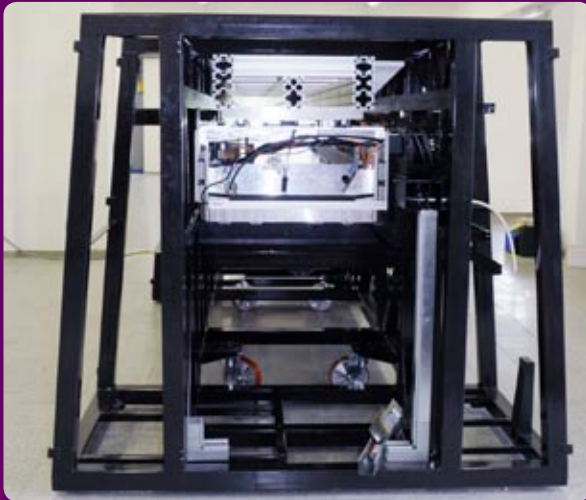


One-Pass per Color Speed, together with high quality



Preview of New UV Printer Grapo Shark



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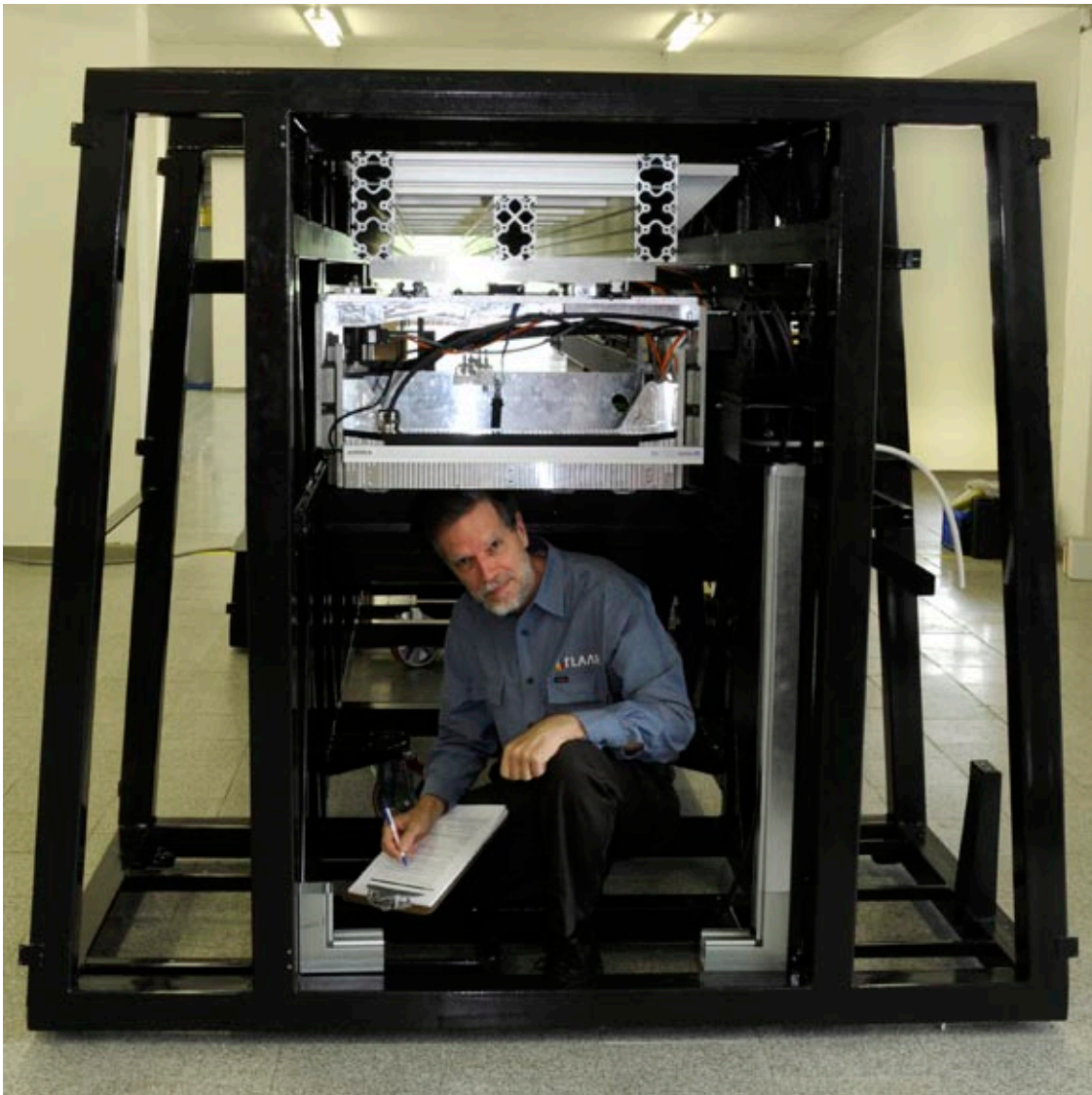
Contents

Introduction to the Shark	1
THE BASICS	3
PURCHASING	6
FEATURES OF THE PRINTER: Vacuum	6
STRUCTURE OF THE PRINTER: Media Path	8
STRUCTURE OF THE PRINTER (if a combo style): Transport Belt	8
FLATBED ASPECTS (for dedicated flatbeds)	11
ROLL-FED	11
STRUCTURE: Miscellaneous	13
ACCESSORY TABLES for Combo or Hybrid Flatbed	14
Miscellaneous	15
OPERATING THE PRINTER	15
CONSTRUCTION (BUILD QUALITY)	17
AESTHETICS	19
SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS	20
INSTALLATION OF THE PRINTER	21
INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS	22
TRAINING	22
TECH SUPPORT & WARRANTY	23
CLEANING & MAINTENANCE NEEDS	24
MAINTENANCE	24
SAFETY & HEALTH CONCERNS	24
PRINTHEAD TECHNOLOGY	26
PRINTHEAD DPI & Features	27
Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING	29
PRINTHEAD Positioning	29
PRINTHEAD: Associated Features	30
PRINTHEAD Life Expectancy	30
PRINTHEAD CARRIAGE and GANTRY	30
MOTORS: Stepper, Linear, Magnetic ?	30
SUBSTRATES	32
LOADING MEDIA	32
SUBSTRATES, Materials, Applications, and Issues	32
SUBSTRATES: Cleaning, Priming, Preparation	33
SUBSTRATES: General Concerns	34
APPLICATIONS	35
INK	35
INK: White & Varnish	36
INK Cost	36
INK: Supply System, Tubing, Filters, etc	37
INK: Longevity	38
INK Color Gamut	38
THE UV CURING LAMPS	39
UV CURING, and ODOR of the printed image	40
UV LAMPS: Cooling	40
UV LAMPS: Reflectors	40
RIP SOFTWARE & Printer Software	41
COLOR MANAGEMENT FEATURES	41
PRODUCTIVITY & ROI (Return on Investment)	41
COMPARISONS WITH OTHER PRINTERS	41
SUMMARY: Image Quality Issues: Banding	42
SUMMARY: Image Quality Issues: General	42
CONCLUSIONS:	42

Introduction to the Shark

During November 2008 a new production-class UV-curing printer is being introduced in Europe: the Shark. It is worth pointing out that nothing of this size and shape has yet been developed anywhere in Asia. And the few roll-to-roll UV printers made in China have all been totally withdrawn and are not featured at any trade show in the US. There is no comparable billboard-ready UV printer of this size yet produced in Japan either.

