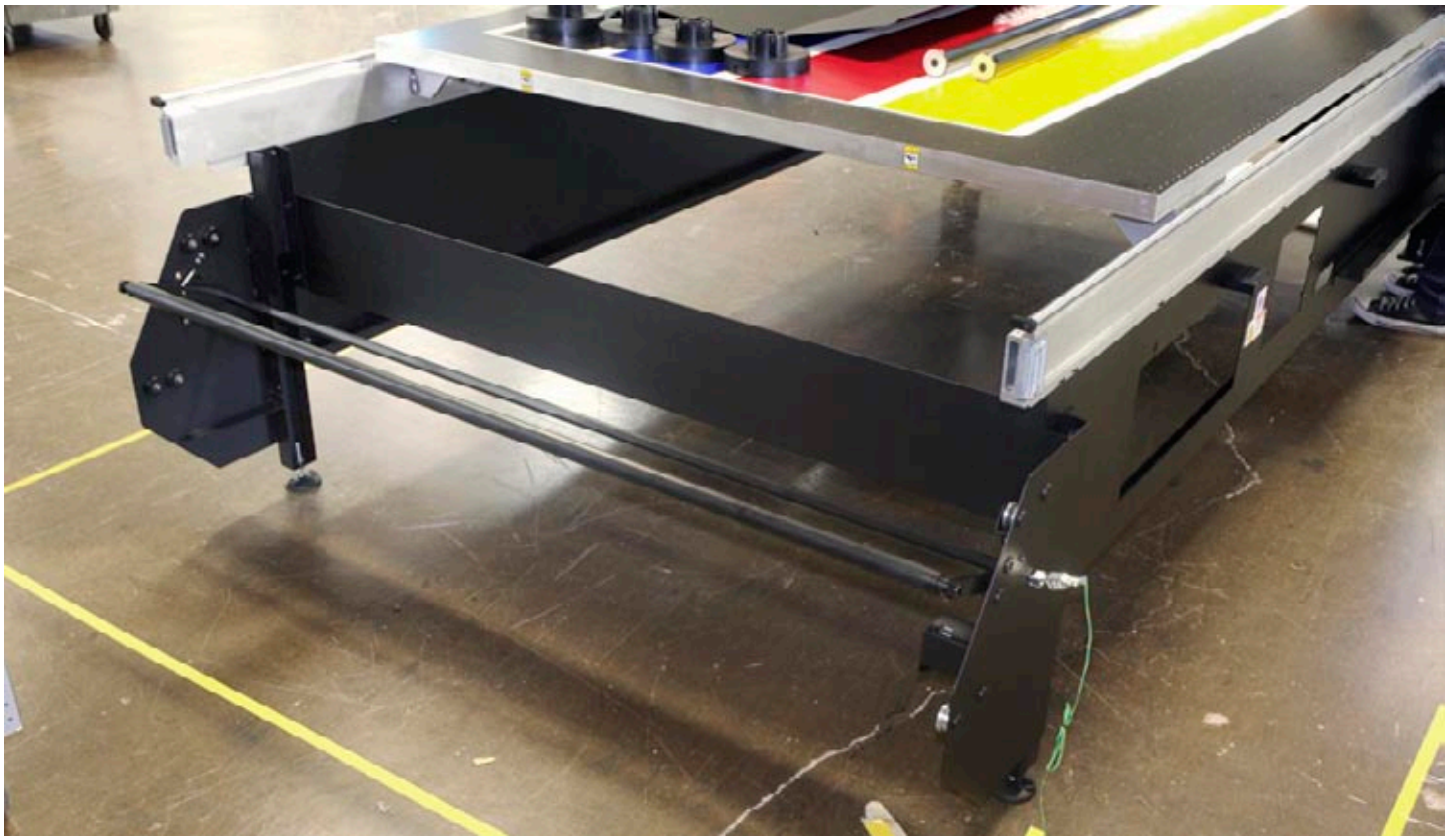
20. If no pin registration system is present, what kind of other registration system is available?
There are no fences expected on a dedicated flatbed, no drop down registration gates either (and no pins).

Testing the Gerber Solara ion X for hours inside the factory demo room. The ion x can print rigid materials up to 1" thick.

ROLL-FED

21. How is the roll media handled at feeding position? For example, is there a dancer bar?
There is one dancer bar in the input area.

22. Describe the overall path of the media through the system?
Because this roll-fed system fronts on the dedicated flatbed system, there is no way to reach the "back" of the roll-fed system (the back is covered by the dedicated printer chassis). So everything has to be handled from the front or sides. There is essentially no access to the back. Thus the engineers had to create a rather innovative solution to loading and unloading all from the front, and all below the level of the platen (since the gantry has to pass over the top, so there can't be any top loading system like on some water-based printers.



The original printer was conceived with the roll-to-roll option from the beginning, therefore, it is physically attached to the printer.

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

The Solara ion^{X} only needs a 12" leader, as opposed to other printers, which require wasting about 36" of material.

With some brands 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, media is wasted before and after cutting, etc.

There is less waste on a dedicated flatbed printer because there is no material used in loading or feeding up to the point it is printed upon.

24. 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. The Durst Rho 351R offers an option to allow printing on two different rolls simultaneously.

25. 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 possible only on a printer with a fixed platen; there is no easy way to put a trough on a flatbed style printer. If you need to print on fabric or mesh with a UV combo printer you need a liner or you need to put an intermediate sheet onto the surface of the conveyor belt (or clean up the ink that passes through the weave).

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

Most dedicated flatbed printers have no area to put such a knife slot.

STRUCTURE: Miscellaneous

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

Once the printer is in position it rests entirely on four corner supports which have threaded leveling capability. So when the printer is in position it has no need for wheels.

UPGRADES, Future Improvements?

28. What features are being added, or changed in the next month or so?

The control panel will be improved from what was shown on the prototype of 2007. Originally (SGIA '07) the LCD screen was too small (sort of the size you get on a Mimaki).

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

The Solara ion^{X} is the first of a "family" of printers, and the newest member of the family, the Solara ion^{V} has just been launched. The Solara ion^{V} offers a four head version of the printer without the roll-to-roll feature. The lower price of $64,995 allows smaller businesses to take advantage of most of the advances of this printer.

In my opinion, including light Cyan and light Magenta would be a benefit. This would naturally increase the cost of the system, but would be a feature not present on the original Oce Arizona 250 GT. But since cationic ink is so new, it was not easy to obtain these light colored inks in cationic formula.

Miscellaneous

30. What moves:

- ***the flatbed platform,***
- ***the printhead area,***
- ***only the material (fed by roller table; then gripped and fed by the printhead area mechanism as on a regular printer; or both?***

For example, on the Inca Columbia the flatbed itself moves in and out for every line of print. The 3M (Leggett & Platt) machine is unique in that it has two options for movement, both the material and the head assembly in X, Y directions.

But on an entry-level flatbed printer, the gantry is moved pass by pass along the edge of the table. The printheads travel back and forth within the gantry. On the Gerber system their flatbed does not need to move at all.

The whole gantry moves along the flatbed table. This means the rigid material is fixed while it is being printed on. SGIA´08 trade show.

31. If the objects you are printing are not as wide as the full width of the printer, does the printing carriage still have to cross the entire space, or can the printing assembly hover just over the area of what has to be printed (and thereby be a bit faster?).

Yes, most sophisticated printers can hover. But this may cause too much heat build up over one part of the printer. So your software also needs to be able to modify the hovering position if so desired.

32. Does this printer offer "skip white space" option?

No, this option is not available.

33. Is there a light inside when you open the hood?

The entire gantry is sealed relatively tight. It is not intended that you open any hood at all. So there is no light inside when you open the hood.

The gantry is totally enclosed. The advantage of this is that there is less risk of light leak that could damage your sight. There is no other flatbed UV printer as well secured against dangerous light leak. All the competing UV flatbed printers (with solid dedicated flatbed table) are open with inadequate protection. If someone from the companies that make the other brands tells you that "our printer passes regulations" then clearly the regulations were made before any inspector was aware of UV flatbed table light leak problems. This is a polite way of saying that the regulations are clearly inadequate. The Gerber ion has the best protection of any flatbed UV printer that I have seen so far.

OPERATING THE PRINTER

34. Is the printer user friendly?

The printer operator and management of the site-visit case study were still learning and experimenting on the printer, but in general they felt it was user friendly.

35. How many operators or operator assistants does this printer require?

A single person is plenty, and while the Gerber is printing he or she can do other things elsewhere in the printshop.

36. Where does the operator stand or sit?

At one end of the gantry there is a control that swings to variable positions. This is very clever.

Gerber Solara ion^x at SGIA 07.

37. What aspects of the printer can you operate from behind (the loading area)?

This printer is unique in design so there are multiple loading areas, depending on whether you are loading flat-rigid materials (in which case you would load from either side) or roll-fed, in which case there is only one position, down at that end of the printer.

38. What controls are on either end?

The hood to reach the maintenance station is at the rigid end of the printer. The roll-fed area is at the far other end. One long side has no specific controls; the operation area is the overall corner area of the rigid end (when using rigid material on the flatbed). If you are printing with roll-fed, then your area of control (still on the end of the gantry) is at the roll-fed corner.

39. Is a foot pedal included (for operating aspects of the printer)?

I have not yet noticed any foot pedal.

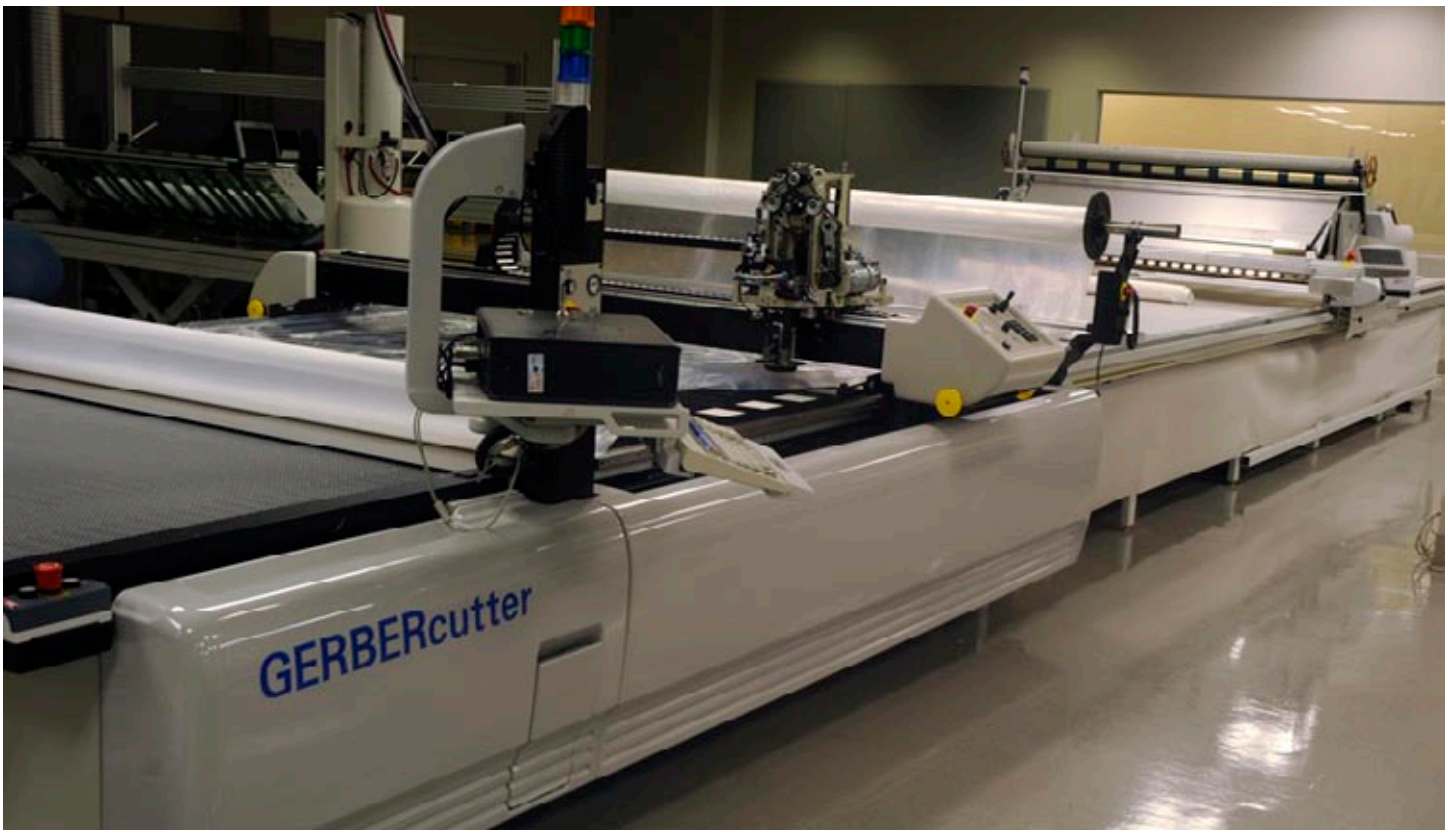
40. Is there a pole with beacon lights?

