FLAAR Reports

February 2009

Entry-Level Hybrid UV Roll-to-Roll

GCC StellarJET 183UVK

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CONTENT

INTRODUCTION

As part of the research to aid in the preparation of this report I visited a printshop that was using the GCC StellarJET 183UVK. This was an offset and screen printing company, in fact they were deaccessioning a one million-dollar offset press the day I was there and installing a new one.

This printshop was located in a small farming community. They had a number of large German clients of recognizable name brands.

Although the GCC StellarJET 183UVK is made primarily for sign shops, it clearly works well also in sizeable commercial printshops with other sophisticated equipment. The company in Germany had a KBA (German-made) Digital 74 Karat offset press (a million dollar+ machine) that they were replacing the day I was there with a more sophisticated Ryobi offset press (another million dollars). So clearly this company can afford to buy whatever brand and model that they feel they need. They asked around, learned about the GCC, bought it, and are content.

THE LOCAL AREA

Here is the new Ryobi offset press that was being installed the day I was inspecting the GCC UV printer.

This is a real printshop at work. If they were not busy, then it would look like a museum; but the true sign of a successful printshop is when everyone is so occupied with new print jobs that there is no time to clean the place up (which would make it look unreal).

Inside these buildings are over a million dollars worth of sophisticated offset, screen, and digital inkjet printing equipment, plus a professional staff of experienced and trained printer operators.

THE BASICS

1. Brand name, model?
GCC StellarJET 183UVK.

2. If there are two or three (or more) widths of this printer, what differences exist other than the width?
This printer comes in only one width, 1.8 meters. Many of the other entry-level hybrid printers come in 1.6 meter width only. 1.8 meters is better than 1.6 meters.

3. What is the nature of the company? Is this company the manufacturer, distributor, or rebranding a machine made by someone else?
GCC is a large successful company in Taiwan. GCC makes vinyl cutters, CO2 laser cutters/engravers and other signage equipment. The head of GCC has degrees in engineering and the staff of GCC has years of experience designing and manufacturing equipment.

4. What other printers are the same or similar chassis from this manufacturer or distributor?
This is an entry-level chassis. The other model from GCC is a mid-range chassis, the StellarJET 250uv. There is a separate report available on the model 250uv. Now there are two new models: the StellarJET K100UV from 2008 onward, and a new combo transport belt version of the 183; this was exhibited at FESPA Asia, which was held in Bangkok the week the airport was occupied by political rabble and the entire city was closed down to international arrivals. I rotted in the Tokyo airport for two days, unable to land in Thailand to see the new printers.

5. Is this same model(s) rebranded and sold under other names?
GCC printers are not yet OEMed by other companies. However GCC is considered a prime potential partner by several companies and in the future I am sure that there will be more partnerships between GCC and US or European companies.

6. What other printers of other brands are comparable?
In the beginning some external aspects of this printer looked comparable to the ColorSpan 72UV concept. However the GCC printer has features not on the ColorSpan and the GCC 183 continues to be developed with additional features (whereas the ColorSpan 72UV R and X have both been discontinued). Today in 2009 it is worth pointing out that the GCC StellaJET 183UVK is not only more sophisticated than the ColorSpan 72uvR and X, but works probably more reliably than the newer ColorSpan 5400uv series.

7. How does this model compare with comparable previous printers?
This printer appears to be unique from GCC, and is not retrofitted from any earlier printer of GCC that we know of.

8. When and where was this model first introduced?
The GCC person says the printer was first shown at ISA 2006. If so I did not notice it, but I did not inspect the entire GCC booth (due to the unexpectedly large number of booths at ISA '06). So the first time I noticed this printer was a month or so later, in mid-May, at FESPA Digital. "Official launch" is listed as VISCOM Germany for Europe and SGIA for USA.

GCC StellarJET 183UVK at FESPA 07

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

This was still a working prototype for the first 18 months of development. The printer exhibited two years ago was 1.6 m wide; the final version is now 1.83 m wide. The printer was scheduled be ready by August and was shown again at SGIA in late September (2006).

But the printer did not appear to be finished at FESPA Digital 2006, so I doubted it would be ready to ship by August, especially not to picky European or American customers.

The printer was still not finished at ISA 2007. It was listed as “still being improved.” At least I commend them for not unleashing a printer that is not finished.

At VISCOM Spain, autumn 2007, I learned that considerable improvements had been made based on feedback from end-users and distributors in Europe. Indeed it was possible to see this printer at the factory in Taiwan in late 2007. This printer had definitely been improved in many aspects. At VISCOM Germany 2008, in Frankfurt, it was clear that the 183UVK had improved significantly. In January 2009 it was possible to inspect a screen printing and offset printing company with the current version of the StellarJET 183UVK in Germany.

10. List price?

60,000 Euros or $80,000, which is not inexpensive for an entry-level printer, especially with the lower price of the ColorSpan 5440uv series. However the GCC printer can print wider materials than the ColorSpan. And 100% of the ColorSpan printers needed to be completely retrofitted (and many still have issues). The GCC can do white, and if necessary can handle clear varnish.

For 2008 the price was listed in US dollars as $75,000.

The current price in Europe offers an all-inclusive offer, including RIP software, all the extra tables, with white ink option too, is 80,000 Euros.

11. What accessories are extra charge? Are these same or similar accessories included with other printers at no extra cost?

The number of accessories would appear to increase the actual price of a completed printer substantially. The optional items are:

- Roller table set (first set included, if you need another, it's extra).
- Roll-fed set
- White color

The roll-fed system is bolted on front and back (if you buy this option).

I can understand white color as an extra-cost item, I can understand extra roller tables, but I would have to check my data on other low-cost UV printers to see if roller tables are an extra cost item for them too.

In other words, you have to buy the tables to do flat/rigid material and then you have to buy the transport system for handling roll-fed media. Realize that this GCC is not a normal hybrid, because GCC itself does not make solvent printers. This printer was made from the ground up to handle UV-curable inks. However the end-result is a hybrid (no transport belt and pinch rollers on grit rollers to move the materials.

At ISA 2007 my notes read that a roller table set is included in the base price, so clearly the pricing is evolving. It is acceptable to charge for an extra additional table (unless the first table is so short as to be effectively useless without the extra extension).

While visiting the GCC factory in Taiwan the rear roll-fed spindle system was listed as included; only the front roll take-up system was optional, $5,000.

12. What other costs are involved?

The printshop in Germany said his price was a flat 80,000 Euros but with EVERYTHING included, even ErgoSoft RIP, all the extra tables and even transportation from Rotterdam and installation and warranty.

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

At least a starter set of ink and flush liquid comes with the printer included in the price.

14. What other equipment is needed to operate this printer? For example, does this printer include its own power line conditioner?

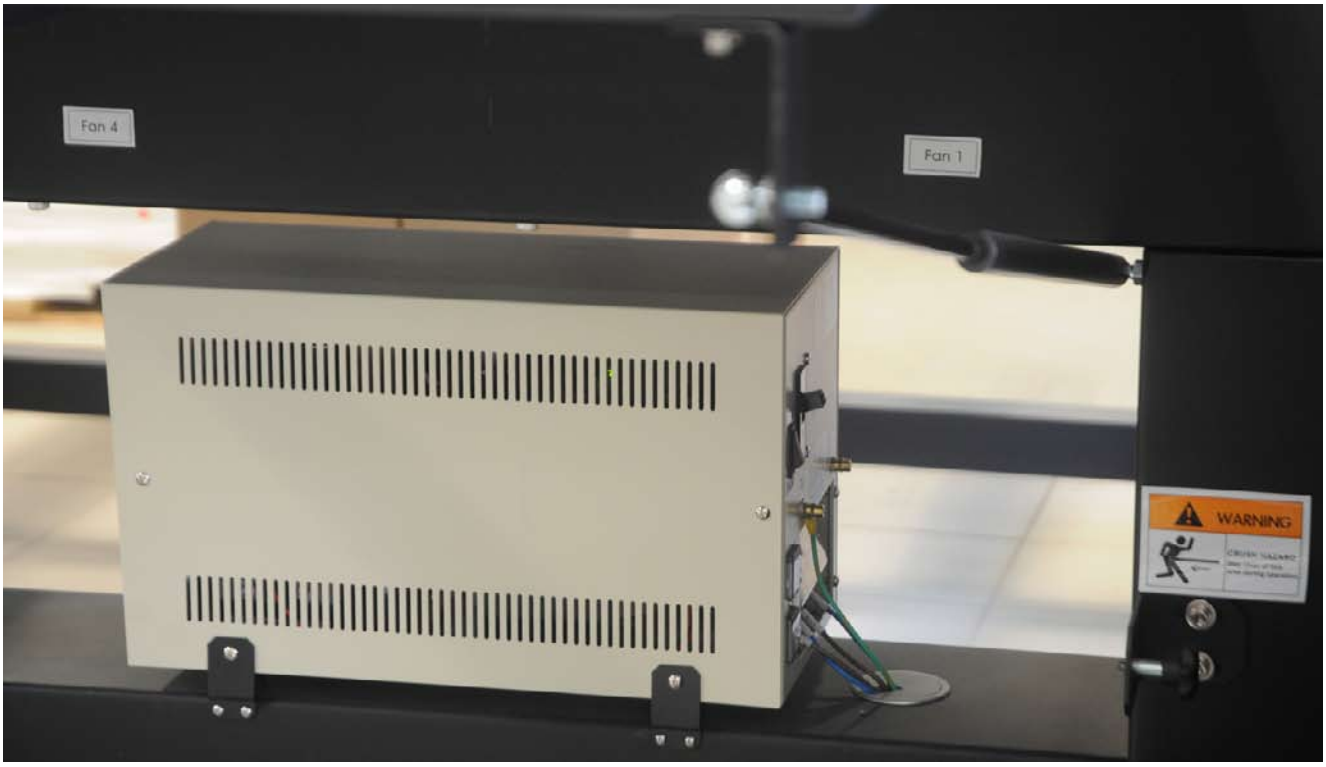
Yes, this printer includes its own power line conditioning unit. You can see this clearly under the center of the machine. The owner of the printshop in Germany said that electrical power was so variable in his town that five hard drives got fried on his million-dollar German-made offset printer. He said he was sure glad to have a power line conditioner on his GCC UV printer.

15. Do you need to provide air pressure for negative pressure for ink in printheads? Do you need to provide compressed air for any other purpose?

The vacuum is created by a row of 11 large fans so you do not need any outside air pressure for the vacuum in the platen area.

16. Is it recommended, or required, to buy a spare parts kit? Or extra printheads?

Most end-users don't wish to buy a spare parts kit up front, in part because they don't yet have the experience to do their own repairs when they are first buying this printer.



Under the middle of the printer frame you see the Powerex-AVR, a crucial device for protecting the electronics inside your printer. This kind of power line conditioner and protective system is totally missing on most printers that cost under $200,000.

17. Or do the dealers prefer that customers not try to make their own repairs?

The end-user is generally not encouraged to take the printer apart and do repairs on their own. Only later on, when you have considerable experience, and have taken advanced tech support training, would doing your own repairs be realistic. However I have visited many printshops where the printer operator prefers to receive this training precisely so they can do their own repairs. After all, if the manufacturer can train their own tech support person surely a printer operator, who also works with this printer every day all month all year, can also learn how to maintain and repair it (if they have the interest and inclination).

This policy varies by manufacturer. Interest in doing their own repairs varies by the end-user and by the printer operator. A few operators like the opportunity to take service training at the factory and thereby to be able to do basic repairs on their own. Most manufacturers discourage this, but some manufacturers do allow end-users to take advanced service training.

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

You can fill out the other columns for the other brands of printer that are on your short list. We can't fill this out for you, since we don't know what is on your short list

	GCC 183			
Base price, chassis and print engine	60,000 Euros or $80,000 (was quoted $75,000 in late 2007)			
RIP Software, lite				
RIP, full version				
transportation	Naturally this is extra			
installation	Depends on the deal that you work out with your local distributor			
training	Depends on the deal that you work out with your local distributor			
ink	Ink included			
warranty	One year			
spare parts kit	Extra if desired in almost all brands and models			
table(s)	Add extra cost			
Front take-up roll	Add extra cost			
	Add extra cost			
Total cost				

PURCHASING

19. Are dealers national (most companies) or regional (Roland allows a dealer to operate only within a limited regional area)? Does a buyer have any choice in dealers?
Several years ago there were not really any GCC UV printer dealer yet in the US. But I met a Canadian dealer or distributor, Canuck Technologies, which said they are pleased with GCC printers because "GCC is interested in quality control."

Now there are two distributors in the US: H&H and Accugraph. In Germany the original distributor is Azon Germany. They use the same logo as Azon headquarters in Croatia but Azon Germany is a completely separate company these days. IGEPA, a company that in the past sold primarily materials and substrates is now an additional dealer in Germany. Technoplot is a German Distributor as well.

STRUCTURE OF THE PRINTER: Vacuum

20. Is there a vacuum function?
There is a slight potential vacuum (where you see the tiny holes).

The vacuum is created by a row of 11 individual fans. From the monitor you can set how many of the fans in the row that you wish to operate at any one time. So it is user definable.

The sucking power of fans is obviously not enough to hold down the warp of a large foam board. With the Neolt and Triangle Milano you get a much stronger vacuum, but this means that the board must be released every single time it is advanced by a rotation of the grit roller. In this case the fans have an advantage precisely because they are not too strong. So every feature has its benefits and its downsides.

21. 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, the Oce Arizona 250, and the Gerber ion 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, those vacuum holes will suck open air and there will not be enough vacuum under the piece of material that you need to print on. But I have also seen flatbed printers costing $300,000 also requiring this, such as Gandinnovations Jeti flatbeds.

STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path

22. 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 a hybrid printer, though is not a jerry-rigged solvent printer (because GCC does not manufacture solvent inkjet printers).

Just realize that the best machine to print on flat material is a dedicated flatbed and the best printer to print on roll-fed is a dedicated roll-to-roll. The advantage of a combo printer is that it can print on both flat and rigid and roll-fed material. But no joint-use printer can print on all materials perfectly: irrespective whether it is a $80,000 entry level or $300,000 VUTEk or other brand.

23. Describe the platen.
This is a normal platen with about 15 rows of holes in the metal plate. The holes are for the vacuum.

24. Are there edge guards at each side (end) of the platen? At left, or at right, or both?
I have not yet noticed any edge guards, but I have seen the printer primarily in flatbed mode, not in roll to roll mode.

25. 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 is not a retrofitted solvent printer. GCC does not make solvent printers anyway.
GCC designed this from the beginning to handle UV-cured ink.

LINING UP FLAT MATERIAL (to help it feed straight)

26. What kinds of raised guide bars (alignment bars) along the side of the table exist? Left or right? How long?
None when the printer first came out as a prototype, but bars have beeen added. However this printer has been shown already a full year previously. That is a long time to add something as simple and essential as guide bars.

27. Can you move the left bar, or the right bar, or both?
You can definitely move the bar that is at the other side.

28. Are there specially accessories on or above the side guides, or are they just a raised guide.
None.

29. Is there a registration gate that is lowered across the back printing area?
I did not notice any gate to assist registration.

30. Is there any other feature that assists in aligning the ability to feed multiple small materials simultaneously?
The Legend 72HUV has a clever accessory that you attach to almost any location on the top of the table to set up feeding paths to align multiple boards for simultaneous printing.

31. Do you have to hand measure the media height, to enter it manually into the software?
You put your material under the printhead carriage (having raised your carriage up). Then you lower the carriage to an estimated proper height above the material. This is all manual.

First step is to align the thick rigid material at the back.

Next step after aligning the sides at feeding area, is to align the front of the board (at the front of the platen).

ROLL-FED

32. How is media held flat? Vacuum table? Pinch rollers?
The pinch rollers probably hold more than the vacuum aspect.

33. How is roll media fed? Pinch roller against grit roller?
Yes, there is one traditional set of pinch rollers atop a traditional set of grit rollers. There are approximately 19 units (counting the grit rollers).

34. Or does the printer use tension rollers instead of grit rollers?
Grit rollers tend to be used for hybrid style UV printers under 2.x meters in width; tension rollers tend to be used for printers of 3 meters and wider. Plus grit rollers are rarely used on a combo style printer because the transport belt is what moves the materials. On a combo printer there is not really a place to put grit rollers since the conveyor belt occupies most of the available space.

Grit rollers at the bottom, working in conjunction with pinch rollers at the top, with a basic vacuum in the middle (under the platen) is to provide you with the lowest possible cost for entry level. But the grit-against-pinch roller system work best on certain materials, and are not perfect with other materials.

Grit rollers are never used in a dedicated flatbed and seldom employed on a combo transport belt system. So tension rollers (to pull the media) may be employed in addition to the transport belt.

35. What size? What positions are the rollers relative to each other?
Each grit roller is about 4 cm long. The pinch rollers, rather than being one solid roller the same width of the grit roller, consist of two individual smaller rollers separated about 2 cm from each other.

36. Are the pinch rollers same size as grit rollers, or smaller?
Each set of two small pinch rollers is a unit and yes, each unit is the same size as the grit roller underneath it.

37. How are the pinch rollers raised (when you want to raise the entire row to get media underneath)?
There is a lever to raise all the pinch rollers at the back right, on the column.

38. Can you raise an individual pinch roller, on only the entire row?
On some hybrid systems it helps to raise any pinch roller that is over the edge of the media. This can help alleviate skew. So sometimes you would need to raise two individual pinch rollers (one at the left, one at the right). Of course this depends entirely on the width of the material and whether, by coincidence, a pinch roller happens to overlap the edge of the media at one side or the other, or both.

39. Can the pinch of the pinch rollers be varied?
Yes, there is a manual wheel, with a handle, at the back of the carriage bridge.

Here is the hand crank to raise or lower the pressure on the pinch rollers.

40. Is there one row of pinch rollers (normal) or two complete sets of pinch rollers about 20 to 25 cm parallel to the other set?
Rare, but double-parallel rows do exist: Zund 250 and Teckwin TeckSmart among others. But the GCC is a normal set: one row of pinch rollers on top of one row of spaced grit rollers.

41. Can the grit rolers move the material only forward, or also backwards?
The Teckwin Tecksmart (a hybrid system) and the Sun NEO UV-LED Evolution (a combo system, with moving transport belt) can move the material backwards as well as forwards; this helps when you wish to overprint to create Braille, and when you wish to print first white ink and then regular colors. But this is not a recommendation for these printers, since each has issues in other aspects; this comment is only a listing of which printers can print backwards as well as forwards. Each printer model usually has some positive features but then other features that you have to know in advance.