This new printer is conceived, designed, and manufactured entirely in Europe. The sturdy structure focuses on efficient movement of roll-fed materials but the configuration will allow the system to handle flat and thick materials also.



Here is Nicholas already inside this new UV-curable printer taking notes. Notice how rigid all the chassis and structure of this printer is: if you need high speed and simultaneously good quality, you must have precision engineering. This is obviously not a full view of the entire printer. But equally obviously we have seen everything already months ago.

It is presently roll-to-roll, but roll-to-sheet in-line cutting will be available in 2009. The design is actually a combo, with moving transport belt. This is more efficient for eventually switching to flat and rigid materials. In English, the word “hybrid” printer is reserved for former solvent printers (with pinch rollers and grit rollers) that have been retrofitted into a UV-curing printer. FLAAR seeks to refine the lack of standardized definitions by calling any printer with a moving belt a “combo.” If a printer is only a flatbed, we call it a dedicated flatbed. If a machine is only roll to roll, we call it dedicated roll to roll. The Shark is a combo, which means it can do everything a hybrid can do, but better.

This printer’s features have focused on selling to people for whom the price of the HP Scitex TurboJet UV printer is too high. The price of this new printer will be more reasonable. And, many printshops do not have enough production to require the expense of an HP TurboJet anyway.

The Shark is the product of a company with seven years experience with UV-cured wide-format inkjet printers. Indeed the first Grapo machine that was begun in 2003 is still printing eight hours a day all year long inside the Grapo facilities. This is because the company Grapo is first and foremost a banner, billboard, and POP signage company. Grapo prints most of the outdoor and indoor signage for the Czech Republic. In other words, Grapo selects which features to include in their printers based on what is needed for efficient production of billboards, building wrap, vehicle wrap, banners, and signage of all sizes and shapes.

Grapo engineers then design the structure, chassis, ink delivery system, substrate feeding system, and even write their own software (the firmware and also their own RIP software). These printers are then put to work inside the Grapo printshop. Since it makes printers for its own use, Grapo then manufactures a few more for discerning printshop owners in our countries and offers these for sale. As a result Grapo printers are at work in sign shops in several dozen other countries.

Now, with feedback from over 200 installations, the Grapo mechanical, structural, electrical, and software engineers have spent two years creating the next-generation printer, the Shark: faster speed, higher quality: but both together. The idea is to allow you to print building wrap or giant billboards quickly but then the same day to produce top quality backlit or other indoor signage for malls, airports, perfume stores, and other Point of Sale situations.



GRAPO Shark printing a FLAAR photograph at VisCom Italy 2008.

You may notice that FLAAR is the first resource that offers an outside inside view: outside because we do not accept PR releases; we do our own research and have our own conclusions. Inside because we were inside this printer already three months before it was announced at VISCOM Germany and shown at VISCOM Italy. We appreciate the access provided, day after day after day, both during the summer and during November.

Plus it was possible to have hours of discussion with the inventor-conceptualizer of this printer, Radim Kralik. There is no trade show, and no Open House event where this much background opportunity would be available. Trade magazine editors have so many subjects they have to cover that multiple 3-day visits to a factory, demo room, and R&D facilities (plus all the back-and-forth travel time) simply are not realistic. Thus this report on the Shark provides a service both to industry and to end-users that is not available elsewhere.

Our normal style of FLAAR Report is to have dozens of photographs, but this First Look is sparse on photos for two reasons: first, the printer was being prepared for packing and shipping to Milano, and second, there is a lot of new technology in certain parts of this printer. After the first trade show the competition will have figured almost everything out anyway, but as a courtesy to the manufacturer we desisted from our normal inside-out photographic coverage at this stage. There is plenty of opportunity in the future to take more photographs, since the development teams and engineers and owners of most of the competing printers will be dissecting the structure and features of this printer for three entire days in Milano.

THE BASICS

1. Brand name, model?

Grapo Shark.

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

Presently there is only one width, but the structure of the printer, the firmware (software specifically for this Shark technology), and other aspects could allow future new models to be 3.x or 5 meters in width.

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

The Shark was conceived, engineered, developed, and manufactured at the Grapo factory in Europe. The firmware (software that handles the new technologies) is also developed in-house at Grapo. The factory is located in Olomouc, Czech Republic (one of the more picturesque architectural cities in this part of the world).



Grapo is a company that has been acquiring knowledge and experience in UV-cured printers for years.

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

This printer is a new development, not entry-level at all; this is a high-end production machine, so the two earlier models of Grapo printers are not the same or even similar chassis. Even the printheads on the Shark are different.

5. When and where was this model first introduced?

Information that this printer existed, but without identifying the manufacturer or actual name of the model, was first published, with permission, by FLAAR in a preview about two months ago. The name and specs were revealed first at VISCOM Germany in early November 2008. The printer itself was first shown to the public at VISCOM Italy in mid November.

6. What is the history of the development of this printer?

The owner is an engineer who is interested in developing UV-cured printers that have features not available on competing printers. He also owns a billboard, banner, and POP printing company. So he knows what a printshop owner needs in a new printer. Also he has feedback from several hundred owners of the Grapo Manta and Grapo Octopus.



Grapo Shark at VisCom Italy 2008.



7. What is the philosophy behind the development of this printer? What did the manufacturer seek to achieve?

First, this printer is part of a long-range plan. There is a lot of strategy behind what you see today. The core technology can be expanded to create an entire family of future printers. Calculate how many screenprinters will need a production printer of this class? Add up how many offset printshops are moving into digital inkjet? On top of this are all the signage shops that need to replace aging (and polluting) solvent printers.

Remember, latex ink canNOT print on thick or rigid material; not today and not tomorrow either. Plus, so far, I have not found any independent analyst or magazine editor who is entirely convinced that latex ink is not simply a solvent ink with some water in it instead of purely solvent chemicals. I am open to learning more by myself, but whenever you speak, off the record, with anyone, not many accept latex ink as really being a water-based chemistry. Latex ink is less a headache than pure solvent, but still has a long way to go to convince people with an independent mind.

This printer is conceived by the developer to offer diverse capabilities in a single unit. For example, some large printshops may have or need a TurboJet and a CORjet. Ignoring the million dollars plus cost of these, and the space requirements, the main issue is overlooked: now you have two totally different platforms to maintain and repair. With two Sharks, your cost is less than a single CORjet. Plus the Shark can produce higher quality (one printshop owner told me he tested a CORjet and found the quality not acceptable to his clients, too bad, since the CORjet is a printer I like for its ability to produce nice images on essentially cheap cardboard). But Grapo proposes that by having two Sharks, you can produce everything the TurboJet and CORjet can produce, plus much higher quality and versatility. And neither the CORjet nor the TurboJet can print on glass, wood, ceiling material, wall material, etc.

Realize that the Shark you see today is the core engine of a larger family. Think in-line production factory.

But the main thoughts of the conception that lead to the development of this Shark printer was to make the price-of-entry into the high end more reasonable for print shops in a down-economy (when the cost of a CORjet is not very realistic any more). The other crucial aspect is flexibility: roll-fed and flatbed in the same chassis.

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

This is a fully functional prototype going into beta stage. The first beta test site will be a screenprinting company in Europe. They already have two UV-cured printers, two solvent printers (including a VUTEk), and a huge screenprinting system (which dwarfs any inkjet printer, even the CORjet). Actually what really hit me when I visited this shop recently, is how much expensive space is wasted by a screen printing system. The area for a single silk screen color station occupies more than the entire Shark will occupy).

