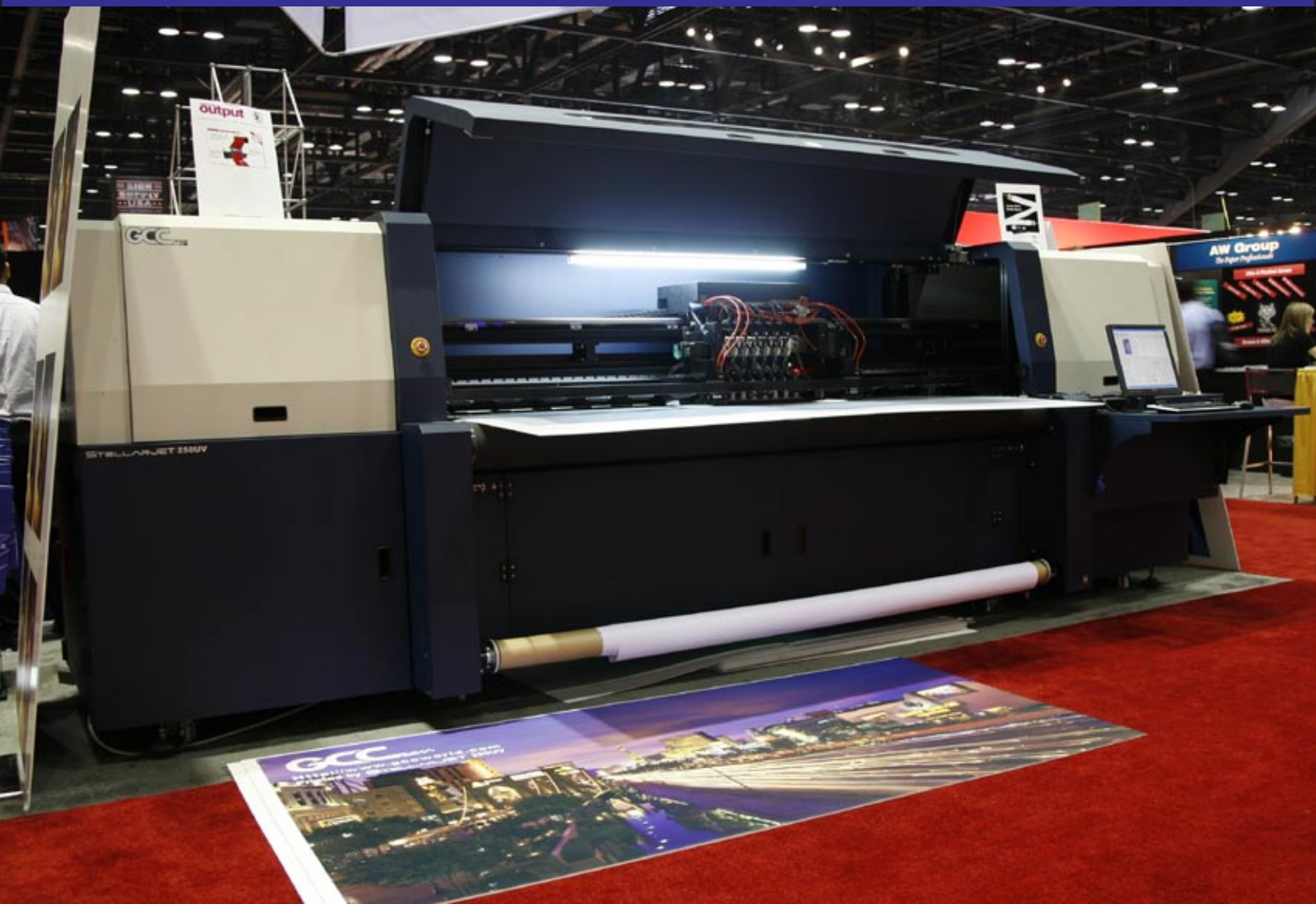
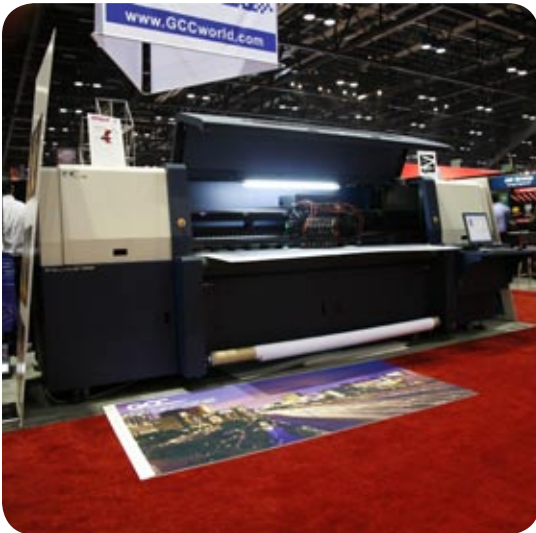


# GCC StellarJet 250 UV





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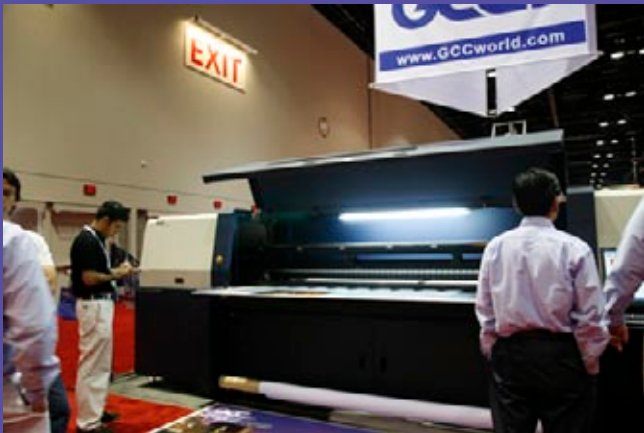
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# INTRODUCTION



During December 2007 it was possible to visit a sophisticated printshop in Taiwan where they were printing on ceramic tiles of diverse kinds. This atelier was quite advanced and had its own primer formula for pre-coating the ceramic tiles.

The results were gorgeous, about the best UV-curable prints on tiles that I have seen anywhere. Thus I felt it was worthwhile to update this entire FLAAR Report on that printer: the GCC Stellar Jet 250 UV. As part of this update I dedicated several days to visiting the GCC world headquarters in Taipei.

Experience has taught me that capable people can make most printers work well; but that lack of understanding and lack of maintenance are what cause about 50% of the “I don’t like this printer” or “this printer is not acceptable” problems.

The owners, managers, and operator of the GCC Stellar Jet 250 UV printer in Taiwan are at a professional level of experience and innovation that allows them to produce such eye-catching results. Frankly I would like to decorate major sections of my home and office with prints from this printshop. The photographs were taken with a 30+ megapixel Phase One digital camera and the GCC printer was able to reproduce them at high quality. I would not want my photographs, of 30+ megapixel quality, to be reproduced by any so-so UV printer. A really good photograph deserves a printer that can handle the quality in the digital capture.

Please realize that these exceptional quality images are based on sophisticated pre-priming chemicals, developed independently by the printshop in Taiwan. But if you wish to have these same pre-priming coatings, just ask GCC and perhaps they can produce them at reasonable cost.

## THE BASICS

### **1. Brand name, model?**

At ISA 2005 an early version of the printer was called the GCC Stellar Jet 200 UV. The printer itself said “GCC” on one side of the front and “IRIS” on the other side. Two were constructed, and then the width was extended to 2.5 meters so the name was changed to Stellar Jet 250 UV.

In late July 2005 we received correspondence from GCC headquarters in Taiwan. They sent us a brand new 2-page spec sheet (one page, two sides) that introduced the newer model, the Stellar Jet 250 UV.

At Viscom Düsseldorf (October 2005) a much larger catalog was available: 12 pages. This same brochure is the one used at Graphics of the Americas 2006. The brochure is fully professional, is friendly, and makes a good impression.

I have subsequently inspected this GCC printer at many other trade shows around the world, and recently spent several days at the factory doing a more intense inspection inside and out.



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

Each model of GCC printer comes in one width only.

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

GCC has offices in Taiwan and China. But the UV-curable printer is made entirely in Taiwan. It is only one model of the GCC laser cutters that are made in China. This Taiwan company has no relationship that we are aware of with GCC Tech that makes laser printers outside Boston.

GCC lists an office in California and in The Netherlands. Their website is [www.gccworld.com](http://www.gccworld.com).

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

We are not immediately familiar with any printers on the same chassis. If you just looked at the printer quickly, from the overall size it reminds me of a Creon Azero printer. But Hypernics made the Creon and Hypernics went out of business in 2004.

Other printers of comparable size and similar overall design would be the Dilli NeoPlus, the rebranded Agfa and Mutoh that are from Dilli, and the IP&I Cube 260.

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

I am not aware of any OEM versions of this printer.

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

At ISA 2005 the printer was still under development. The attendant at ISA 2005 said the machine was a prototype that would be ready August or September. The printer at GoA (February 2006) appeared more mature. It has been shipping in Japan since September 2005.

Today (2008) the printer is long out of beta stage.

**7. List price?**

The attendant at ISA 2005 indicated the price would be \$100,000, which makes this competition for the well established Zünd 215 series. The attendant at GoA 2006 gave the price as \$200,000. This price range is a hard sell because of the many printers at a lower price and the several better known printers at a higher price (Durst, Gandy, etc).

For 2007-2008 the price is \$175,000.

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

A set of extension rollers is available. I assume they mean an extra table. The spec sheet does not indicate whether these rollers are for the front and back. Usually this kind of printer needs extra table space at both the front and the back.

**9. 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?**

Yes, you get a complete set of ink (at least one liter per color). Actually the Accessories list shows that you receive 5 kg, which is more than a liter.

**10. What other equipment is needed to operate this printer? For example, does this printer include its own power line conditioner? Do you need an uninterruptible power supply (UPS)?**

GCC even includes a voltage stabilizer.