Dilli was among the first to use a vertical pole with beacon lights. Most other printers do not have such a beacon. Presence of a beacon is not a major plus point; absence of a beacon is not a significant minus point.

CONSTRUCTION (BUILD QUALITY)

41. How would you describe the overall workmanship of visible parts? Clean (Swiss made), or flimsy and uneven (several Chinese-made printers)?

The printer is intended specifically to be of reasonable cost, so the construction is not massive, but Gerber has years of experience making large flatbed cutters for textiles, so already knows how to make machinery.



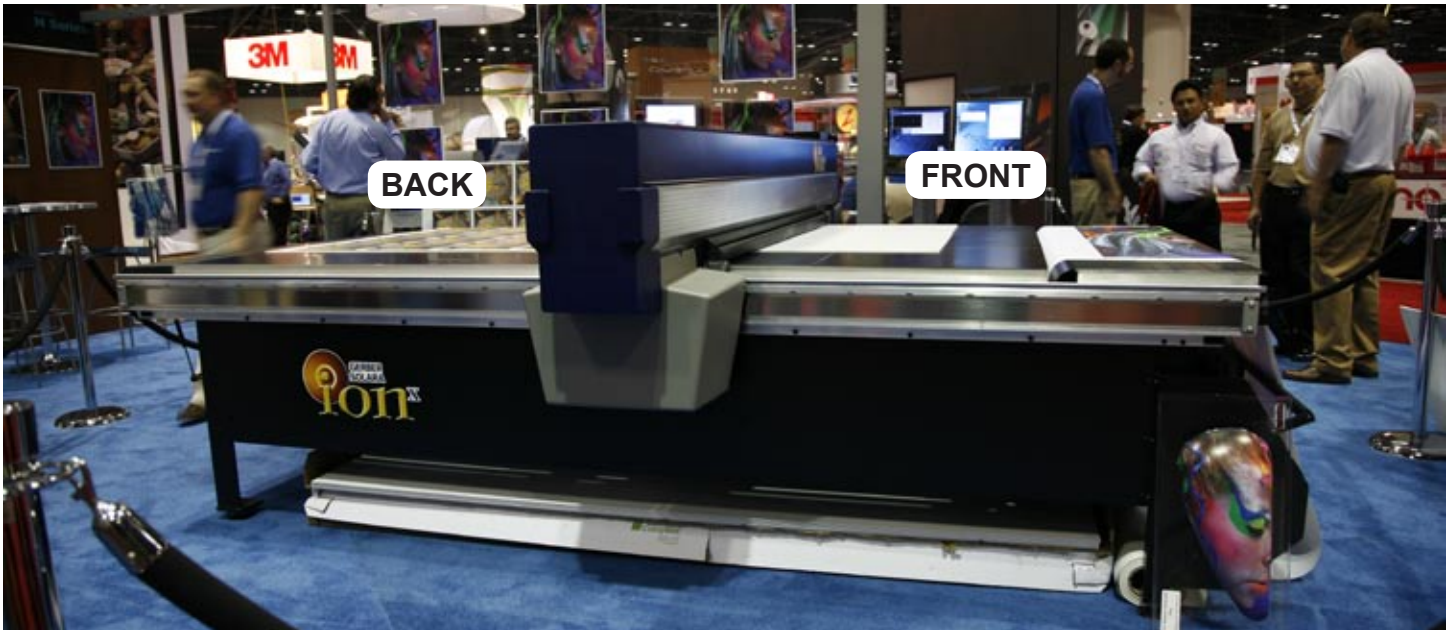
Gerber has many years experience in building industrial equipment. But more than this, Gerber has years of experience in building flatbed machines, specifically flatbed cutters for cutting textiles. Now you can understand another reason why Gerber chose to build a dedicated flatbed and not try a hybrid printer or a combo printer (with moving transport belt). Although they have experience with moving belts, and although their first UV printer was a hybrid, from all this experience they realize that the best design concept is a dedicated non-moving flatbed table.

AESTHETICS

42. Can you easily distinguish which is the "front" and which is the "back'?

I call the front the area where the LCD and operator panel(s) are situated. 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.

Since this dedicated flatbed is open on both sides, and actually at both ends, there is not really a front and back in the traditional sense. But one end is clearly the operational end, and one side of the gantry is clearly the front, namely the side that has the brand and model written on the gantry.



Gerber Solara ion^x at SGIA 07.

SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

43. Do you need to budget installing a ventilation or room exhaust system?

All UV printers need room ventilation, for everything from ozone to misting ink to general odor. Increasingly ozone production is surprised; this has led some companies to claim that "no ventilation is needed." Such a claim is dangerous, especially in a country like the US where litigation is so common. Has Agfa never heard of misted ink? Ink mist is what the printer operator could potentially breath if the ink is misting (many printers mist, most notoriously the Infiniti 1600 models; the ColorSpan 72uvX also mists a great deal).

Even if a ventilation system is not required by statute, I would recommend room ventilation for every printer other than water-based (I would never operate a latex ink printer without ventilation either).

44. Are there any special temperature or humidity requirements or preferences of this printing system?

The GerberCAT cationic UV inks will never gel, from either heat or cold. The temperature specs for the Solara ion^X are 65-75°F (18.5-24°C) and are important for different reasons. The temperature and humidity specs on the low end of tolerance are there to control static, which can affect operation and print quality. The temperature and humidity specs on the high end of tolerance are because high temperatures and humidity inhibit the curing of the ink.

45. 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, 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 not only ink odors, but everything else that is already in the printshop environment.

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

User networks and their robustness vary by site.

47. Does the printer come in one piece? Does this mean you have to remove a wall to get the printer this size into your office?

The Solara ion^{X} will pass through a 36" door.

The printer is specifically designed to be of practical size and shape to install, even if you need to move it deep inside a building down corridors. It can cost about $15,000 to tear a building wall down to bring in a really large or bulky-sized UV printer.

Furthermore, the Gerber ion is designed to enter sideways (vertically) if necessary, to go through doors and down hallways and around corners. Again, someone on the design team clearly had a lot of experience, and was very clever in designing a user-friendly structure.

The Solara ion^{X} will pass through a 36" door.

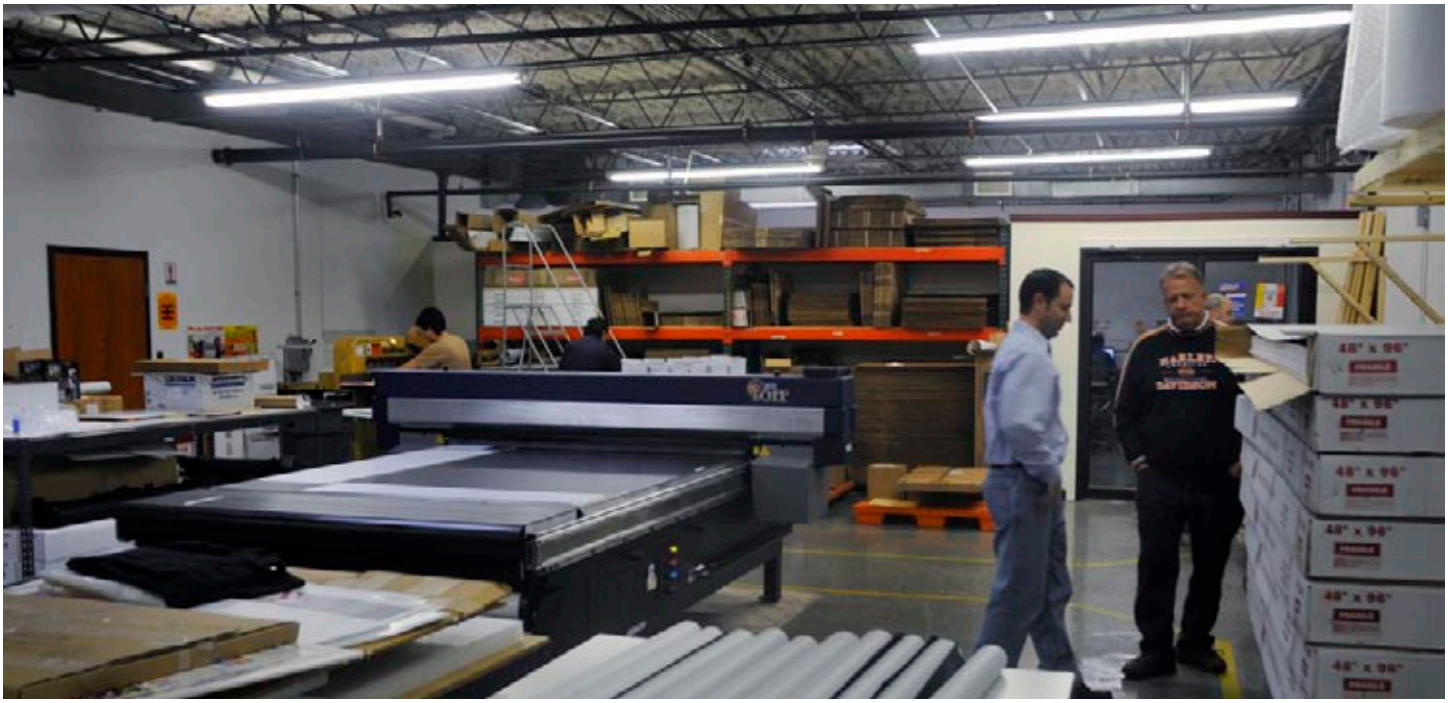
You receive three boxes. This means some assembly work will need to be done at your site.

48. How many boxes arrive?

Three boxes arrive.

49. What size and kind of forklift truck do you need? Or do you need a crane?

The printshop in Chicago was on a second floor. But the ion comes in three different crates, so no one crate is too large to lift. It was possible to lift each crate up to the second floor with a fork lift; no crane was needed.



Besides the space of the printer itself, consider the space needed to load and store rigid materials. FLAAR got to visit Phoenix sign shop, in Chicago, to evaluate the ion^{x} in a real environment.

INSTALLATION OF THE PRINTER

50. What is the rating of usefulness of the User's Manual and other associated materials?

I am updating this report in Switzerland and do not have the User's Manual with me. So this question will be attended to when I receive the manual from my office.

TRAINING

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

The print shop in Chicago was producing sellable jobs quickly, in part because they get repeat business every week. So they do not have time to waste on a printer with a several month learning curve. I visited them after the printer was here for a few weeks and they were printing without hesitation. Many shops report they produce jobs the first day the Solara ion^{X} is operational.

52. How much of a learning curve is there?

The screen printing company that had purchased their Gerber ion the previous month were still learning but they were producing full-time already. So like everything else in life, we are always learning something new. Yet the basic operation of the Gerber ion was not complex. They already had experience with an HP 5000, HP 5500, and a Roland eco-solvent printer. I would classify operating the Gerber ion as normal ease if you already know what a RIP software is and already know how to operate any other wide format inkjet printer.

Inside Phoenix, a printing company in Chicago. The Gerber ion^{x} is relatively easy to use, but experience with any other industrial printer is always helpful. In the background you can see this sign shop has a Roland eco-solvent printer and two HP printers.

TECH SUPPORT & WARRANTY

53. What is the original warranty period?

Normal warranty is one year. Gerber offers service contracts for one year increments which can be purchased at any time you own the printer.