As soon as the Shark is in the beta test site, and we receive feedback, this FLAAR Report will be updated.



The prototype is moving into beta stage. FLAAR has visited the R&D facilities and factory twice during 2008 to inspect the Shark.

9. List price?

List price is intended to be noticeably less than an HP Scitex TurboJet, plus potentially faster and with universal capability (flat, rigid, thick, roll-fed: this printer can take materials up to 9 cm thickness). The suggested trade show special price of 350,000 Euros was less than I had expected, since in terms of capacity this is a four-hundred thousand Euro class of printer.

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

Auto-loading, unloading, and in-line cutting are potential future accessories.

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

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

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

Every printer manufacturer and distributor has their own policy on whether they wish the end-users to make their own repairs. The philosophy of ColorSpan was to keep the end-user from fiddling with anything inside the printer. This was logical because many were first-time users of this kind of printer. The downside was that once you became experienced, or if your printshop was already advanced, the lack of access to the innards of the printer was self-defeating and undesired.

But there is no right or wrong policy (ColorSpan is not "wrong," they are simply trying to protect newbie's from making a mess of the inside of the printer. In general, the end-user is usually not encouraged to take the printer apart and do repairs on their own. Only later on, when you have considerable experience, and have taken advanced tech support training, would doing your own repairs be realistic. However I have visited many printshops where the printer operator prefers to receive this training precisely so they can do their own repairs. After all, if the manufacturer can train their own tech support person surely a printer operator, who also works with this printer every day all month all year, can also learn how to maintain and repair it (if they have the interest and inclination).

This policy varies by manufacturer. Interest in doing their own repairs varies by the end-user and by the printer operator. A few operators like the opportunity to take service training at the factory and thereby to be able to do basic repairs on their own. Some manufacturers discourage this, but some manufacturers, including Grapo do allow end-users to take advanced service training. In general Grapo has a flexible and realistic policy about allowing end-users to learn as much about servicing their own printers as they wish to learn.

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?

The distribution channel for Grapo printers is being expanded. Distributorships will be available for Canada, the US, and Latin America during 2009.

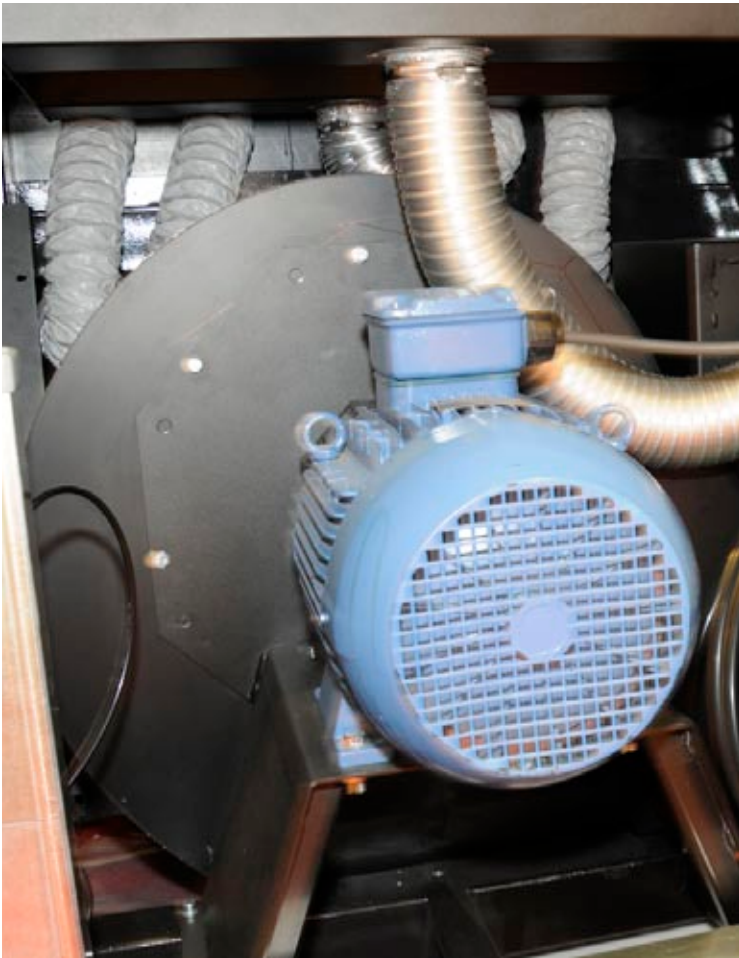
FEATURES OF THE PRINTER: Vacuum

14. If pumps, how many pumps are there?

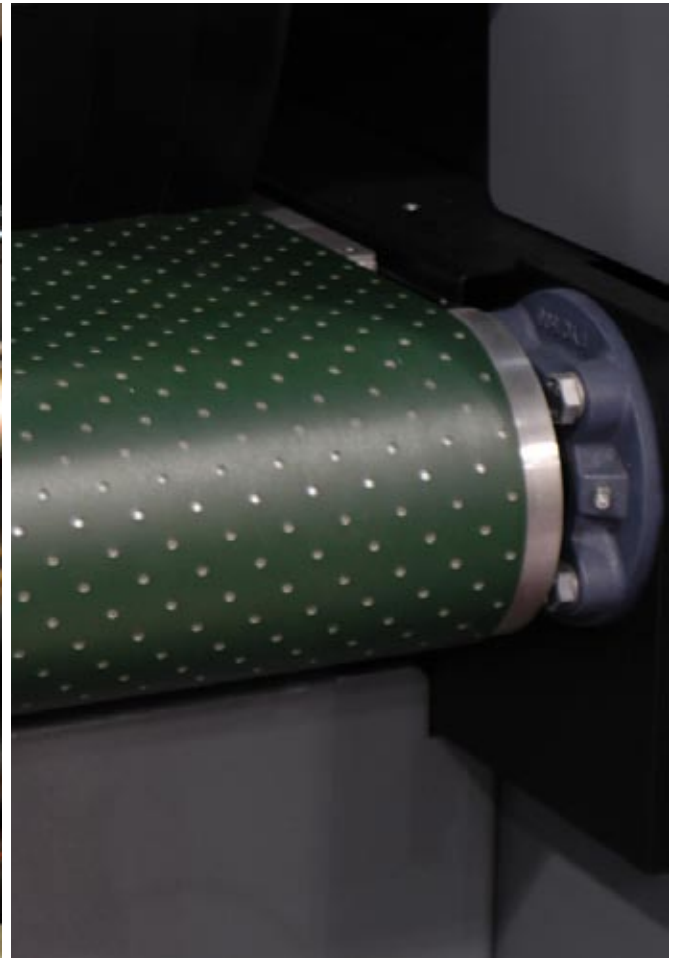
One pump for the negative pressure of the ink in the printhead nozzle plate.
 One pump for degassing unit and cleaning the heads.
 One huge pump for the vacuum table.