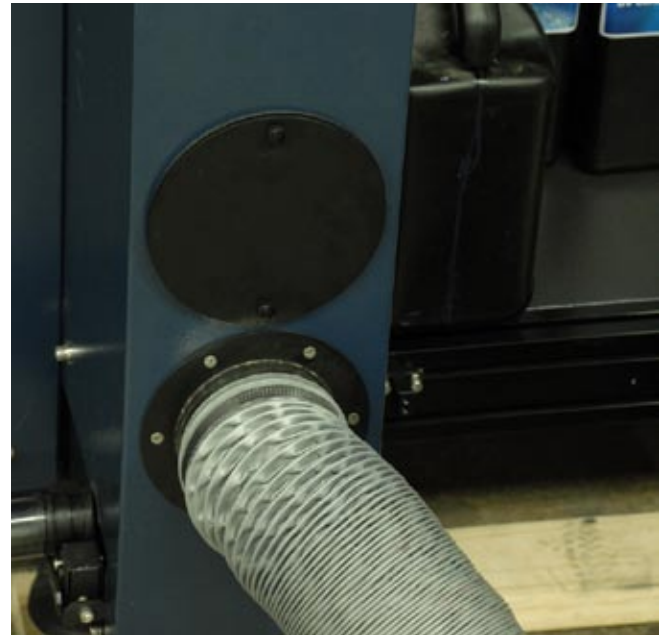
**11. Is an air suction system needed to be installed as a separate item, or is all the vacuum table or other vacuum requirements already included in the printer itself?**

GCC is one of the few companies that includes both a vacuum pump and an air compressor.

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

The end-user is not encouraged to take the printer apart and do repairs on their own.

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.



GCC Stellar Jet 250 UV vacuum

## PURCHASING

**13. 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?**

Dealers tend to be national. A few countries have more than one distributor: Italy has one distributor for the model 250 since most of their customers are looking for grand format solvent printers. The other Italian distributor is DPS; they sell primarily to small sign shops, so the GCC model 183 is more appropriate.

In Australia, Anitech is a distributor.

## STRUCTURE OF THE PRINTER: Vacuum

**14. Is a vacuum present? If there is a vacuum table, how many separate sections can you assign vacuum to?**

There are four vacuum sections. You can turn any off or on at will. This is a sophisticated feature.

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

Entry level printers use fans to create a vacuum; mid-level to high-end UV printers use air pumps (this is what the Stellar Jet 250UV uses).

**16. In how many sections?**

Four.

**17. Can you turn one or the other section(s) off and on?**

Can be operated individually.

**18. Just Off and On? Or variable?**

The control is a meter, so can be turned up or down, manually, with a control at the back.

**19. Are the vacuum areas (size and position) user definable?**

The current model has fixed areas but the new model will have variable control capability.

## STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path

**20. 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 combo style, with flatbed and roll-to-roll both.

**21. 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?**

GCC makes primarily UV-curable printers: not solvent printers. So this printer is from the ground up designed to handle UV-cured ink. One of many problems with most Chinese-made UV printers is that they are retrofitted solvent printers.

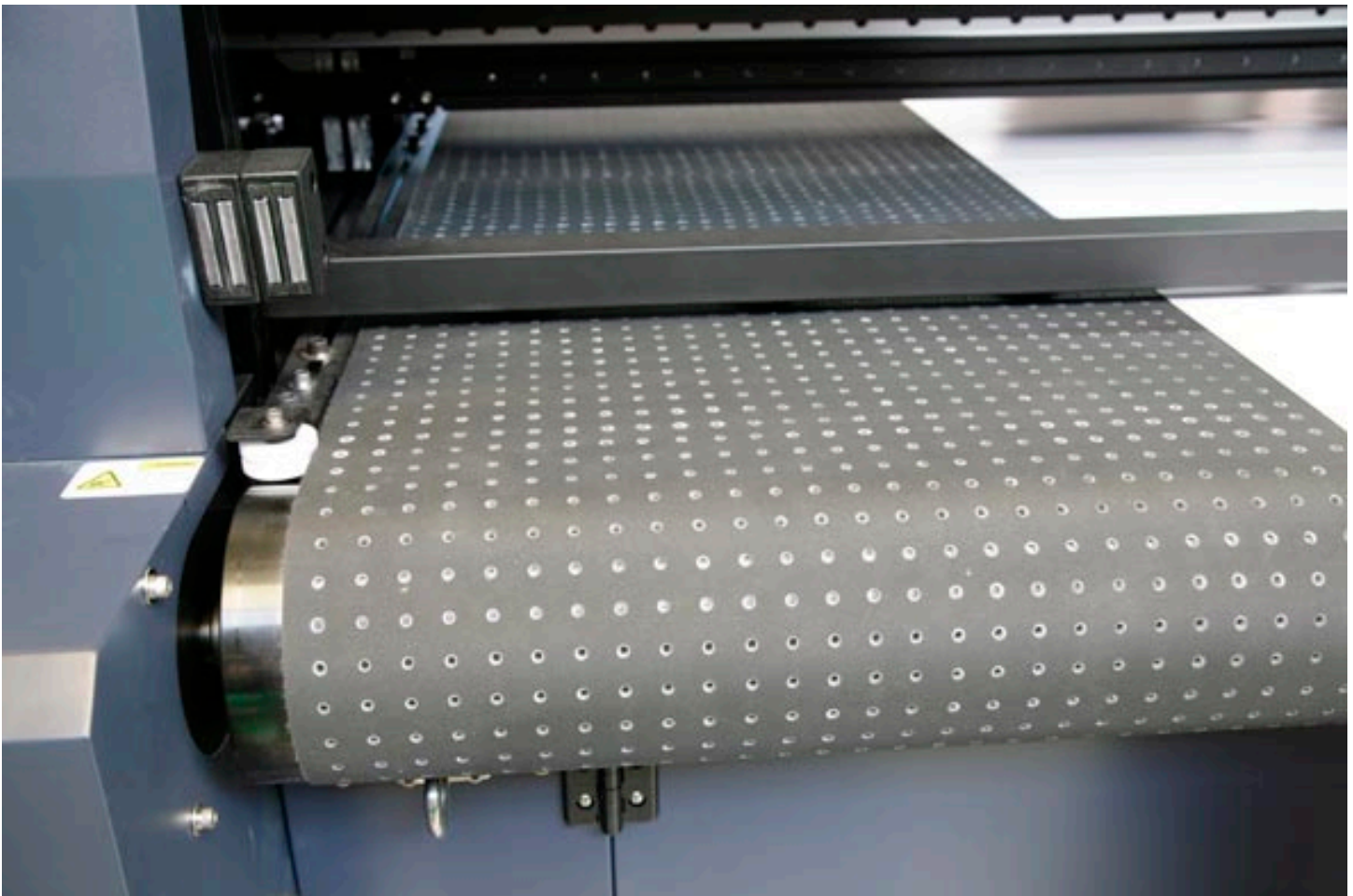
## STRUCTURE OF THE PRINTER: Transport Belt

**22. Describe the transport belt? What material? What manufacturer?**

As with several UV printer manufacturers, GCC continues to test belts from better manufacturers.

**23. What are the features of the platen area? Conveyor belt?**

A row of 14 widely spaced pinch rollers is present, but no grit rollers because the "platen" area is a moving transport belt. Most combo style UV printers don't include pinch rollers, but some do (at least one model of Durst Rho has pinch rollers).



GCC Stellar Jet 250 original transport belt

**24. How well does this belt hold up to heavy use? Does it skew?**

You can check this yourself to some degree by looking at the transport belt from either side. Have the lighting shine on the belt so that you can see the horizontal sections. What you want to see is whether the woven aspect of the belt remains straight, or whether it has shifted from stress and strain.

Several other UV printers have an infamous record of belts that may be so unstable that they “wander.” But the belts on GCC printers do not have this reputation; when I asked about one of their machines that I was inspecting in their test/demo facilities in Taiwan, they said it was two years without replacement. Naturally this will vary considerably depending on usage and how it is maintained.

But skew and replacement are two different issues. A belt can skew and not need replacement for several years. Replacing a belt does not necessarily eliminate skew: it’s the basic structure of some belt materials that lends to skew. As all manufacturers, GCC has suffered from transport belt skew from some brands and some materials. So they switch to belts that are less likely to skew. I commend GCC for openly commenting on this issue. Some UV printer manufacturers pretend that there is no way their belts could possibly cause skew (this is unrealistic at best, and deliberately misleading at worst).

But with even the combo belts that are considered acceptable, some materials will skew: depends on belt usage, wear-and-tear, on material weight and surface characteristics, etc.

**25. How many rollers control the belt: is the path of the belt horizontal, or triangular?**

There is one drive roller and one driven roller, as is the case on 95% of the UV printers.

You should expect at least one drive roller and one driven roller, one at the front the other at the back. In between is a rectangular horizontal vacuum bed, essentially the same kind of bed you get on a dedicated flatbed printer.

The IP&I Revo has three rollers; the IP&I Cube260uv has four rollers that control the transport belt. This adjustment and alignment control system on the IP&I Cube UV printers is the most sophisticated I have yet noticed.



GCC Stellar Jet 250 belt edge groove

**LINING UP FLAT MATERIAL (to help it feed straight)**

**26. Is a feeder-stacker option available?**

The only printers that call for a feeder-stacker are half-million dollar machines.

**27. What kinds of raised guide bars along the side of the table exist? Left or right? How long?**

There is a stop-bar at the input side, but there is no side guide bar. No scale is imprinted on the printer (hard to do if there is a movable transport belt).

**28. Is there a registration gate that is lowered across the back printing area?**

Most printshops report that most rigid media is crudely cut and rarely are



the edges really at 90° to each other. So you don't really want to align a corner, you want to align one side (on one end).

**29. Does the drop-down gate have special fixtures for placing or measuring position of materials that are set against it?**

Yes, there is a "gate" for aligning rigid materials.