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

Roland also now offers a two year warranty but this is because they want to sell you Roland branded ink and Roland branded substrates. They can only sell you these higher priced consumables if they provide a free warranty. If you do not use Roland ink, the warranty is voided anyway. But there are not really any or many UV printer manufacturers who sell their own branded media, so there is no reason for a UV printer manufacturer to offer more than a one year warranty.

In the past Grapo offered a two-year warranty. That is because their UV printers are relatively simple (in a positive sense, meaning less to break down).

CLEANING & MAINTENANCE NEEDS

55. The ink that is purged, where does it go? Into a drain/waste bottle, or into a drip tray?

There is no waste ink bottle because there is not that much ink wasted or purged. Ink that is purged simply goes onto a napkin in the drip tray under the parking/service area below the gantry.

So, at first it may look like Gerber cationic ink is expensive, but if you are not wasting X% of it by purging into a waste tank, the amount of ink that is producing sellable material is higher than a cheaper ink where the waste tank holds 10 liters and must be emptied every several weeks! Yikes, that is several thousand dollars worth of ink that you have to hire someone to dispose of accounting to local environmental laws.

56. Do you have to manually open and close a valve to let the flush solution flow through a printhead? Is it individual for each printhead? Or is it automatic from the LCD touch-screen or keyboard?

Yes, to purge you need to turn a set-screw for each ink line, individually.

57. If you need to wipe yourself, manually, is it a dry wipe, or a wet wipe with a solvent or clearning material?

A dry swab is moistened with one drop of Gerber flush solution.

MAINTENANCE

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

When I inspected a Gerber ion in Chicago they were not needing to purge or flush very often. Instead they just wipe the heads every two to four hours.

59. What is the most delicate, or complex, or time-consuming cleaning or maintenance chore?

Printhead nozzle plates are fragile. Some manufacturers say never to wipe the actual nozzle plate by touching it. Other manufacturers require that you physically wipe the nozzle plate with a swab. A few manufacturers are unsure and change their recommendations. But no matter that model printer or what model printhead, I would list printhead cleaning as delicate.

SAFETY & HEALTH CONCERNS

60. How much odor is emitted by the photoinitiators or other aspects of the UV-ink or curing process? How much subsequent outgassing is there, and for how long does the stuff smell?

The printshop in Chicago had no complaints about odor, and said none of their clients complained either. Their clients are bars and liquor stores.

Some free radical UV ink has a terrible smell: two brands of ink are especially unpleasant (listed and identified in the FLAAR Report on UV-curing inks).

61. Is the machine enclosed, or exposed?

Totally enclosed; this is about the most sealed system I have ever seen. It's seal puts the Oce Arizona 250 to shame (the Arizona 250 is one of the potentially most dangerous UV lamp systems that has been allowed to be kept in use; the potential damage to your retinas from the Oce is staggering).

Gerber Solara ion^{x} at SGIA 07.

62. Does the hood close down completely to seal the system, or are there a few inches open at the bottom?

The hood on any hybrid or combo system must allow space for boards to pass through, so it's hood can never close down tightly onto the platen area. The design must allow space; this space should be closed off with a skirt. Some printers use flaps or rubber like material; other printers use skirts of brush-like material.

63. What kind of "skirt" exists along the bottom of the hood to prevent light leakage?

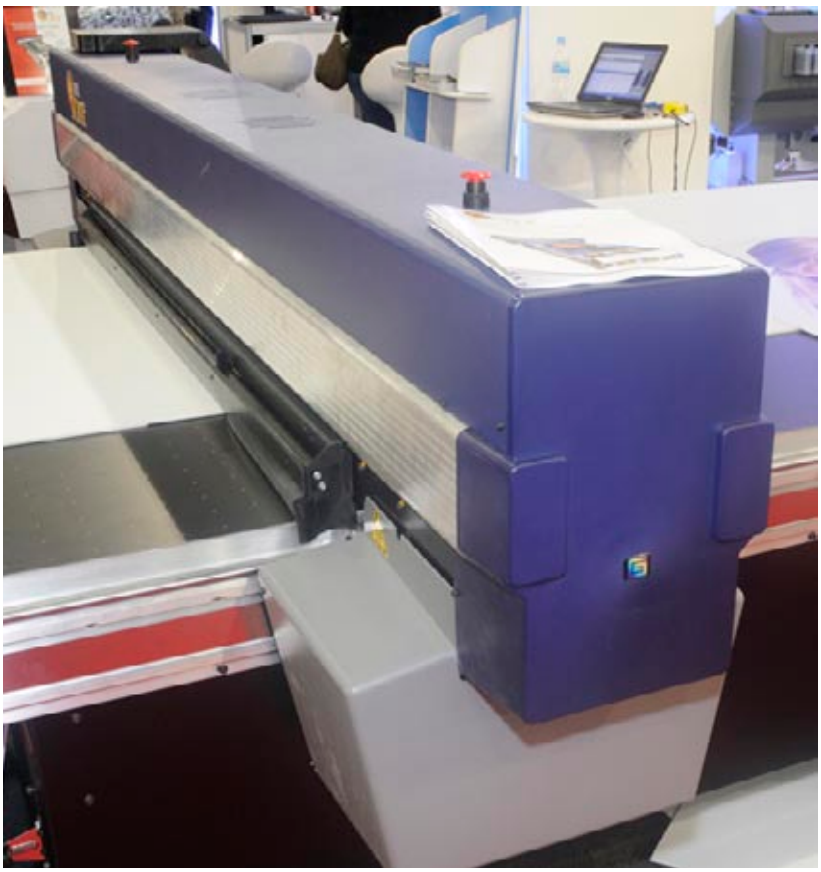
On the week of its launch in 2007 the Gerber printer was roped off so that you could not get close enough to really inspect anything. And there is a "fluorescent-like" UV curing lamp the full length of the gantry. Its position is about where a skirt would be on a more traditional UV-cured flatbed (a skirt is for light protection system, either brushes or flaps).

64. Is there a skirt at the back as well as at the front?

Yes, since there is a full-width UV curing lamp along the back, as well as across the front, there is the equivalent of a skirt in both locations.

65. What system of ventilation or exhaust system is built into the printer? Or if not required, what would common sense dictate? Is it adequate to clear the work area of gasses and fumes?

There are no duct openings in the sense of an area you could attach to an actual duct pipe. Of course since the gantry itself moves, a duct would need to be flexible. Instead there are two slot-like grilled openings in the top of the gantry.



As you can see in these photos, the receptacle where the printhead carriage moves is totally enclosed. Dr. Hellmuth examined the assembly of the gantry (above). Here, the Gerber ionx at FESPA Mexico 2008 (lower left). Components being installed at the ends of the gantry (lower right).

66. What is the noise level, primarily of the fans for the vacuum?

The machine has no noticeable noise level that is bothersome except when the vacuum pumps turn on. Then the noise is an issue, as is true with most other UV flatbeds (although the ColorSpan 9840uv was the worst I have heard, since it's pump is outside the housing (you have to supply it yourself).

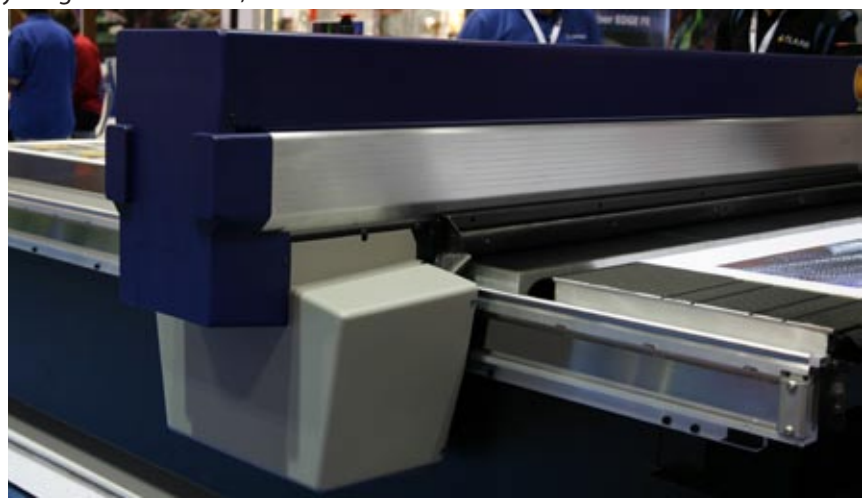
The printshop in Chicago said they felt they need to put some sound insulation material around the base. Gerber is below required noise level limits, but depending on where you put the printer, it can affect how loud it sounds to you. In the demo room, there are acoustical tiles that muffle the sound. DO NOT put anything around motors, or it could burn out the motors. Gerber does not recommend putting any materials around the fan blower motors under the table, as that would negatively impact heat dissipation and can shorten the life of the fan motors.

67. What moving parts might hit a person if they are standing near the printer?

The ends of the gantry, on this and all comparable dedicated flatbed printers with a moving gantry, should be marked with yellow warning tape. The GRAPO Mantra is the only such gantry end that is carefully marked with warning tape.

68. How easy is it to obtain the MSDS of the ink?

The Solara ion^{X} GerberCAT MSDS is in every box in five languages.



It would be good to have warning signs at the ends of the gantry. However, there is no sudden movement that might cause serious damage to the operator. On this aspect, the Oce Arizona 250GT is caracterized by being relatively slow.

PRINTHEAD TECHNOLOGY

69. Which brand printhead is used?

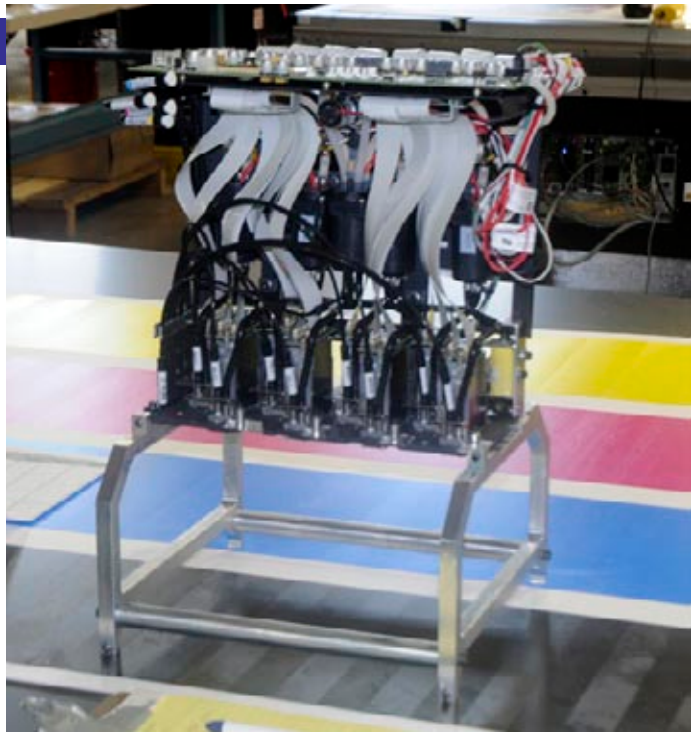
The official policy of most printer manufacturers is not to identify the brand of printhead they are using. So how does an analyst learn what printhead is used? First, learn the picoliter drop size, then figure out how many nozzles.

Then go through all eight brands of printheads, and find out which one matches: bingo.

So, even before I got to SGIA '07 I had learned that the printhead being used was probably a KonicaMinolta. At SGIA I was told by several analysts (not in the Gerber booth) the same information: 512 nozzles.

At SGIA 2007 and at all displays in the subsequent 16 months, the booth personnel have politely declined to name the printhead. Oce tried this; Mimaki tried this (not identifying their head officially). But everyone knows they use Toshiba Tec. I would not buy a car if I did not know whether the motor was diesel or gasoline or hybrid powered. But officially the Gerber printhead selection has no name. Officially it is not a KonicaMinolta printhead.

Actually a KonicaMinolta printhead is an asset because this is a respected brand name.



Ink lines ready for printheads to be installed. Gerber declines to identify the brand and model of head for the ion^{x}.