Table rollers

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

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

43. Is there an air (pressure) core system?
Air core spindles tend to be used only on grand-format printers costing over a quarter of a million dollars.

44. How is the roll media handled at feeding position? For example, is there a dancer bar?
No dancer bar; no tension bar.

45. On a hybrid system, at the back, is there an extra roller bar(s) near the platen or transport belt? Is it a bar to roll under the media, or over the media, or are there both (in addition to pinch roller/grit roller arrangement).
Yes, at the level of the platen there is a roller bar.

46. At the front, is there an extra roller bar(s) near the platen or transport belt? Is it a bar to roll under the media, or over the media, or are there both (in addition to pinch roller/grit roller arrangement).
Yes, there is one extra roller across the entire top of the table, sort of like a long pinch roller (but no grit roller under this one; the grit rollers are further inside the machine, set into the platen as is typical on solvent ink printers).

There is a second roller bar at the exit side, with the top of this roller at the same level as the platen.

Now the printhead height is measured, to avoid head strikes. Notice that the material here is very thick. The GCC handles this thickness easily.

47. How is the roll media handled at take-up position? For example, is there a dancer bar?
No dancer bar, it's a very simple media feeding system.

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

At ISA 2007 the machine was set only for flat material, so you could not see how roll-fed material was fed.

49. Can you print on more than one roll of substrate simultaneously?
Being able to print on several different rolls of material simultaneously is common on grand format solvent-based printers but almost unknown (and unavailable) on printers less than 104 inches. The Durst Rho 351R offers an option to allow printing on two different rolls simultaneously.

50. For handling ink that passes through the weave of fabrics or mesh, is there a trough? Or other mechanism to catch the ink?
I have not yet seen an option for a trough.

51. Is there a cutter? Is it manual or automatic.
Most UV printers have no on-board cutters. The Durst Rho 351R has a manual cutter since this is a dedicated roll-to-roll printer (meaning it has no moving conveyor belt). So roll-to-roll systems are more likely to have an appropriate location for a cutting element and even potentially a cutting slot.

STRUCTURE: Miscellaneous

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

Leveling support of the printer

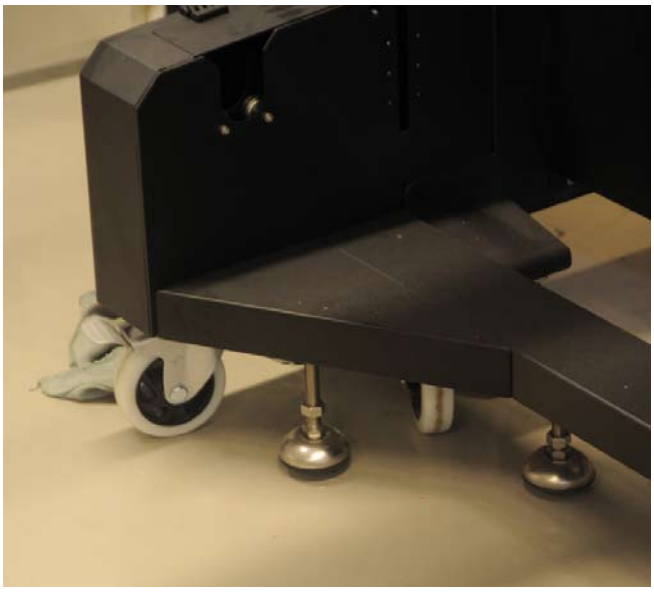
53. Does the printer have leveling supports? How many, and how strong?
Yes, more than most. At trade shows there are so many boxes piled up alongside the printers that it's impossible to get a clear view to be able to count how many supports exist. This is why we prefer to do the evaluation at the factory demo center.

Leveling any UV printer is crucial. Indeed at the NUR factory, once the structure is leveled in the assembly room, rather than roll it from stage to stage, all construction stages take place with the printer not moving from stall to stall.

At the printshop in Germany the floor in one half the room was a different height than the floor in the other half. So it would have been impossible to level this UV printer unless the GCC 183UVK had enough leveling devices;

It does, indeed it has more than most other entry level and probably as many wheels and leveling devices as a printer costing twice as much.

54. Does the printer have wheels? How many, and how strong?
Yes there are wheels. Indeed I would rate the wheels on this printer as better than on most comparable UV printers. There are two levelers at each end, with a wheel in between. There are two more levelers under the main weight of the machine (at each end) each with a wheel nearby. So three wheels and four levelers at each end.

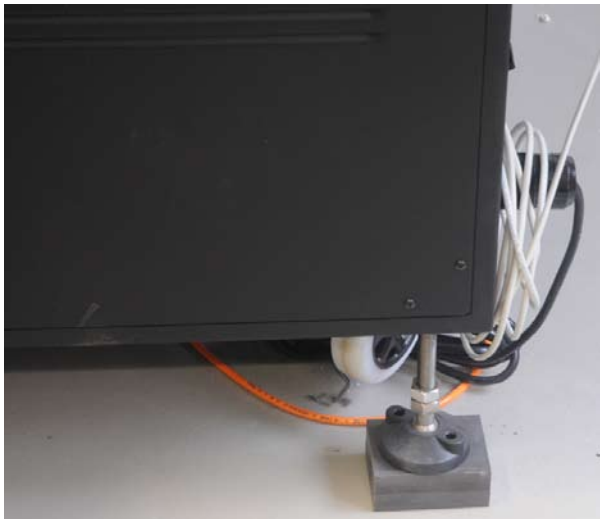


The roll-to-roll accessory has its own wheels and leveling devices.

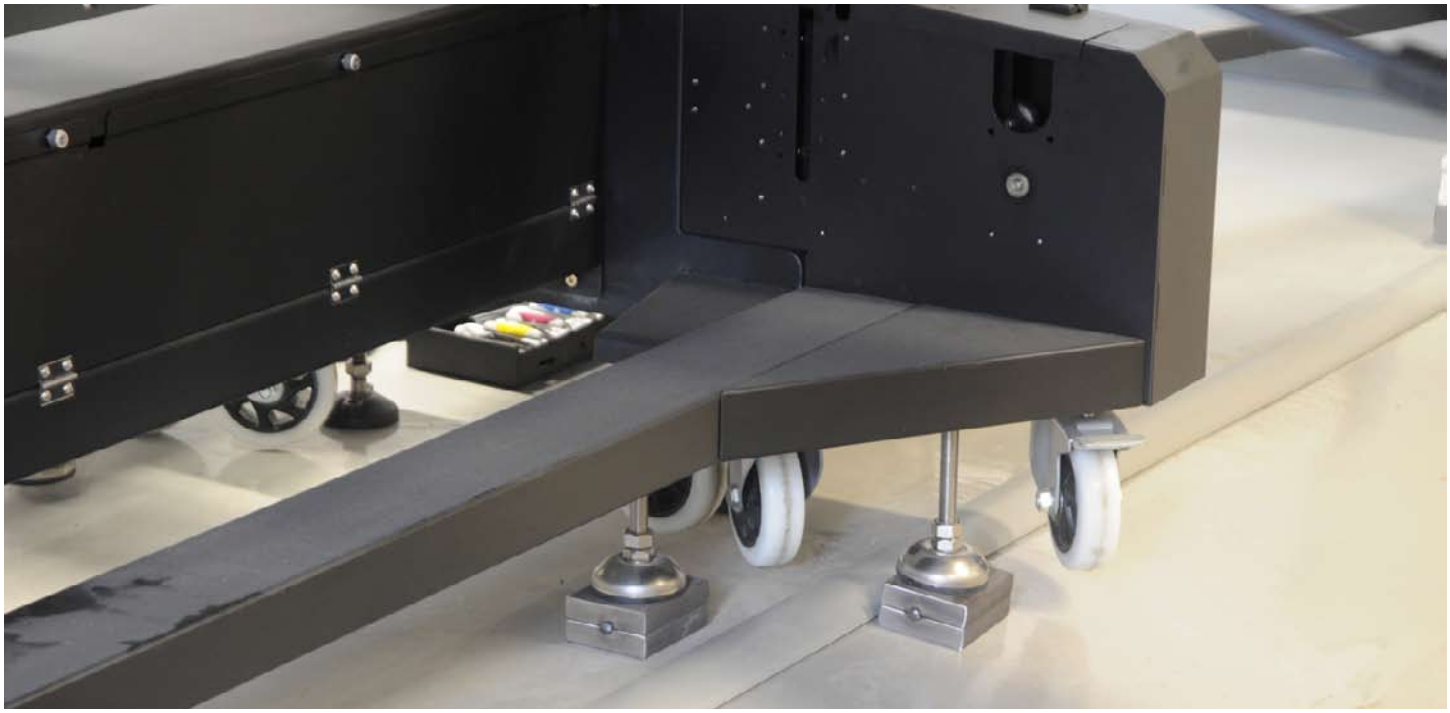
55. Are the leveling supports part of the wheel, or are the wheels and leveling supports separate?
The leveling supports are separate.

There is one roll-fed unit at the feeding side and another similar one at the exit side. Each has has two wheels and two levelers at each end.

56. Do the wheels have a lock on them?
For any printer weighing over one ton it is assumed that no locks or brakes are needed on the wheels because a tank will not roll anywhere if parked on a level floor. On the GCC, the inner wheels have no locks (because there is no easy way to get your foot under the printer to raise or lower a lock). The outer wheel at each end does have a foot-operated brake.



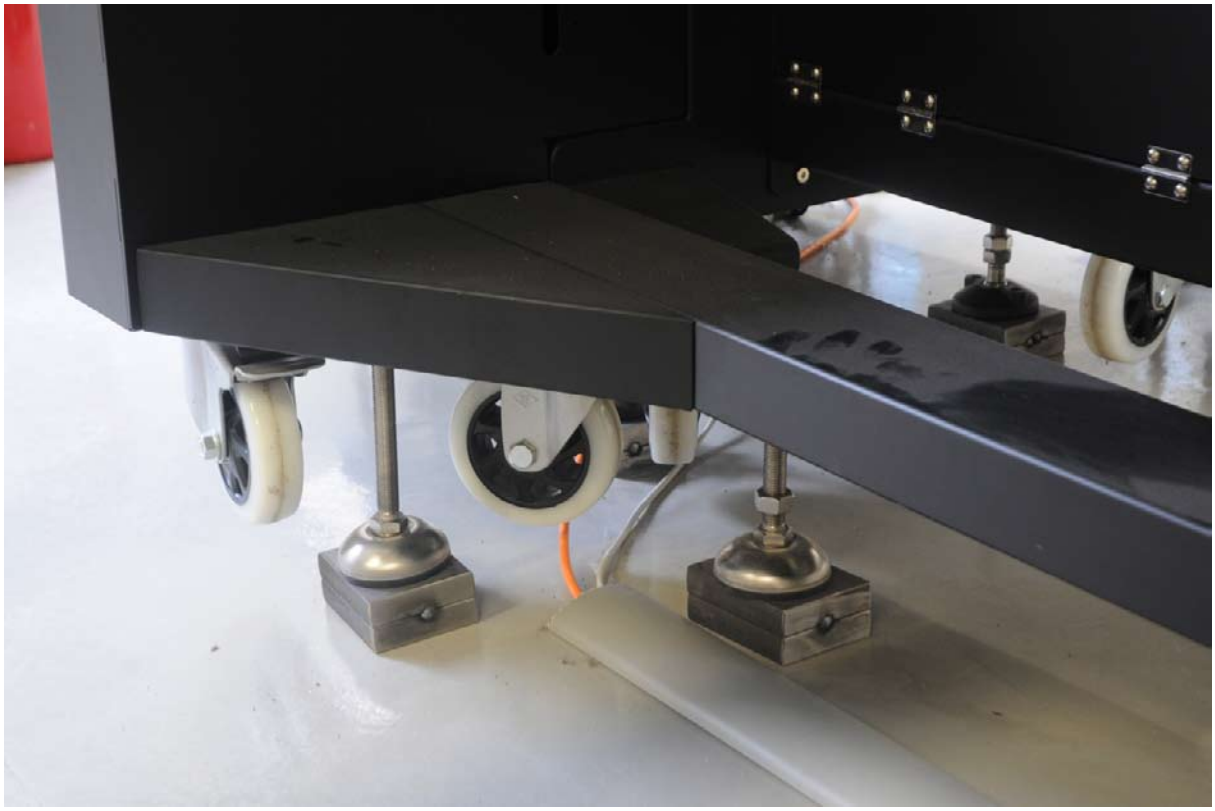

The main body of the printer has wheel and leveling system at the end, and also under the other portions (shown in other photographs).



Here you can see that GCC provides plenty of wheels and leveling devices. This is not a low-end printer that skimps on every feature.

You do not need the wheels once the printer is leveled on the leveling system.

Here you can see how the leveling devices are utilized. The floor in this printshop was very uneven, hence the need to raise this part of the printer up. The GCC handled this well.



Here you can see there are level supports on each crucial part of the understructure of the printer.

ACCESSORY TABLES (front and back) for Combo or Hybrid Flatbed

57. What is the approximate size of the table?
There is a “half” table that can be raised off the main chassis.

58. Is this table size adequate?
No table for any hybrid or combo flatbed printer is large enough to handle a 4x8’ MDO board, so everyone has to jerry-rig an extra table.

59. Do you need to provide an additional table at the front or back?
Yes, you need to provide extra tables (which are available as an option).

60. Are the tables an extra charge, or is the price of two tables included in the original price of the printer?
The extra tables are an extra cost.

61. What is the design of the take-up table?
- **Horizontal roller bars the full width of the table?**
- **Horizontal roller bars with rigid supports in the middle and/or elsewhere too?**
- **Separate flat bars with rows of tiny rollers?**
- **Solid flat table with small roller bars?**
- **Solid flat table with ball bearings?**
- **Another design?**

Please note: some kinds of feeder take-up table (the table after the rigid material comes out of the printing area) may cause a warped piece of material to snag against the roller bar. So the design and implementation of the take-up table is something you need to understand. Both DuPont and Oce changed their roller-bar system for a solid table (DuPont added ball bearings).
The original table several years ago had ten rows of bars, each with 10 rollers set into a bar.

The table today has 7 rows of bars, each with 9 rollers set into a row.

62. If there is a row of rollers set into a bar, can you slide the individual bar to a new position?
It is rare that you can slide any individual bar, or roller, to a new position. The only table that I can remember that had movable features was that on the ColorSpan 72UV printers.
No, the position of the bars or rollers is fixed.

63. Are there any special rollers to assist moving a large heavy flat material from left-to-right to help align its edges?
Durst Rho 700 has a special set of black “wheels” on the feeding-side table. These can be moved into action with a crank. The purpose of these free-spinning wheels is to allow you to move a heavy material over to the right edge of the feeding table to align the material with the raised alignment bar.

I have not found any side-ways assistance wheels on any other table other than that of Durst, nor would I expect any.

64. Does the table stick out with cantilever support only? Or does the front have legs for added support?
Thin cantilever support and only two legs, not four. That was an early version of the table. Today (in 2009) the current table that is attached to the printer has only a thin cantilever support. There are legs under the extension table. When it is lower down, the shape is like capital “H”.

Flatbed table.

65. Are there only two legs (at the front) or are there four supports?
The add-on table is bilaterally symmetrical, with a central support system and cantilever supports for the two upright table sections. There are no supports at any corner whatsoever.

66. If the table(s) are of roller bars, how are cross-supports situated? Same level as rollers? Or under the rollers?
The upper frame of the table is strong. These are not cheap flimsy tables like you see on cheaper brands.

67. Is the front table (output side) the same as the back table (feeding side)?
The tables are identical front and back except for the alignment system on the feeding tables. This alignment system is not needed and is not expected on the output side.

68. Is the table physically attached to the printer? Or just rolled up close to the printer?
The initial set of original tables are physically attached to the printer.

69. Does the table fold up into/ onto the printer?
The table does indeed fold up onto the printer. Indeed one of the rollers that is used for feeding roll-fed material is situated on the table. So the folded-up table is an essential part of the roll-to-roll system. This is very clever. I am not familiar with this dual-use on any other hybrid printer.

There are legs under the extension table, as the photo showed. When it is lower down, the shape is like capital "H".

70. How much weight can the feeder-table or take-up table hold?
The table does not look like it can hold very much weight because it has no supports at the corners front covers. So the tables are okay for feeding foam-cor but not for feeding concrete blocks or stone.

71. To change from rigid to roll-to-roll, what do you have to do?
You simply fold the half-table onto the structure of the printer and load the core of the rollers into the roll-to-roll base accessory. Takes a few minutes.

72. How long does it take to change from roll-to-roll to rigid?
Easy, less then three minutes.

Miscellaneous

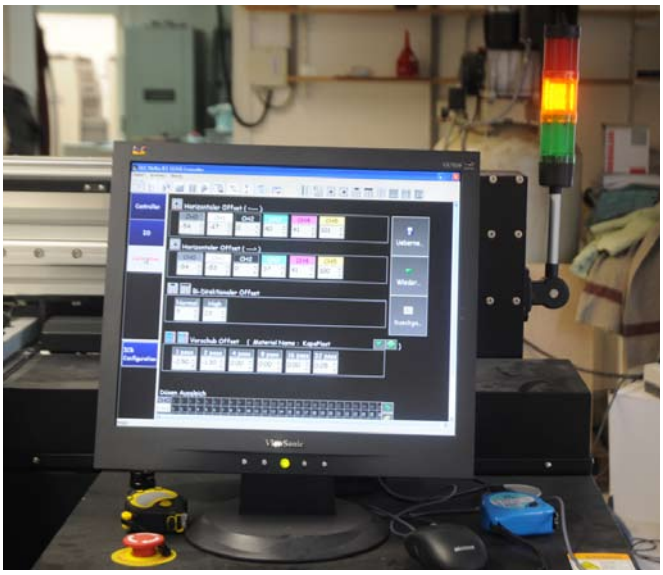
73. If the objects you are printing are not as wide as the full width of the printer, does the printing carriage still have to cross the entire space, or can the printing assembly hover just over the area of what has to be printed (and thereby be a bit faster?).
Yes, most sophisticated printers can hover. 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. This is a decision the operator has to make.

OPERATING THE PRINTER

74. Can the operator manage print jobs via the Internet with this printer?
Not normally.

75. What is the level of ease of use? Can anyone use this printer or do they have to be trained and certified? What about daily and periodical routine maintenance?
Any printer that you can learn how to use in two days should be considered user-friendly.