15. Just Off and On? Or variable?

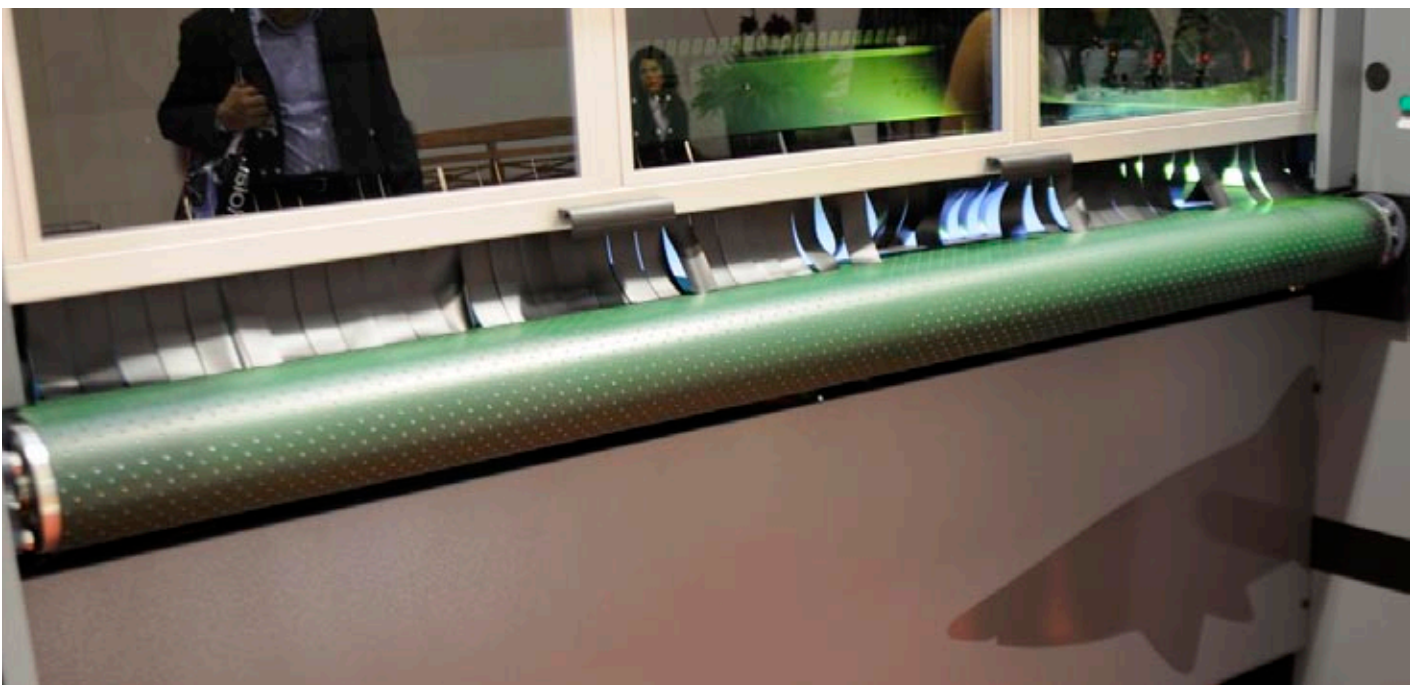
The power of the suction is variable, but the location is all or nothing.



The Shark uses one big vacuum pump located below the transport belt.



The transport belt has a grid of holes to let the vacuum hold the media.



STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path

16. 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?

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

17. Is there a moving transport belt (combo style) or a stationary platen (hybrid style)?

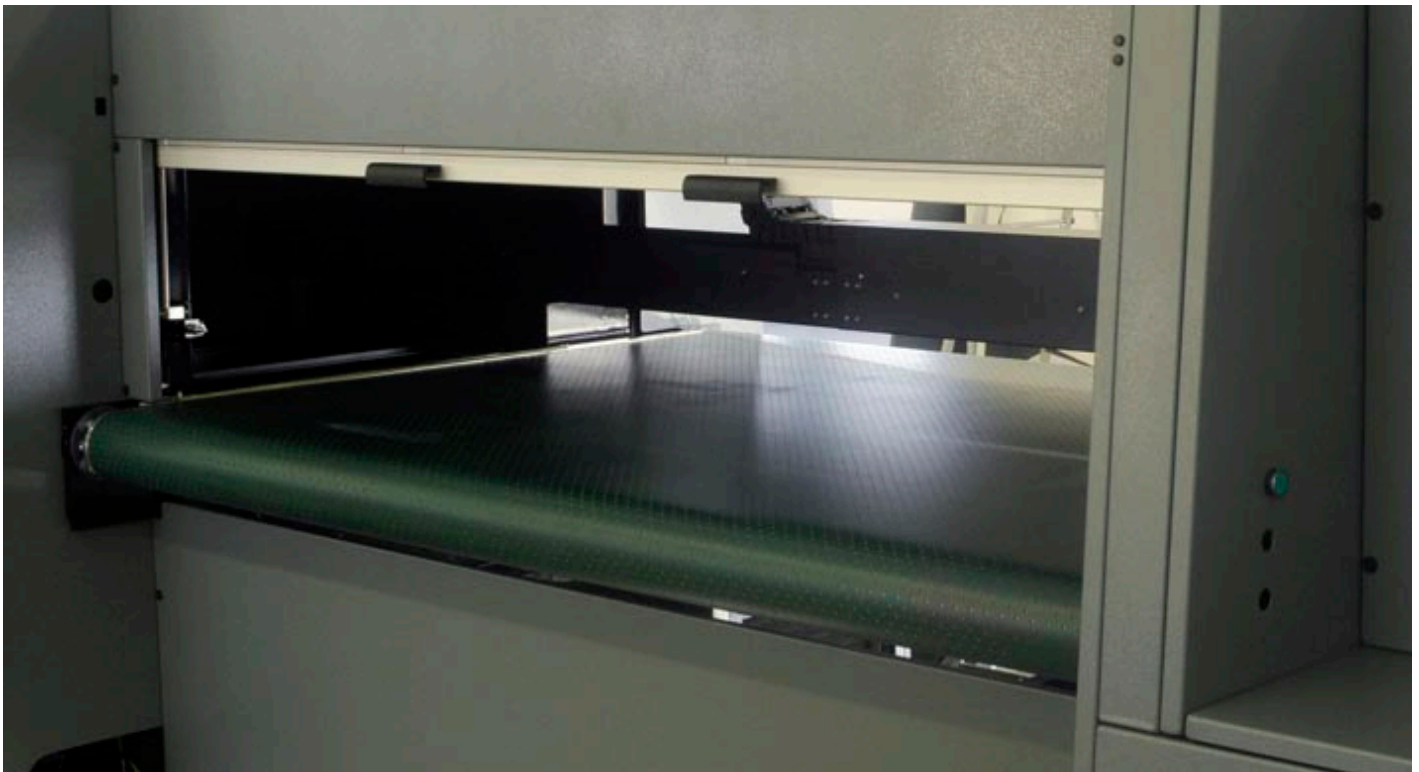
This is a combo-style system (moving transport belt) which is significantly better in all respects than a platen-based hybrid-style system (a hybrid printer is limited to grit rollers or tension rollers with pinch rollers on top). There is no really successful hybrid (platen-oriented) UV printer in mid-range and especially not at the high-end.

STRUCTURE OF THE PRINTER (if a combo style): Transport Belt

18. Describe the transport belt? What material? What manufacturer?

Grapo already has experience with several hundred belt-based printers. So they know what kind of a transport belt to specify.

The belt is covered with a protective surface to protect against the strong UV light from the curing lamp.



Transport belt of the Shark printer. Grapo already has a lot of experience developing the transport belt mechanism from its first combo machine, the Octopus UV printer.

19. Size, does the transport belt stick out, at the front? Or at the back?

The printer is bilaterally symmetrical. At the front and at the back the transport belt begins about 20-25 cm inside the front plane of the printer structure.