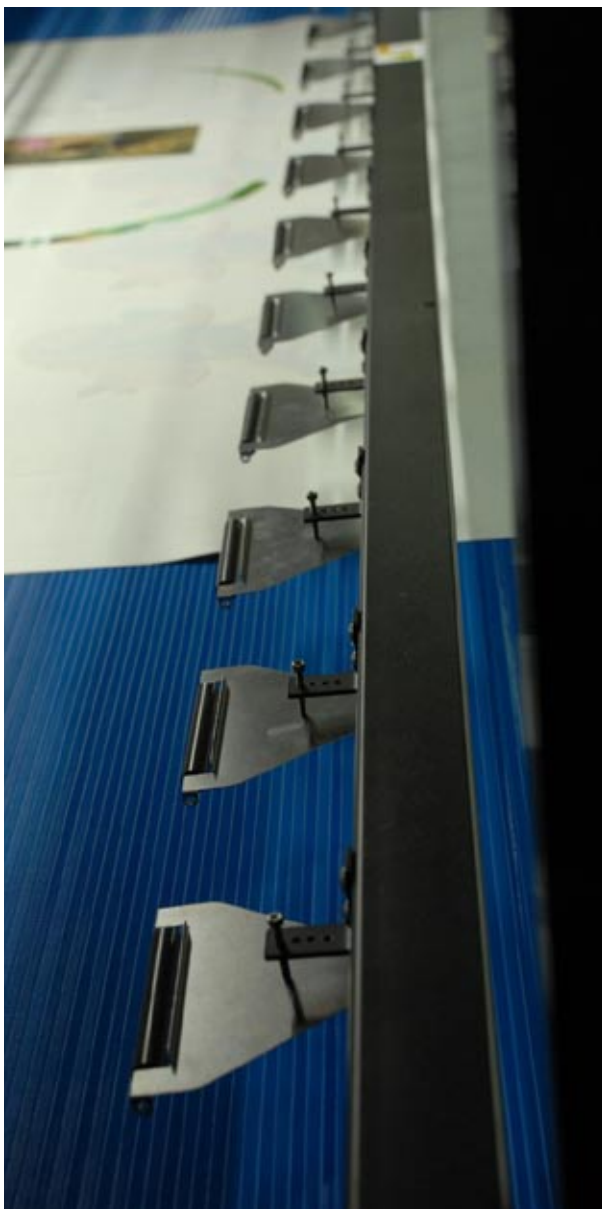
**FLATBED ASPECTS (for dedicated flatbeds)**

**30. Is pin registration present? How many pins? What is their position(s)?**

There is no pin registration on most mid-range combo printers. Usually it is only high-end dedicated flatbed printers that have pin registration.

This GCC printer has a stationary laser to show where the zero point is.

**ROLL-FED**



GCC StellarJet 250 pinch roller system

**31. 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.

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

Most mid-range inkjet printers use a spindle.

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

**33. 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.

**34. How is the roll media handled at feeding position? For example, is there a dancer bar? If there is no dancer bar, is there at least a tension bar?**

No dancer bar.

**35. What about the take-up reel? Does it work unattended?**

The take-up reel is a simple motorized system.

**36. Describe the overall path of the media through the system?**

The path is simple, which 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.



**37. How much media is wasted during loading and feeding?**

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

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

**38. 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.

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

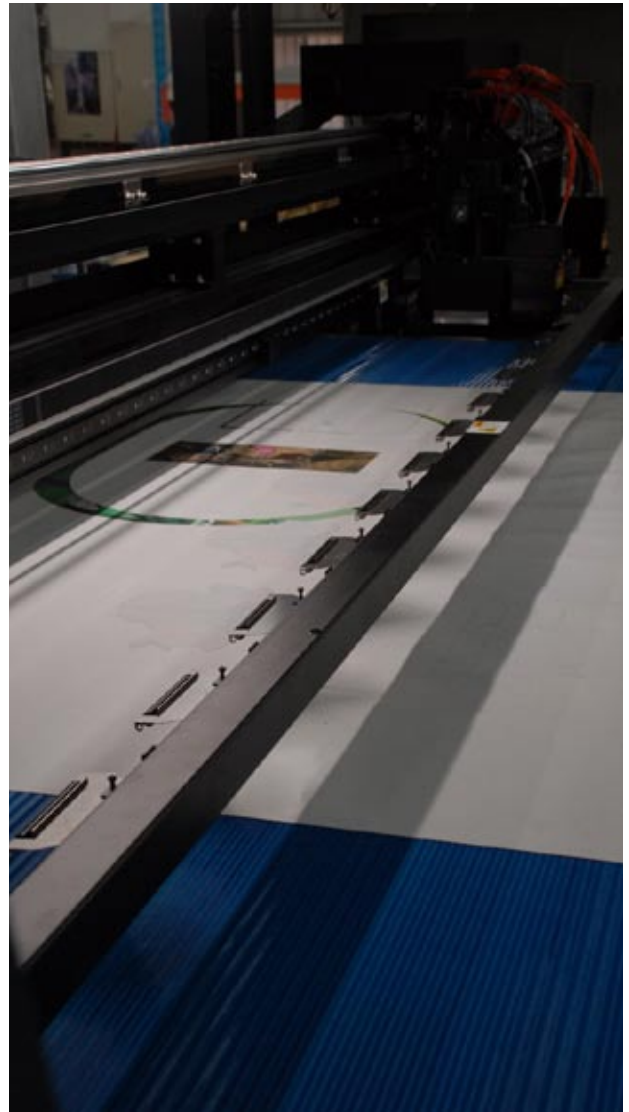
A trough is possible only on a printer with a fixed platen; there is no easy way to put a trough on a combo style printer. If you need to print on fabric or mesh with a UV combo printer you need a liner or you need to put an intermediate sheet onto the surface of the conveyor belt (or clean up the ink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

**40. Is there a cutter? Is it manual or automatic.**

Most combo-style 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.

**41. Is there a “knife guide,” a slot where you can draw your knife down and across the width of the substrate?**

Most combo-style printers have no area to put such a knife slot.



**STRUCTURE: Miscellaneous**

**42. Does the printer have levels built into the structure of the printer?**

I did not find any carpenter’s levels built into the structure of this 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.

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

There are eight leveling supports. These are independent of any wheels.

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.

**TABLES for Combo or Hybrid Flatbed**

**44. 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?***

The table is atypical. First, it is seemingly solid (no spaces between any roller bars). Second, it is very stubby, and integrated with the roll-to-roll system (rather than being separate). But until we have a site-visit case study or a demo-room inspection we can't judge any more about this.



## UPGRADES, Future Improvements?

### **45. What features are being added, or changed, further out in time?**

The newest version of this printer for 2008 will include

- KonicaMinolta printheads which are significantly higher quality than the Xaar heads
- Steel structure (chassis) instead of aluminum
- User-definable vacuum areas instead of pre-set areas.

## Miscellaneous

### **46. What moves:**

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

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

If flat and rigid, the material moves, initially fed atop the roller table; then gripped and fed by the printhead area mechanism as on a regular printer.

### **47. 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.

### **48. Is there a light inside when you open the hood?**

Yes, there is a light inside the hood. It can be turned off and on.



There is a light inside when you open the hood, it can be turned off and on

## OPERATING THE PRINTER

### **49. Do you get an LCD screen in the printer or a real computer monitor? How big is the screen or monitor?**

You get a real LCD screen.

### **50. Is the position of the LCD screen or monitor user-adaptable?**

Yes, you can adjust the LCD screen to some degree.

### **51. Can the keyboard be moved or is it fixed into the structure of the printer?**

Yes, to some degree you can move the keyboard.

### **52. What controls are on either end?**

At the left end of the printer there are no controls.

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

Not many printers have a foot pedal.

**54. Is there a pole with beacon lights?**

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



**CONSTRUCTION (BUILD QUALITY)**

**55. What is the solid-ness of the construction of the outer body? Is it plastic? Metal? Heavy gauge?**

The printer does not look cheap, shoddy, or low-bid.

**56. Is there both a front hood and a back hood?**

Yes, there is both a front hood and also a rear hood.

**57. Does the hood have a frame?**

In the front hood there is one long window; in the back hood there is no window.

**58. Is the frame plastic or metal?**

Metal: this is not a cheap plastic UV printer like some brands where all the parts are low-bid.

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

The construction is clean (like in Europe, Japan, and Korea). The construction is not flimsy, uneven or jerry-rigged as you see in many of the cheaper brands of Chinese-made printers. Indeed my notes state: "GCC StellarJet 250UV very neat and clean inside."

**60. Does the printer wobble back and forth when printing?**

No wobble.

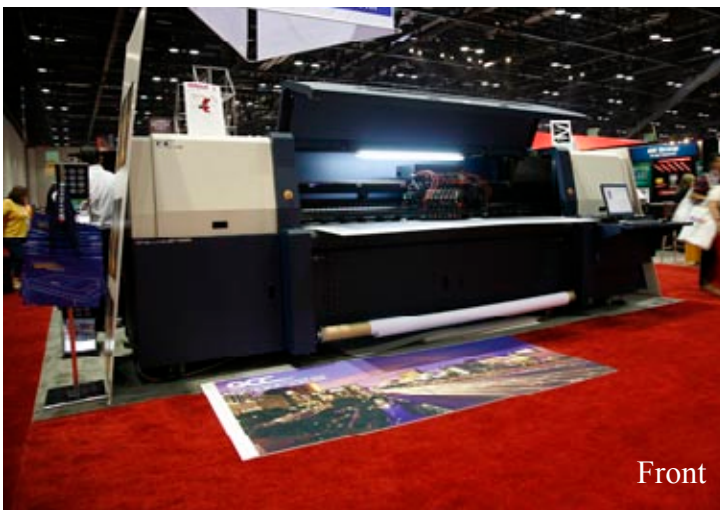
**AESTHETICS**

**61. How would you describe the design of the printer?**

The printer is attractively designed. This is not something made in a garage. GCC has been making CO2 laser engravers for many years and has plenty of experience designing machines.

**62. Can you easily distinguish which is the “front” and which is the “back”?**

Yes, you can tell the difference. 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.



**SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS**

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

Two months.

**64. What are the electrical requirements of this printer? This means, will the building have to be rewired.**

220-240 VAC, 15 A, 50/60 Hz, 4400 Watts.

**65. 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).

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

18 to 20 degrees C which is 65 to 85 degrees F, or same as the GCC model 183.

Temperature and humidity are indeed crucial. Even more important is that whatever temperature and humidity is present, that it not vary during the day: cool in morning, hot by 11 am. Hotter by 2 pm.

**67. 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.

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

10/100 Base T Ethernet.

**69. What air pressure is required to be provided to the printer? Is this for a vacuum table, or other purposes (such as ventilation)?**

An air pressure pump comes with the machine. Overall the accessories of this nature are impressive, since usually (with other brands) you have to scrounge around and get the air pressure system yourself.

**70. Realistically, how much surrounding and support space will the equipment need in addition to the machine's own footprint.**

Most UV-flatbed printers do not come with adequate table space. You also need adequate loading and unloading space on at least one side. If you are printing large heavy sheets of rigid material, then you will need one person on each side to lift the sheets on, and then off, the printer.

**71. What is the size and weight of the printer?**

	Width of materials	Length of printer	Height of printer	Depth of printer	Weight
Stellar Jet 200UV	78.74 in 2.0 meters	162.83 in 4.136m	62.72 in 1.593 m	65.75 in 1.67 m	2,204.62 1000 kg.
Stellar Jet 250UV	98.43 in 2.5 meters	194.4 in 4.938 m	65.94 in 1.675 m	58.27 in 1.48 m	2750 lb 1250 kg

	Hybrid or dual-use, pounds	Dedicated flatbed, pounds	Dedicated flatbed, kilograms	Hybrid, dual, kilograms
Dilli NeoPlus				1,200
DuPont Cromaprint 22 (Flora 2214),	3,307			1,500
Durst Rho 600	7,500			3,400
Gandinnovations		8,000		
GCC 250	2,750			1,250
Inca Columbia Turbo		8,800		
L&P average of various models				
Lüscher JetPrint			3,480	
Oce T220UV		2,300	1,043	
NUR Tempo		12,125	5,500	
Vutek 200	3,505			1,589
Zund 250				1,800

So the GCC weighs about the same as the Dilli NeoPlus.