76. In the main area for operation, is the machine software based (touch screen), or with physical control buttons? Or both?
The Durst Rho printers are touch-screen operated. The Gandinnovations are keyboard operated. The Fieldcenter Formosa UV printer has many cranks and manual switches. So clearly there are several equally valid ways of operating a computer.

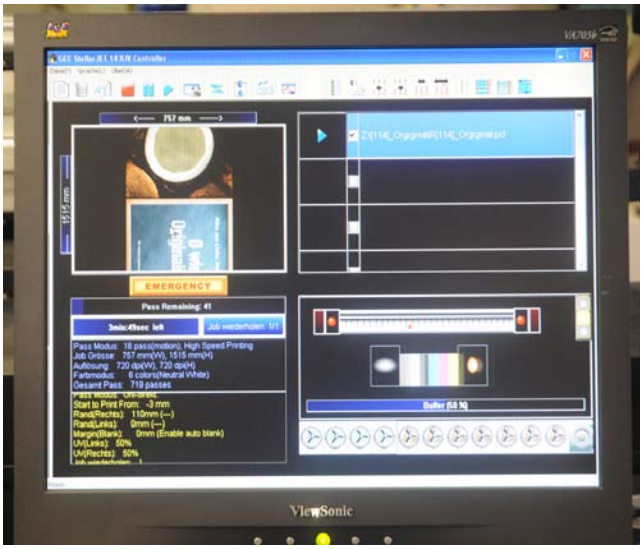


With the Durst Rho current system, everything is on the touch-screen to the point that you almost don't need the keyboard any more. But a full keyboard is available in case you need this f or some other function.

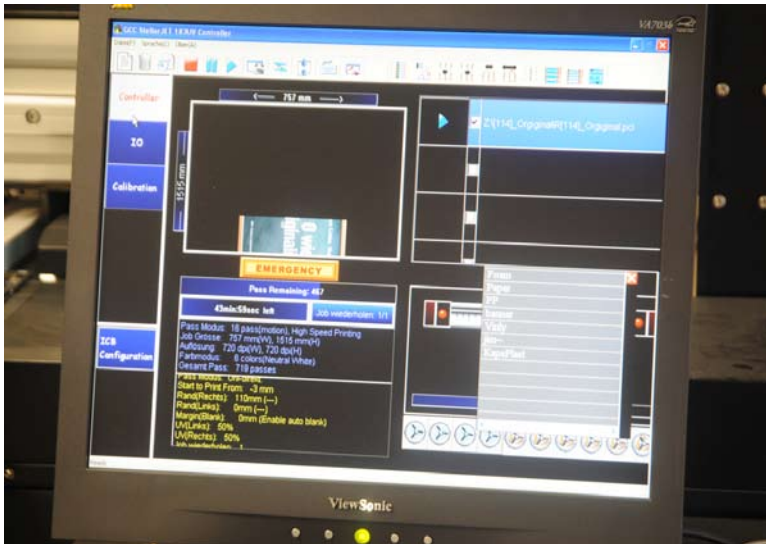
This GCC printer has no toggle switches and really no manual controls except for the main On/Off switch. There is no keyboard either (none needed). All controls are operated on the LCD monitor via the mouse.

77. Do you get an LCD screen in the printer or other real computer monitor? How big is the screen or monitor?
This monitor is in color, and is significantly larger than the B&W monitor on earlier ColorSpan printers. This is the kind of monitor you expect in a $200,000 UV printer. It is a Viewsonic VA 7036 monitor, about 17" but square (so larger than the 17" monitor on my Macintosh 17" laptop.

78. Is the position of the LCD screen or monitor user-adaptable?
Yes, you can move the monitor around; it is free-standing.



Here across the bottom right of the LCD monitor you can see the row of fans that create the vacuum for the platen. You can click onto which of the fans that you wish On (or Off).



The LCD monitor is larger than anything offered by Mimaki and more user-friendly than any mid-range solvent printer LCD panel on any Roland, Mimaki, or Mutoh.

79. Where does the computer keyboard sit?

Actually there is no computer keyboard because no keyboard is needed. If you absolutely insist on a keyboard you can summon a keyboard layout across the lower portion of the LCD screen.

80. Is there a drawer under where the computer keyboard is (a drawer for storing odds and ends)?

There is no drawer.

81. Is there a ledge or other space where the operator can park tools, cleaning liquids, iPod or other accessories?

Increasingly too many UV printers have slick exterior skins. They look like a designer style, but are impractical because there are no ledges for storing cleaning fluid, wipes, Coca-Cola cans or coffee mugs, etc. But the GCC 183UVK does have a table area. This is where the monitor stands. There is enough space for a Coca-Cola or small note book.

82. Where does the operator stand or sit?

Front right, where the monitor is, but the operator also has to load the material and the back and align this material at the back, then align it across the front of the platen.

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

Two controls are at the back: pinch roller pressure and raise/lower the pinch rollers.

Here you can see the beacon tower of lights, and the two fans at the right end of the printer (to exhaust the heat sink). Notice all the dust that has settled on the printer; this is from the adjacent offset presses.

Notice how the table so nicely folds up onto the front of the printer.

84. What controls are on either end?
At the front right end are all the On/Off switches, electrical power connection, USB cable, network plug, and switch to turn the on-board PC On and Off.

85. Is a foot pedal included (for operating aspects of the printer)?
There is no foot pedal.

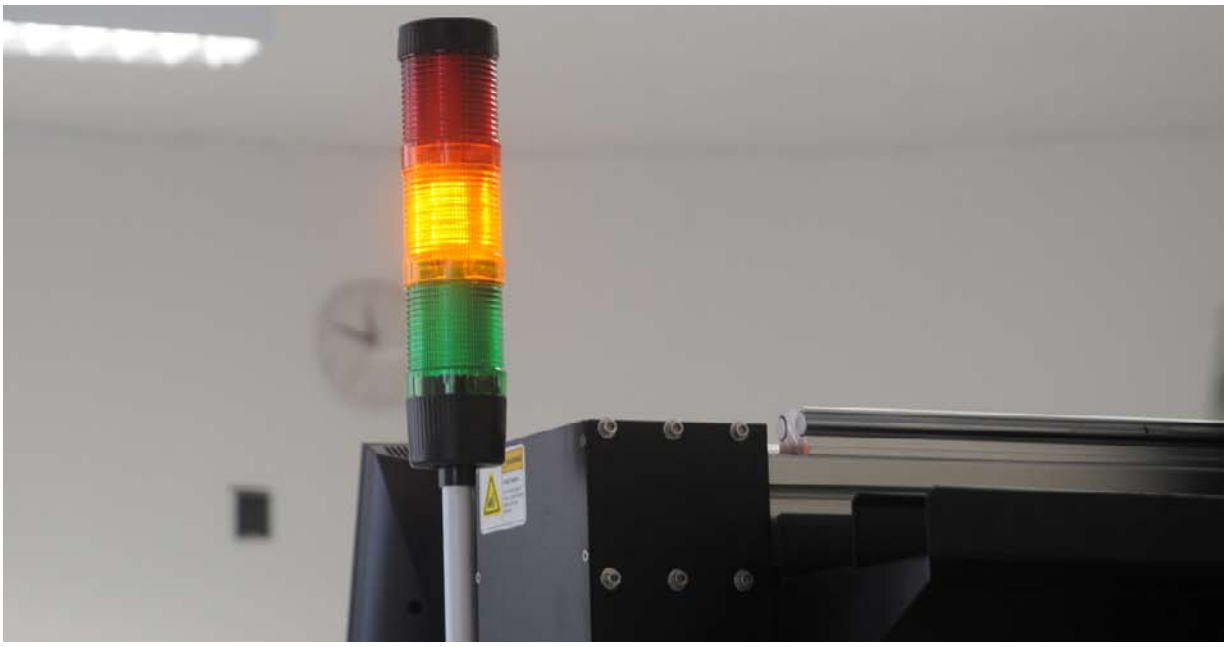
86. How many operators or operator assistants does this printer require?
One person is all that is needed.

Here you see the outlets, attachments, and switches at the right end of the printer.

87. Is there a pole with beacon lights?

Yes there is a pole with three beacon lights, red, yellow. green. Dilli was among the first to use a vertical pole with beacon lights. One person said that DuPont's UV printer from RTZ (Flora) was the first of all. 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.

First DuPont and then Dilli were 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.



Beacon tower of lights. Not many printers have this system available.

LCD screen

CONSTRUCTION (BUILD QUALITY)

88. When designed, what is the life-span that each part is tested for?
For many manufacturers, parts life-span is a new concept, especially when the cost of the printer needs to be kept down. But if the EU requires a guaranteed parts life-span, this will impact Chinese printer manufacturers in particular.

89. What is the solid-ness of the construction of the outer body? Is it plastic? Metal? Heavy gauge?
This GCC printer looks as intelligently designed and carefully crafted as any mid-range printer made in Korea, Japan, or Europe.

90. Is there a hood?
Hard to decide whether the cover over the printhead carriage on this machine is a hood in the normal sense. A full hood should protects you from most UV lamp light leak. A hood protects you, to some degree, from misting UV ink. With a hood it is easier to exhaust ozone and misting UV ink (if you attach a ventilation system to a vent opening in the top of the hood).

But since it is expensive for a printer manufacturer to add a hood, most cheaper UV printers have no hoods. An exception is ColorSpan; they sell so many UV printers, and many go to relatively family-operated companies, that not to have a hood would be too risky for possible future lawsuits. Yet in the real world most printshops run their printers with the hoods completely off (or opened).

91. Is there both a front opening for the hood and a back opening?
Since the hood covers only the immediate printhead carriage, it is not large enough to have any doors. The entire front of the hood raises up if you need that kind of access.

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

93. Does the printer wobble back and forth when printing?
No significant wobble.

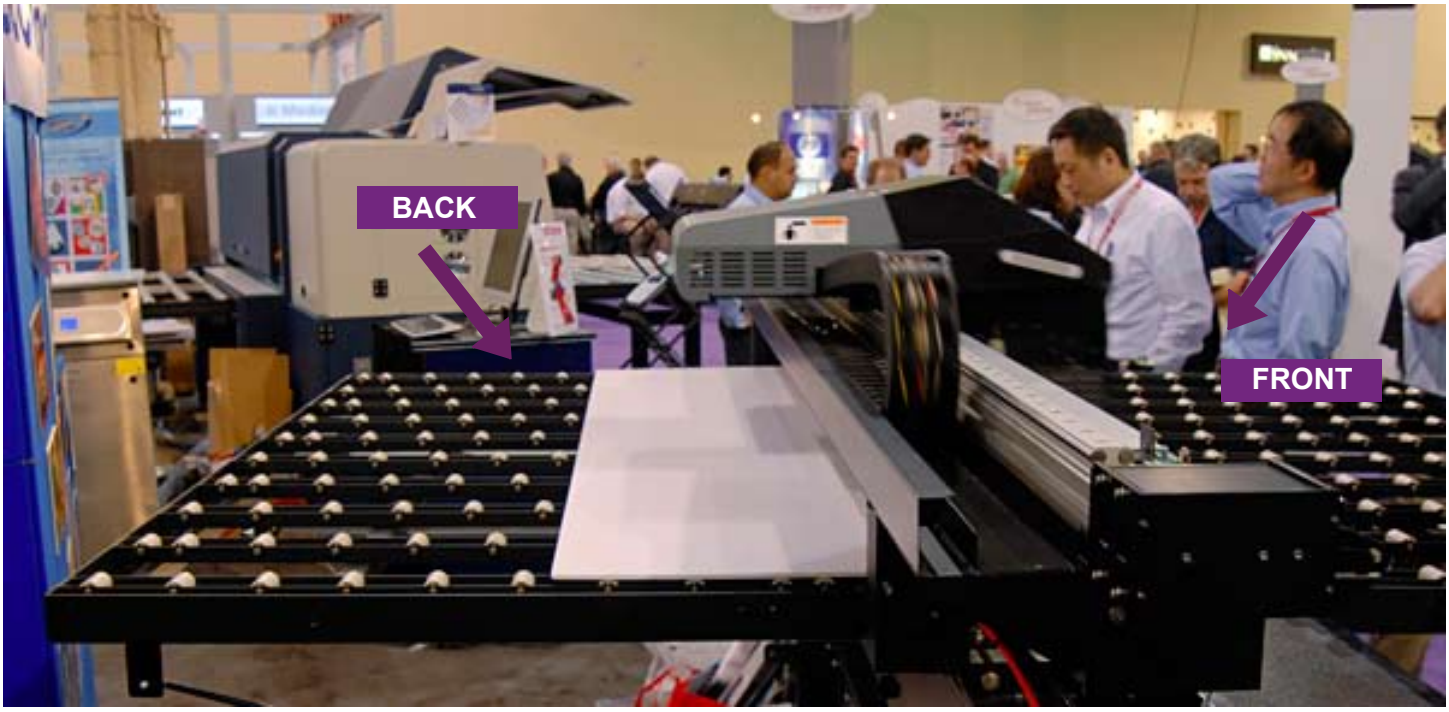
AESTHETICS

94. How would you describe the design of the printer?
Clean, no frills (since none are needed), professional.

95. Can you easily distinguish which is the “front” and which is the “back’?
Yes, the front and back are distinguishable.

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.

Some UV-curable printers have a moveable control computer that can be situated at one end, or at the feeding area (whichever location the operator prefers). But the standard arrangement is that the LCD and keyboard are on the output side. I call this the front.



SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

96. What are the electrical requirements of this printer? This means, will the building have to be rewired.
200-240 VAC, 15 A, 50 or 60 Hz.

97. 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 breathe if the ink is misting (many printers mist, most notoriously the Infiniti 1600 models; the ColorSpan 72uvX also mists a great deal).

The printing company in Germany had no ventilation for the room in which the printer is situated.

98. Are there any special temperature or humidity requirements or preferences of this printing system?
Temperature and humidity are indeed crucial, especially humidity. Even more important is that whatever temperature and humidity is present in the work area, that it not vary during the day: cool in morning, hot by 11 am. Hotter by 2 pm.

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

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

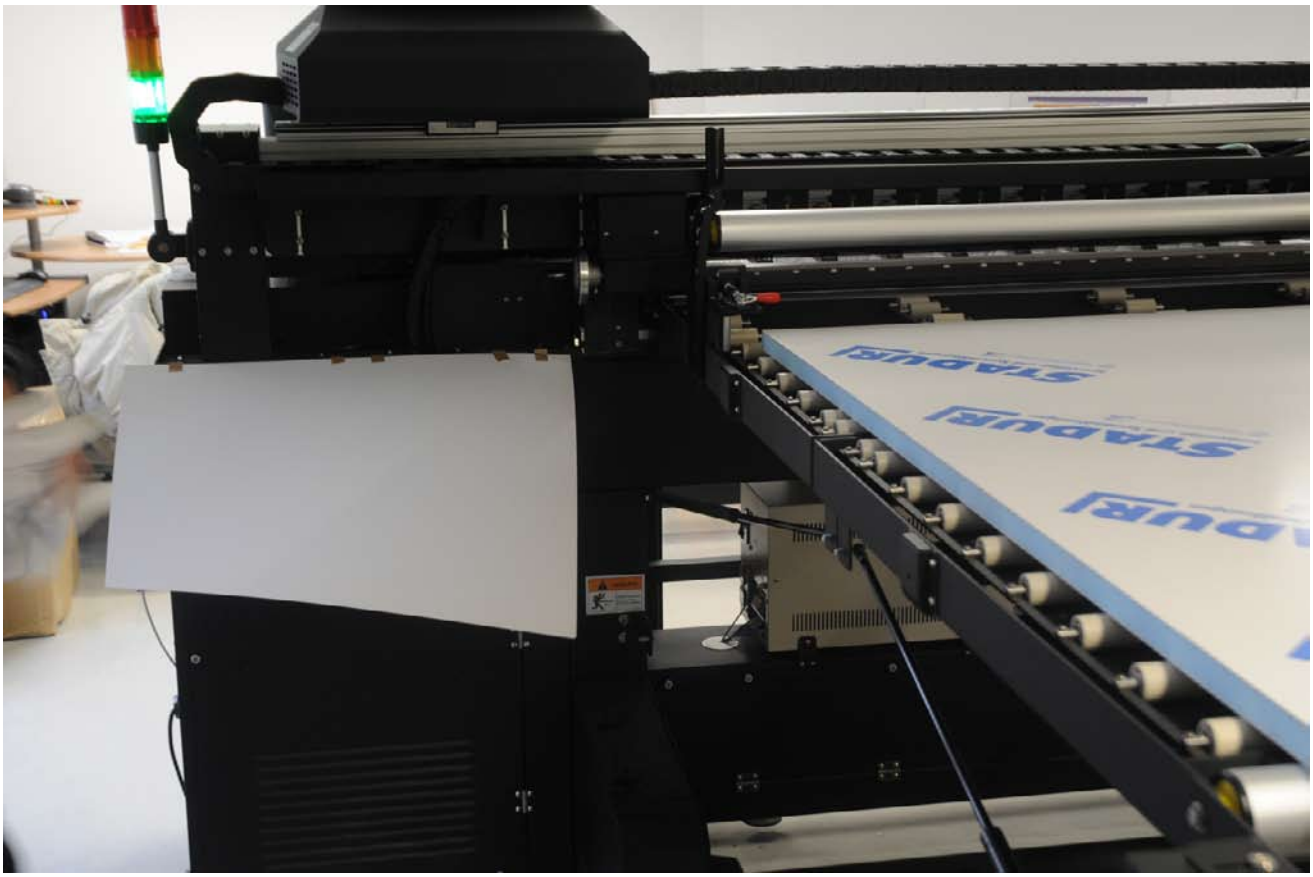
In other words, you need to ventilate away more than ozone and ink odors; you need to ventilate away everything else that is already in the printshop environment. The printshop that I inspected in Germany had a dust problem due to the offset presses and all the paper that was used for the offset press in the adjacent room.