20. What exists in front of the belt? At the front? In front of the belt at the back?

There are no auxiliary rollers or features in front of the belt.

21. Can the belt move forwards and backwards, or only forwards?

I only began to ask this question when I learned that the transport belt of the Sun Neo LED Evolution could go either forwards or backwards. The reason on that printer is because the white ink heads are set behind the others. So if you want to do a pre flood coat you print in one sequence; if you need to do a post white ink layer, you move the material in the opposite direction.

The Shark can move the transport belt either forwards or backwards.



In this control area located at the back you can see the switch to move the transport belt forwards and backwards (1), turn on and off the vacuum (2), and wind/rewind the spindle (3).

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

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, as does the new Shark from Grapo. 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. But if you need to move the belt backwards as well as forwards, a 4-roller system can cause problems. For this reason the engineers at Grapo decided on a 3-roller system.

23. What does the transport belt area of the printer look like under the belt?

The transport belt is at a slight angle to accommodate the tension roller (the third roller). It is best if the belt tension system allows adequate space under the roller for developing future features inside the printer. The IP&I belt, in distinction, since it has four rollers, goes down deeper.

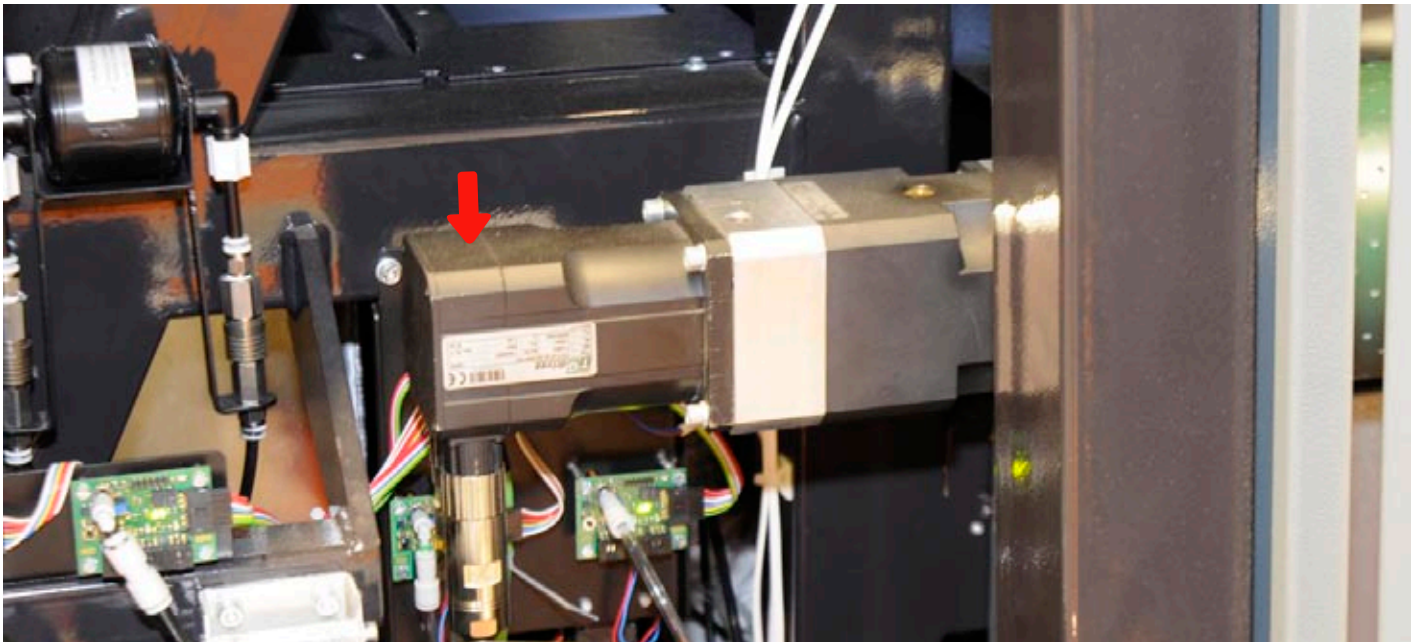
24. Why did your designers select this structure for the transport belt?

A combo printer uses a moving transport belt instead of grit-rollers. A moving transport belt has its own pros and cons. MDO boards can skew if fed in the narrow dimension (even on a \$300,000 big-name brand printer). Some transport belts "wander" if they are not calibrated. This is not serious for roll-fed materials, but is not good for flat materials. So the one extra tensioning roller was added under the main transport mechanism. The reason is that you do not want to need to flex (to move in or out of position) the front or back roller because they will not be parallel to the media feeding rollers.

So yes, all UV printers can print on practically everything, but not all UV printers can move every different kind of material through the printer with perfect precision.

25. Which is the drive roller for the transport belt (where is the motor and what kind of motor turns the transport belt?)

The motor for the transport belt drive roller is at the front left.



Here you can see the motor at the left end of the front roller, which drives the movement of the transport belt.

26. 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 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. Thus it will be interesting to check with the end-user at the beta test site to see how the third roller helps keep the transport belt aligned.

27. How often does the main flatbed transport belt need to be replaced? At whose expense? What is the cost of a replacement belt?

One printshop that we inspected had to replace their transport belt four times in less than 18 months (DuPont Cromaprint 22uv, known for its early transport belt problems). At least DuPont was honorable and covered the cost of the replacement itself. Now that DuPont has pulled out of UV printers, the people who bought this printer may have to pay over \$2,000 per new belt!. In comparison, the replacement belt of a Dilli UV printer costs about \$400.

So this is one aspect of the printer that we will keep in view. But so far, on printers such as the Durst Rho, I have never heard of them having serious or consistent problems with their transport belts.

The engineer said that belts on the Octopus II hold up for an average of four years, but that with the higher heat of the more productive Shark, that the belt is expected to last about two years.

FLATBED ASPECTS (for dedicated flatbeds)

28. *Is there a pinch roller system for the flatbed, and if so, where is this located?*

Yes, there are actually dedicated flatbed systems that also have pinch rollers. Indeed one Chinese flatbed has two sets of pinch rollers atop the flatbed. There are even some combo systems (with moving transport belt) that also have pinch rollers: the Durst Rho 700. Of course this begs the question of whether its vacuum system needs the pinch rollers. But pinch rollers can be more assistance than moving the media-- a pinch roller can keep the trailing end of a piece of foam core from lifting up (curling up) as the front end is being heated and printed on. So, if you wish to keep an entire foam board flat from front to back, you may need pinch or pressure rollers in addition to a vacuum system underneath.

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

Pin registration is normally present only on a dedicated flatbed, not on a moving transport belt. Just realize that not all sheets of rigid material are themselves actually perfectly rectangular!

30. *What are the pros and cons of a dedicated flatbed compared with a combo printer (with moving transport belt) or hybrid printer (with platen)?*

Even dedicated printers have their downsides too; with a dedicated flatbed you (the operator) are idle, totally, while the printer is printing. You can't load or unload anything (except on some of the newer million-dollar printer systems). But if you have a top-of-the-line combo printer, such as the Durst Rho 700 or 800, you can load at the back while the printer is cranking the previous job of flat material out the front: this can print and load and unload all at the same time. I have seen this ability to feed-while-printing also with the ColorSpan 9840uv (HP Scitex FB910).