**72. How many boxes arrive?**

Two boxes (crates) arrive: one for the body; one for the extension tables.

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

The forklift must accept over two tons and have a 2-meter long fork.

## INSTALLATION OF THE PRINTER

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

The User Manual is 80 pages long.

**75. Is there a glossary in the User's Manual?**

No, there is no glossary.

**76. What is the native language of these guides? Is the translation acceptable?**

The User Manual is in better English than even most manuals of some leading brands of Japanese printers. There are a few spelling errors (phonetically spelled, for example) but I have seen worse in writings by people whose original language is English.

**77. What kind of cut-away drawings or other drawings exist that show the various parts of the printer?**

The User Manual has a cut-away drawing that is more helpful than in most other brochures: it shows the actual printer (in a photograph, not just a drawing) and has all the cabinet doors removed so you can see inside.

**78. How many people are required to lift, move... the printer during installation? How many people do you need to provide for the installation?**

It takes four to six people to lift the lid of the shipping crate, so you need to have the appropriate number of helpers available for a few minutes.

## TRAINING

**79. Is training included in the purchase price? If so, what kind of training is offered?**

The brochure offers "GCC's comprehensive training courses and global technical support team." We would have to hear back from an actual installation whether this functioned as advertised.

If there is a global support team, they are not connected with the GCC telephone number that I called, twice, and twice left a voice message. No one seems to have been home that day.

**80. 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).

**81. Is classroom training available?**

No, classroom training is not common.

**82. 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.

**83. What on-line training is available?**

No, fewer than 5% of the UV printer manufacturers offer on-line training.

## TECH SUPPORT & WARRANTY

### **84. What is the original warranty period?**

1 year.

### **85. Does it include parts, labor, printheads?**

Printheads are included in the warranty for 6 months.

### **86. What training does my tech support person have? Is he factory trained? In what language? How many tech support people are available to cover the US (or Canada...)?**

The booth personnel at Graphics of the Americas spoke primarily Chinese.

## CLEANING & MAINTENANCE NEEDS



GCC StellarJet 250 Mante Service Area

### **87. How is head cleaning accomplished? Spray, vacuum, manual, other?**

Automatic purge and wipe (once you press the button in the software to tell the machine to do this cycle). The wiping is accomplished by a special patented dial.

### **88. 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?**

Purge is initiated in the software (unless for some reason you wish to, or need to, do a manual purge).



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

You can set the purge time in seconds; as well as set the number of passes before a purge is initiated.

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

If you wish to purge only one particular printhead, this you can do manually. If you wish to purge all heads at the same time, this is accomplished automatically (by instructing the printer to do this).

**91. Is there a capping station?**

In the software you press a button. This causes a tray to slide to the front, exposing the capping station.

**92. Where is the service area, at the left, or at the right?**

The service station is at the left.

**93. What is the nature of the service station?**

The service station lifts up.

**94. Where is the parking area, "home?"**

Parking is normally at the left. But for longer parking, a capping station is at the right.

**95. Is the service area the same as the parking area?**

The parking station is at the right. The maintenance station is at the left.

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

No, this particular model does not have a spitting function.

**97. Is a liquid flush cleaning solvent available as a separate on-board system?**

You must place the solvent into the ink line manually.

## MAINTENANCE

**98. What daily procedure is required at start up in the morning?**

- Open the valves
- Purge at the left
- Wait for temperature on the ink/printheads to rise
- Wait for the UV lamps to be ready

Then start printing.

**99. What part(s) of this printer need the most attention to avoid breakdown?**

UV lamps and printheads need the most attention. To preserve the heads you have to avoid contact with the materials being printed.

**100. How long can the printer sit unused?**

For three days without using the printer, purge out the white ink.

For a seven day period without being used, purge out all ink; then with syringe, fill the ink lines with flush.

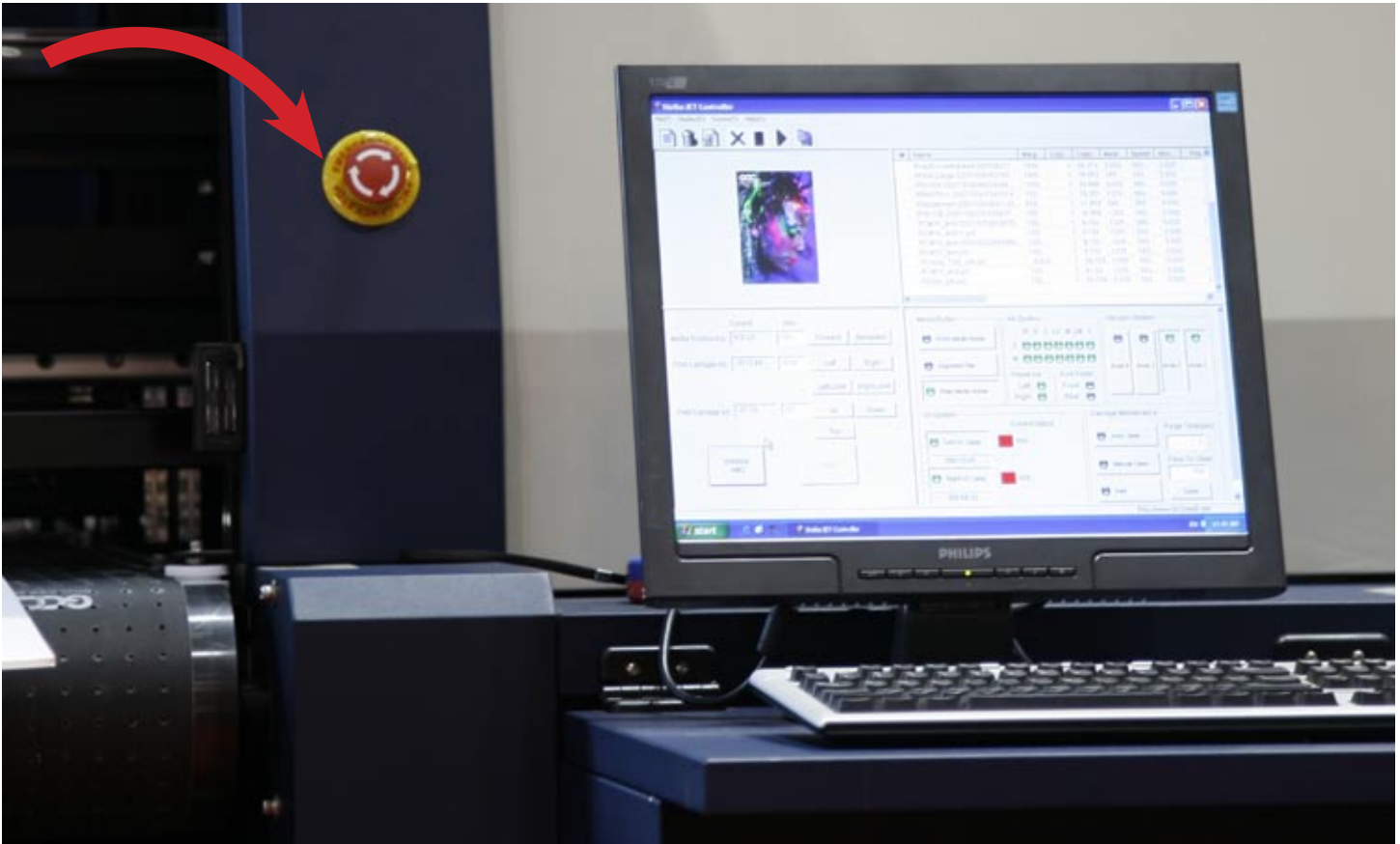
## SAFETY & HEALTH CONCERNS

**101. How is safety treated in the printed literature?**

The warnings in the User Manual are quite blunt (which is the way it should be). The hazards of UV ink are stated painfully clearly.

**102. How many emergency stop buttons are there? Where are they located?**

We can see two red emergency buttons on the front of the machine, one at each side. There are also two red emergency buttons on the back of the printer, in the normal and expected positions.



One of two front emergency buttons

**103. Is the machine enclosed, or exposed?**

This model is enclosed.

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

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

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

The skirt consists of flaps, but they are not overlapping.

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

Yes, there is the same kind of skirt across the back as there is across the front.

**107. 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?**

The advertising brochure shows only the enclosed unit; no feeder table is pictured front or back on the brochure handed out at SGIA. No vent is visible on the top of the printer.

We were told there is no vent opening for venting out the top; instead the machine vacuums the odors down. So far the most serious dedication to ventilation is by DuPont, on their CromaPrint 22uv: it has two large venting systems going up, one at each end.

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

There is no objectionable noise until the air-suction system starts; then there is a shrill noise.

**109. 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.

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

It has been suggested by other industry specialists that retina damage may become a concern, especially for open units. At least this unit is closed, but that still does not protect the eyes of operators if the UV lamp inside is not adequately shielded too.

## PRINTHEAD TECHNOLOGY

**111. Which brand printhead is used?**

Not a peep in the spec sheet about printheads. Nothing about what brand, what model, or even how many printheads. But when you ask you are immediately told Xaar 500. This is one of the last non-Chinese UV printer that uses Xaar printheads: the Zund 215 is no longer produced and even most GRAPO UV printers have switched to KonicaMinolta printheads.

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. Thus it is not a surprise that GCC is also testing these brands of printheads for possible future use.

**112. Which model of printhead is used**

Xaar XJ500 printheads are used in the original model.

**113. How many printheads per color?**

One per color.