PRINTHEAD DPI & Features

70. What is the drop size in picoliters?

Drop size is stated to be 42 picoliters. This is within the range anticipated from a KonicaMinolta printhead. But this is far from the 14 picoliter drop size of the more sophisticated KM printheads used by Dilli, IP&I, etc. But the smaller the drop size the slower the printer, so if the curing system inherently prefers a slow cure (such as for cationic ink, or any cold cure), then you do not want to increase the slowness by also having a small picoliter drop size.

71. Is there variable droplet capability?

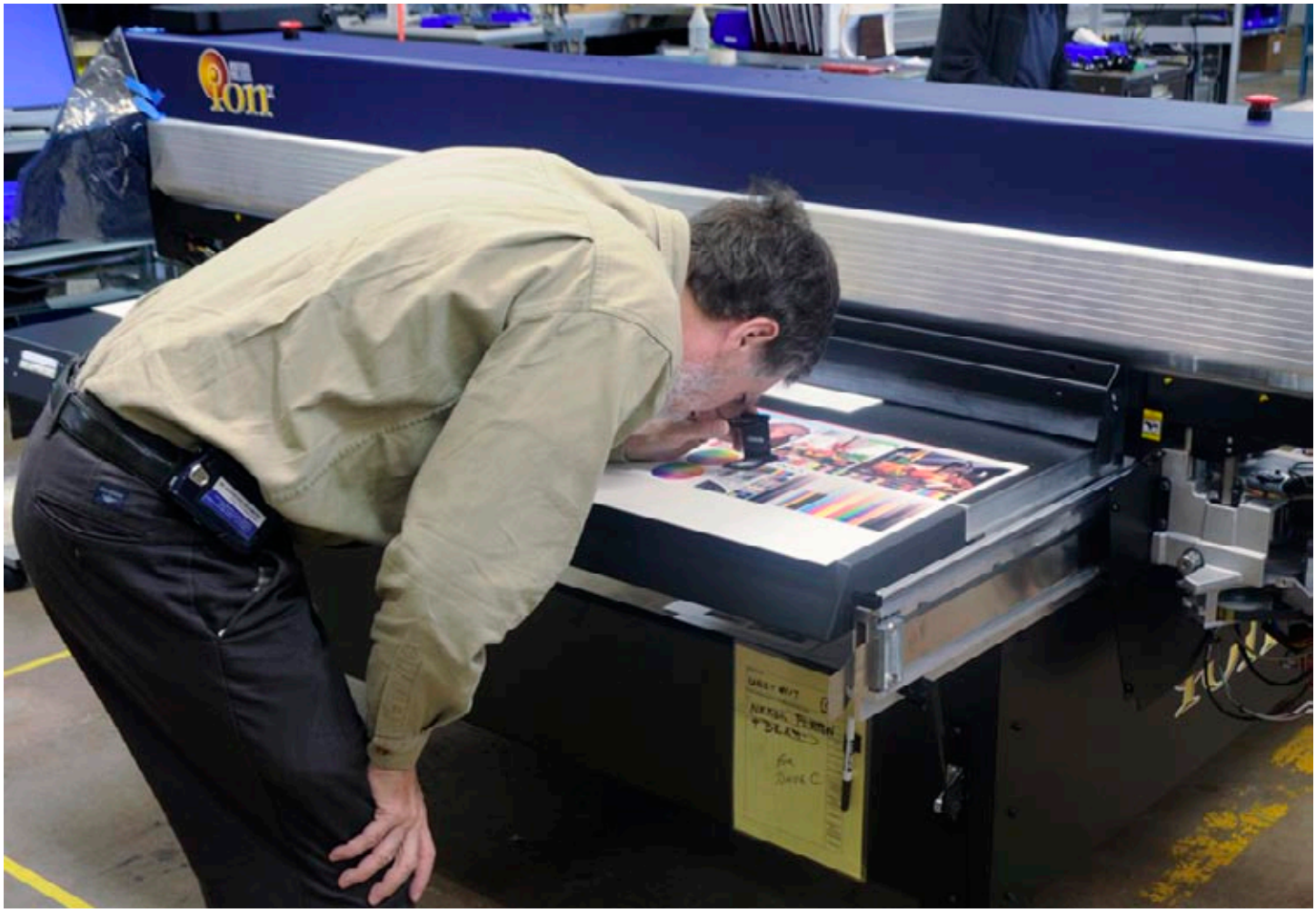
No, there is not yet any variable droplet capability on this printhead.

72. Does the software use passes or modes to describe quality levels?

Increasingly most printer companies are not listing the passes that their printers run back and forth. The definition of a pass is not consistent in any event: FLAAR defines a single pass as the movement of the printer carriage, while jetting ink, from one side to the other. There is a difference between "single pass" and "one pass" but that needs an entire article (one pass means a page-width row of non-moving printheads).

Mutoh describes one pass as a complete back-and-forth movement (FLAAR defines that as two passes).

Most printer manufacturers would rather avoid having to state clearly how many actual passes it takes to achieve specific quality levels. So they create "modes" that are a combination of passes and possibly other features that result in a specific quality level.

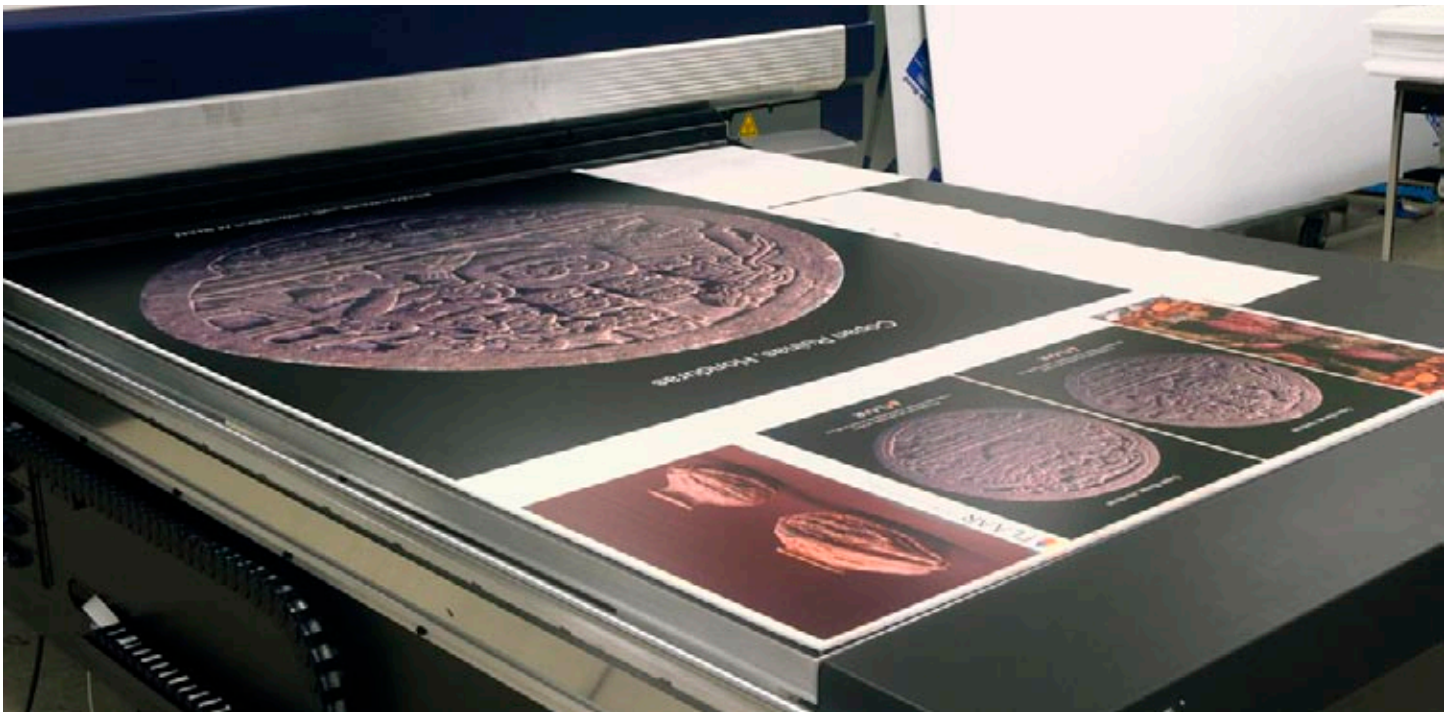


Dr. Hellmuth at the Gerber factory evaluating the quality of the printed samples. Drop size and color gamut are some of the aspects considered in our evaluations.

Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING

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

Uni-directional mode is needed to avoid the lawnmower effect from cure banding of bi-directional mode. With Gerber's carriage return process, uni-directional printing modes on the Solara ionX are only 40% slower than bi-directional, unlike other UV printers where uni-directional print modes are 100% slower than their bi-directional modes. When Gerber engineers created the Solara ionX, they knew people didn't want to print that way, so they created a carriage return process that allows the uni-directional printing to be the primary way customers print.



If you choose to print at uni-directional mode you will get a higher quality than if you chose bi-directional. But uni-directional printing slows your production times. I am very picky about the quality of printing for my own photographs (seen here). Although this printer is not intended for printing photo exhibits for a museum, for normal viewing distance of several feet away, I found the print quality to be good color and saturation.

PRINTHEAD Life Expectancy

74. What is true life expectancy of this print head? Is the printhead considered a consumable?

It is crucial to learn how long any printhead lasts when cationic ink chemistry is flowing through this head. Cationic ink chemicals ionize several metals, including the metal inside some printheads. Since this chemical fact is now known to both ink and printhead manufacturers, GerberCAT cationic UV inks are a proprietary formula that are designed to be less aggressive towards printheads when proper maintenance is performed. Problems in early beta machines have been resolved, many of which were due to improper maintenance. Gerber has over 250 Solara ionX printers installed worldwide as of January 2009, and has thoroughly tested printheads to work towards the goal that without head strikes and with proper maintenance, they should last 1000 hours or more.

75. What else, besides a head strike, can cause a head to fail prematurely?

It is essential with any ink that is known to ionize metal, and any ink that is known to cause problems inside printheads, to check with other printshops that are using this printer to learn how long the printhead last.

When properly maintained, the Solara ion^{X} print heads should not experience this problem as quickly as printheads with earlier kinds of cationic ink chemistry.

So try to find a real printshop (that is not beholden to the manufacturer) to learn how long the printheads last in a real production environment. If the printheads last at least one year, then that is acceptable. If the printheads don't last more than two months, then this is highly suspicious.

SUBSTRATES, Issues

76. What materials can this printer print on perfectly?

At Graph Expo 2008, the samples displayed in the Gerber booth included

- Tyvek (which you can't print on with most solvent inks)
- Plain plotter paper (very economical)
- Coroplast (Sericol ink will not work on this without primer; Gerber does not use Sericol ink)
- Perforated window film
- 3M banner vinyl
- 3M Scotchlite removable graphic film
- White-faced cardboard
- Wood style floor vinyl
- Sintra (Sericol ink splits off when you cut Sintra printed on with Sericol ink; Gerber does not use Sericol ink)

Plus a dozen other materials.

The only other printer that makes an issue of being able to handle Tyvek is the $100,000+ HP latex ink printer. But their Tyvek must be treated (HP makes considerable effort to avoid using the word "coated"). With the Gerber ion and its cationic UV ink you do not need to coat the Tyvek or prime it.

Plus, once you print on the Tyvek with the Gerber printer, you can twist it and crush the Tyvek and the ink does not fall off.

Omega-Bond was one of the materials printed by the Gerber ion^x at GraphExpo 08.

77. Heat concerns: will the heat generated by the UV curing lamps cause adverse effects to some delicate forms of heat-sensitive media? Which materials might curl, distort or discolor from the heat?

Heat sensitive materials would include polyethylene, polypropylene, shrink-wrap, very thin and thermal sensitive papers, plastic coated cartons, PVC and aluminum foil (www.dotprint.com/fgen/prod1297.htm).

Oce lists several other common signage materials as sensitive to the heat of UV lamps. For these reasons we have a separate FLAAR Report on applications and materials.

Heat can build up when the printhead carriage hovers over a small area to print a narrow job. Heat can build up inside the printer as materials (especially metal) absorb heat and hold it (and then radiate it out for a long time). So heat is not only an issue from the obvious and immediate heat of the UV lamps. Residual heat can be an issue as well.