101. What is the connectivity? Network, SCSI, FireWire, USB or USB 2, or other?
The Ethernet is 10/100/1000 Base T.

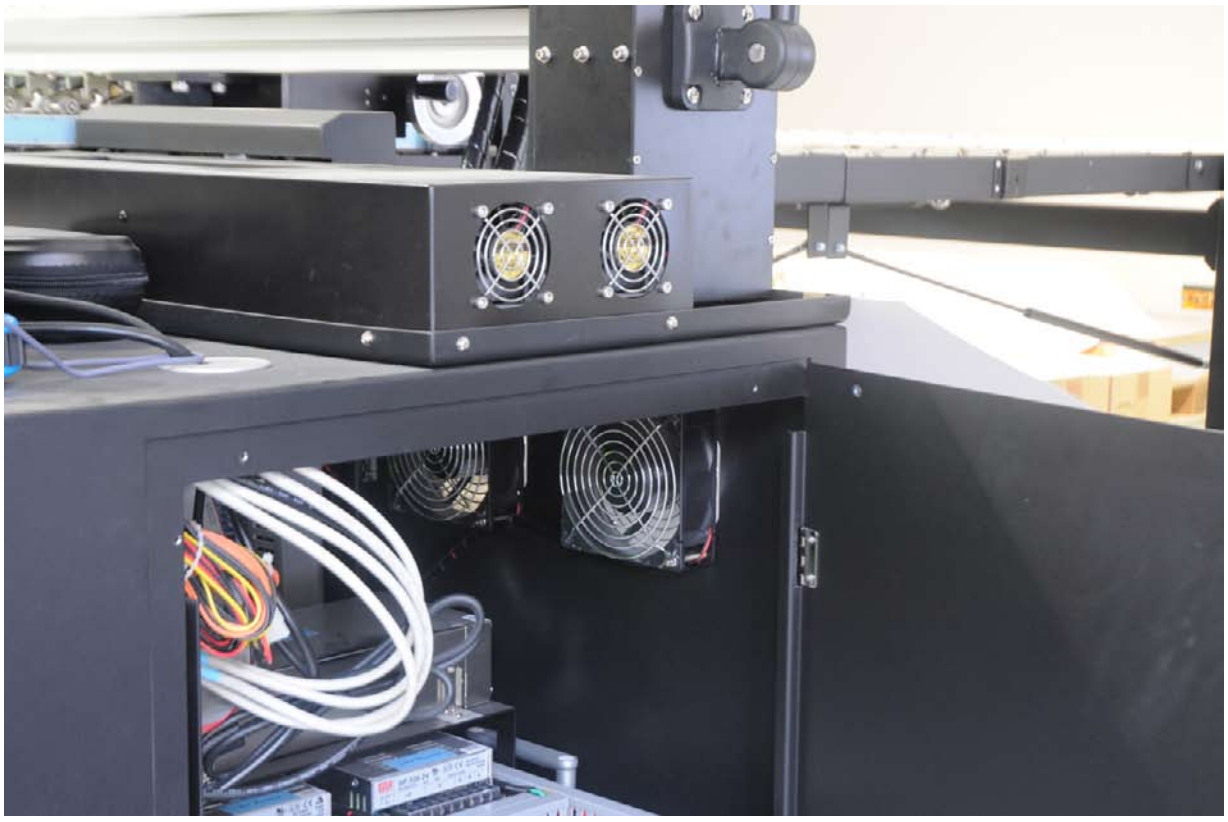
102. What air pressure is required to be provided to the printer? Is this for a vacuum table, or other purposes (such as ventilation)?
The printer has its own fans to create the vacuum.

103. What is the size and weight of the printer?
105 inches long by 31 inches deep by 52 inches high (2.65m x .78m x 1.329m).

104. What size and kind of forklift truck do you need? Or do you need a crane?
The forklift should be able to lift at least 2500 kg but it's even better if it is rated to lift 4500 kg. The forks must extend to 5.57 ft (1.7 meters).



Here is a feature that needs to be changed, so that the air does not blast out at this level. Horst Scholz has put a piece of thick paper over the exhaust area.



Here you see that the top end fans exhaust from under the heat sink.
The larger lower fans exhaust out of the electronics cabinet.

INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS

105. Which manuals are hard-copy? Which manuals are only on CD?
The User Manual is available as hard-copy and also on CD.

106. What is the rating of usefulness of the User's Manual and other associated materials?
The original User Manual is 106 pages long, which is within the normal range of comparable guides.

107. What is the native language of these guides? Is the translation acceptable?
The translation is significantly better than most Chinese made printers, is better than most Korean-made printer manuals, and is as good as most Japanese-made printer manuals. In other words, it is better than comparable manuals from other Asian countries.

The following statement is as valid for a $400,000 UV printer as it is for a $70,000 model. No matter how well translated, all translations done by a speaker for whom English is a second or third language should have the translation proof-read by a native English speaker. If a company is selling printers into the US, the translation needs to be fully and completely comparable to spoken English, not literal English.

90% of the manuals whose native language is other than English use terms that are too literal: they are translated terms, not the actual terms that anyone in America would use. This is a polite way to say, that every manual should be read by a native English speaker who is familiar with the jargon of UV printers.

108. What kind of cut-away drawings or other drawings exist that show the various parts of the printer?
The best exploded views of any product in the world are those by Canon camera.

109. If there are no cut-away drawings, are their photographs of the back as well as of the front?
There is a comprehensive itemized numeration of features on the photograph of the front of the printer, but in the User Manual there is no photograph of the sides or back.

110. How hard, or easy, are the manuals to obtain BEFORE you buy the printer?
The manuals for both models of GCC printers were provided to FLAAR as soon as we requested them. Some printer manufacturers hide their manuals because they don't want anyone to see them. Yet MacDermid ColorSpan offered their manuals openly on-line (on their web site). So the policy varies by manufacturer. We do a full report only on those printers where the manual is available to us.

TRAINING

111. Is training included in the purchase price? If so, what kind of training is offered?
Yes, you get training from the distributor while the printer is being installed.

112. Is training necessary?
Yes, training is essential for any UV printer, whether an entry-level machine or high-end. Lack of training, incomplete training, and lack/or of experience are a factor in about a third of the problems that people have with UV printers. Another third is often inadequate cleaning and maintenance of the ink and printhead system.

The other third cause of problems would naturally be weak parts (that wear out before they should), wear-and-tear (happens even to the strongest parts made in Switzerland), and features that need improvement, etc).

113. Is classroom training available?
No, classroom training is not common.

114. Is factory training available?
No, factory training is rare, though some companies do welcome factory visits, and a few companies do indeed offer training at the factory.

115. What on-line training is available?
Fewer than 5% of the UV printer manufacturers offer on-line training.

116. Between the day the printer arrives, how soon is it realistic to achieve full productivity?
If a printer is mature (and out of beta stage) you can achieve full productivity within a week or month. But many owners have told me quite frankly, that it took them several months to achieve full productivity (especially owners of the Luscher JetPrint). The longest time before a printer is really productive is when a printer is still in beta stage when you buy it. It takes a while for the firmware and hardware to be improved and updated.

After speaking with many different printshop owners, what I am learning is that if the printer is cheap and junky you will have constant down time due to the printer breaking down (reports from owners of Infiniti UV printer). If the printer is expensive and complex, it takes longer to understand everything and achieve full productivity. And when an expensive and complex printer does break down, it takes longer to repair.

TECH SUPPORT & WARRANTY

117. What is the original warranty period?
The normal original warranty period is one year but some companies have had a special offer of “second year free if you buy before such-and-such a date.

118. 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).

119. Does it include parts, labor, printheads?
Printheads are warrantied only for six months.

120. What sort of serious technical assistance is actually offered? Do the tech support operators read from a script and only get a real technician later on?
The owner of the printer in Germany is content with the tech support he is receiving from the distributor.

121. What happens if the tech support from your local distributor is uninspired or inadequate? Can you telephone the manufacturer directly? If so, will be manufacturer actively assist you, or only begrudgingly?
The printshop owner in Germany says that tech support from the local distributor, Azon, is fine, so he has no need to contact the manufacturer in Taiwan whatsoever.

122. Can the manufacturer remotely diagnose the printer?
Remote diagnosis is rare, and not available on any mid-range UV-curable inkjet printer.

123. What is the native language of the tech support person?
The tech support people in Germany speak native Deutsch.

124. Who does repairs? Dealer, manufacturer, distributor, or third-party?
The distributor/dealer handles all tech support. The owner has not needed to contact the manufacturer at all.

CLEANING & MAINTENANCE NEEDS

125. How easy is it to access the area where you have to clean the heads?
Easy.

126. How is head cleaning accomplished? purge, suction, manual, other?
Purge and wipe.

127. To initiate a purge, where is the control or button? Is it software generated or do you have to press a button? Is the button on the outside of the printer, or inside on the carriage?
You purge by manually pressing the appropriate purge button.

128. How often should you purge? Does the User's Manual honestly indicate how often you should purge?
The User Manual suggests purging the printheads at the end of the day.

129. If done with a flush solution, how do you add the flush to the printheads? With a syringe, or a manual button or toggle switch, or automatically with software command, or other method?
Yes, you have to inject the flush solution with a syringe.

With most mid-range UV printers, you manually turn a valve to open the ink lines so that the flush will flow into them. In cheaper printers you have to inject the flush with a syringe by hand.

130. Where is the service area, at the left, or at the right?
Service station is at the left.

131. What is the nature of the service station?
The "spittoon" is an open area where the ink just drips down.

A year later at ISA 2007, I was told "will add a service station" which suggests there is still none now. But the machine has already been under development for over a year and has been shown at least twice in the US.

In the year 2006 User Manual the service area is shown at the left. You slide open the top to reveal the open service area below. The printer that I inspected in 2009 had a clever cleaning system, shown in the photograph. This is one of the better ideas for cleaning that I have seen anywhere. You ought to go to a GCC booth at the next trade show and ask them to show you how simple they have been able to make the cleaning ritual.

The service station is at the left.

132. Are there wipers?
You need to decide if a wiper is as effective as a well trained operator doing a manual wipe with a special cloth. Also, if you don't clean and maintain an automatic wiper it can do as much harm as good.

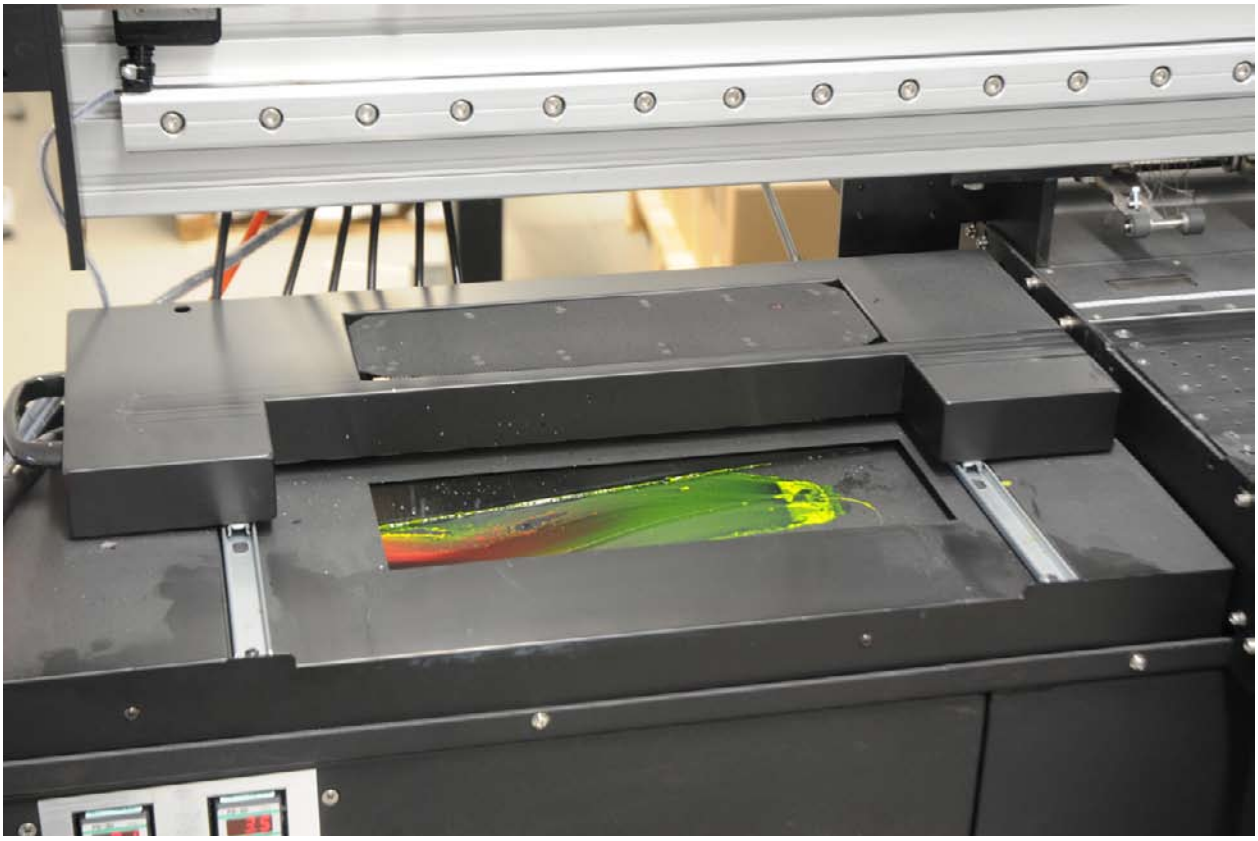
Wipers are not recommended by KonicaMinolta for their printheads. Mimaki made the mistake to feature wipers for their Toshiba Tec printheads. These wipers (and those heads in general) are one of the causes for issues with the Mimaki JF-1631 flatbed UV printer.

133. Is there a vacuum suck cleaning system, like a traditional vacuum cleaner?
There is no vacuum or other sucking system.

134. Where is the parking area, "home?"
Parking is at the right.

135. Is the service area the same as the parking area?
No, the service area is at the far left.

136. Is the capping station the same as the service area or the parking area? Or separate from both?
There is no capping system. The heads simply sit over an open trough. In the bottom of the trough you put a pad to soak up any ink that leaks out of the negative pressure system.



The service station is certainly easy to access: it is right in front of you.

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

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

Although most UV printers do not require a band of printable colors along the edge, many UV printer manufacturers do recommend spitting. However some UV printers do not have a spitting capability.

138. 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?
There is a toggle switch to open and close each ink line individually. This is not automatic from the LCD screen. You have to inject the flush solution manually.

139. Does the manufacturer provide any special cleaning tools?
You receive a unique cleaning system: a drawer (literally) with a raised feature to reach each printhead. Each raised feature is covered by a soft cleaning cloth. You purge and then insert the drawer, and with a manual control you wiggle the cloth back and forth. I cannot describe this as nicely as the cleaning (wiping) solution is designed; it is very intelligent.

Then when through, you do a final wipe by hand, after looking at the nozzle plate to see where there is any

To clean the printheads is very simple. I definitely like how GCC has cleverly arranged this. There is a pre-set "wipe" for each printhead. You use your thumb to wiggle each wipe.

ink residue.

140. Does the manufacturer provide any special cleaning liquids?
Yes, there is a bottle of cleaning fluid which is also the fluid you manually inject into the ink lines if you intend to keep the printer turned off more than for several days.

141. Does the printer itself have a wiper (a blade)?
There is no wiper blade. Wiper blades have proven to be a problem, indeed their presence on the Mimaki JF-1631 printer is one of its weakest points.

Here is the cleaning liquid that you can obtain from GCC.

This is the service station area in summer 2006. Today, the service station has is much improved; you can see the better version in the site-visit case study of the StellarJET 183UVK in the German offset printing company.

MAINTENANCE

142. What daily procedure is required at start up in the morning?
The operator said the start-up procedure is easy: purge and wipe. Do print sample, and usually purge and wipe one more time.

143. What daily maintenance is required at night?
The User Manual suggests purging the printheads at the end of the day.

144. What daily maintenance is required if you print the entire day long?
This GCC printer seems relatively free of any need for constantly cleaning and constant purging, especially compared with other UV printers.

145. What other periodic maintenance is required by the operator?
The printer operator said “white ink needs more cleaning than the other inks.”

146. 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 requite 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.

147. What is the average number of maintenance calls per printer per year?
One infamous UV printer brand (not a GCC) reportedly had an average of 52 service calls per year. HP had to retrofit 100% of all their entry-level hybrid UV printers. These are examples of what happens if a printer is released that still has issues.

148. How long can the printer sit unused?
If the printer has been off for more than one day the printheads should be cleaned out with flush before doing a purge.

If idle for more than several days, it is recommended to flush ink from print heads completely and replace with print head flush solution. Actually it is best to use your UV printer every day. If you are not going to use it every day, fill the system with flush solution and cap the heads (please note: this procedure varies considerably from one printer to another; some have no capping station; others you have to inject flush with a syringe).

Check with an experienced tech support person, but merely turning your UV printer on for a test print every few days is NOT what is meant by using your printer every day. It may be better to fill it with flush and not use it at all. But this depends on the plumbing system of your specific printer, so check with tech support: we are not a medical doctor for specific individual printing problems; just trying to get the message out: UV (and solvent) printers are designed to print; not to sit unused.

The owner of the printer said that for the long Christmas vacation he forgot to fill the tubes with flush, and so ink was in the tubes the entire three weeks that the printer was off. He said he simply had to do a much longer purge and cleaning cycle to get the printer up and running again (20 minutes), but that he was able to get everything going just fine.

149. How should a printer be prepared for sitting unused for a long time?
Solvent printers need to be used every day. Otherwise the ink dries in the nozzles and nozzle plate of the printheads. It was an early mantra that UV ink escaped all the problems of solvent printers: that you never had to weep (spit at the end of every pass); that you never had to purge; etc.

But in reality UV-curable ink has comparable issues, plus the added problem of curing inside the nozzles. Cationic ink can cure spontaneously (once initiated) all the way back into the ink tubes. Fortunately most printers don't use cationic ink; they use free-radical curing chemistry.

But reflected light can cure the ink inside the nozzles; heat can cause gellation which can clog the heads. So in some printers the heads are capped at night; in some printers you have to fill the ink lines with flush if you don't print frequently. Indeed a UV printer is intended to be used every day. We just received an e-mail from an end-user whose printer had endless issues. He said they used it seldom because of other issues. My first question was whether the infrequent use was a cause of at least some of the issues.

SAFETY & HEALTH CONCERNS

150. How is safety treated in the printed literature?
Early in the User Manual the adverse affects of inhalation or contact with UV-curing ink is indicated.

GCC's StellarJET 250 UV manuals have among the best treatment of safety aspects; in other words, they tell you point blank some of the reality of UV ink and UV lamps. If the warnings do not make you cringe, they are not realistic.

151. 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?
Odor level is okay; there is no particularly noticeable odor, but then again, the printer was not working on full-width images.

All ink emits odor (even water-based), but if you ventilate the printer and the work area the smell is manageable, for most UV inks. However one or two UV inks have a reputation for a smelly chemistry. So be sure that the printer you have on your short list has an ink that passes the sniff-test.