**114. How many total number of printheads?**

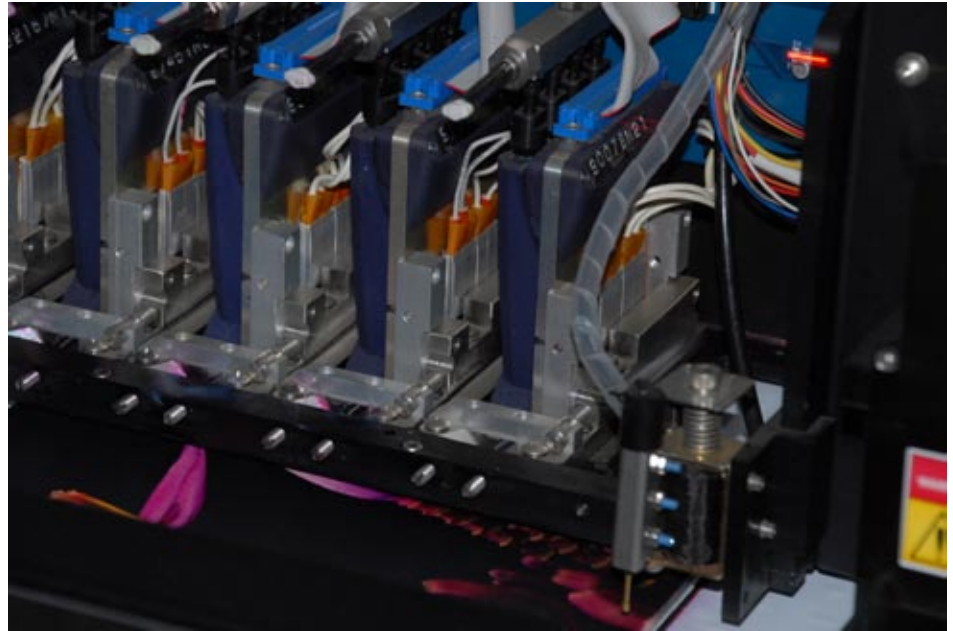
Seven printheads.

**PRINthead DPI & Features**
**115. What is the drop size in picoliters?**

The picoliters drop size of the ColorSpan and Raster Printers is 30 picoliters. I am not aware of any other company listing their picoliters drop size, which suggests that some of them are larger than 30. But when you ask about the drop size of the GCC you are told it is 40.

**116. 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 360 x 360. We assume this is the dpi based on several passes, but would have to check. If they would list the printhead make and model you could better estimate the true dpi of the machine.


**117. How many passes can this printer achieve?**

The original spec sheet listed 1 pass and 2 passes. In most other kinds of inkjet printers neither 1 pass nor 2 pass produces adequate quality. It usually takes 4 or 8 passes to achieve adequate quality.

The newer spec sheet does not list the number of passes, but if you ask you are told

- High-speed, 1 pass
- Normal quality, 2 pass
- High quality, 4 pass
- Highest quality, 8 pass

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

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

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

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

**Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING**
**119. Is printing bi-directional or uni-directional? What are the different results in speed; in quality?**

As with almost all UV printers, the sequence of colors laid down is one sequence printing from left to right and a different sequence when printing from right to left. Each sequence of mixing the colors results in a barely perceptible color difference, which is called bi-directional banding (which is also accentuated by the direction the ink falls as it is being solidified).

## PRINTHEAD Positioning

**120. Are the printheads in a straight row, or staggered?**

The printheads are parallel to each other and not staggered.

**121. Do you raise the heads manually, with click stops, or motorized?**

Motorized.

**122. How complex is the procedure to align the printheads?**

Alignment of the printheads both vertically and horizontally is clearly outlined in the User Manual.

## PRINTHEAD: Associated Features

**123. What is the firing frequency (voltage) of the printheads (in KHz)?**

8 KHz.

**124. Can the firing frequency be varied by the end-user?**

No.

**125. Is the negative pressure user variable?**

Yes.

**126. How is air eliminated from the ink lines or from the printheads?**

Purging is one way to eliminate air from the printheads. Eliminating air in more sophisticated manners gets expensive.

## PRINTHEAD Life Expectancy

**127. If this piezo head fails, who is responsible for paying for replacement heads?**

To answer this question you need to understand what are the most common causes of printhead failure. Then you need to check to see which of these causes of failure are covered by the warranty? Which causes of printhead failure are not covered by the warranty? Is there a limit to the number of printhead failures that are covered over a unit of time. You need to check your warranty in specific detail. Get it in writing, up front.

**128. How can head strikes be avoided?**

The GCC StellarJet 250uv has a bumper with a sensor to help avoid head strikes before they happen.

**129. What does each printhead cost to replace?**

Because each printhead is in a module, it costs \$3,000 to replace the entire module.

## SUBSTRATES

**130. Can this printer handle printer rigid material only, or roll-to-roll only, or both interchangeably?**

The printer can accept both flexible material and rigid material.

**131. What sizes of material can be printed on?**

Rigid material can be 43.31"; I assume this is length; the specs don't indicate. Elsewhere the spec sheet lists print width as 78.74" (2 meters).

The newer model 250UV accepts materials 2.5 meters wide (98.43"). The material can weigh up to 110.23 lbs (50 kg). When we asked in person the answer was 40 kg, but probably that is the model 200 rather than the wider model 250.

There is no specific maximum length for printability of roll material.



**132. 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.

**133. What about edge-to-edge printing (borderless)?**

Yes, prints edge-to-edge.

**134. If roll-to-roll, what core diameter(s) will this printer accept?**

3-inch core.

**135. Is roll-fed media loaded from the rear, top, or front?**

Rear loading, very simple.

**136. What is the media path?**

Path is simple; there is no dancing torsion bar. The “platen” area is a moving belt.

**137. 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 the fault of the printer but a result of the fact that each different kind of material feeds slightly differently.

**138. Can you adjust carriage speed?**

Yes, there are two speeds: 1120mm and 560mm. Naturally the lower speed provides better image quality.

**139. What thickness can this printer handle?**

The printer can accept rigid media up to 2 inches thick (5 cm).

**140. What materials does the manufacturer list?**

The new brochure for the model 250UV lists

- Rigid foam board
- Acrylic sheets
- Glass
- Wood
- Metal (Aluminum, steel)
- Carpet
- Leather
- Tile
- Flexible vinyl
- Textile (tarpaulin, canvas, banner cloth, etc).

This is a typical list for a spec sheet, of companies not just from Asia. The discrepancy with all these lists is the total lack of warning that although you obviously can jet ink onto any material, the real question is, will the ink stick.

Acrylic sheets and glass are the most troublesome.

Carpet has its own problems

When you buy an industrial printer like Océ or NUR, their Operator Manual gives all the warnings. Of course the logical question is why aren't these warnings handed out in advance.

These comments apply to most brands of UV-printers; this statement is not specific to GCC.



## SUBSTRATES, Issues

### ***141. What materials can this printer print on perfectly?***

- PVC
- Banner
- Vinyl
- Foamcore

### ***142. What materials can this printer not print on at all?***

Only a few UV-cured printers can print on mirrors (because a mirror reflects the UV-light up inside the printhead, causing the ink to solidify up inside the printhead).

### ***143. Can you print on mirrors?***

Yes.

### ***144. What exotic or atypical materials can you print on?***

A company in Turkey is printing on tiles for a Turkish bath. The steam, heat and changing temperatures are a challenge.

Another customer does ceiling tiles.

Another customer does ceramic tiles (I visited them; very impressive results).





**145. 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?**

To help lower heat there are several steps: control the energy of the UV lamps or change the position of the start of the print pass.

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

**146. 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.

Static electricity is a serious problem for UV-cured printers which is seldom discussed. The machine is grounded but has no specific anti-static bar.

GCC suggests using an anti-static brush rather than a corona gun to clean materials that are susceptible to excess static charges.

**147. 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).

## SUBSTRATES: Cleaning, Priming, Preparation

**148. Do you have to brush off or otherwise clean each sheet of incoming material by hand before you print on it?**

Generally yes. The need to clean incoming materials is typical of any printer. Some materials have more detritus or dust or issues than other materials. And some suppliers offer better materials than others.

**149. Which substrates must be or ought to be prepared before printing by being corona treated?**

I was told "no," yet when I visit print shops the operators say that corona treatment is indeed needed on some materials, for example on Coroplast. 90% of the booth managers and sales reps say no pre-treatment is needed. Yet I would not be surprised if over 50% of end-users disagreed and found, from experience, that some pre-treatment is needed.

**150. 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.

## SUBSTRATES: General Concerns

### **151. 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).

### **152. How well can this machine handle warped substrates? Obviously you don’t deliberately use warped material, but out of a shipment, at least a few sheets end up with some warp anyway. On the subject of substrates, you will also have to ask your supplier of printing material: “Can substrate suppliers guarantee their material is all the same identical thickness and surface consistency? If not, the print quality will vary depending on how close each sheet is to the expected specifications.**

Obviously you don’t deliberately use warped material, but out of a shipment, at least a few sheets end up with some warp anyway. On the subject of substrates, you will also have to ask your supplier of printing material: “Can substrate suppliers guarantee their material is all the same identical thickness and surface consistency? If not the print quality will vary depending on how close each sheet is to the expected specifications.

## APPLICATIONS

### **153. What are the applications listed by the manufacturer?**

Billboards, posters, signs,  
 Floor graphics  
 Floor tiles  
 Furniture  
 Material for handbags  
 Sunshades in large umbrella format over the tables for sidewalk cafes  
 Sails for sailboats  
 Surfboards  
 The booth personnel stress that this printer is made for producing signage.



### **154. 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.

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

Vehicle graphics; okay if adhesion and cleanser-resistance is adequate.

## INK

### **156. Is there a special ink for flexible material, and another ink for rigid material? What other inksets are available? Is there any choice in inks?**

Nothing about the ink whatsoever is mentioned in the spec sheet.

### **157. 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.

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

Seven colors: CMYK, Lc, Lm, White

**159. What is shelf life of the ink (CMYK)?**

Shelf life of the CMYK ink is about one year.

Shelf life of the ink depends on storage temperature.