Now you know why most printer manufacturers are moving away from hot mercury arc curing lamps. Cationic ink does not need the hot kind of lamp. So Gerber can use a cooler lamp, which means that heat-sensitive materials can be used in most cases.

78. What about build up of static electricity? What kind of materials cause this? Do some materials generate static electricity which cause the media to attract ink in areas not supposed to be printed on. How is it manifested?

You do need to be aware of how to prevent static electricity build up:

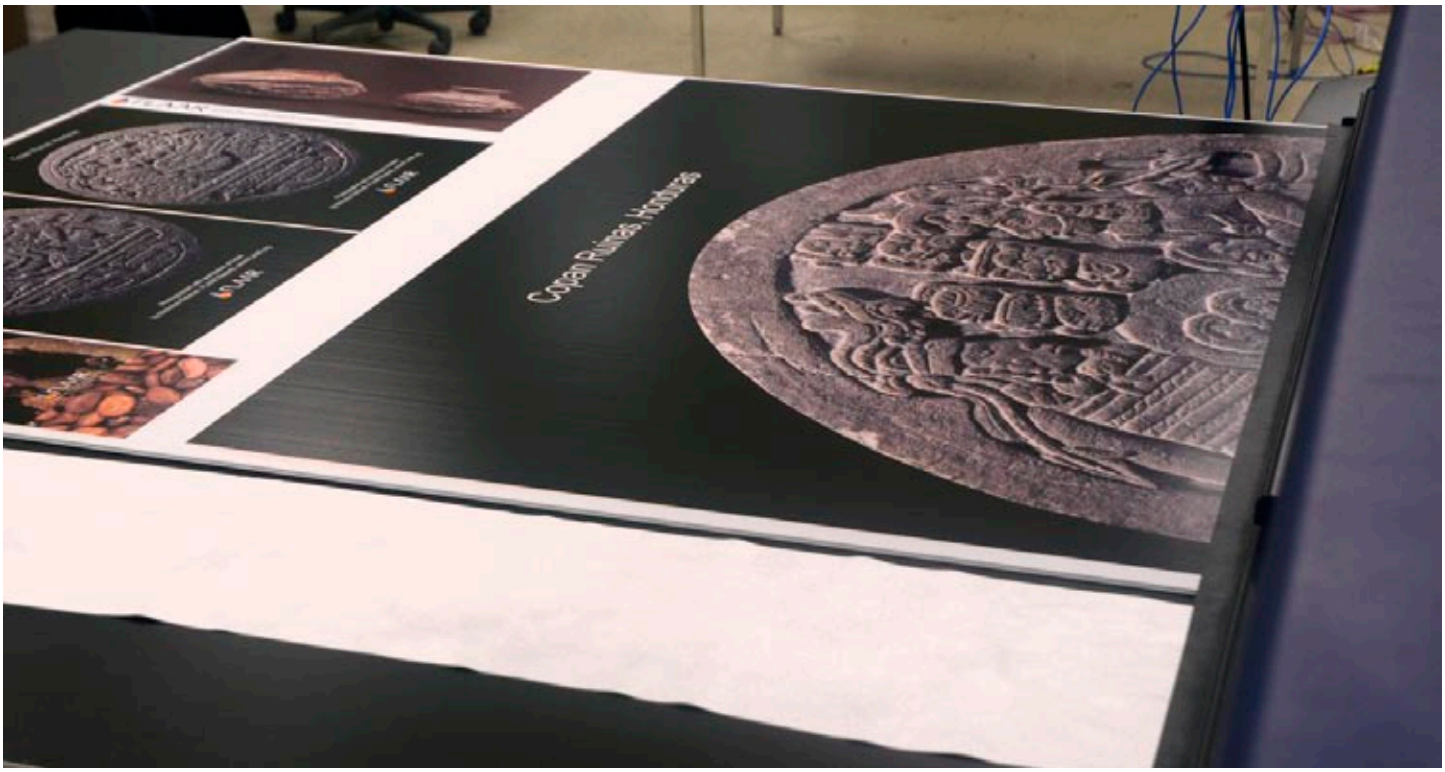
- No carpets or rugs on the floor. Indeed you should consider anti-static tiles or carpet.
- Use a humidifier during winter months to avoid dryness
- Learn which media are susceptible to gathering a static charge.
- Consider a printer that has specific anti-static features:
    - Grounding
    - Static bar(s).

Most printer reps suggest this is more an environmental issue than a printer or ink issue. They say you can't have carpet and you must maintain a high humidity. They admit that the static electricity situation varies depending on each site's situation.

79. What happens in very dry weather (low humidity), especially in winter with central heating?

During dry periods (with low humidity) static problems may increase. With a high static charge (such as with PVC materials), the ink is attracted to charged areas of the material. This results in overspray (ink laydown in unintended areas).

This can be resolved by keeping the environment within spec as noted in the owner's manual, even at night and on weekends, and using the above precautions.



FLAAR photo archive images printed on at the demo room.

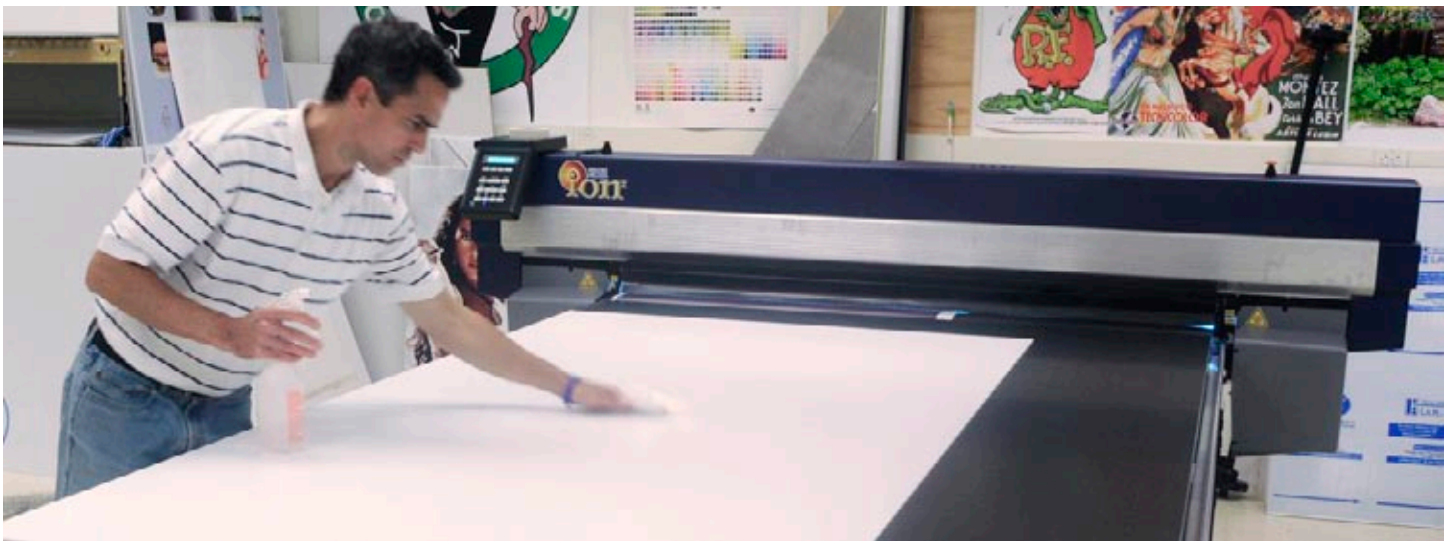
SUBSTRATES: Cleaning, Priming, Preparation

80. Do you have to brush off or otherwise clean each sheet of incoming material by hand before you print on it?
Generally yes. The need to clean incoming materials is typical of any printer. Some materials have more detritus or dust or issues than other materials. And some suppliers offer better materials than others.

81. Which substrates ought to be laminated, top-coated, or otherwise post-treated?
Some competitive UV printers still require lamination to help ink stick to the substrate, but Gerber's proprietary cationic ink adheres to many materials and does not require lamination.

Lamination can also serve to provide a glossy finish on a material that is naturally matte.

The printshop in Chicago, Phoenix, said that their customers like it when they use Accushield thin laminate on top of the print so customers in a restaurant, bar, or store can write prices of the products being advertised by the sign onto the sign with dry-erase markers. You can then erase these prices and change them, or the message, by hand, in the store.



Cleaning the incoming material before printing. Gerber´s demo-room visit, 2008.

APPLICATIONS

82. Can you print on textiles or fabrics? How do you handle the ink that gets through the weave?
The Solara ion^{X} prints well on textiles, but some open weave textiles need backing to prevent ink from adhering to the table.

Another aspect evaluated is adhesion. Here, Dr. Hellmuth scratching a print sample with a pen at ISA 08.

In Chicaco, Phoenix sign shop owners and Nicholas Hellmuth showing print samples.

INK

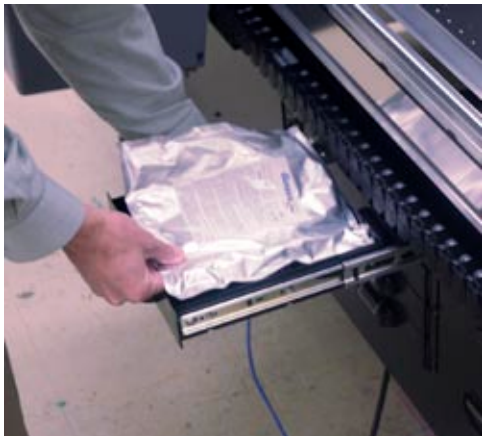
83. Is an extrudable or thermal-formable ink available from the printer manufacturer?

At present only Mimaki, Durst Rho and Gandinnovations offer a special heat-formable UV-cured ink.

84. How many colors are used to produce output - four, six, or eight?

Presently only basic CMYK is offered. But we found out there is a reason why only CMYK was offered back in 2007. If an ink is new (if chemists are still working on it, especially if it's an experimental ink), light Cyan and light Magenta would tend to be the last of the colors to be developed. So the reason why six colors are not offered today could be because six colors of cationic ink are not yet available. Indeed cationic ink is so new that other ink companies only had a few basic colors, not even the full CMYK.

The question is, if light Cyan and light Magenta are not yet fully finished, how mature are the basic CMYK colors? Obviously the other option is that four-color machines are less expensive than 6-color machines, so if all six colors of cationic ink are available, the cost alone could be a reason not to offer them.



Installing the yellow ink container.

85. What company makes the inks? Choices include DuPont, Jetrion (now InkWare/VUTEk), Hexion, Sericol, Sun, Triangle, KonicaMinolta, Toyo, Tetenal and several others.

This is the question that everyone asks. My interest is not to reverse engineer the ink (or the curing system or mechanics of feeding material). But every ink has a track record: for example, would you wish to use the same ink that Inca tested (but it failed), the same cationic ink that failed Inca and then failed Zund catastrophically? So we will hope that the Gerber ink is not from Sericol.

The next question is about Japanese UV ink. Ink tends to come through the printhead manufacturer, in this case probably KonicaMinolta. A slight exception is the cationic ink for the Durst Rho 350R. The heads were from Spectra (if I remember correctly, there are over 101 models of UV-curable printers). But the cationic ink used by the Durst Rho was from Japan. Reports indicate that the Durst ink was provided by KonicaMinolta. Two sources suggest that the ink for the Gerber ion is specifically not Toyo. Yet most analysts estimate that the primary partner for KonicaMinolta for UV cationic ink is Toyo, but this estimate is not yet substantiated. Toyo says no.

It would be so much easier if the ink source were simply listed. By the time of ISA '09 everyone will know it anyway. Several sources indicate clearly that the ink is from KonicaMinolta itself, which does not mean they have their own ink factory, but that KM is the primary developer of the ink with an ink partner. Nowadays printhead manufacturers want to obtain a tax or tithe from all ink that jets through their printheads. Epson started this system. Of course the downfall is if the ink is not adequate it makes

Curtis Brey installing an ink bag at Gerber factory.

no use how good the printheads are. Agfa found this out when their own free-radical ink turned out to have issues. Agfa learned this same lesson earlier when its eco/mild solvent inks caused malfunction of Epson printheads. This inadequate ink caused the demise of the entire Agfa eco/mild solvent printer program: these printers simply evaporated from the trade shows: no explanation (it would have been too embarrassing).