ROLL-FED

31. *Does the printer use tension rollers instead of grit rollers?*

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

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

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

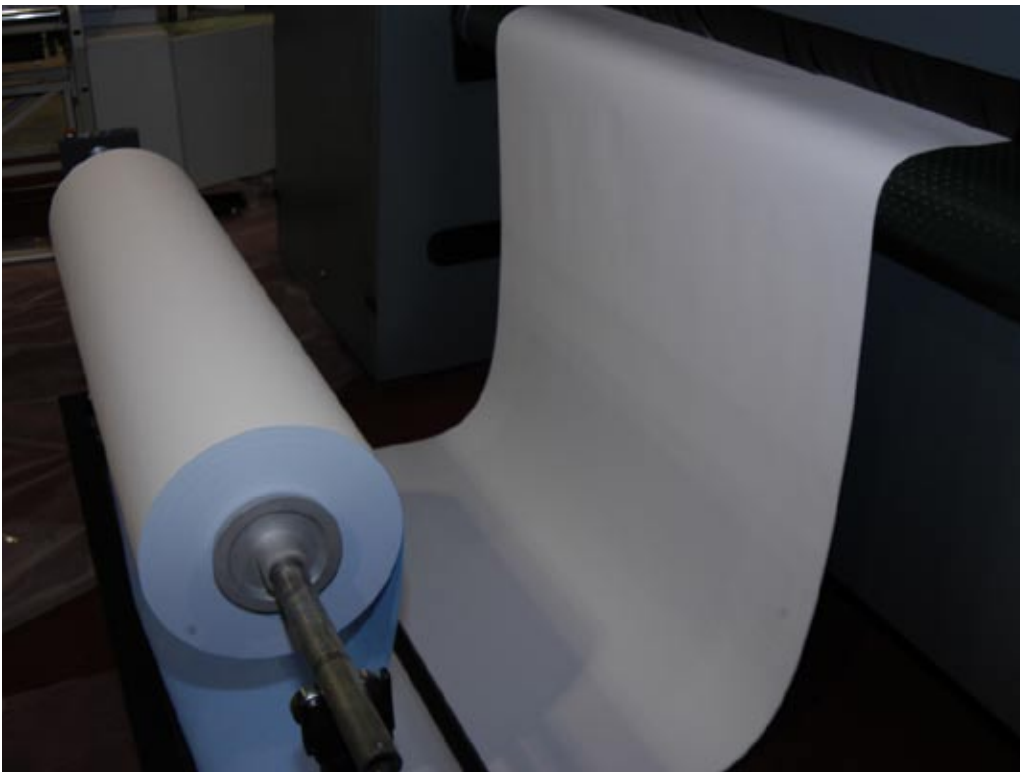


The slots in the lower areas at the front and at the back show that this printer will have the option of a fixed spindle (or saddle) to hold rolls of media. The only combo printer using pinch rollers that I can think of is the IP&I 1606.

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

Grapo printers tend to use a spindle, and not a saddle.

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.



Roll-fed material is held on a spindle. As you can see, the structure that holds the spindle is not fixed into the printer, it is an independent frame.

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?

A tension bar goes up and down. A dancer bar tends to move diagonally. Each one changes position as tension is needed.

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

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

36. 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.

37. 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 most easily on a printer with a fixed platen. A trough for mesh or fabrics tends to be present only on a printer costing a quarter of a million dollars or more.

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).

38. 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.

39. 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.

The operators at VisCom Italy 2008 used a manual knife to cut the media. It is more likely to find an on-board cutter on a dedicated roll-to-roll printer than in a combo printer.



STRUCTURE: Miscellaneous

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

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

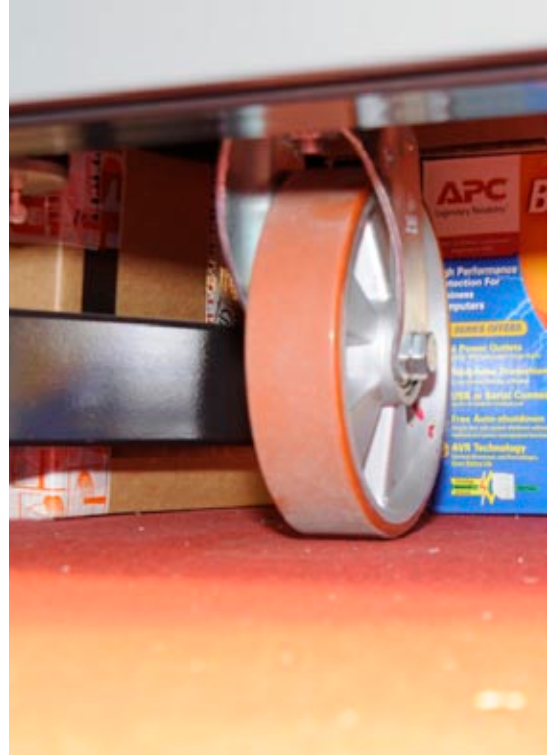
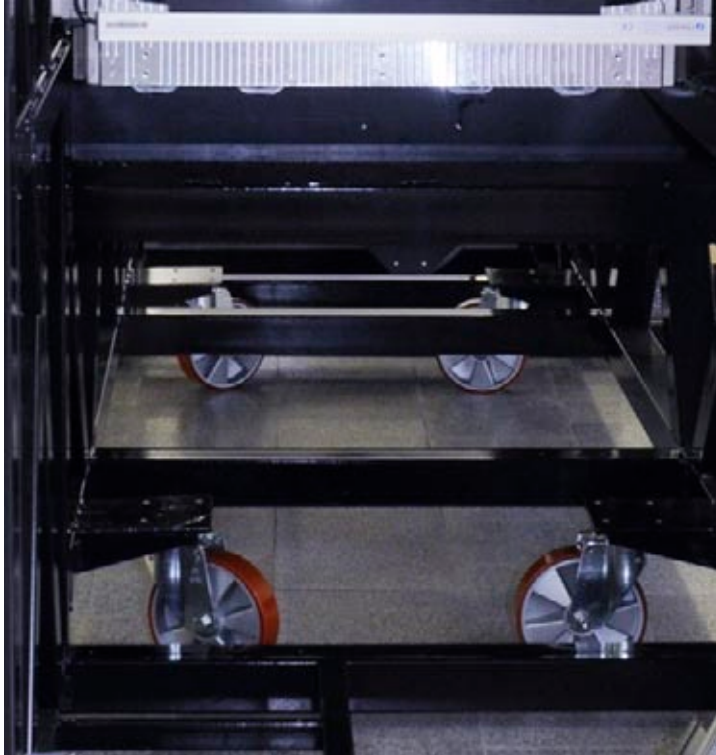
41. Does the printer have leveling supports? How many, and how strong?

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.

The current prototype appears to have four leveling supports under each end section (and none near the wheels).

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

The printer has four large and sturdy wheels on the central steel structure. There are no wheels visible on either of the end cabinets.



The printer has two wheels in the front and two wheels at the back.

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

The leveling supports are separate from the wheels.

44. Do the wheels have a lock on them?

For any printer weighing over one ton it is assumed that no locks or brakes are needed on the wheels because a tank will not roll anywhere if parked on a level floor.

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

45. Is this table size adequate?

No table for any hybrid or combo flatbed printer is large enough to handle a 4x8' MDO board, so everyone has to jerry-rig an extra table.

46. If there is a row of rollers set into a bar, can you slide the individual bar to a new position?

It is rare that you can slide any individual bar, or roller, to a new position. The only table that I can remember that had movable features was that on the ColorSpan 72UV printers.

47. Are there any special rollers to assist moving a large heavy flat material from left-to-right to help align its edges?