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

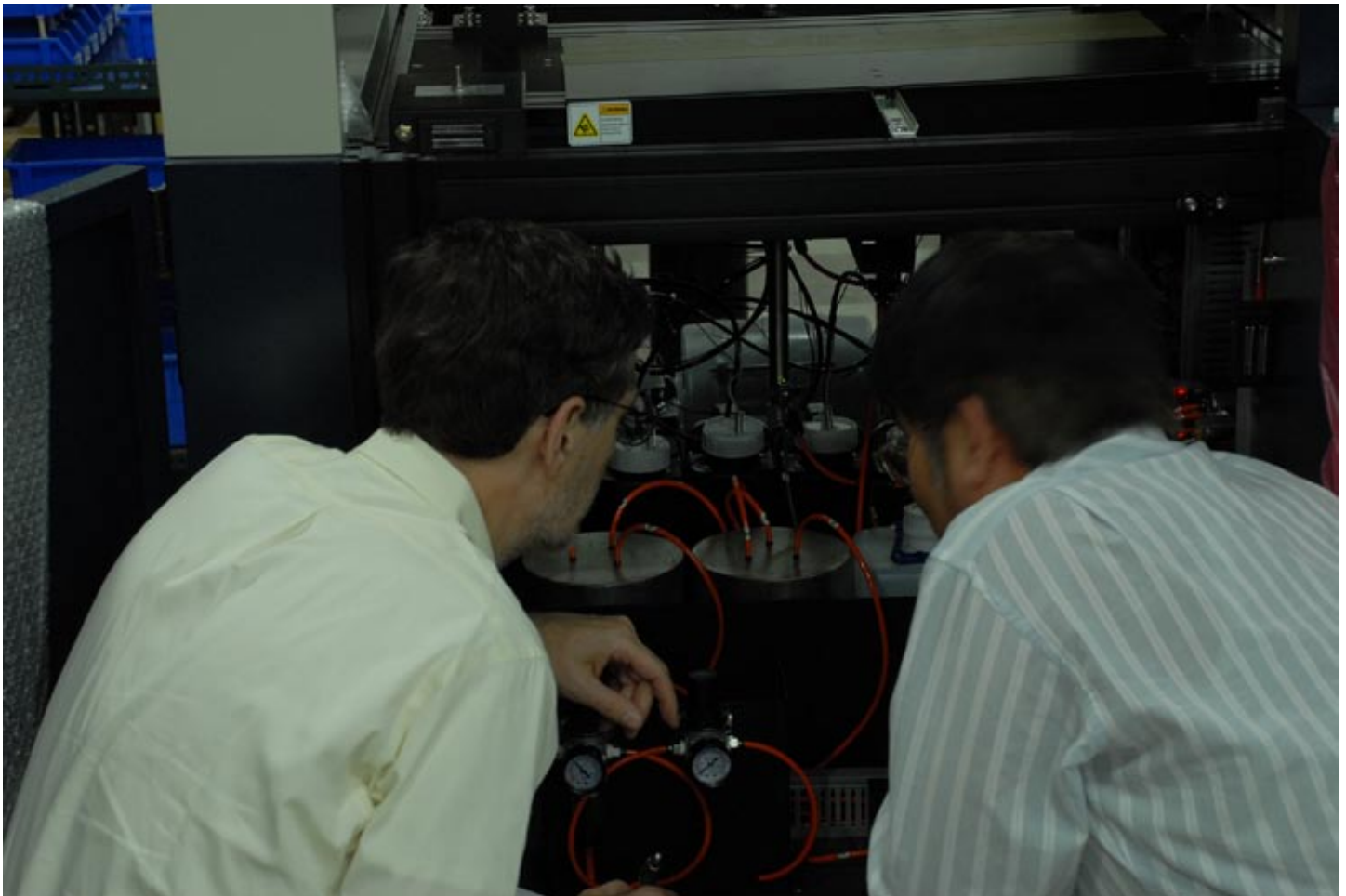
In the beginning they used Sericol ink but said they were considering switching to ink from Sun Chemical. During 2006 they said they "no longer use Sericol ink." Very interesting.

It turns out that the Sericol ink was for the Xaar heads. For the newer KonicaMinolta heads they will use Toyo UV ink.

GCC considers two kinds of ink: for flexible materials or for rigid materials. Most ink, however, is a compromise: one ink that is okay for both rigid or flexible materials, but not perfect for either.

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

The ink containers are in the front left lower area, behind the cupboard door in this area of the printer. Or, you could consider that this cabinet was at the right side of the back.



## INK: White & Varnish

### **162. Is white ink available?**

Yes white ink is available.

### **163. What is the sequence of printing the white ink? Can you print all white and then print colors on top?**

On the brochure they list printing white either as an undercoat (on clear acrylic) or as an overcoat (on glass).

### **164. Is the white ink opaque enough?**

The following is a general statement and is not directed at GCC, but is based on inspecting printshops that have white ink installed. The majority of printshops with white ink installed report that white ink has innumerable issues and is not as realistic to use in your printshop as it is portrayed in a trade show booth or a printer manufacturer demo room. I would not be convinced of the white ink of any company: whether European, US, or Japanese, until I have visited a print shop where it was functioning flawlessly over a several month period.

### **165. Is spot varnish available?**

"Varnish is in the planning stage."

## INK Cost

### **166. Does the refill container of ink come in cartridge, bottles or bulk? How large are the ink containers for this replacement ink?**

Ink is sold in a 5-kilo container. Cost is \$575 for the five kilos.

### **167. What is the cost per container? What is this cost translated to liters?**

Cost is \$575 for the five kilos. I was told that for a precise liter, cost is \$165 per liter.

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

Keeps track to notify you when ink is low, but does not keep track of how much you use per print.

### **169. How much ink is used to print a square unit?**

10cc to 13cc of ink per square meter. I was also told on a separate occasion that you can average this as about 11 cc of ink per square meter.

### **170. What is the cost, in ink, per square unit?**

Estimates are a cost of \$1.81 per square meter.

### **171. Where is waste ink collected? In a tray? In a bottle?**

Ink goes into a slide tray; the slide tray is at an angle. The ink goes into a hose at the end of the tray.

### **172. How much ink does the waste ink container hold?**

About five liters which is approximately one gallon.

### **173. How do you know when the waste container is full?**

A sensor detects the waste container is full, triggers an audible alarm and sends a message on the monitor.

### **174. Is there an out-of-ink alarm? Is there a warning before actually being out of ink?**

There is an audible alarm and a message on the monitor.

## INK: Supply System, Tubing, Filters, etc

### **175. How much ink does the ink container in the printer hold?**

5 liters per tank.

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

There is a main ink container and a sub-ink container. To add new ink you replace with the new ink container of five liters.

### **177. What is the situation with the ink gelling?**

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

### **178. What filters are on the ink system to trap particles or trap gelled ink?**

There is only one filter on each ink line.

### **179. Is there an issue with "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.

180. Has any misting or spray been reported? What about ink inside the machine parts?

During in depth inspecting while visiting a printshop with a StellarJet 250, and while in the demo rooms, I did not notice any evidence of misted ink.

## INK: Longevity

### **181. What about solvents such as cleaning solvents? Do they mar, dull, or wash away the ink or change the surface quality, especially on vehicle wrap?**

- Ammonia (in Windex and comparable cleaning liquids) (no problem)
- Soap and water with sponge (had not yet tried)

## INK Color Gamut

### **182. Which colors print best?**

My notes from ISA 2005 read: "reds okay but overall resolution looks weak. Color balance was poor."

My notes from GoA 2006 read:

Chrome, black, purple, blue, skin colors, cheese colors, browns were all very good.

Yellow was okay with no excess green.

Reds were a bit orange.

Magenta and pink were off color, as is typical of most UV-cured inks.

## THE UV CURING LAMPS

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

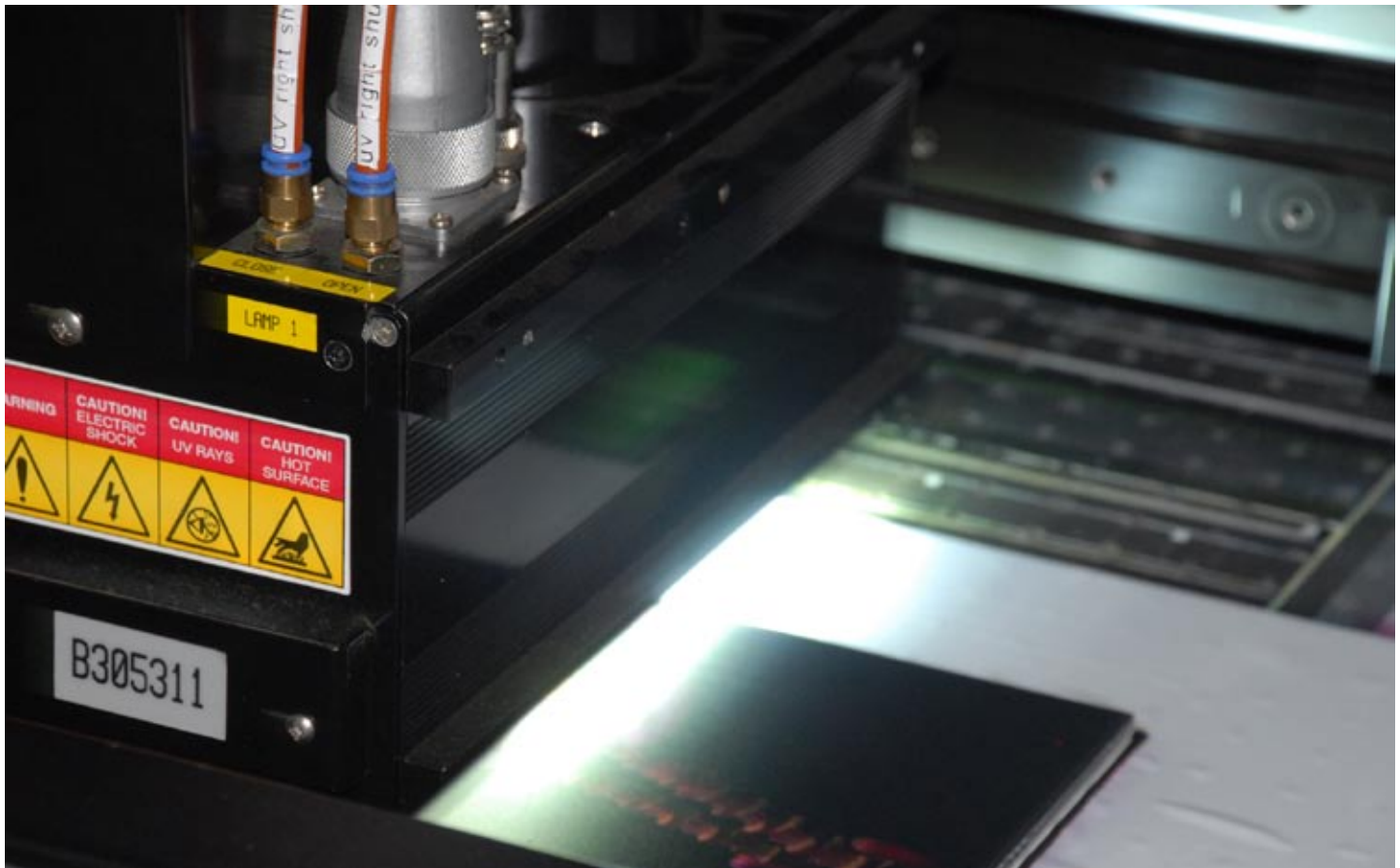
As usual, not any information whatsoever about the UV-curing technology is in the initial 1-page spec sheet. But when you ask you are told the lamps are mercury arc, as would be expected.