The issues with Agfa's own UV ink could also be a partial cause for the collapse of their own Agfa UV printer that was so nicely displayed in semi-secret at FESPA '05 in Munich.

So knowing what company makes the ink is crucial to understanding whether a printer will have issues or not. At present (December 2008), the actual source of the cationic ink for Gerber is unknown, but it is most likely primarily Japanese. Konica Minolta has many capable ink chemists in its company.

Curtis Brey next to the ink boxes at Gerber factory.

INK: White & Varnish

86. Is white ink available?

No, white ink is not available. Lack of white ink is also a major downside of the Oce Arizona 250. That said, it is a truism that most clients do not ask for white ink.

INK Cost

87. What is the cost per container? What is this cost translated to liters?

Ink was priced at $245 per liter, which is quite expensive for a large format printer ink. But if you do not need to purge often, you save a lot on ink by this fact.

Some printers and some printheads (Toshiba Tec, for example, used on Mimaki printers) require a lot of purging. The Seiko printhead is also rumored to need spot checks.

88. Where is waste ink collected? In a tray? In a bottle?

Because you do not need to purge often, there is not really any need for a 5 to 10 liter waste bottle like the VUTEk QS-series UV printers require. With the Gerber ion the ink simply drips onto a paper towel or special rag. When the towel is saturated, you simply throw it away and put a fresh absorbant strip there.

The owner's manual states that only Gerber's lint-free wipes should be used in the ink waste tray.

INK: Supply System, Tubing, Filters, etc

89. What is the situation with the ink gelling?

Ink gels from heat; not from UV light (since in theory the inside of the printer will have black ink lines so no UV light can reach the ink).

Heat will not gel the GerberCAT inks under normal conditions, but customers must still follow the ink storage specifications.

90. Is there an issue with "ink starvation?"

"Ink starvation" means that not enough ink can get to the printheads in fast printing modes. Gerber has developed an ink delivery system which eliminates this problem in the Solara ionX. Ink starvation is a real issue that affects even some quarter-million dollar printers.

INK Color Gamut

91. Which colors print best?

Color gamut will depend on the color of the material on which you are printing, on your experience with color management, and whether you are using canned ICC color profiles or custom profiles that you made yourself.

At Graph Expo 2008 in Chicago, the food colors were good, Coca-Cola red was excellent, and metallic colors were perfect. Many other brands of UV-cured inks can't get good reds (they tend to be orange).

At the site-visit case study in Chicago the two owners of the company said that their clients were content with the colors. Previously this printshop used primarily screen printed material for point of sale. Now they are gradually moving these print jobs to the Gerber Solar ion.

Photo at the left: Nicholas Hellmuth in front of the Gerber cutter showing a print sample at GraphExpo 08. At the right: Dr. Hellmuth holding a sample printed on Tyvek at ISA 08.

THE UV CURING LAMPS

92. What technology is used in curing lamps: microwave, continuous (mercury arc), LED, or flash (pulsed Xenon)?

The lamps are not microwave (only NUR and a few other systems use microwave).

The lamps are not pulsed Xenon flash(ing) lights because these were not successful when attempted by VUTEk long ago and failed again when Oce tried them for their ill-fated Arizona 60UV.

The lamps are not continuous mercury arc: these are too hot for cationic ink.

The lamps are not LED. Gerber has access to this technology, but the Solara ion^{X} utilizes Cold Fire Cure and GerberCAT matched technology.

Gerber wants to insure that no other printer manufacturer gets information on their new lamp technology. So far their patent application is not easy to find, though it would be fair to assume that competitors have better access to patent applications than I do. In reality it does not help to obscure the information on the kind of lamp because if the lamp+cationic ink does not work, it is unlikely that any competitor would want to copy this anyway.

Besides, KonicaMinolta's cationic ink printer uses LED lamps. So it is unlikely that any company would want to copy Gerber's UV curing lamps.

The Inca Spyder 150 also uses long lamps affixed to the gantry; a long series of lamps that do not traverse with the printhead carriage. But the lamps on the Spyder 150 are LED, not mercury arc.

93. What is warm up time?

Gerber does not claim instant-on. The stated warm up time is 2 minutes, 43 seconds, but to save time you can run the printer in Lamp Delay Mode so the lamps will stay on for 10 minutes in between jobs. This eliminates the need to wait for warm up.

94. How many lamps does the printer use?

Two is the usual number of lamps when a system uses mercury-arc UV lamps. Some cheap Chinese printers use only one lamp. Mimaki uses one lamp on several of their narrow-format UV printers to avoid the lawnmower effect that is caused by bi-directional printing (bi-directional print requires two lamps, one for each direction of ink laydown by the printer carriage).

The Agfa :Anapurna 100 (a printer that was never finished due to being too complex), I believe had three lamps. The Lüscher JetPrint, due to its über-dimensional size, may also have needed more than two lamps (whatever it had did not function fully adequately).

The Gerber has a unique lamp system: the lamps are the entire width of the printer; and do not travel on the carriage.

The light you get to see in the edge of the gantry shows that the lamp covers the print width.

95. What shuts the lamps off? For example, after so many minutes of not being used; or if they overheat?

Some UV lamps must be shut off if the printer is not operating for over 5 minutes. Then you have to wait to warm the lamps up again. This wastes time and also turning the lamp off and on eats up its life span. A single strike is the equivalent to an hour or more of being on. So in a single day you wear the lamp out more by turning if off and on than by using it.

None of this is an issue with the lamp selected by Gerber. It can stay on all day, or be turned off and on, as you desire. Once these printers get into use and feedback is available, better guidelines can be produced, since practice is sometimes a bit different than theory.

96. How long does the lamp last, in terms of hours of operation?

10,000 hours is the usual lamp life for LED, but since these are not LED, and are new, lamp life will probably be better known as time goes on. But in the 3,000-5,000 hour range is a good place to start. Mercury arc UV lamps last between 500-1000 hours.

97. How many hours are used up by each "strike" (by each time you turn the lamps on)?

There is no usage time generated by turning these lamps off and on. With a mercury arc lamp (or any photographic lamp such as tungsten or halogen) every time you turn the lamp on this wears it out. Same with a traditional household light bulb. This is why, when they fail, its when you turn them on. The filaments break. You don't have these problems with cool lamps or LED lamps. So this is a potential advantage with the Gerber system (assuming everything else works).

98. What is the true drying (curing) time of the inks used with this set of lamps? What factors influence the true (total) drying time?

GerberCAT ink begins to dry right away, and as time goes on, the ink gets stronger in adhesion and durability. When some metal substrates are printed on while they are colder than room temperature, they can absorb the heat in the ink and the curing process is slowed.

Some colors, depending on how thick the ink is laid down, may cure "instantly." But several factors may result in a cure that takes 24 hours, 48 hours, or weeks. If you set the print mode for "glossy" this reduces the lamp intensity. These prints will outgas for weeks.

Cationic ink can use dark cure (it continues to cure even when the light source is removed).

UV LAMPS: Cooling

99. Are there shutters?

Shutters are primarily for microwave and mercury arc lamps, to help control light leak and save from having to turn the lamps off. So the lamps last a bit longer and you can be more productive, not having to wait for the lamps to cool down and then warm up all over again.

Shutters are not expected on cool forms of UV curing lamps.

100. In the areas at left and right of the printing area, is the surface specially protected against the extreme heat of the UV lamps when they carriage is parked?

Since the long UV-curing lamps do not emit searing temperatures there is no need for special ceramic, stone, or open heat-dissipation grills as with normal mercury-arc UV lamps.

The maximum temperature on the lamp itself is 212°F and the maximum temperature on the material surface is 85°F.

RIP SOFTWARE & Printer Software

101. Which RIPs are featured?

Onyx, Flexi, Wasatch, and ErgoSoft are available at present. CADlink will probably be added.

Caldera is finishing now and will soon be available.

COLOR MANAGEMENT FEATURES

102. What color management sensors or measuring tools are on-board?

ColorSpan has color management tools built into its UV printers, but otherwise this feature is not yet available on other brands.

PRODUCTIVITY & ROI (Return on Investment)

103. Can you sell the output at the machine's fastest output speed or is the quality at that speed not acceptable to most client standards?

90% of the different brands of printers can't produce usable output at their fastest claimed speed. So I call these speeds "junk mode." It is false advertising in probably half the spec sheets. With the Gerber ion I myself would need to test their fastest claimed speed, but what I can report is that their realistic speeds produce attractive prints for basic signage needs.

No one would expect a 42 picoliter drop size to produce acceptable POP signage, but I spent an entire afternoon and early evening at a successful printshop in Chicago which prints exclusively point of purchase material, for bars, restaurants, and liquor stores. At normal viewing distance (5 feet) the signage looked professional and more than adequate. If you were sitting at a bar and had one of these signs on your table, only if you were a digital imaging specialist would you notice modest banding or rough surface dot pattern (from the 42 picoliter drop size). I was pleasantly surprised at the quality and it was clear that the clients (the liquor companies) were content with the price. In today's recession, price is more important than special quality (in most, but definitely not in all situations).

Print samples at Phoenix sign shop. Chicago, 2008.

104. What is the level of productivity, high, medium, low?

The speed of this cationic ink system is judged to be slow by every analyst that I have spoken with. But when you ask a printshop owner and printer operator, they are content because of the price of the printer. Naturally everyone wishes for a faster printer, but if the faster printer costs $272,000 to $340,000, and the Gerber Solara ion^{x} costs $88,995, you can get two to three ions for the price of a single faster printer. Plus, in a down economy in a recession, most printshops prefer to be frugal.

The owners of Phoenix printshop in Chicago told me about their Gerber Solara ion: "We had a print run of 100 24 x 40" images, one-sided. The Gerber ion accomplished this without a glitch. We printed it at 4-pass uni-directional. The speed and resulting quality were acceptable to us and to the client.

When I tested the ion in Connecticut at the demo room of the manufacturer, 4 pass, uni-directional, 360 dpi of the large sized images took 15 minutes and 51 seconds.

If you want or need even better saturation you can select 8 pass uni-directional, 360 dpi, at 30 minutes 30 seconds. These are the large images you can see here in the photo.

For a 20" image it took 14 minutes 42 seconds. So for the larger size, at 8 pass, we estimated 1 hour + 13 minutes (73 minutes) for 720 dpi, 8 pass, uni-directional.

In effect, the quality is there if you wish it; the speed is there if you need that. If you want more quality for 4 pt fonts, there are printers for $120,000 on up. If you need faster speed there are printers for $340,000. So the choice is simple, $88,995 and you get two printers in one: roll-fed and dedicated flatbed, a tad slow, but acceptable for basic point of sale images, and definitely okay for anything viewed at over 5 feet away.

FLAAR photo archive images were used to evaluate the print quality and production performance at Gerber factory demo room.

ADVERTISING CLAIMS

105. What advertising claims use smoke-and-mirrors to hide something, or make a claim that is not realistic?
Gerber's initial use of industry jargon like "linear speed" did not accurately portray its slower speed and was somewhat misleading, but they have since omitted that from their marketing, and are using the more precise wording "true print throughput", which better describes the real speed at which the Solara ion^{X} prints.

106. What about the inherent, systematic problems of printers, especially banding issues and other well known but seldom openly discussed problems with piezo-electric heads?
Five years ago the printer with most banding was the Roland with its Epson piezo heads. Now Roland has improved its handling of the heads and Epson has improved the heads as well. But today banding lines or path marks are the one signature of inkjet printing that mars most images. Mutoh avoids most kinds of banding by its Intelligent Interweaving. Most other companies now have comparable gradient masking. But still, feeding banding is tough to eliminate totally. I would want to check to what degree substrate advance may cause minor banding when using the roll-fed portion of the Gerber ion printer.

But one the prints on rigid material, done in the Gerber demo center, there was no banding on solid black. My notes state clearly that "solid black is perfect, no banding."