The Durst Rho 700 has a special set of black "wheels" on the feeding-side table. These can be moved into action with a crank. The purpose of these free-spinning wheels is to allow you to move a heavy material over to the right edge of the feeding table to align the material with the raised alignment bar.

MISCELLANEOUS

48. 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.

The Shark is a traditional combo style UV printers which moves rigid materials with the transport belt and move roll-fed materials through a combination of the transport belt and the roll-feeding and take-up rollers.

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

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

OPERATING THE PRINTER

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

Not normally.

51. Where does the computer keyboard sit?

The computer keyboard is fixed into a ledge at the right side of the transport belt. It can not be moved.

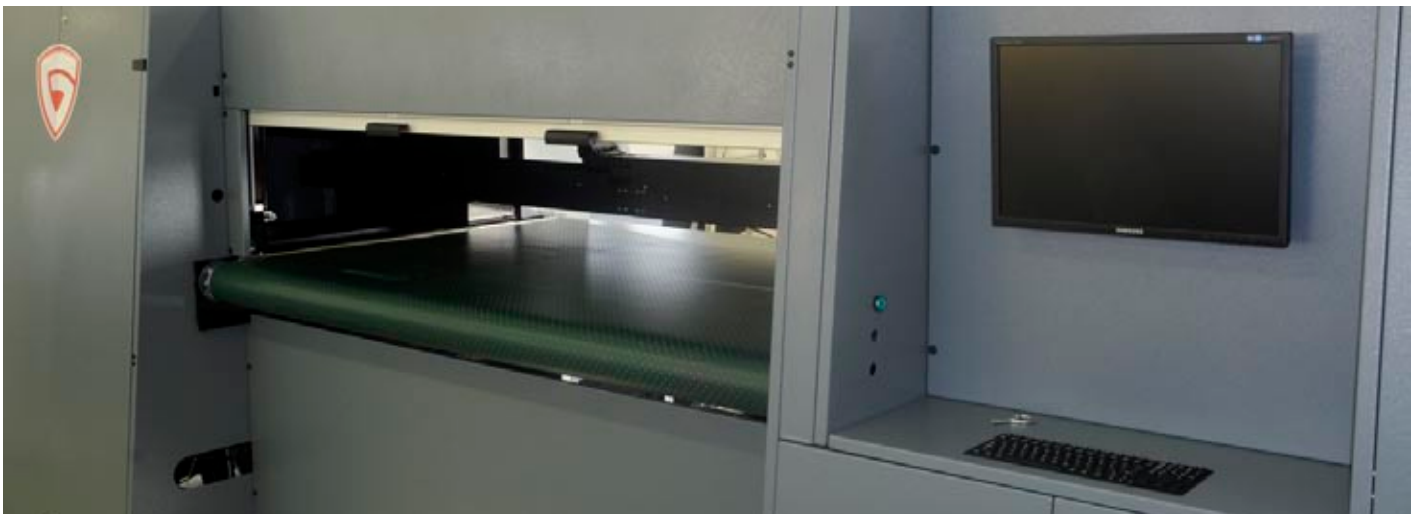
52. Is a foot pedal included (for operating aspects of the printer)?

I did not see any foot pedal.

53. Is there a pole with beacon lights?

No pole with beacon lights. Presence of a beacon is not a major plus point; absence of a beacon is not a significant minus point.

Dilli was among the first to use a vertical pole with beacon lights. One person said that DuPont's UV printer from RTZ (Flora) was the first of all. Most other printers do not have such a beacon.



On this printer, the LCD monitor and the keyboard are fixed in the printer.



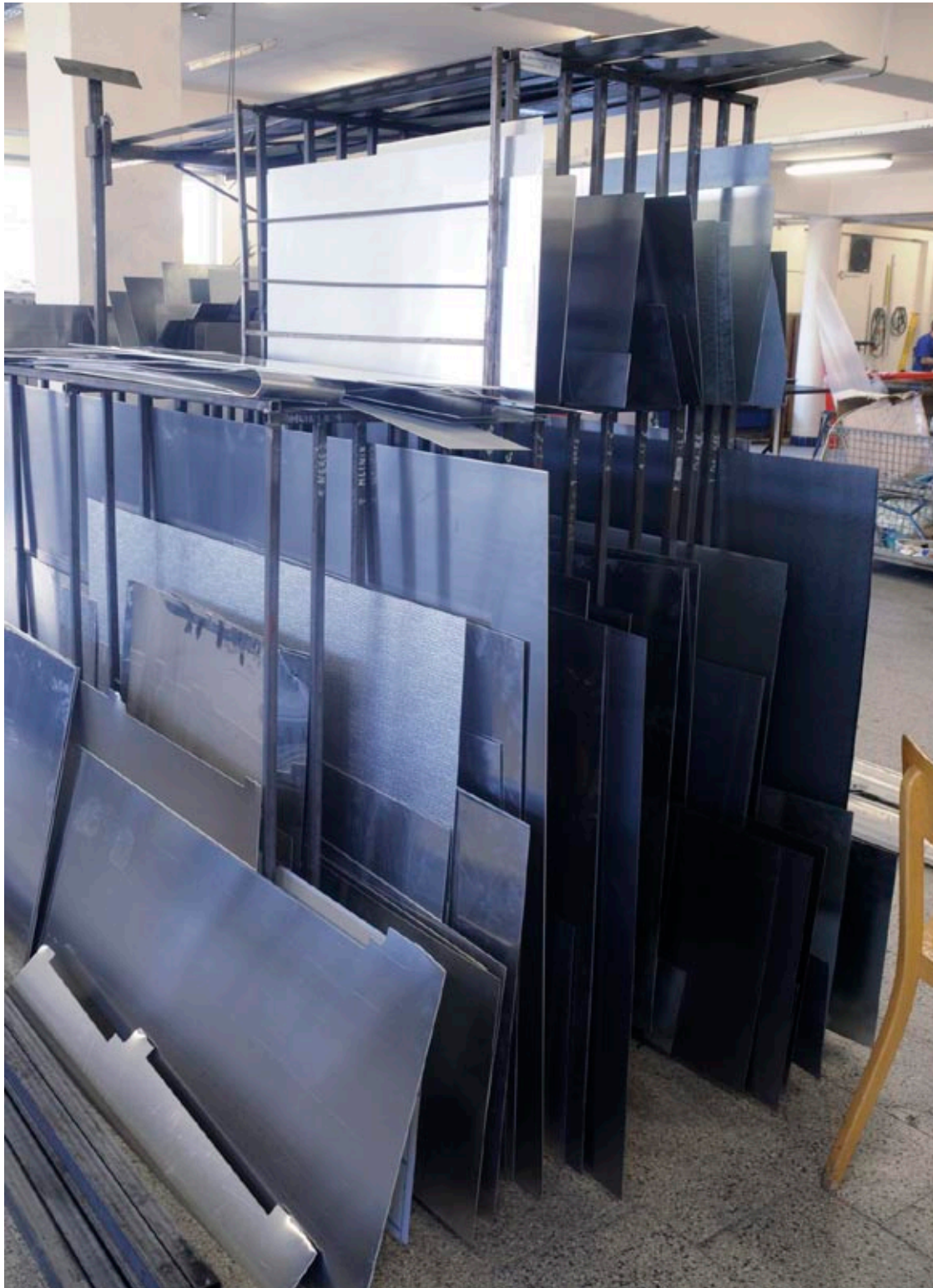
The design of the main control area is clean. there are only a few buttons. Most operations are software-based: the operator controls the printer using the keyboard and the mouse.