152. Is the machine enclosed, or exposed?
The machine is exposed, which is not a good idea, especially since Mimaki, ColorSpan, and Gandinnovations have ceded to critique about their open systems: their new models are now closed for safety and health protection.

153. Does the hood close down completely to seal the system, or are there a few inches open at the bottom?
There is no hood, so there is no seal whatsoever.

GCC StellarJET 183UVK is an exposed machine, FESPA Digital 06

The hood on any hybrid or combo system must allow space for boards to pass through, so its 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.

Most large dedicated flatbed printers have no hood at all (Oce Arizona 250 is the worst offender). Some gantry structures are enclosed (Teckwin TeckStorm, for example).

154. What keeps UV lamp light from leaving from the space between the bottom of the hood and the platen or transport belt?
Light leak (because of lack of any shield) is the issue with open systems.


Light leak is high because there is no skirt (or at least I did not notice one). Notice that the hood is raised; this is typical. In all printshops that I visit, they almost always have the hood raised.

155. What kind of "skirt" exists along the bottom of the hood to prevent light leakage?
No protective skirt since there is no hood.

156. 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?
Note that even trade magazines comment, "Venting—Flatbeds, both solvent and UV-curable, may require the addition of equipment for venting fumes, odors, and particulates." (Nov/Dec 2004, p. 38, The BIGPICTURE Magazine).

Lack of a hood and lack of a ventilation system is a drawback of any open system: ColorSpan 72UVR, 72UVX, Dilli Neo Titan, Agfa :Anapurna M, GCC StellarJET 183UV, and comparable designs.

157. What is the noise level, primarily of the fans for the vacuum?
Normally the vacuum pump is the nosiest part of any UV-curable flatbed or combo-style printer. Roll-to-roll UV printers do not need as much vacuum table area so are not as noisy in this respect.

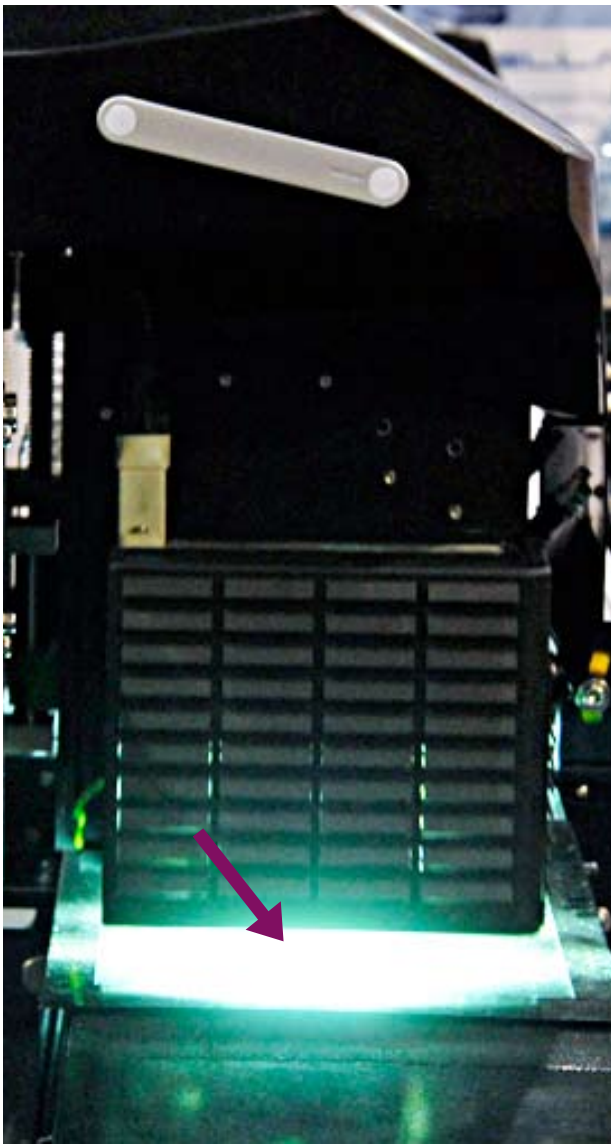
158. Are any other safety or health issues involved? Does the operator need to be concerned with any other safety precautions?
Most of the health issues of UV-cured inks are still not fully known, and definitely not adequately published. For example, how long does the ink really cure? What measures and standards exist to measure this? How long does the polymerization process continue, and what about ink that has misted? These are general questions, not specifically directed toward this one printer model.

Relative to other safety or health issues we recommend keeping track of industry publications and asking other people who use, or are considering to use, UV-lamp printers. Helpful information is available from various issues of the RADTECH Report, from at least 1999 onwards.

159. How easy is it to obtain the MSDS of the ink?
It is rare that the MSDS of the ink is easy to obtain. If the MSDS is an auto-download from the company website, this is how it should be. But most companies do not wish the end user to know which brand of ink is being used, so hiding the MSDS is not necessarily an attempt to hide the dangers, but may be to hide the source of the ink.

160. Does the ink used in this printer contain chemicals suspected of causing cancer? Does the ink in this printer contain chemicals that may cause problems with genes?
And the other question, for using UV ink in the EU, is whether any chemicals in the UV ink in the printer that you have selected is prohibited for certain uses (such as for wallpaper). These are questions you need to ask a chemist since most people in the trade show booth may not know the answers. And merely reading the MSDS (which is usually a challenge to obtain in any event) is not much help unless the pros and cons of each chemical are clearly expressed.

161. Does your ink contain any chemicals in Risk Class R40 or R43?
The tables of Oce, Mimaki, and some other flatbeds are bright polished metal (aluminum?). So you have an almost mirror-like surface directly below your UV lamps.



A disadvantage of this lamp is that it has no adequate shield for the UV light, FESPA 06

162. How is the UV light shielded so it does not burn the eyes of the operator? Does operator have to wear safety glasses?

The tables of Oce, Mimaki, and some other flatbeds are bright polished metal (aluminum?). So you have an almost mirror-like surface directly below your UV lamps.

The prototype exhibited in 2006 allowed too much dangerous UV light to be visible. The UV light is excessively high. Hopefully this will be changed when the printer is re-designed. Doing a copy of the ColorSpan 72uv was not a good idea because this is an open design. Even ColorSpan has phased that out; all new ColorSpan UV printers are now enclosed.

Last year Mimaki asked FLAAR to list the improvements their UV printer engineers should consider: we recommended a list of missing features. The most important aspect from our list that they added (to the model presented at ISA 2007) was superior protection from UV light.

This is why increasingly companies are wanting to bring FLAAR to their factories early in product development cycle, so that their next generation printers will have helpful features BEFORE they are shown to the public. We work on the prototype designs under NDA (confidentiality agreement) when this is appropriate.

163. How do users know if they are allergic to the non-cured ink?

As with all chemicals, allergic reactions can take many forms. But people we have spoken with indicate that if you spill non-cured UV ink on your skin, if you are sensitive, you will notice it quickly (and painfully). But even if you do not react immediately, you do not want to have UV ink or the flush for UV printheads on your skin.

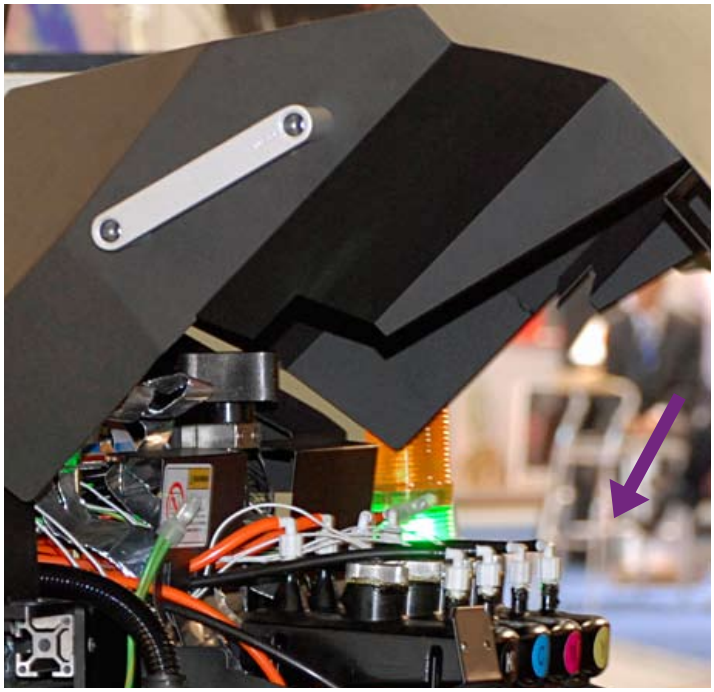
PRINTHEAD TECHNOLOGY

164. Which brand printhead is used?
Most UV printers made in the US, Japan, and Europe use Spectra, Ricoh, or KonicaMinolta heads. VUTEk is one of the few that uses Seiko printheads. It is reported that one downside of Seiko heads is that they must spit (which waste expensive ink). Most Rho printers do not have to spit except for white ink.

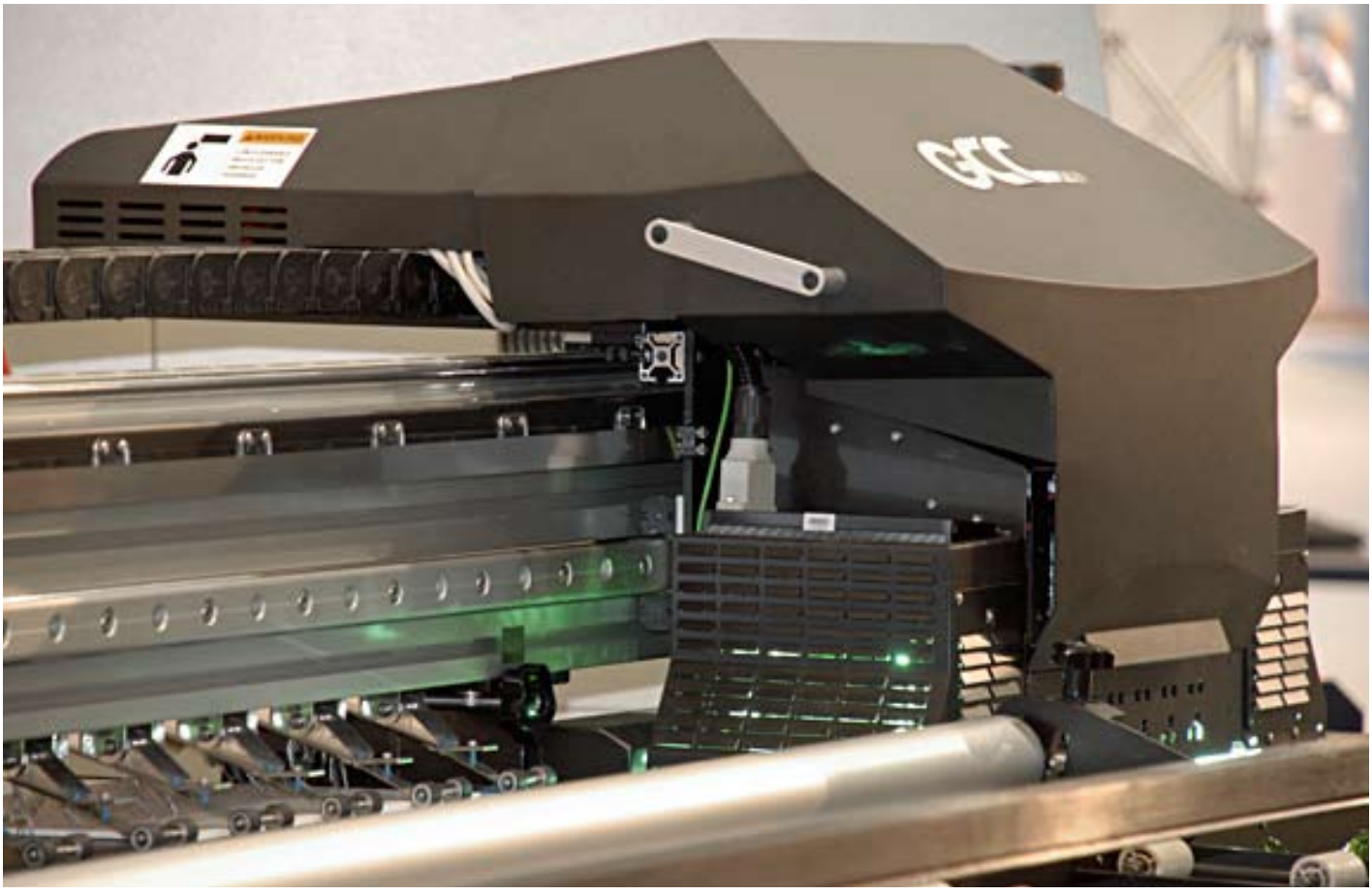
This printer uses a KonicaMinolta head, KM 512. But the year 2006 User Manual lists the heads as Konica(Minolta) 512MH.

165. How many other printers utilize the same printhead? Have they shown any problems?
The IP&I also uses a Konica printhead; its output quality is gorgeous.

166. How many nozzles per printhead?
512 nozzles.



KonicaMinolta Printheads



Printhead carriage

167. How many printheads per color?
One printhead per color.

168. How many total number of printheads?
Currently there are six slots for printheads.

169. What is the position of the white printheads relative to the rest?
The white printhead is in the same row as the others.

170. Is the printhead for the white ink the same model as the printhead for the other colors?
In the beginning, DuPont tried to use a printhead for the white ink that had a larger droplet size. However gradually they switched to using all the same model printheads. The reason a larger drop size for white ink is a good idea is because otherwise you need two printheads in order to make the white ink opaque enough. But it turns out you need two printheads for white ink anyway, so that you can jet down a flood coat of white before the rest of the colors (when printing on transparent or translucent materials).

Nowadays almost all printer manufacturers use the same printheads for white that they use for colors. What is different is that the ink tanks for white require a method of agitation so that the pigments of Titanium dioxide don't settle out.

The only instance that I have heard of recently where a new UV printer is designed with special heads for white ink is where the newest L&P Virtu uses Spectra M Class heads which are MEMS technology. These are not yet appropriate for using with white ink, so a different model head is used just for the white.

PRINTHEAD DPI & Features

171. What is the drop size in picoliters?
14 is a nice small droplet size.

172. What is the advertised DPI, and is it true dpi or "apparent" dpi? How is dpi presented (with what adjectives)? How is this dpi calculated?
Advertised dpi is 720 x 720.

173. How many passes can this printer achieve?
2, 4, 8 passes, this machine can print in 16 passes and 32 passes, when applying in white.

The lower the number of passes, the faster the printer prints, but the lower the quality. At a printer's fastest rated speed, the output is usually unusable for most applications other than distant viewing for a billboard or banner. To achieve viewing quality for Point of Purchase or an honest photo quality, you generally need to set the number of passes at the highest number (which results in the slowest speed).

Most UV printers can achieve 12 to 16 passes, but some, such as this model, are set for a maximum of 8 passes.

174. Does the software use passes or modes to describe quality levels?
FLAAR prefers to use consistent terms that are standardized for all printers so that printshop owners, managers and printer operators have a fair chance of comparing speed vs quality. By not identifying the actual passes, or by defining pass in an atypical manner, this results, in effect, in hiding the reality of speed vs quality. Thus we commend those companies that keep to, or return to, the traditional usage of the term pass(es).

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. Thus we commend GCC for using a realistic nomenclature.

175. Is nozzle compensation available?
Yes, a basic diagnostic pattern is available for nozzle-out compensation.

Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING

176. Is printing bi-directional or uni-directional?
The printshop that I visited presently prints only in uni-direcdtional mode.

177. Which materials can be printed fast at 2-pass or 4-pass modes?
The number of passes needed may also depend on how worn the printheads are. If the printheads are old you may need more passes than when the printheads are new.

PRINTHEAD Positioning

178. Are the printheads in a straight row, or staggered?
The normal position for printheads is parallel to each other in a row. But there are exceptions, and staggered the positions may have other benefits. Each pattern for positioning the printheads has a reason, but most printheads are simply parallel to each other in one row.

179. How complex is the procedure to align the printheads?
You can calibrate the angle of the head position to alleviate skew of the printheads and to calibrate horizontal offset, vertical offset, bi-directional offset, and Right, Left line offset.

The HP spec sheet is helpful in alerting you to the reality of aligning their X2 MEMS printhead when you need to replace a failed head with a new one: 45 minutes. Even if this honest estimate was not provided in the spec sheet, it would be ascertainable sooner or later anyway. I commend HP for being ethical in listing this aspect of maintenance.

PRINTHEAD: Associated Features

180. Or is the entire plate heated and thereby some heat gets to the heads?
Heating the metal plate that holds the nozzle-plate area of the printheads as a group (the base of the printhead carriage so to speak) is a cheap way that early Chinese printers did their heating. Today GRAPO is perhaps the only serious UV-curable inkjet printer manufacturer outside China that uses a heated plate to heat their ink (but with 45 manufacturers, there are always surprises). GRAPO has plenty of experience since they are themselves a signage printshop, so they would not use any system that was not successful.

181. Is negative pressure required to maintain the ink (without the ink dripping out the printhead when the machine is turned off)?
Most UV printers use a slight negative pressure on the printheads.

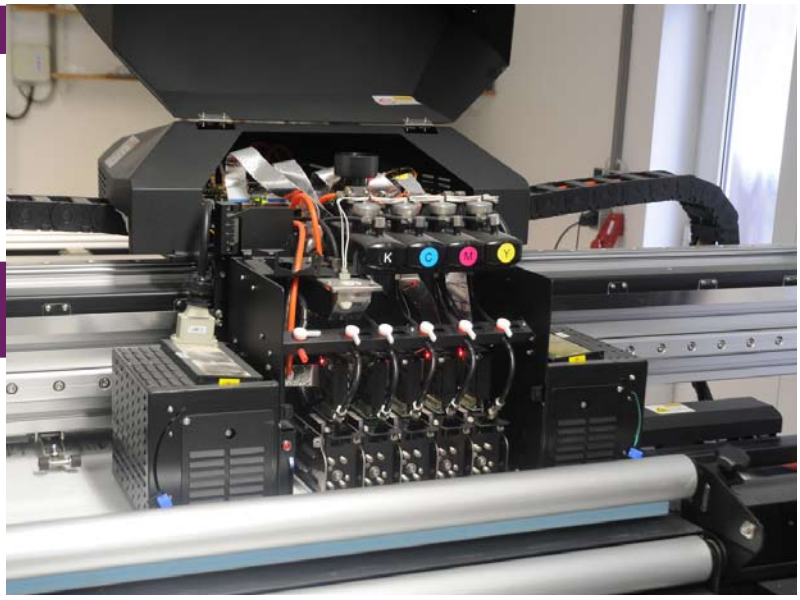
182. Is the negative pressure user variable?
Yes, you can easily vary the pressure of the ink.