With Gerber's carriage return process, uni-directional printing modes on the Solara ionX are only 40% slower than bi-directional, unlike other UV printers where uni-directional print modes are 100% slower than their bi-directional modes. This faster speed makes it realistic for the customer to use uni-directional mode as the primary way to print, which removes the probem of the banding caused by printing in bi-directional mode.

107. Do certain parts of the printer need to be repaired or accessed so often that you have to remove safety plates or protective plates to make access easier?
This is mainly with Chinese-made printers.

108. How often do people return this printer and say they want their money back?
This is a statistic that we will need to learn.

GENERAL CONSIDERATIONS

109. How many printers of this model are in use; in the USA; in the rest of the world?
There are now 250+ printers installed worldwide as of February 2009. Naturally a score of these are at dealers and distributors around the world. But more than enough of the Gerber ion are in printshops busy at work.

COMPARISONS WITH OTHER PRINTERS

110. What features on the other printers may be issues?
I can verify that I saw plenty of their different jobs. Color and quality were comparable to other printers in their price range such as the ColorSpan 5440. The downside of this printer is that there is potential skew for thick heavy material, the Ricoh printheads have a history of problems, and the ColorSpan print engine has problems.

SUMMARY: Image Quality Issues: General

The print quality at DRUPA '08 was indeed okay, just that the printer only functioned a few hours a day the first one or two days, and thereafter only perhaps an hour a day (and on some days, it did not print at all).

Some people might find the overall pattern of the printing "grainy." This is probably a result of the large droplet size (42 picoliters is unprecedentedly large size for a printer intended to print anything that will be viewed at close distance).

The print quality during demo room printing at the Gerber headquarters in autumn 2008 was fully acceptable for viewing distance of 5 to 6 feet. The images looked handsome from this normal viewing distance. At the Dubai Middle East trade show in 2009 the printed results every day looked fine from a viewing distance of two meters.

111. What about the dot pattern? Is the image grainy (like sand) or is the image smooth as you would expect of a photograph?

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112. Do you need "Pantone markers" to do touch-ups?

If you use Pantone markers or other markers for touch-ups you run the risk that these areas will fade faster than the original UV ink.

CONCLUSIONS

Pros

Now, in March 2009, most everything said previously about the Gerber ion is past history. The printer has performed admirably at SGIA 2008, GraphExpo 2008, VISCOM Germany 08 and VISCOM Italy 08, FastSigns 2009 and Dubai 2009. As a result I have updated this FLAAR Report as of mid-November 2008 and again in late November. Then I visited a successful printshop in Chicago that had their Gerber Solara ion busy at work. So I updated this evaluation again in early December 2008. In January 2009 it was possible to speak with several owners of Gerber ion printers at the FastSigns convention and trade show. Not one had serious compaints and no one spoke out about anything awful.

The printer in shipping and installation mode is specifically designed to be of practical size and shape to install, even if you need to move it deep inside a building down corridors. It can fit through a 36" door.

Gerber stated clearly that they obtained and then took apart other competing printers to understand how to design a better system. This practice is standard, and demonstrates that they sincerely wished to produce a breakthrough printer.

A clever innovation was that Gerber got away from the idea of running the roll-fed material over the flatbed area. Making the roll-fed system independent seemingly never occurred to most other manufacturers (except NUR, on their Tempo flatbed, which has an independent roll-to-roll system underneath). Oce tried to attach a roll-fed system to a dedicated flatbed but it has taken them almost two years to get it to function.

Why not make two separate machines? It's the cost of the printheads. At about $2000 per head, with 8 heads, that's 16,000 dollars of the cost of the printer before you add anything else. If the same gantry with the same printhead carriage and ink system can move to the roll-fed feeding area, you have saved $16,000+.

Furthermore, the Gerber ion is designed to enter a building sideways (vertically) if necessary, to go through doors and down hallways and around corners.

Potential Pros

Cationic ink, in theory, offers a stronger bond and a more elastic bond. Cationic ink is better than free radical ink in most (but definitely not in all) respects. Cationic ink is especially good for flexible materials. But, like everything else in the world, there are pros, and cons. The downsides are infamous (discussed below and in more detail in the FLAAR Reports on UV inks).

I list cationic ink features as potential pros because the features listed here are totally unproven to the skeptical world. These features are pros only if they function flawlessly. For Durst and for Zund, cationic ink was a disaster. I admire Gerber for trying.

GerberCAT inks have overcome the problems other companies have had with these inks, and customers report the inks bond to the substrate and are durable and flexible.
Are we predicting the Gerber will fail? no, in part because we hope it succeeds (a success by Gerber is good for everyone; competition is what keeps everything moving ahead). A fabulous new Gerber printer will rejuvenate the entire industry, will provide a great printer for franchise printshops, and will jolt the competition into putting on their thinking-caps.

Downsides: the structure & operation of the printer

The end of the printer has an area that sticks out. It makes a perfect seat to sit on. It makes a perfect platform to put heavy boxes of material on. This area has a "Do Not Lean" notice, but that is not because it's fragile, it's because it's sensor driven, and leaning on it can cause interruption of printing. So far, not one has been broken because of leaning, as it is made of steel

I will have to check to see if anyone else is having an issue with network connectivity. The printshop in Chicago was having issues running the ion from a network. Whether this was a RIP issue or a printer issue only a network specialist could tell. This does not affect the printing, only the ease of use.

One owner of the ion said it would be easier if you did not have to "send" jobs twice: once from the RIP to the printer and the same job from the printer console to get the image to start printing. Perhaps there is just a setting that needs to be set to overcome this glitch. But this is an issue of network setup affecting this specific sign shop.

When I speak with end-users they often say that tech support people change their recommendations occasionally. I have now heard this about handling Toshiba Tec printheads (used by Oce Arizona and Mimaki JF-1631). At stake here is to what degree the printhead nozzle plate should be touched at all, and if so, how (obviously gently) and how often. In other words, sometimes there is a discrepancy between what the manual says and what the tech support person tells you.

The Gandinnovations flatbed is the first one that recognized you can print faster if you print the long axis of your table. Inca printers are a bit hobbled in this respect because they print only across the short dimension of their table. Oce prints across the long dimension; Mimaki prints across its short dimension.

Gerber has no choice but to print across the short dimension of its table since otherwise the roll-fed area would need to be 10-feet wide. That's okay for grand-format, but not for the entry-range and mid-level that Gerber operates at.

Downwides: general aspects

A potential non-positive aspect of a thorough evaluation of any brand of UV printer is the smoke and mirrors relative to the adequate identification of the printhead. There are only about 6 printhead manufacturers in the world, and Gerber is not one of them. So there is no way this can be "our own" printhead. Oce tried this ploy and it has not kept people from finding out what printheads they use. Everyone knows Oce uses the Toshiba Tec, even which model is now widely cited. So why don't Oce booth personnel just tell people up front.

The second downside lack of adequate information is on the UV-curing lamp system. If you are paying $88,995 for a piece of equipment, it would seem you should expect that the manufacturer would let you know what you are buying. After all, everyone will find out sooner or later.

Besides, competing printer companies find out on their own anyway.

The third downside is that everything in the printer is new; new to Gerber and new to the world of UV: new UV lamps, new UV ink.

The printshop I inspected in Chicago said they wished that Gerber Scientific could offer an option to muffle the sound of the vacuum pump, perhaps by putting a skirt around the base of the printer, or otherwise to reduce the sound. Vacuum pump noise is an issue also on several other brands, so this is not limited to the Gerber Solara ion.

Downsides: the ink chemistry

The newness of the cationic ink is only one weak link in the chain. In 2003 Sericol provided a cationic ink to Zund that could most politely be called unfinished. It turned out also to be inadequate. Zund was knocked out of the wide-format inkjet printer business as a result (the company itself did not fail; it simply reverted to producing the well-known Zund flatbed cutters).

Some Japanese company provided an inadequate ink to Durst for their Rho 350R in 2004-2006. It would be very curious if this is the

same ink used by Gerber. This is why the name of the actual true manufacturer of the ink is important. However I would hope that Gerber did their background research and is using a source different from that of Durst.

But clearly, if it is true that light Magenta and Light Cyan do not yet exist in finished state because these inks are not even brewed yet, this suggests that the CMYK colors are also relatively new. This in turn is a polite way to suggest that the cationic ink formula itself is new and perhaps not fully tested in real-world situations, such as the humidity of Florida, not to mention any country or area of the world that has a rainy season. As a child in St Louis, Missouri, I can remember humid summer days much of the summer. In Ohio it's so humid in the evening that in winter your windows freeze from the mist while you are in the grocery store shopping.

What appears to be going on is that the printer companies are serving as testing labs for the ink companies. The ink companies can test their new chemistries only in a lab. But until hundreds of different end-users, out in the real world, report the pros and cons of a novel new ink, no one really knows how the ink will actually hold up in a real production shop. Zund was very upset that they were used as a guinea pig by an ink company whose cationic ink had already failed a few months earlier in in-house tests with Inca Digital. At the time they accepted the cationic ink from Sericol, Zund was not aware that the ink they were offered had already failed at Inca. Zund only found this out later (when it was too late).

I would hope that the ink being supplied to Gerber is at least reformulated (since Durst Rho 350r was dedicated roll-fed; the Gerber is dedicated flatbed with a roll-fed at one end). So the ink for the Gerber would more likely be a dual-use general ink, not just for roll-fed flexible material.

Because of these known issues, a success for the Gerber ion will break all records and will show all nay-sayers to have been incorrect. All great inventions, and inventors, faced similar odds: Thomas Edison for electricity, the Wright Brothers for airplanes. Probably the review writers of their era said "airplanes are too new, they won't fly…" So let's hope that the Gerber ion system, and it's remarkable cationic UV curing ink is a window to the future, since a cationic ink that functions is the greatest breakthrough in eight years.

There are inadequate statistics on printhead failure caused by the chemistry of the cationic ink. But all comments, albeit not substantiated (because no one admits what is really happening), suggests that printheads fail after a few months. In some cases printheads may fail even before then. One beta tester was not allowed to answer questions unless the questions were submitted in writing in advance to be checked by the manufacturer before deciding whether to answer them.

But the main aspect of cationic chemistry is its tendency to continue to cure after the UV lamp is off or no longer shining on the ink. As one world-renowned ink chemist rold me recently "anything that goes wrong if the curing propagates will be catastrophic."

The lack of clarity in press releases about the beta tests

Gerber sent two ion flatbed printers out for beta testing after ISA 08. One went to Portland, Maine; the other went to Maryland. Just before DRUPA a glowing effusively bubbly Success Story was issued about the one in Maryland, proporting to be in the words of a content end-user.

And for the beta site in Maryland. Why did they not mention the issues, defects, problems, and things that needed to be improved? We know for a fact that the printer had issues; after all, it is a beta test version, barely out of alpha stage. Actually still a prototype in many respects. No one expects any prototype to function perfectly.
FLAAR specializes in site-visit case studies, so this is our next step in our long-range evaluation of this fascinating cationic ink chemistry. So far the first-site visit case study (winter 2008) did not turn up any disasters.

Comments & Suggestions

Essentially Gerber has one chance: if they succeed they can become the #1 entry level UV printer company worldwide. If cationic ink does not function adequately, this brand will be clobbered by the combined clout of HP + ColorSpan on one side; Koreans + Chinese on the other side; and Oce above them.

If the Gerber printer were finished and ready to actually function tomorrow, it could take advantage of the disjunction when any two disparate corporations (HP and ColorSpan) try to join forces. The other printer that may take over the entry-level sales record is potentially the Mimaki UJV-160, an LED-curing hybrid style. Downside is that hybrid printers are iffy for most thick and heavy rigid materials.

The same features of cationic chemistry that are causing the most headache are precisely the features that FLAAR hopes will work, because all innovative printers help everyone:

- Provide end-users a better printer
- Nudges stodgy old-fashioned competitors to get with it and produce something newer
- And all these innovations provide a growing market for true, factual pros-and-cons kind of discussions, which is why the FLAAR Reports are so helpful to end-users.

Gerber has also spent a considerable amount of money developing their new ion. So the question is whether they can afford this loss if the printer does not function. So for countless reasons we hope that cationic works.