**184. How many watts are the lamps?**

The first time I asked I was told 1200 watts. At FESPA Digital I was told 250 watts, which seemed far too low. The actual wattage for the lamps used during 2007 is 1400 watts.

**185. What brand of lamp is used?**

A local Taiwan brand.

**186. How many lamps does the printer use?**

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

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

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

Lamps shut down if they overheat.

**188. 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.

**189. 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.

**190. How do you keep track of lamp-hours?**

There is a time checker.

**191. 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.

## UV LAMPS: Cooling

**192. Are there shutters?**

Yes, the lamps have shutters. 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.

**193. 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.

**194. How are the lamps cooled? Air? Fans? Water-cooled?**

Cooled with a fan.

**195. How many fans are there per lamp?**

Two fans per lamp.

**196. How many settings do the lamps have? Or are the fans just Off and On?**

Off, 50%, 75%, 100%, so three levels.

## UV LAMPS: Reflectors

**197. Do lamps have dichroic reflectors?**

GCC is experimenting with dichroic reflectors for possible future use. These reflectors lower the temperature of the lamp unit substantially.

## RIP SOFTWARE & Printer Software

**198. Which RIPs are featured?**

- Colorprint (a Chinese RIP)
- Onyx

Or another brand, depending on customer preferences. Some Europeans ask for ErgoSoft.

**199. Does the price of the printer include a RIP?**

A RIP is included. The RIP is not identified by name in the spec sheet. But when you ask you are told it is ColorPrint from Amiga Software. This same Chinese-American software is used by some other Asian printers.

Onyx PosterShop is available, at optional cost. Now (2006) they offer PhotoPrint RIP from SAI (Scanvec Amiable).

**200. Is a computer and monitor included (to run the RIP)?**

Since a RIP and monitor are included, and as a keyboard is pictured, it is logical that a computer is included also, inside the machine.

Normally you must buy your own separate computer to run the RIP if you want to RIP and print simultaneously.

**201. What kind of monitor is included with the printer's computer?**

A 17" computer monitor is included.

**COLOR MANAGEMENT FEATURES**

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

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

**PRODUCTIVITY & ROI (Return on Investment)**

**203. What productivity claims does the printer manufacturer made?**

**GCC StellarJet 250UV**

1 pass, High Speed	48 square meters	516.7 square feet per hour
2 pass, Normal Quality	24 square meters	258.3
4 pass, High Quality	12	129
8 pass, Highest Quality	6	65

This is a helpful chart compiled from the spec sheet but with the number of passes added from our interview. It is rare for a product spec sheet to come close to all aspects of what an inquisitive mind wishes to know.

I do not know any UV printer that can produce usable output at 1 pass.

I doubt most UV printers can produce usable output at 2 passes, but I am willing to check this in a future demo-room test.

4-pass would be what most clients would expect.

With Xaar printheads, you may have to go 8-pass to equal the output that ColorSpan can achieve with its Ricoh-Hitachi heads. Again, we need to do a more detailed examination in a demo-room. Trade shows are too hectic.

**204. 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.



## ADVERTISING CLAIMS:

### ***205. How does the actual printer compare with what was claimed in the ads?***

The ads suggest, "Buy now and start turning a profit." But this needs to be independently certified. In other words, FLAAR needs to find an actual print shop, that bought this printer, and then turned a profit. Encad tried advertising that its printer would produce an almost immediate profit. This can be misleading, and is best if removed completely.

The other aspect of their advertising is the laudatory dedication to customer care. But why then, for four months after ISA trade show, is there nothing on their website about this printer? When we see a prominent USA website (and a person to return Voice mail), and when we can do a site-visit case study and find a happy customer for this specific UV flatbed printer, then we will be glad to update these comments.

### ***206. 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.

### ***207. How often do people return this printer and say they want their money back?***

This is mainly with Chinese-made printers.

## GENERAL CONSIDERATIONS

### ***208. How many printers of this model are in use; in the USA; in the rest of the world?***

We consider this printer still in beta stage during 2005. By May 2006 GCC had sold one in Canada and 10 outside the USA. Today (2008) the GCC StellarJet 250uv is mature, indeed it's going into its second generation (with KonicaMinolta printheads and several other new features).

As of late 2007, 35 GCC UV printers had been sold, primarily in Australia and Europe.

## SUMMARY: Image Quality Issues: General

### ***209. What about satellite drops which cause edge splatter?***

The edges look relatively clean.

### ***210. 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?***

The identical image printed on the GCC 250 was matte on the GCC 250 and glossy on the GCC 183. But several factors impinge: first, some end-users prefer matte and dislike glossy. Indeed the Inca Spyder 150, which can produce only a high gloss finish, has sold poorly because screen printers say they don't like the gloss!. Most UV inks can produce only matte, or at best a semi-gloss. The other factor is that the test materials happened to be slightly different kinds of foam material. And, once the GCC changes from Xaar heads to KonicaMinolta or other heads, the ink will probably change as well.

### ***211. 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.

### ***212. What about abrasion (scratch) resistance? How susceptible is the ink to abrasion?***

The sample print they gave out, printed on a thick rigid board material (not foam board), was slightly abraded.

## CONCLUSIONS:

### Pros

You receive both a vacuum pump and an air compressor. On most other UV printers less than \$250,000 you have to buy or provide your own air compressor. On some UV printers you even have to buy your own vacuum pump. GCC even includes a voltage stabilizer.

The president of GCC has a PhD in mechanical engineering and is a specialist in servo control systems. Servo motors are more reliable than cheaper stepper motors used in lesser equipment.

GCC is capable of improving their printers when an issue occurs. Most larger manufacturers rarely make changes or improvements once a model is launched. Improvements are delayed until a completely new model comes out. But GCC is flexible and agile enough to make changes at any time they are necessary.

The User Manual is in a better English than some manuals of Mimaki and is better English than most manuals from companies in Korea. But all their manuals (Mimaki, GCC, and Korean) are better English than most manuals I have seen from Mainland China.

GCC is more open and direct about some safety and maintenance aspects. This is a polite way of saying that GCC is more up front about reality of some aspects of UV printing. For example, other companies have a mantra that UV ink has absolutely none of the drawbacks of solvent ink (need for frequent cleaning, etc). GCC, possibly because it does not make solvent printers (so does not have to protect any past history), clearly states that the printheads ought to be cleaned every four hours. Not many sales reps of other brands of UV-curable printers would admit this up front. Naturally FLAAR supports printer manufacturers for being open and forthright about the pros and cons of each ink chemistry.

GCC clearly mentions that UV lamp life is decreased by 3 hours every time you turn the lamp off-and-on. Not many other companies admit this in such specific clarity, for each strike.

Has a sensor-equipped bumper to detect potential head strikes.

GCC is testing a variety of new inks, different UV-lamp curing chemistry, and new dichroic coating of reflectors for the UV lamps.

### Downsides

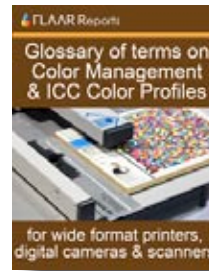
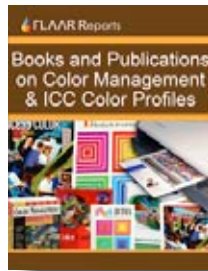
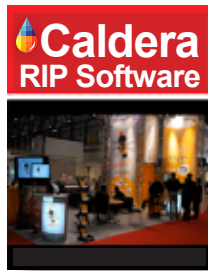
Most end-users (owners of printshops) are unsure of the differences among printers from China, Taiwan, and Korea. This is precisely why FLAAR invested so much time during 2007 in visiting UV-curable inkjet printer manufacturers in China (Teckwin and Honghua (Infiniti, Fina, Aprint), Taiwan (GCC), and Korea (IP&I and Dilli).

### Comments & Suggestions

The prints a GCC 250 did on ceramic tiles were gorgeous: no banding (naturally printed in uni-directional mode). The owner of this printer was a distributor but he also operates several printshops. He has no qualms about using this printer for his own projects. The output was completely professional, and on the basis of what I saw, I have no reservations myself in writing up his work as exemplary.

In other words, this printer, in the hands of trained people, is fully capable of doing completely satisfactory and professional UV-curable printing on the materials that this company prints on.

**Most recently updated January 2008.**



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](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 man-

agement 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](mailto:mergui@caldera.fr)  
**If you have questions about color management**, if you are in the US you can contact: ImageTech at: [www.ImageTechDigital.com](http://www.ImageTechDigital.com)  
 Mark Spandorf (owner and president), [mark@imagetechdigital.com](mailto: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](mailto:info@BARBIERIElectronic.com)  
[www.BARBIERIElectronic.com](http://www.BARBIERIElectronic.com)  
 Tel.: +39 0472 834 024  
 Fax: +39 0472 833 845



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

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

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

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

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



## XY Cutter Options

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

### To contact Gerber:

Phone (US): 800-222-7446, email: [cservice@gspinc.com](mailto:cservice@gspinc.com)

Fax: 800-227-6228 or 860-648-8064

Phone (Intl): 860-648-8028, email: [gspinternational@gspinc.com](mailto:gspinternational@gspinc.com)

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

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



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



Gerber M Series cutter at ISA '08.

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[www.FineArtGicleePrinters.org](http://www.FineArtGicleePrinters.org)



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Large Format



Medium Format



35 mm

 **FLAAR**



[www.Digital-Photography.org](http://www.Digital-Photography.org)

**Digital Photography**

[www.digital-photography.org](http://www.digital-photography.org)

## 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. In your years of wide format printing experience have encountered results different than ours, please let us know at [ReaderService@FLAAR.org](mailto:ReaderService@FLAAR.org). We do not mind eating crow, though so far it is primarily a different philosophy we practice, because since we are not dependent on sales commissions we can openly list the glitches and defects of those printers that have an occasional problem.

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

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## Update Policy

Starting in 2008, updates on UV-curable wide-format inkjet printers are available for all individuals and companies which have a subscription, or to companies who are research project sponsors. If you are a Subscriber or manager in a company that is a research sponsor, you can obtain the next update by writing [ReaderService@FLAAR.org](mailto: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](http://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.**

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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](http://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](http://www.wide-format-printers.NET).**

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

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#### Legal notice

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

#### Advisory

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

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

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

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

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

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

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

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

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

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

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

without warranties as to performance or merchantability, or of fitness for a particular purpose. Any such statements in our reports or on our web sites or in discussions do not constitute warranties and shall not be relied on by the buyer in deciding whether to purchase and/or use products we discuss because of the diversity of conditions, materials and/or equipment under which these products may be used. Thus please recognize that no warranty of fitness or profitability for a particular purpose is offered.