PRINTHEAD Life Expectancy

183. Is the printhead considered a consumable?
Yes, the printheads are warrantied only for three months.

PRINTHEAD CARRIAGE and GANTRY

184. Describe the design and construction of the carriage area?
The carriage area is of reasonable size and nice and simple.



MOTORS: Stepper, Linear, Magnetic ?

185. Describe the motor and the system that moves the printhead carriage? Is the motor for the carriage a linear servo motor or a stepper motor?

The only major UV printer that still uses an antiquated stepper motor is the Mimaki JF-flatbeds. A stepper motor moves the carriage (or other part of the printer), in steps of set distance. Downside is that they are not as accurate since they don't provide feedback that can be monitored and allow correction on the fly. The crucial advantage of a servo motor (usually an AC servo motor) is that it provides feedback and can correct its positioning. But since a servo motor is significantly more expensive, it is missing from many UV-curable printers.

SUBSTRATES

186. What sizes of material can be printed on?

1.83 meters; 72 inches. This is the same width as the ColorSpan 72UVX, but wider than the newer ColorSpan 5400uv series.

187. What is the difference between media width and actual print width?

We have this entry because some printers are called "3.2" because they accept substrates that are 3.2 wide, but the printer can actually print only 3.1 meters. In such a case the model name is misleading (and incorrect in a sense). I have even seen some model designations claiming 3.3 when they only hold media 3.2 meters. So there is a bit of misleading advertising out there.

188. Can you adjust the rate of media feed?

You need to adjust the rate of feed to remove banding lines caused by media feed that is slightly off. This is not entirely the fault of the printer but a result of the fact that each different kind of material feeds slightly differently. On the GCC 183UVK you can do this adjustment on the fly, easily.

LOADING MEDIA

189. What thickness can this printer handle?
2.54 cm, 1 inch. This is relatively thick for an entry-level printer. Mid-range printers ($150,000 and up) can usually print on material twice this thick: namely 5 cm.

190. Can you measure the height of the material with a sensor, or is it manual?
What you really want to measure is the printhead gap height: the space (gap) between the top of the material and the nozzle plate (the “printhead”).

191. Is roll-fed media loaded from the rear, top, or front?
Rolls are loaded at the rear, bottom.

SUBSTRATES, Issues

192. What materials can this printer print on okay?
It helps if the material is a clean, homogeneous surface, and should all be the same thickness.

193. Can you print on mirrors?
Printing on a mirror is a risk with most designs. Only a few printers are specifically designed to reduce the chance of reflections of the UV light up into the nozzles. Once UV light gets into the nozzles, it will cure ink inside the printhead, causing failure (no more ink can be jetted from a nozzle blocked by cured ink).

194. 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 for mercury arc UV lamps 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.

You can in effect lower the heat that reaches the material by raising the entire printhead carriage. However this results in noticeably less quality (because the ink is flying through the air a longer distance while the material is moving away from it). You can also set the printhead carriage to move further away from the printing area at the end of each pass (in those cases that the media is less than the maximum and in those cases where these settings are facilitated by the printer design and firmware).

One way to dissipate heat is to have good ventilation drawing the hot air up and out of the enclosed printer. There are two exhaust tubes at the top for this purpose. These are not only to suck out the odor and ink mist, but to remove some of the heat too.

195. Does the printer have a pre-heater to pre-condition the media before it faces the heat of the UV lamps?
There is no pre-heater. Probably only one atypical UV printer has a pre-heater. This feature is not considered a norm.

196. 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.

Nonetheless, some UV printers already have anti-static systems carefully built into their printers. When these work it documents that the investment is well spent. However if the low price of your printer is in part because there is no on-board static system, and if you indeed have a static issue, the natural question is why, since this is such a well-known issue, did your brand not have an anti-static system or if so, why does it not work satisfactorily.

One economical way to get rid of some static is to use a fabric softener – Downy-for example, which you can get from the supermarket. But be sure to learn which materials need anti-static treatment. No sense wasting time with those materials which do not have a static issue.

And be aware that the amount of cleaning liquid you put onto a material can cause after-effects when that same material is heated by the UV lamps.

197. 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). Dust can be a problem in places and seasons with low humidity. This is one of several reasons why you should have humidity control in your printshop, to allow maintaining proper humidity level for optimum performance of your printer.

SUBSTRATES: Cleaning, Priming, Preparation

198. Do you have to brush off or otherwise clean each sheet of incoming material by hand before you print on it?
For flat rigid material 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.

I rarely see any printer operator attempting to clean roll-fed materials.

Horst Scholz first vacuums the surface.

199. Which substrates must be or ought to be prepared before printing by being corona treated? Corona treatment is to improve surface tension to promote adhesion.
Corona treatment may help on some materials if you do the treatment within a few hours or day or so before printing. Otherwise the corona treatment wears out after a while, so has to be refreshed before printing to be effective. So buying pre-treated material is only a good idea if it is fresh (but you have no way to know how long the material was in a warehouse before reaching your shop).

200. Which substrates ought to be laminated, top-coated, or otherwise post-treated?
Realize that top-coating (a UV clearcoat) may be useful on some materials and even possibly required on some applications. This may require an additional machine, space, training, and further ventilation considerations. You are not protecting against the sun, you are protecting against the ink rubbing off slippery surfaces such as glass or marble.

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

Lamination will also cover up “lawnmower banding” appearance. Lawnmower appearance is caused by bi-directional printing.

SUBSTRATES: General Concerns

201. Although this printer “prints on almost all materials,” what is the adhesion rate with most materials? Does the ink easily scratch off certain materials?
Realize that all statements must be judged based on how long the ink has been on the material, and the surface nature of the material. Not all fluted plastic material is the same; and six months later the adhesion could theoretically be different (based on conditions of display and the nature of the surface of the material).

Adhesion may be difficult on polypropylene and Lexan. Some UV ink does not work well on Coroplast, or prints well but begins to fall off after several months.

You need to test each material yourself before you promise your client you can do a job that will hold up six months or a year.

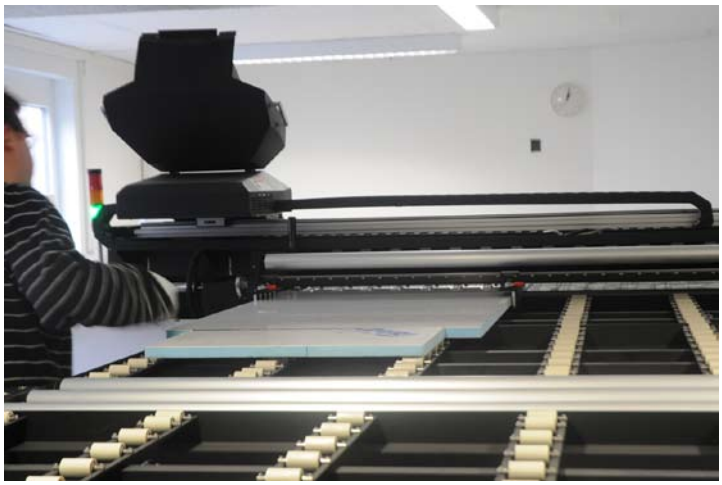
202. What problems in feeding exist, such as skew to one side?
Skew results because no one single feeding system can accommodate all kinds of surface characteristics or thicknesses of materials. The owner of the printshop I inspected said there is no serious skew that he has noted so far.

203. What other problems in feeding exist? For heavy material? For light material?
Just realize that no transport belt on any combo-style design can feed all materials with the same precision. Some materials will go through okay; others will skip or stutter, and some may skew. This also happens on expensive VUTEk 200/600 transport belts.

And what feeds well during a test may react differently when you are in full production day after day (when the belt gets worn, and a bit out of kilter).

The worst cases of skew that we have heard of are from the DuPont Cromaprint 22uv.

Alignment is at the back left. Other printers align at the back right. There is no one way that is better or worse. Here it makes more sense to align at the same side as the LCD monitor on the other side.



Notice the extra piece of material taped onto the end. This extra piece allows the grit roller and pinch rollers to move the board all the way through the platen system.

It is essential to wear gloves when you handle boards being printed on with inkjet inks.

Nicholas Hellmuth and Horst Scholz, at Scholz Druck GmbH, Schnefenbach, Germany, near Wurzburg.

APPLICATIONS

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

There are two issues with printing on fabrics: first, the ink goes through the weave and ends up on the table or transport belt or platen. Second, the fibers from fabrics or mats can get onto the printhead nozzle plate and sometimes up into the nozzles.

205. What other kinds of applications can you print?

i. Billboards (good on most materials, because viewing distance is far)

ii. Banners, general signage (good on most materials, because viewing distance is far)

iii. Exhibit graphics; okay if viewed up high or 2 meters away; may be considered too grainy for close viewing

iv. Backlit; okay if viewed from far away; too grainy and banded for close viewing. You get better backlit with the "camera" system on the Jeti solvent printers.

v. POP; slightly grainy and may have banding, only suitable for close viewing if client or customers accept the output

vi. Vehicle graphics; not ideal for sharp edges or extreme curves. Use the roll-to-roll UV printer with its flexible ink.

vii. Bus shelters, okay if average viewer is not discerning.

viii. Rigid materials; such as construction signs. Ideal for MDO boards and comparable materials for construction signage.

That said, today (2008) the inks are a lot better and you can consider experimenting with UV-curable vehicle wrap especially since 3M inks are specifically directed towards allowing vehicle wrap. Actually I have seen vehicles being wrapped with prints from GRAPO Octopus, using their normal UV ink.

206. What kinds of applications are not something you should try? What applications print mediocre, or poorly, and why?

The biggest problem with UV-cured inks on vehicle graphics is when the material has to stretch or conform to the shape of the vehicle, especially over rivets, decorative trim, or anything that is not flat. Most UV printers are not recommended for vehicle wrap unless they use a special ink made to be flexible. Also be careful by making sure that adhesion and cleanser-resistance is adequate.

That said, today (2007) the inks are a lot better and you can consider experimenting with UV-curable vehicle wrap.

Here is a triangular jig, a custom-cut holder to hold and help guide a triangular object through the printer. This printshop intends to print on a diverse range of materials, much more than just foam-core.

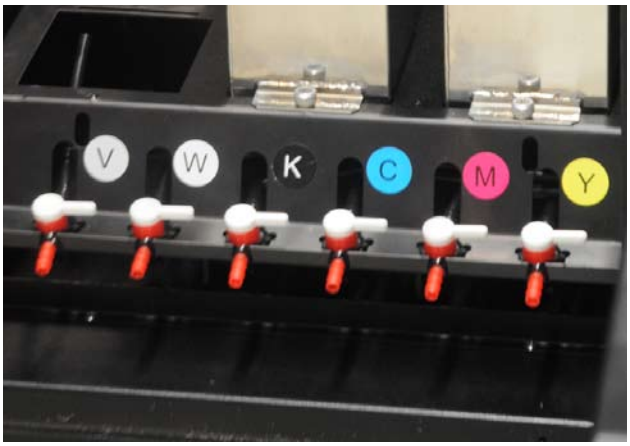
INK

207. Is an extrudable or thermal-formable ink available from the printer manufacturer?
At present only Mimaki and Gandinnovations offer a special heat-formable UV-cured ink.

In the past only Hexion and Gandinnovations offered a special heat-formable UV-cured ink. The Mimaki heat-formed samples are simply a basic generic flexible UV ink that they can stretch a bit; as of summer 2008 Mimaki was not yet using a real dedicated thermo-formable ink.

At DRUPA 2008 (if I remember correctly), Durst announced that a heat-formable ink would be available for their Rho printers.

208. How many colors are used to produce output - four, six, or eight?
The prototype exhibited in 2006 had four colors. But the printer has a row of 6 features that suggest the maximum number of colors is potentially 6 (assuming that there is no on-board flush system, which would occupy one ink like if it were present). The current lines used in 2006 are W, K, C, M, and Y with one ink line with no current marking.



Four different colors plus white and varnish.

209. What is shelf life of the ink (CMYK)?
One year.

Shelf life of the ink depends on storage temperature, plus on how honest the company was that delivered the ink. If the company bought too much ink, and could not sell it fast enough, they might be tempted to back date the shelf life.

210. What company makes the inks? Choices include DuPont, Jetrion (now InkWare/VUTEk), Hexion, Sericol, Sun, Triangle, KonicaMinolta, Toyo, Tetenal and several others.
The ink comes from Toyo. Evidently there is a relationship between Toyo ink and the KonicaMinolta printhead company. The printshop that I inspected said that so far he has no issues with this Toyo ink.

211. Does the printer manufacturer have its own ink chemists on staff?
Grapo, being a printshop, uses UV-cured ink on a regular basis. So their printshop for billboards, banners, POP, thermo-formable and other applications gives them daily experience. In some aspects this counts more than having an ink testing laboratory per se (which they do not have).

Durst, HP and comparable large printer manufacturers have their own ink chemists (even when they don't necessarily manufacture their own ink). But even when a company owns their own ink factory, sometimes they also rebrand the ink from completely different ink companies when they need an ink that they themselves do not yet make.

212. Where are the printer's ink containers located? Front, back, or sides?
The ink cabinet door is at the front left.

The ink system is in the left front cabinet. Notice how everything is clean. This printer is not a cheap piece of low-bid junk that will fall apart in the first month.

INK: White & Varnish

213. Is white ink available?
One of the ink lines is marked as "W," documenting that white ink is available. White ink is unheard of on most other entry-level printers. The printshop in Germany said that he needed white ink and was pleased to be able to find white ink in the GCC 183UVK printer.

214. To use white ink does that require not using light colors in order to make space for the white ink?
There are six ink channels, so you have to select which colors you want in addition to CMYK.

215. How many ink lines or printheads are dedicated to white ink? One or two?
In theory two channels are available for white but the printershop in Germany was using only one white channel.

216. Is the white ink opaque enough?
White ink today is better than it was two years ago. But if you intend to depend on white inkjet ink, be sure to interview several other printshops that are already using the specific brand and model of printer that you also intend to use white ink with. If they are satisfied with the white ink, then you can be confident that white ink will likely work in your printshop as well.

217. Does the white ink need special attention? (Titanium dioxide may settle out if it sits too long). What company provides the white ink?
Yes, the white ink on this printer is handled separately than regular ink.

218. Is the white ink situated in the same area as the other inks?
This question is in the FLAAR FAQs because the Zund 250 situated their white ink up inside the printhead carriage. If you have 500 features on a printer, 200 tend to be standard (similar solutions on most UV printers); another 200 are special or have a few tweaks, and one or two are unique.

219. Is spot varnish available?
Yes, spot varnish is available. If you absolutely need spot varnish then you might consider this. But most people in industry say (for all printers) that varnish is not easy to handle inside an inkjet system. The head engineer for L&P said that having a varnish in their L&P Virtu was something he decided was not worth even trying to build inside his printer. He said that from his experience using varnish inside an inkjet printer would always be iffy. When I speak with people who have tried varnish, they too have said that varnish is tough to work with in an inkjet printer.

INK Cost

220. Does the refill container of ink come in cartridge, bottles or bulk? How large are the ink containers for this replacement ink?
The ink comes in 2-liter containers.

Ink tends to come either in bottles (where you pour the ink into the ink container on the printer) or containers that are themselves the ink container: you take the old one out; throw it away; and place the new container in its place. Cartridges tend to only be used in printers with Epson printheads. No currently functioning UV printer other than the narrow format Roland LEC-300 uses Epson printheads: one Eastech printer tried, but it is not widely used.

221. How many liters of ink does the on-board ink container hold in the main tank?
One liter per color.

222. What is the cost per container? What is this cost translated to liters?
Cost of ink varies depending on the dealer/distributor, and depends on what country you are in. Usually the smaller and cheaper the printer, the more the ink costs. The larger the printer is, and the more ink it uses, the lower the ink is priced.

223. How often does the waste container need to be emptied?
The User Manual suggests checking the waste container every day (though obviously it does not fill up that quickly at all).

224. Is there an out-of-ink alarm? Is there a warning before actually being out of ink?
There is a warning message on the LCD monitor indicating the ink is out.

INK: Supply System, Tubing, Filters, etc

225. How much ink does the ink container in the printer hold?
2 liters.

226. How is new ink added? Pouring into the on-board container? Switching the container to the new ink container?
New ink is added by pouring. The downside of this is that old ink can build up in the on-board container. The best way to avoid buildup of old ink is to replace the on-board ink container with the new-ink container every time new ink is needed.

227. What is the situation with the ink gelling?
Ink gels from heat; not only from UV light (since in theory the inside of the printer will have black ink lines so no UV light can reach the ink). But overall heat will cause UV ink to gel. But if you have some circulation within the tank and if the ink is far from the heat, gellation will not be as much an issue.

228. Is ink flow turned off and on with a valve (a manual control) or via the software on the monitor?
Ink is turned off and on to allow into the tubes by a manually controlled valve.

229. Is there an issue with "ink starvation?"
About every meter, I noticed a microscopic row of ink with less ink than adjacent inks. I used a magnifying glass to check the surface. So something is causing less ink periodically. The printshop operator said he would check to see if there was a defect in the surface of the material. So neither of us is sure what caused the occasional minor ink laydown. One potential cause could be ink starvation.