And a comeback is always possible. We call these the Prodigal Printer, as the Prodigal Son in the Bible. If a printer that has initial bad luck can quickly be redesigned and relaunched, we call it a Prodigal Printer. We give Prodigal Printers special attention because we realize how much work has gone into overcoming initial Pech, and coming up with a better concept. We hope the original Gerber ion concept works, and if not, we hope their Prodigal Printer version can replace the first version and be successful.
Mixed messages have been sent: press releases state that the cationic ink works just fine and printers will be delivered in May. The exhibits at ISA 2008 showed dozens of handsome samples. The printer was actually printing at least half the time (albeit very slowly; any claims of speed on the brochure are inaccurate). The advertisements about speed are unacceptable for any printer that is as slow as was demonstrated at SGIA '07, VISCOM Italy '07, and ISA '08.

- The main salvation of the Gerber flatbed is that
- The Mimaki flatbed continues to have small issues, but repeatedly; sales are low to slow
- The 4x8' Raster Printers flatbed (made in the USA by ISI/Triangle Inx) is not yet finished because of the failure of MEMS printheads.
- The entry-level Gandinnovations flatbed to match the Oce Arizona 250 GT is now launched but costs twice the price of the Oce.
- ColorSpan never built an entry-level flatbed
- The GRAPO Manta is sold only in Europe (not in the USA or Latin America), so has limited appeal. And the GRAPO printers have stalled; none are at DRUPA that I can see so far.

But in a positive tone, at least the Gerber ion at it's first public appearance at SGIA 2007 printed better than the VUTEk flatbed at DRUPA 2008. VUTEk is exhibiting a prototype flatbed at DRUPA that (based on preliminary reports) can't even print yet at all. The consensus is that this is premature, and will impact VUTEk's reputation even more than all the PR releases about the financial downturns at EFI.

Conclusions

Several factors facilitate the success of the Gerber Solara ion:

First, the ColorSpan 5440uv series printer continues to disenchant end-users. Even the replacements from HP are not entirely satisfactory (they are better than the originals, but not good enough).

Second: the ColorSpan (in addition to its mechanical, ink system, and printhead glitches) is not a dedicated flatbed. The HP Designjet 35000 and 45000 are roll-to-roll printers with roll-up tables to handle basic foam core via pinch rollers on top of grit rollers. That is not a good system if you intend to print primarily rigid materials.

Third: the Mimaki flatbed continues to have issues and is not selling successfully. Unofficially it has been withdrawn. How do you know the printer is being withdrawn? The price has collapsed (but that's not a good reason to buy a printer with known defects).

Fourth: the Grapo Manta flatbed from Europe has never been offered in the US. So this printer (which has outsold the Mimaki flatbed across Europe), is not competition (until Grapo decides to offer their printers in the US).

Fifth: all other dedicated flatbed printers cost over $120,000, half-again more than the cost of a single Gerber ion.
Sixth: the cationic UV ink may adhere better than most Sericol UV inks (used in Oce and Fuji Acuity printers).

In effect, there is no other entry level dedicated flatbed printer. All other entry-level printers are combo or hybrid.

Site-Visit Case Study

I flew to Chicago in early December 2008 to undertake an inspection of a Gerber ion out in the real world, at Phoenix Marketing Services. They have a Roland SolJet Pro II SJ-740 eco-solvent printer, two HP water-based printers (Designjet 5000 and 5500), a GBC Talon 44 laminator and had recently purchased the Gerber Solera ion. I thank the two partners for making time to receive me and show me their printshop and their results with cationic ink.

They are in the same building with offset presses and screen printing equipment, so when their customers need lots of material those traditional old-fashioned printing methods are available in-house on site. But "customers are mainly looking for smaller quantity."

They print on foam cor and 50 point card stock. Previously they had to print on the Roland then mount on foam cor or mount on Coroplast. Now they can begin to print directly onto Coroplast. What they like best about the Gerber ion is that they do not have to pay anyone to mount things by hand: they can print directly on rigid display materials.

They and their clients find the color and quality acceptable. They said that low price per print to their clients was more important than higher quality at a higher price. "Clients do not care how or with what ink chemistry a job is printed."

They bought the printer on the basis of recommendation of another printshop owner and a recommendation from their local distributor (Advantage Sign Supply), "good people, good service."

"We went to Graph Expo '08 trade show. Oce Arizona 250 had a terrible UV lamp light leak. The price of the Gerber ion made it a no-brainer when compared with the Oce. "our prints are not going to the Louvre museum," so we don't need to spend the extra money for quality that is not necessary.

Their conclusion on the Gerber Solara ion, "It does everything we expected it to do."

And note also that the end-user in Europe (US Army in Germany) is very content with their Gerber Solara ionX, see below.

Comment from an end-user

I have had three comments over the last nine months from an end-user in Germany. Here is their most recent comment.

If i had to recommend a low cost option to anyone it would be Gerber's top ION model. You can get in very cheap by asking Steve Albert at Gerber to eliminate the roll option. We saved $15K this way. Service excellent, responsiveness excellent. They extended warranty 3 months due to past head and ink/pump problems when they change inks and/or formula. Far better safety wise.

Printer really covers Coroplast, corrugated plastic well. Better colors, less color correction problems that H700, virtually no static issues even with plastic. Still issues with ink clogging but that is more due to inconsistent use.

Also get this ink, we had a complaint from a German worker who didn't want to be moved to the print shop that we were "poisoning" him with fumes, harmful emissions, ozone etc. Steve Albert got his chemist to send me additional data about all of this stuff over and above the MSDS data sheets. In addition to the almost non existant fumes, we had installed the air scrubber you referred me to in las vegas that is usually used in the solvent arena. Worth every penny by the way.

In any event we had a detailed inspection by the German safety officer and the industrial hygienist. They bough VOC meters, DB meters the work. We did a "worse case" 4 x 8 foot print job with heavy intense color saturation. The formal report just came back and there is virtually no danger even without the scrubber. As we all know, they pointed out that the handling of the inks with proper gloves and eyewear is the most important.

Most recently updated February 2010 after receiving a third set of comments from an end-user that we know (US government agency in Europe) who has been using a Gerber ion about a year.

First issued November 2007. Updated four times in December 2007; updated January 2008, February 2008, April 2008, May 2008. Updated twice so far in June 2008, after DRUPA. Updated July 2008. Repeatedly updated during August, including after FESPA Mexico. Updated September 2008. Updated several times in November 2008. Updated December 2008 after completing a site-visit case study of a screen printing company in Chicago which had a Gerber ion happily at work. Updated March 2009 after inspecting the Gerber ion printer successfully printing every day at the Dubai trade show in the Middle East.

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

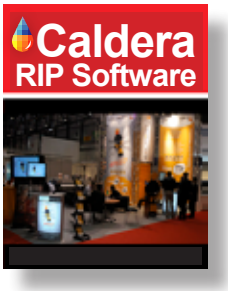
In a period of economic recession printshops will tend to ask about options that are priced lower than high-end prices. Thus we suggest a possible solution at mid-range price: Gerber M class cutters. I have inspected two huge factory complexes of Gerber Scientific in 2008 (especially their cutters for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



These reports on RIP software and Color Management for serious UV printers are free downloads on all FLAAR web sites (follow the link to 'free downloads') http://www.wide-format-printers.net/reviews_reports_evaluations/free_download.php

RIP, COLOR MANAGEMENT, and ICC Color Profiles options

Once you have a serious UV-curable wide-format printer, you may prefer to have an equally serious RIP software and color management equipment.

The RIP software for simple water-based printers such as Canon, Epson, and HP may not be the same RIP software that could be most effective and productive on a UV-curable flatbed or UV-cured roll-to-roll production printer.

I first noticed Caldera RIP on Gandinnovations UV printers several years ago, then I saw Caldera being used at the Mutoh Europe factory demo room in Belgium.

When I was visiting the Durst factories in Europe I again noticed that they were using Caldera RIP software.

So I requested access from Caldera so I could visit their world headquarters in Strasbourg, France, to spend several days learning more about their RIP. As a result there is now a FLAAR Report photo essay on this software.

Most recently I have seen Caldera RIP at the Shanghai printer trade show in China, at DRUPA in Germany, at FESPA DIgital in Geneva, SGIA '08 and Viscom Italy '08.

When I visited a large printshop in Maribor, northern Slovenia, they were using Caldera RIP and the manager of technical services for this company said, "*Caldera does a good job*." This company in Slovenia has about eight UV printers (about five of them from Durst) and an equal number of large solvent printers. They originally used a GretagMacbeth color management system but switched to BARBIERI because the BARBIERI spectrophotometer can read more efficiently and can handle textiles, backlit, wood and other materials that are either awkward or difficult on other brands of color management instruments. You can learn about the BARBIERI equipment either from their headquarters in Brixen or their distributors worldwide.

Caldera also offers a highly regarded spectrophotometer from Barbieri, the leading color management company in Italy (they are headquartered in the same city as Durst, the manufacturer of Rho UV-cured printers).

For further information on Caldera contact Joseph MERGUI
mergui@caldera.fr
If you have questions about color management, if you are in the US you can contact: ImageTech at:
www.ImageTechDigital.com
Mark Spandorf (owner and president), mark@imagetechdigital.com
or 510 238-8905.
If you are in Europe or the rest of the world you can contact **BARBIERI** directly at: BARBIERI electronic snc,
info@BARBIERIelectronic.com
www.BARBIERIelectronic.com
Tel.: +39 0472 834 024
Fax: +39 0472 833 845

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).

Licensing Information

If you wish to distribute this report to other people within your company, please obtain a site licensing agreement for multiple copies from FLAAR by contacting ReaderService@FLAAR.org Substantial discounts are available for licensing to distribute within your company; we call this a subscription. The advantage of a subscription license is that you can opt for automatic updates. You may have noticed that FLAAR reports tend to be updated as additional information becomes available.

In some instances a license would be available to distribute outside your company, including in other languages.

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 access to their digital equipment, also for providing three different models of Epson inkjet printers to our facilities on loan at BGSU (5500, 7600, 7800). We thank Mimaki USA for providing a JV4 and then a Mimaki TX-1600s textile printer and Improved Technologies (ITNH) providing their Ixia model of the Iris 3047 giclee printer.

We thank 3P Inkjet Textiles and HP for providing inkjet textiles so we could learn about the different results on the various textiles. IJ Tech-

nologies, 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 Hewelt-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 (2007-2010)

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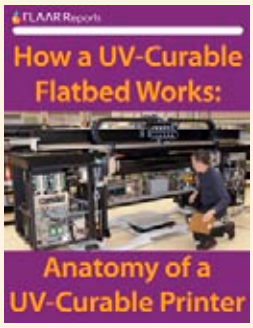

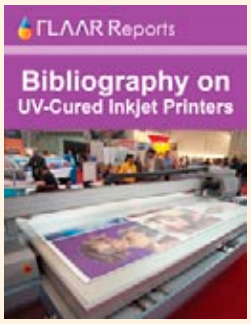

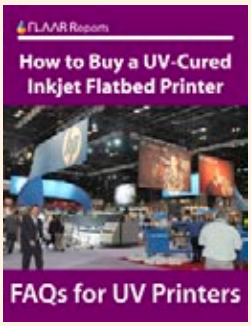

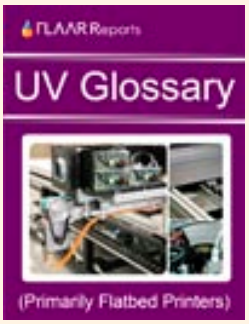

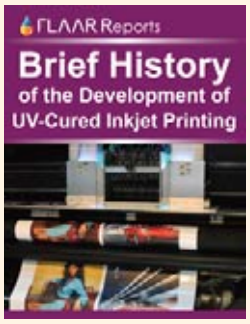

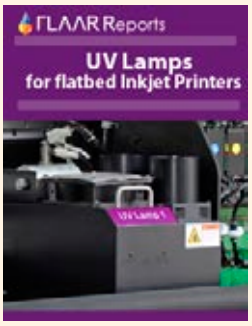

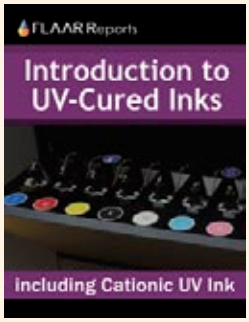

Most recent UV Printers