The user is advised to test products thoroughly before relying on them. We do not have any special means of analyzing chemical contents or flammability of inks, media, or laminates, nor how these need to be controlled by local laws in your community. There may well be hazardous chemicals, or outgassing that we are not aware of. Be aware that some inks have severe health hazards associated with them. Some are hazardous to breathe; others are hazardous if you get them on your skin. For example, some chemicals such as cyclohexanone do not sound like chemicals you want to breathe every day. Be sure to obtain, read, and understand the MSDS sheets for the inks, media, and laminates that you intend to use. Both solvent, eco-solvent, and UV-curable inks are substances whose full range of health and environmental hazards are not yet fully revealed. It is essential you use common sense and in general be realistic about the hazards involved, especially those which are not listed or which have not yet been described. FLAAR is not able to list all hazards since we are not necessarily aware of the chemical components of the products we discuss. Our reports are on usability, not on health hazards.

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

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

### Results you see at trade shows may not be realistic

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

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

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

Trade show examples tend to be on the absolutely best media. When you attempt to save money and use economy media you will quickly notice that you do not get anywhere near the same results as you saw in the manufacturer's trade show booth, or pictured in their

glossy advertisement. Five years ago we noticed Epson was laminating prints to show glossy output because their pigmented inks could not print on actual glossy media. The same equipment, inks, media, and software may not work as well in your facility as we, or you, see it at a trade show. All the more reason to test before you buy; and keep testing before you make your final payment. Your ultimate protection is to use a gold American Express credit card so you can have leverage when you ask for your money back if the product fails.

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

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

### Factors influencing output

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

Actually you may have people with even more experience than we do, since we deliberately use students to approximate newbies. FLAAR is devoted to assisting newcomers learn about digital imaging 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 smelting heat or freezing cold during shipment.

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

#### **Availability of spare parts may be a significant issue**

Chinese printers tend to switch suppliers for spare parts every month or so. So getting spare parts for a Chinese printer will be a challenge even if the distributor or manufacturer actually respond to your e-mails at all. Fortunately some companies do 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 your 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 and electronics, will tend to have teething issues. Until the firmware is updated, you may be a beta tester. This does not mean the printer should be avoided, just realize that you may have some downtime and a few headaches. Of course the worst case scenario for this was the half-million dollar Lüscher JetPrint: so being "Made in Switzerland" was not much help.

#### **Counterfeit parts are a problem with many printers made in China**

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

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

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

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

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

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

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

#### **Be sure to check all FLAAR resources**

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

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

#### **Acknowledgements**

With 19 employees the funding has to come from somewhere, so we do welcome project sponsorship, research grants, contributions that facilitate our educational programs, scholarships for co-op interns and graduate students, and comparable project-oriented funding from manufacturers. The benefit for the end-user is a principle called academic freedom, in this case,

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

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

Besides, it does not take any money to see which printers and RIPs

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

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

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

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

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

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

We thank MacDermid ColorSpan (now part of HP), Hewlett-Packard, Parrot Digigraphic, Color DNA, Canon, Gandinnovations, and other companies for providing funding for technology training for the FLAAR staff and our colleagues at Bowling Green State University in past years and for funds to allow us to attend all major international trade shows, which are ideal locations for us to gather information. We thank Sun LLC, Caldera, EskoArtwork, Raster Printers (EFI Rastek), DEC LexJet, DigiFab, Barbieri electronic, Seiko II, Mutoh Europe, IP&I, Dilli, Yuhan-Kimberly, GCC, Grapo, Durst, and WP Digital for providing funds so that we can make more of our publications free to end-users. During 2000-2001 we had grants to cover all the costs of our publications, and all FLAAR Reports were free in those early years. As that early grant naturally expired after a few years, we had to begin charging for some of our reports to cover costs. Now (in 2009), we are seeking corporate sponsorship so we can gradually make another 20% of our publications free to our readers.

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

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

Barbieri electronic (color management), Caldera (RIP), ColorSpan, DEC, Durst, EskoArtwork, Gerber, Grapo, IP&I, Mimaki USA, Mutoh, Dilli, GCC, NUR, Océ, Shiraz (RIP), Sky AirShip, Sun, Teckwin, VUTEk, WP Digital, Xerox, Yuhan-Kimberly, Zund have each brought FLAAR staff to their headquarters and printer factories. Bordeaux, InkWin and Sunflower ink have brought us to inspect their ink manufacturing facilities and demo rooms. We have visited the world headquarters and demo rooms of HP in Barcelona and received informative and helpful technology briefings roughly every two years. We are under NDA as to the subjects discussed but it is important that we be open where we have visited. Mimaki Europe has had FLAAR as their guest in Europe to introduce their flatbed UV printer, as have other UV-curable manufacturers, again, under NDA as to the details since often we are present at meetings where unreleased products are discussed. Xaar has hosted an informative visit to their world headquarters in the UK. You don't get this level of access from a trade magazine writer, and I can assure you, we are provided much more detailed information and documentation in our visits than would be provided to a magazine author or editor. Companies have learned that it's a lot better to let us know up front and in advance the issues and glitches with their printers, since they now know we will find out sooner or later on our own. They actually tell us they realize we will find out on our own anyway.

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

Improved Technologies (ITNH) providing their Ixia model of the Iris 3047 giclee printer.

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

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

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

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

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

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

So it's obvious that providing products or even a grant is no shield from having your products fail a FLAAR evaluation. The reason is clear: the end user is our judge. The entire FLAAR service program is to assist the people who need to use digital imaging hardware and software. If a product functions we find out and promulgate the good news. If a product is a failure, or more likely, needs some improve-

ment in the next generation, we let people know. If a product is hyped by what an informed user would recognize as potentially false and misleading nonsense, then we point out the pathetic discrepancies very clearly.

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

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

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

Grant funding, sponsorship, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. We receive support from three manufacturers of thermal printheads (Canon, ColorSpan and HP) and also have multiple printers from three manufacturers of piezo printers (Epson, Seiko, Mutoh, and Mimaki). This is because piezo has definite advantage for some applications; thermal printheads have advantages in different applications. Our reviews have universal appeal precisely because we feature all competing printhead technologies. Every printer, RIPs, inks, or media we have reviewed have good points in addition to weaknesses. Both X-Rite and competitor GretagMacbeth provided spectrophotometers. Again, when all sides assist this program there is no incentive to favor one by trashing the other. Printer manufacturer ad campaigns are their own worst enemy. If a printer did not make false and misleading claims, then we would have nothing to fill our reviews with refuting the utter nonsense that is foisted on the buying public.

It is not our fault if some printers are more user friendly, print on more media than other brands. It is not our fault that the competing printers are ink guzzlers, are slow beyond belief, and tend to band or drop out colors all together. We don't need to be paid by the printer companies whose products work so nicely in both our universities on a daily basis. The printers which failed did so in front of our own eyes and in the print shops of people we check with. And actually we do try to find some redeeming feature in the slow, ink gulping brands: they do have a better dithering pattern; they can take thick media that absolutely won't feed through an HP. So we do work hard at finding the beneficial features even of printers are otherwise get the most critique from our readers. Over one million people will read the FLAAR Information

Network in the next 12 months; 480,000 people will be exposed to our reports on wide format printers from combined total of our three sites on these themes. You can be assured that we hear plenty of comments from our readers about which printers function, and which printers fail to achieve what their advertising hype so loudly claims.

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

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

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

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

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

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

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

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

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

 <p><b>Trends</b> in UV Flatbed Printers</p> <p>documented at <b>DRUPA 2008</b></p>	 <p><b>UV Printers</b> <b>Trends 2008</b></p> <p><b>SGIA '08</b> <b>PART I</b></p>	 <p><b>Flatbed &amp; Roll-to-Roll</b> <b>UV Printers</b></p> <p><b>SGIA '08</b> <b>Part II</b></p>	 <p><b>Chinese-Made</b> <b>UV Flatbed Printers</b></p> <p><b>Shanghai '08</b> <b>Trade Show</b></p>	 <p><b>UV Printer</b> <b>TRENDS</b></p> <p><b>VISCOM ITALY '08</b></p>
 <p><b>Trends</b> in UV printers at</p> <p><b>VISCOM</b> <b>Germany 08</b></p>	 <p><b>TRENDS, Part II:</b> <b>Markets &amp; Technologies</b></p> <p><b>UV-cured printers at</b> <b>ISA 2009</b></p>	 <p><b>TRENDS, Part I:</b> <b>Analysis One by One</b> <b>of the UV-cured printers</b></p> <p><b>ISA '09</b></p>	 <p><b>UV Market</b> <b>TRENDS</b></p> <p>Observable at <b>FESPA Digital</b> <b>Europe 2009</b></p>	 <p><b>TRENDS</b> in 2009</p> <p>Analysis One by One of the UV-cured printers at <b>FESPA Digital Europe</b></p>
 <p><b>TRENDS</b> of UV-Cured Wide-Format Printers</p> <p><b>Shanghai '09</b></p>	 <p><b>UV COMBO</b> <b>FLATBEDS</b></p> <p><b>Shanghai 2009</b></p>	 <p><b>TRENDS IN HYBRID</b> <b>STRUCTURE UV PRINTERS</b></p> <p><b>Shanghai 2009</b></p>	 <p><b>UV Roll-to-roll</b></p> <p>Observable at <b>Shanghai 2009</b></p>	 <p><b>UV Flatbed</b> <b>Printers</b></p> <p>at <b>APPPEXPO,</b> <b>Shanghai '09</b></p>

UV Printers Manufactured in China, Korea and Taiwan

 <p><b>Chinese UV</b> <b>Inkjet Printers</b> <b>2009</b></p> <p><b>Comprehensive</b> <b>FLAAR Inventory</b></p>	 <p><b>Chinese UV</b> <b>Inkjet Printers 2008</b></p> <p><b>Comprehensive (Complete)</b> <b>FLAAR Inventory</b></p>	 <p><b>UV Printers</b> <b>Manufactured in</b> <b>Korea 2009</b></p> <p><b>Trends, Markets</b> <b>&amp; Applications</b></p>	 <p><b>UV Printers</b> <b>Manufactured in</b> <b>KOREA 2008</b></p>	 <p><b>List of UV Printers</b> <b>Manufactured in</b></p> <p><b>Taiwan 2009</b></p>
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