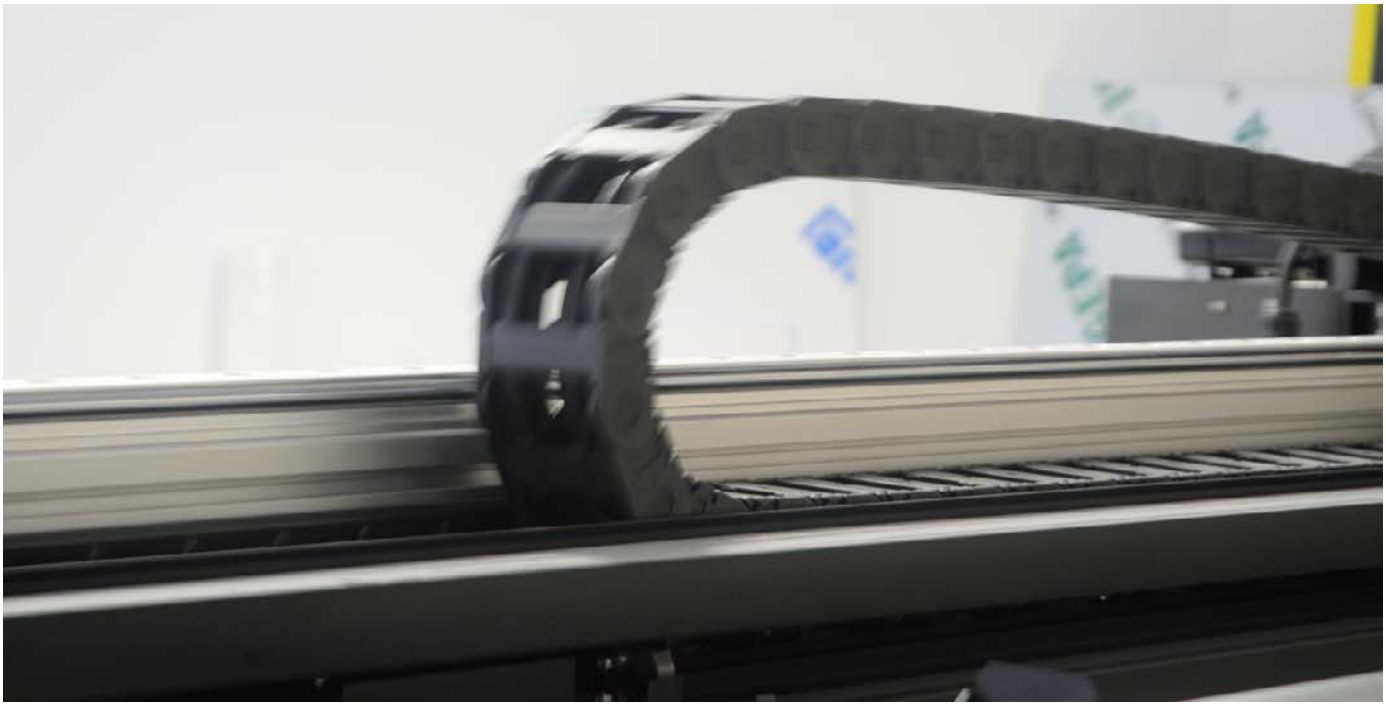
"Ink starvation" means that not enough ink can get to the printheads in fast printing modes. Ink starvation is a real issue that affects even some quarter-million dollar printers. So you need to check with end-users to see if they have issues with ink starvation.

230. Are ink tubes black, opaque but white, another color, transparent?
The first year's production of the hybrid UV printer of Infiniti used ink tubing so flimsy that the tubes split, dissolved, or became disconnected on a regular basis. This is what happens when you take a solvent printer and try to retrofit it to take UV-cured ink. But something similar happened when Roland and other companies

tried to run the first generation eco-solvent ink through their printers which previously were made only for water-based ink: the fittings and other parts of the original ink delivery system were made to handle water, not solvents. There were endless tech support issues for more than a year as a result. At least Roland and Splash of Color finally fixed these issues (and two different eco-solvent ink chemistries were developed in subsequent years as well).

231. What kind of e-chain is used? Igus brand?

The energy chain is the plastic linked system that holds all the cables and ink tubing so that it does not get rubbed while being moved back and forth to feed the carriage. Most mid-range and almost all high-end UV printers have an energy chain from the company Igus. Since the e-chain was in motion most of the time I was inspecting the printing (this is an active printshop) I did not notice the brand name, but it looked more than adequate.



E-chain (energy chain), probably IGUS brand or equivalent.

232. Where, and in how many locations, is the ink heated?

In over 80% of the UV-curing printers that I have inspected, ink tends to be heated in two locations: in a sub-tank, and on the printhead. Most UV printheads have special features in or on the printhead to facilitate heating the ink. This is to prepare the viscosity so the ink is liquid enough to jet out the nozzles; this ink heating has nothing to do with the ink needing to be cured.

So far, the only printer whose ink does not get heated at the printheads is the new Roland LEC-300. This is also the only UV printer, so far, which successfully uses an Epson printhead.

233. Can the end-user vary the printhead temperature, or is the temperature fixed?

It is not advised to change the printhead (ink) temperature arbitrarily. However in certain situations, a sophisticated end-user, with a high level of knowledge of the overall ink chemistry, UV-curing situation, and experience in the ramifications of varying the factory-set temperature, then changing the temperature could be considered.

234. Has any misting or spray been reported? What about ink inside the machine parts?
Just ask any ink chemist about ink misting; then ask most sales reps. Most people in a typical booth are in a state of denial, or do not fully understand the concept of misting.

Most safety instructions do not mention the potential of the UV ink misting during printing. Some chemists have told me that there is no way to totally prevent all misting since you are generating x-million drops a second from a rapidly accelerating carriage. Misting is inevitable. The most misting that I have seen so far was inside an Infiniti UV printer: the entire surface of the inside (platen, rollers, etc) was totally covered with misted ink). The second most amount of ink misting that I have seen was in a ColorSpan 72UV X. But many other printers mist as well. You can check simply by putting a white swab or white cloth or white paper in a fixed location inside the printer (under the hood). Check it every week or so to see how much misted ink has settled on it.

This is the amount of ink that you may be breathing if the workplace is not adequately ventilated.

235. How often do the ink filters have to be checked? Cleaned? Changed?
It is recommended to change the ink filter every six months.

INK: Longevity

236. What is the longevity outdoors? What about in the full sun in direct sunlight?
In some cases the ink may last longer than the material on which it is printed.

INK Color Gamut

237. Which colors print best?
Blues are good, as with almost all UV-curable ink. Lemon yellow on this printer was the best I have seen on any UV printer, at any price.

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.

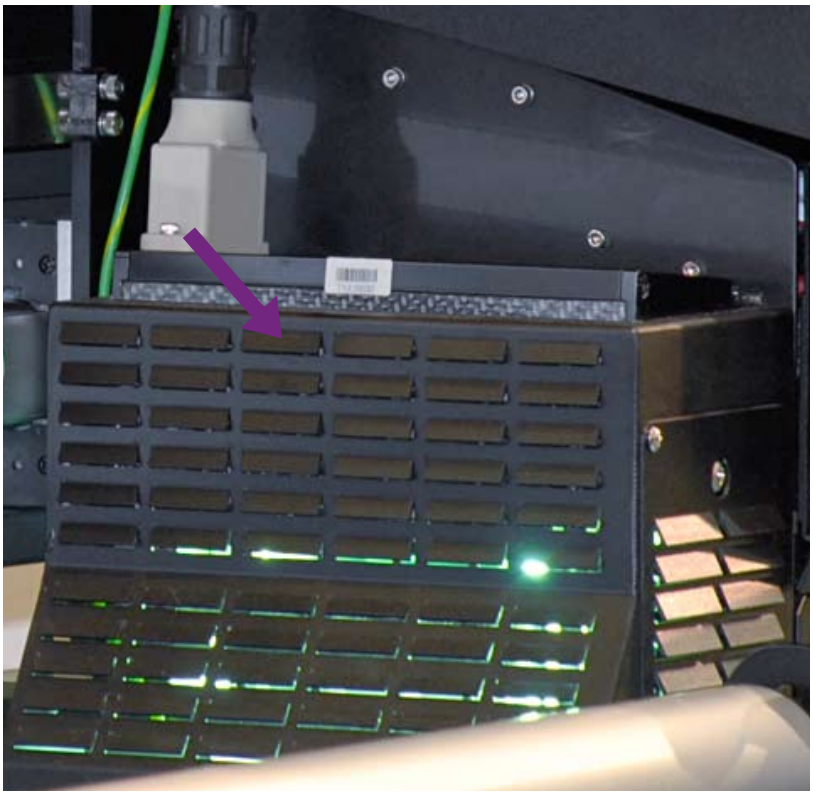
238. Which colors print poorly or not at all?
Reds are much too magenta, as is typical of most UV-cured ink.

When you do test prints, try various reds; try a wide range of yellows and greens. Try a red-brown. These are colors which may present issues.

THE UV CURING LAMPS

239. How many different sets of lamps are there? Is there pinning first and then curing later?
95% of UV-curable printers have only curing UV lamps. Only the Inca Spyder 150 and a few other innovative machines have a pinning lamp before the curing lamp.

240. What technology is used in curing lamps: microwave, continuous (mercury arc), LED, or flash (pulsed Xenon)?
Virtually all UV printers use mercury arc UV lamps. Only NUR and a few others use microwave UV lamps. Pulsed Xenon lamps have failed the few times they were tried (an early VUTEk UV printer circa 2000-2001; a cheap Oce Arizona 60uv printer). LED lamps are now being tried in several UV printers, such as by Sun LLC (in Russia). The Gerber Solara ion uses a rare type of long UV lamp that is not used by any other wide-format inkjet printer manufacturer.



UV curing lamps

241. How many watts are the lamps?
550 watts per lamp.

242. What is warm up time?
It takes a lamp 2 minutes to cool down (before you should attempt to turn it on again).

243. What brand of lamp is used?
A local Taiwan provider is used.

244. How many lamps does the printer use?
Two, one on each side of the printhead assembly. 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), and its recent replacement, the :Anapurna XLS, have three sets of lamps: all curing, not for pinning. 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).

245. Can you have one lamp on one setting and the other lamp on another setting? Or do both lamps have to be on the identical setting?
Each lamp has an individual control.

246. What shuts the lamps off? For example, after so many minutes of not being used; or if they overheat?
This is a crucial question, and one seldom asked elsewhere: if your UV lamps need to be turned off after the printer being unused for 5 to 10 minutes, then your lamps' life gets used up quickly (if they are mercury arc). Each strike (turning the lamp off and on one time) can lower the life of the lamp by one or two hours. So ideally you want a kind of UV lamp system where the lamps can stay on as long as possible to avoid having to turn them off and on all day long.

Another downside of having to turn the lamps off is that you then have to let them cool down, and then have to let them heat up again. Most of these issues are with mercury arc lamps (due to their intense heat). You don't have these problems with LED lamps.

247. How many hours are used up by each "strike" (by each time you turn the lamps on)? GCC is one of the few companies that clearly, specifically, and openly mentions how many hours are wasted by each strike: namely three hours.

The User Manual indicates that lamp life will be impacted every time you turn the lamps off-and-on, but does not give any specific figure for how many hours of use are wasted by a single off/on cycle.

248. Is the lamp fan filter a user-replaceable item? How often should this be cleaned or replaced?
If the filter gets clogged with dust then it is less efficient in keeping down heat. Heat build-up is not good for the overall carriage area.

249. Is the UV curing assembly (lamp included) user-replaceable? If so, how easily or difficult is self replacement?
Yes, the end-user can replace the lamp and relatively easily.

UV CURING, and ODOR of the printed image

250. What is the true drying (curing) time of the inks used with this set of lamps? What factors influence the true (total) drying time?
No UV ink really cures within seconds. 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.

251. Is there any heater to assist in drying the inks (drying as opposed to curing)?
I believe (if I remember correctly, I am writing this on a train from VISCOM Germany in Frankfurt, to inspect two UV printers in a printing company in Hamburg), the Mimaki LED-curing model 160 has a heater to assist curing; if not the Mimaki, then the Roland; one of the two appeared to have a heater.

UV LAMPS: Cooling

252. Are there shutters?
When this printer was first designed no low price entry level UV printers had shutters. But ColorSpan surprised everyone by including shutters in their new entry-level 5440uv series.

Shutters 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. But shutters are primarily for controlling the extreme heat of mercury arc UV curing lamps.

The shutter under the UV lamp is manual, which at least means it won't get stuck (like an automatic one does). You open and close it yourself. You open it at the beginning of a print run, and you close it at the end of the print run.

253. How often do the shutters stick?
The shutters on the Gandinnovations printer are pneumatic, so don't stick as often as mechanical shutters. DuPont Cromaprint 22uv printer seems to have issues with its shutters getting stuck (either stuck open or stuck shut). So DuPont had to switch to another solution. We occasionally hear of shutters of other brands of printers sticking as well. Indeed one company said they don't use shutters at all due to the possibility of them not opening or closing. Making them pneumatic resolves many of these issues. Of course one reason for not using shutters is to save cost. Most Chinese printers and low-cost UV printers made in the US and elsewhere may skip shutters.

But it may be safer to have no shutters at all rather than have shutters, then depend on them, and if they fail nonetheless, then the UV lamps can set the printer on fire. So the GCC has the best of both worlds: it has shutters but you set the shutters yourself every time, so they do not get stuck. But you do need to remember to flip them closed when you are through printing.

254. How are the lamps cooled? Air? Fans? Water-cooled?
Air-cooled with fans.

255. How many settings do the lamps have? Or are the fans just Off and On?
50% on, 100% on, and Off.

256. Are there fans elsewhere in the printhead carriage area?
There are two small fans at the end of the printer at the level of the platen. At the back there are two large fans over the electronics cabinet. These fans blast air out at a high rate and thereby blow right in your face every time you need to operate the controls that are a few inches above them. The German printshop put a piece of thick paper as a shield and will build a metal duct to get rid of the blast of air at this point.

257. What other fans are there in the printer, or exhaust ports?
Under the platen there is a row of eight or nine fans that control the vacuum. If you go under the printer you can see this row easily. You can also see the entire row on the LCD monitor.

258. 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?
There are heat sinks for the UV lamps in the parking area. I did not notice if there were heat sinks also in the service area. Other than the heat sinks there is no special material at either end. The heat sinks are an area the size of the lamp housing with holes drilled in it. So there are holes not louvers or slats.

259. How long does it take to cool the lamps down before you can touch them to change them?
The operator's instructions for the Durst Rho 800 Presto is the first user's manual where I have seen mention of how long you need to let the lamp cool down enough to touch it safely: they recommend one hour.

UV LAMPS: Reflectors

260. Are the reflectors at an angle? What angle, and why?
A wrong direction would be light that reflected off the surface of the material up into the nozzle plate.

RIP SOFTWARE & Printer Software

261. Which RIPs are featured?
Besides Onyx and ColorPrint, the available RIPS are Wasatch (V6.4), ErgoSoft (v2008), ColorGATE (v 5.2), CadLink (v.8), and Caldera (v 7.5).

262. Does the price of the printer include a RIP?
You obtain your RIP software separately. Several options are available.

COLOR MANAGEMENT FEATURES

263. 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 of UV-curing wide-format inkjet printers.

PRODUCTIVITY & ROI (Return on Investment)

264. What productivity claims does the printer manufacturer made?
The spec sheet is painfully honest in the print speeds: 3 to 40 square meters an hour. So the high quality mode is about 9 square feet an hour, which ought to be compared with the productivity of the Gerber Solara ion^{X}. Presently the Gerber is one of the slowest UV printers (yet when I speak with people who own a Gerber ion, they are satisfied with the speed and output).

265. 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. So the GCC spec sheet is honest in comparison.

266. How much time does it take to set-up each new size and shape of rigid printing substrate?
This aspect is not listed in any spec sheet. You learn this only if you spend an entire day in the demo room, but doing the loading and printhead height calibration yourself. Then you get a further comparable reality check when you start production in your own print shop.

This factor will make or break your production goals. It makes little difference how fast a printer will print if you have to spend 7 frenzied minutes to align and set-up each new print job by hand.

So find one of these printers that is already installed, and learn from them what productivity obstacles exist and what real throughput is. I did this, and the printshop owner was nonetheless producing plenty of output with his GCC StellarJET 183UVK.

267. Can this printer hold up to two or three shifts per day all week?
Most printers made in Mainland China have to be turned off to rest between shifts (and most would not last an entire shift if run the entire time). The GCC printers are better engineered and will hold up better. But I would have to first find a place that is using this model for more than one shift a day.

ADVERTISING CLAIMS:

268. 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.

269. How often do people return this printer and say they want their money back?
This is mainly with lesser brands of cheaply-made printers. But, any time you are seriously thinking of any printer it is essential to learn what the recall or return rate is. In other words: how many printshops return this printer because it is either not what they expected or not what they need.

This does not automatically mean that the printer is bad; it may mean that the printshop had an unrealistic expectation. Sometimes the printshop did not anticipate how much maintenance and care the printer needed in the evening and in the morning.

It is likely that every single brand out there has printers they have had to take back. But you ought to learn how many, and why.

If the manufacturer, distributor or reseller is honest and gives you the actual facts, this is a company to trust.

If they say there have been no returns, this is statistically unlikely (but not impossible).

GENERAL CONSIDERATIONS

270. How many printers of this model are in use; in the USA; in the rest of the world?
It is crucial for a printshop owner, who is making their short list of which printers to consider buying, to know how many printers of each brand have been sold. There are nowadays so many dozens and dozens of different models that no one model is sold by the hundreds any more. This GCC StellarJET 183 series is serial # H00063 so I estimate that about 60 have been sold.

COMPARISONS WITH OTHER PRINTERS

271. When people are considering buying this printer, what other printer(s) are they also looking at?
Printshop owners, managers, and printer operators will tend to be looking at the ColorSpan 5440uv series (now part of HP), at IP&I 1606, at Dilli Neo Titan and at the Agfa version, :Anapurna M. The ColorSpan is 1.6 meters not 1.8 meters and the ColorSpan 5400 model is synonymous with minor issues.

In the US another hybrid is the DEC Legend 72HUV.

272. What features on the other printers may be issues?
Low-bid philosophy and switching part suppliers the minute a cheaper part is available is what causes other brands printers to fail (along with lack of enough years of experience in understanding the complexity of moving thick materials through a printer and UV-curing chemistry).

The Mutoh Zephyr is also a hybrid but is envisioned mainly for roll-to-roll (plus it costs more than most other hybrid printers).

The Mimaki UJV-160uv is barely finished and the ink does not fully cure. Plus, like the Zephyr, the Mimaki is primarily for roll to roll. The GCC is primarily for both: flat rigid and roll to roll.

273. What aspects of the selected printer help decide in its favor?
The printshop that I visited in Germany selected the GCC StellarJET 183UVK because it cost less than other UV printers and because he had always received good advice and productive printers previously from the German distributor (AZON Germany).

SUMMARY: Image Quality Issues: Banding

274. Is there banding in areas of solid black?
There is faint banding in uni-directional mode so this is not cure banding. But the average viewer would never notice this banding because it is so faint. I have seen UV printers that cost $270,000 with worse banding than the GCC.

275. How can banding be avoided?
More passes tend to get rid of banding on almost any and all inkjet printers. Of course it helps if the machine is precision engineered so you don't get much banding at four passes and above. Banding at two passes is normal. You can eliminate pass-overlap banding by using an interweaving technique (which Mutoh developed and now Roland and others have copied). More and more brands are either copying the Mutoh concept or developing something similar themselves.

Since there are two kinds of banding: cure banding and rate-of-feeding banding, this question is not easy to answer. But for feeding banding, the GCC has a control that you can use even during the printing. If you notice a bit of light banding or dark banding you can "dial it out" to some degree.

SUMMARY: Image Quality Issues: General

276. Is text sharp or fuzzy? What is the smallest text that you can easily read?
The first thing I noticed about the output is that the text was not as fuzzy as text produced by most other entry-level printers. Indeed there was no edge-shadow (overspray that is clearly visible). You would need a loupe to see any overspray. I would rate this precision as being as good as a printer in the $150,000 price range.

277. Can the system produce glossy finish? To what degree is surface glossiness an issue? Can you select glossy or matte or do you get what the system provides and that is all? If you get only one, or the other, which is it you get?
This particular ink is not especially matte.

278. 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

279. Are you satisfied with this printer to the point that you would recommend it to someone else?
I would not waste my time spending days inspecting this printer and weeks preparing this report if I did not find that this printer had merit.

280. If so, why would you recommend that others buy this same printer?
There are four stages to a FLAAR evaluation:

- "first look" at major international trade shows
- demo room testing,
- factory visit,
- and site-visit case study in a printshop.

I have accomplished three of these: only missing is doing extensive printing with this machine myself, with my own images. But what counts the most is having inspected the GCC 183UVK inside a printshop where it was being used the entire time that I was there.

Conclusions

Positive Features

The list of hazards (pinching your fingers, impact from moving parts), is better done in the GCC manual than in many other manuals.

As an example of the fact that GCC works hard to produce practical printers is that they include a power line conditioner (to keep out spikes coming from your local electricity). This feature is an asset.

The printer can handle relatively thick materials for an entry-level printer.

GCC in Taiwan produces a more satisfactory product than other cheaper brands. Every aspect of the printer design is clear and neat. There is no clutter, no half-thought out features; nothing stuck on as an after-thought. There do not appear to be any jerry-rigged parts.

The GCC spec sheet is honest about the speed. They do not claim unrealistic speeds.

The model 183UV has a real computer monitor, not a wimpy LCD display of only four lines. The inadequate LCD display is a constant negative point of Mimaki printers.

Everything that is displayed on the monitor is user friendly. From what I saw it is entirely "American." The monitor messages and interaction with the end-user for the ColorSpan 5400uv series is one of that printers best features. I would rate the GCC as comparable or possibly better (I would need to sit and use both printers a few days to compare them, a luxury of time that does not exist in my life).

The voltage regulator is an added feature that is missing from even UV printers that cost over $150,000. No voltage regulator would be expected on any printer under 100,000 Euros at all. This printer has one and the entire system including options, costs 80,000 Euros. GCC provides a Power EX-AUR; AUV = Automatic Voltage Regulator. This professional size unit offers Stabilizer, Power Conditioner and Surge Supression.

There is a better system of wheels than any entry-level UV printer, indeed the wheels are as good as those I have seen on $150,000+ printers.

This printer is one of the few entry-level UV printers that can handle white ink.

Same with the leveling devices; there are adequate number, especially if you also order the optional roll-fed system.

This system does not require constant purging. Actually the printshop owner says his GCC can run all day without needing a purge. And, when you do purge in the morning, it is easy. Plus GCC has cleverly developed a tray system that is ingenious. I have not yet noticed any other company that made cleaning their printheads so easy.

In general I would compliment the manufacturer on having made a simple straight-forward printer. The advantage is the lack of complexity which primarily invites things to go wrong. A complex printer (complex electronics, complex mechanics, complex anything) tends to get out of synch during initial shipment from the factory to the client. This was one problem with the hybrid UV printers that are now abandoned in Guatemala: their complex electronics and mechanics probably shook out of place during shipment.

I would rate the “lemon yellow” on this ink set the best lemon yellow I have seen. Yellow was not a good feature of the ColorSpan ink set; its yellows used to be “dirty.” Now that ColorSpan is, I assume, using HP ink from South Africa I would need to recheck its yellow colors.

The ink used in this GCC printer does not have the awful smell that one or two other brands have. Yes, you can smell all brands of UV ink, but one other brand is infamous for its awful odor.

The optional tables are well constructed and not cheap after-throughts (as are tables on some other cheap hybrid printers). The only downside of the tables is the lack of support at the corners.

The “half” table that comes with the printer cleverly folds up onto the front of the printer. One of the roller bars on this folded table now serves as part of the roll-to-roll system. So the table serves one purpose when it is up (it supports thick flat materials). When folded up it helps with the roll-feeding. Very clever.

What to me was noteworthy of the printshop where I inspected the GCC was that they are an offset printing company and also have two screen printing machines. The month before I inspected a different brand of UV-curable flatbed printer in a printshop in Chicago. They had screen printing and offset printers in the same building. In early winter 2008 I inspected two UV curable printers in Hamburg: this was a screen printing company.

In other words, owners of screen printing companies are gradually recognizing that they need to buy a UV-curable hybrid-flatbed, combo-flatbed, or dedicated flatbed printer.

Downsides

This printer progressed slowly from alpha stage to beta stage to final stage, but it has been in a final (current) stage since 2008. In other words, the printer is now ready. It is better that a printer have a long gestation period than it be pushed on end-users before it is finished. The printer is now finished.

No hood; so no control over misting or ozone. Gandinnovations, Mimaki, and ColorSpan have all changed their designs to include hoods or enclosures (for safety). So it's not a good idea to continue with an open unhooded design. Absence of a hood and thereby no way to easily hook up a direct ventilation duct system is a drawback of any open system: ColorSpan 72UVR, 72UVX, Dilli Neo Titan, Agfa :Anapurna M, GCC StellarJET 183UV, and comparable unhooded designs.

Oce tried to make a UV-curable inkjet printer for $40,000, and it failed (it simply costs more than this to make a good UV-curing wide format printer). So even a printer at under $100,000 needs to omit features that are present on printers costing over $100,000. So on an $80,000 printer you need to handle flush solution with a syringe, by hand. With a $150,000 system flush solution is added by turning a valve. With a $350,000 system you hope that flushing the printheads is automatic and done from firmware on the keyboard or LCD touch screen.

Most of the downsides that we noticed two years ago have been fixed with improvements based on feedback from end-users and from distributors in Europe.

The owner of the 183 in Germany suggested: that for the fans at the back left, have their air diverted to blow down to the floor or out to the right, but not straight ahead and not to the left. This is because the air to the left or straight blows right in your face if you are the operator.

When you raise the pinch rollers, or have the pinch rollers high because you are printing on thick material, you have to be careful about sending the carriage back to the service station, because the carriage will hit the raised pinch rollers. There needs to be an alarm or a warning to avoid this situation to begin with. But one thing I will say about the printer, it recovered immediately from the crash once the operator lowered the pinch rollers.

The owner suggested that a larger hard drive in the printer would be good because if you have to RIP one file multiple times, by the 21st time the system can't handle it any more (I would be curious to know whether Caldera could do better here, or whether it is entirely a limitation of the hard drive).

So the list of downsides is short. I will seek additional information as it becomes possible to speak with more end-users but the printer in the German printshop was doing fine.

Comments & Suggestions

The printers from GCC appear better made than any hybrid UV printers from Mainland China. But it's a tough competitive market around the world: there are more than 40 manufacturers (not counting the Chinese companies that don't yet exhibit outside China). There are over one hundred models of UV printers that printshops can select from (if you include models from earlier years).

The staff of GCC at every booth have been helpful, both in Europe and in the US. As the printer gets more features, FLAAR had updated the evaluation. The printer in 2007 definitely looked better than the earlier version in 2006, but we would need to undertake site-visit case studies to learn how the printer is holding-up in real-world usage in printshops in Europe and in the US before we can make any recommendation.

For the StellarJET 250UV it was possible to see this in a successful printshop (printing on ceramic tiles; the output was the best on tiles that I have seen from any other printer in the world). So it was easier to write the report on the model 250UV. But now in 2009 it has been possible also to scrutinize the model 183 UVK in a printhshop, and it is so much more realistic to understand a printer out in the real world.

Appendix A Site-Visit Case Study

During January 2009 it was possible to visit a German printshop that had a 183UVK printer. They had bought the printer from Azon Germany but were also a client of IGEPA (a vendor of inkjet media in Germany).

This printshop company, Scholz Druck, also has a Mimaki JV3-160 that they are very happy with. Scholz also has an HP 3000 which is no longer used, and an Epson 7600 as a proofer for their offset press.

This company is content with their UV-cured inkjet printer and with the dealer(s): Azon Germany and IGEPA. They tend to get their substrates from IGEPA. They receive all training and tech support from their German distributor (Azon). They have no direct contact with GCC in Taiwan because their local dealer takes good care of them. Since Scholz Druck had previously bought a Mimaki JV3 from Azon, they tend to listen to what they have to offer. They went to DRUPA, but primarily to buy and sell their offset printers.

They believe that Azon may have one GCC actually at work in a printshop owned by one of the Azon partners. If so, this would explain why Azon feels confident with this printer. Indeed when I was at VISCOM Germany, in the Azon Germany booth, they expressed confidence in this printer.

Most recently updated February, 2009, after spending a day inspecting a GCC 183UVK with white ink in an offset printing company near Würzburg, Germany.

Previously updated May 2007. Updated January 2008 after spending several days at the GCC factory in Taiwan in December 2007.

Appendix B Site-Visit Case Study

Scholz Druck GmbH has both offset and screen printing equipment. The two screen printing machines were in the adjacent building, and I did not take my camera over there. But here is one of the two offset printers that they already have. This is typical of a commercial printer to be adding a UV-curable hybrid, combo, or dedicated flatbed inkjet printer.

Schnepfenbach is a picturesque rural farming community near Dettelbach, which is so pretty with its church and winding typically Middle Age streets and creeks flowing under archways that I wished I was not busy inspecting printshops. Here are chickens doing their best to survive the winter chill next door to the printing company.

Here is the new Ryobi offset press that was being installed the day I was inspecting the GCC UV printer.

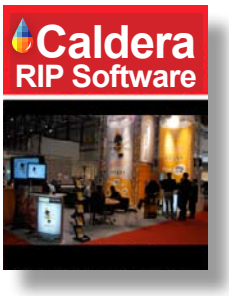
Instead of spending tons of money on a Zund or Kongsberg XY cutting table, instead he got a more reasonably priced vertical cutter. The brand we know the best is Keencut; I believe the one here is Fletcher-Terry.

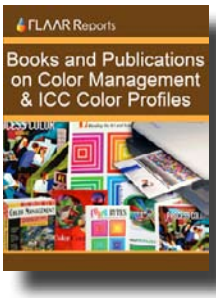
View of the village of Schnepfenbach, Germany.

Last year I traveled about 400,000 km by plane and hundreds of kilometers by train to reach printshops, printer manufacturing factories, ink labs, R&D facilities to learn about wide-format inkjet technology. Here is the train station in Wurzburg.

Sometimes you get a surprise. I was instructed to take a train to "Dettlebach." But when I got to "Dettlebach" there was no train station, no town, and no public telephone. Plus the adjacent hotel and restaurant were abandoned! Ouch. Especially with jet lag. Fortunately I can speak Deutsch and fortunately my quad-band cell phone decided to function, so I was able to wrangle a ride to the village several kilometers away.

As you can see, the train dropped me off in the middle of fields. Well, it was not too cold, and it stopped raining long enough for me to wait the half-hour to find a ride to the actual village (which in turn was a fair distance from the next village where the printshop was, which had no hotel). But I like quaint villages and everyone was friendly and I enjoyed the entire time I was in Germany. I learned a lot at the printshop the next day.





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).

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

Update Policy

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

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

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

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

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

Please Note

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

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

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

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

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

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

Citing and Crediting

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

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

The material in this report is not only copyright, it is also based on years of research. Therefore if you cite or quote a pertinent section, please provide a proper credit, which would be minimally "Nicholas Hellmuth, year, www.FLAAR.org." If the quote is more than a few words then academic tradition would expect that a footnote or entry in your bibliography would reference the complete title. Publisher would be www.FLAAR.org.

If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to license the report

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

Legal notice

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

Advisory

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

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

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

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

Equally often, what at first might be blamed on a bad product, often turns out to be a need of more operator experience and training. More often than not, after learning more about the product it becomes possible to produce what it was intended to produce. For this reason it is crucial for the FLAAR team and their university colleagues to interact with the manufacturer's training center and technicians, so we know more about a hardware or software. Our evaluations go through a process of acquiring documentation from a wide range of resources and these naturally include the manufacturer itself. Obviously we take their viewpoints with a grain of salt but often we learn tips that are worthy of being passed along.

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

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

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

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.

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 15 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 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, Raster Printers (Rastek), DEC LexJet, DigiFab, Barbieri electronic, Mutoh Europe, IP&I, Dilli, Yuhan-Kimberly, InkWin, GCC, Grapo, Durst, Teckwin and Zund for providing funds so that we can make more of our publications free to end-users. During 2000-2001 we had grants to cover all the costs of our publications, and all FLAAR Reports were free in those early years. As that early grant naturally expired after a few years, we had to begin charging for some of our reports to cover costs. 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.

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

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

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

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

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

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

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

Some of the media provided to us failed miserably. Three printers failed to meet common sense usability and printability standards as well (HP 1055, one older desktop model (HP Color Pro GA), and

one Epson). Yet we know other users who had better results; maybe ours came down the assembly line on a Monday or Friday afternoon, when workers were not attentive. One costly color management software package was judged “incapable” by two reviewers (one from the university; second was an outside user who had made the mistake of buying this package).

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

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

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

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

Grant funding, sponsorship, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. We receive support from three manufacturers of thermal printheads (Canon, ColorSpan and HP) and also have multiple printers from three manufacturers of piezo printers (Epson, 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.

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

Contributions, grants, sponsorships, and funding for surveys, studies and research is, however, open to a company who has an accepted standing in the industry. It is helpful if the company has a visible presence at leading trade shows and can provide references from both end users and from within the industry. Where possible we prefer to visit the company in person or at least check them out at a trade show. Obviously the product needs to have a proven track record too. Competing companies are equally encouraged to support the FLAAR system. We feel that readers deserve to have access to competing information. Competition is the cornerstone of American individualism and technological advancement.

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

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

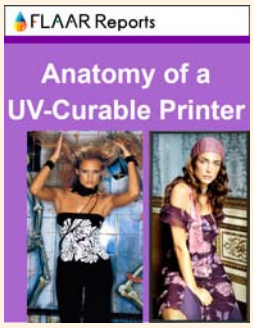
A modest portion of our income comes from our readers who purchase the FLAAR series. All income helps continue our tradition of independent evaluations and reviews of inkjet printers, RIPs, media, and inks.

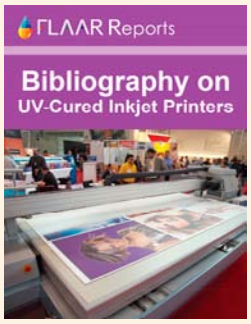
These are some of the most

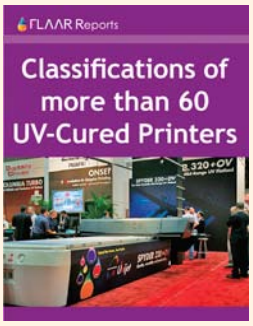
Recent FLAAR Reports (2007-2009)

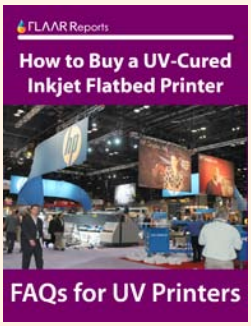
You can find these and more reports at: www.wide-format-printers.NET

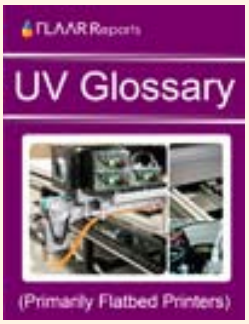
Introduction to UV Curable Inkjet Flatbed Printers

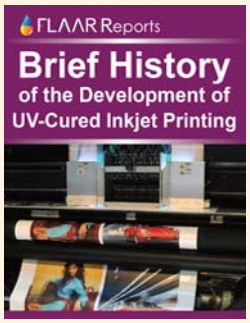


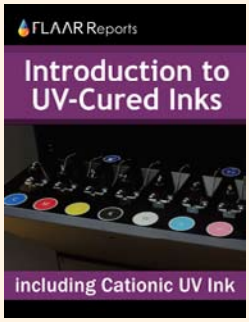




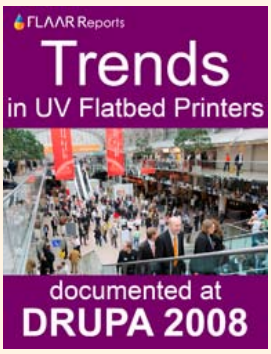








Comments on UV Inkjet Printers at Major Trade Shows 2007-2009



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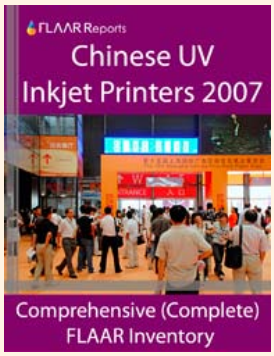
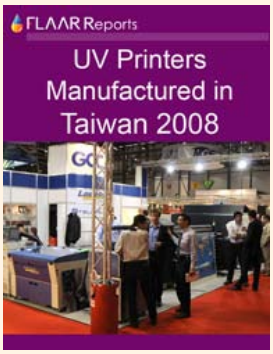
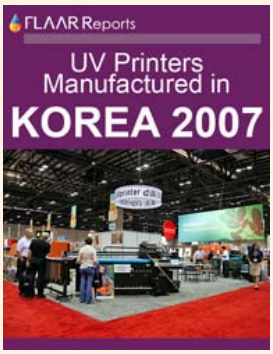
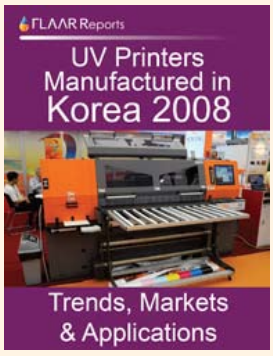
UV Printers Manufactured in China, Korea and Taiwan









Most recent UV Printers