These are the only physical buttons you will find in the main control area.



The operator stands at the right.

CONSTRUCTION (BUILD QUALITY)

Grapo has many years experience with working metal; they make the frames for the billboards; they make the frames for their own printers. Here you see the sheet metal that covers the outside of the printers. This kind of metal working is very different from what you see in China.

54. When designed, what is the life-span that each part is tested for?

For many manufacturers, parts life-span is a new concept, especially when the cost of the printer needs to be kept down. But if the EU requires a guaranteed parts life-span, this will impact Chinese printer manufacturers in particular.

55. Is there a hood?

Across the open front there is a slide-up, slide-down hood. So it does not open by angling up diagonally. The hood is in three sections, each one with a window. I have not seen many other hoods that this that slide up and down in a slot.

A hood protects you from most UV lamp light leak. A hood protects you, to some degree, from misting UV ink. With a hood it is easier to exhaust ozone and misting UV ink (if you attach a ventilation system to a vent opening in the top of the hood).

But since it is expensive for a printer manufacturer to add a hood, most cheaper UV printers have no hoods. An exception is ColorSpan; they sell so many UV printers, and many go to relatively family-operated companies, that not to have a hood would be too risky for possible future lawsuits.



The design of the hood is unique in the sense that most hoods open up with hinges.

56. Is there both a front opening for the hood and a back opening?

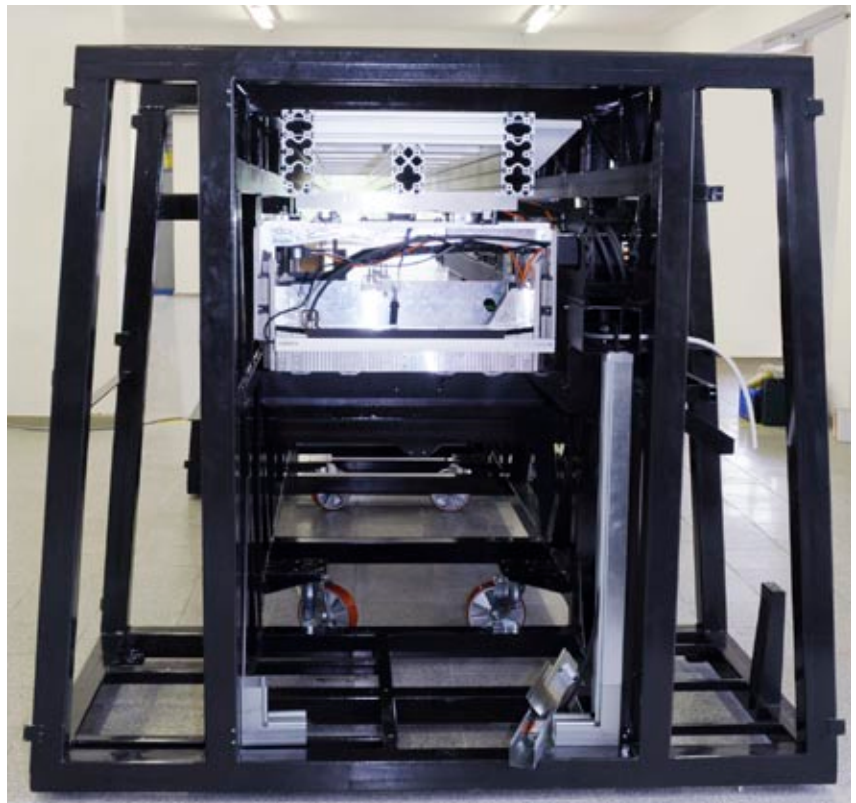
The back will be closed, with no openable hood there.

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

This printer is robust, as you would expect in Europe. Besides, he is making this printer for his own needs to print billboards fast but with good enough quality for point-of-sale backlit as well.

58. Does the printer wobble back and forth when printing?

Most 5-meter printers wobble more than they should (Gandinovations printers especially; they have a robust frame and all that, but some early 3-meter solvent models wobble so much you can't even read the monitor because it is shaking so much). The present model is 2 meters, so does not have the wobble problems of a 5-meter chassis. But remember, one of the engineering goals is to remove as much of the weight from the print-head carriage as possible, precisely to reduce the deceleration+acceleration movement which is what causes the wobble to begin with.



Here you can see how well built this printer is: a rigid structure is needed to allow the printer to perform around the clock at high speed.

AESTHETICS

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

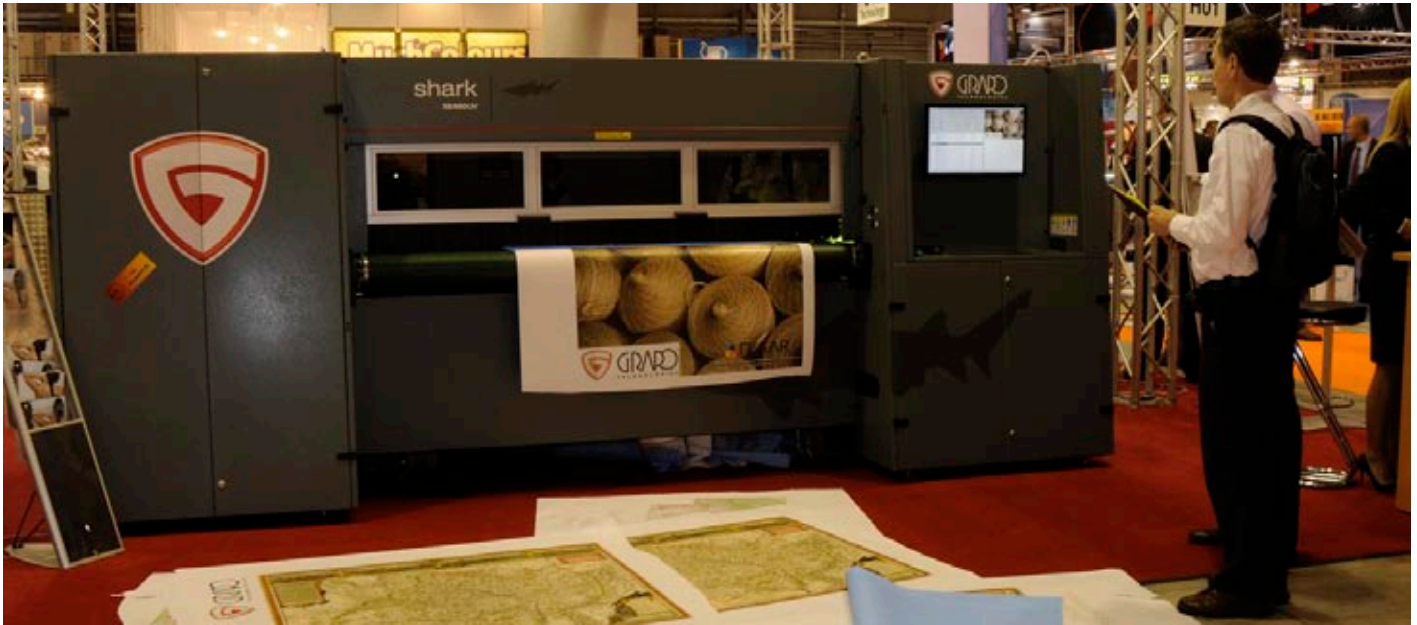
I call the front the area where the LCD and operator panel(s) are situated. This usually means that the other side is where you feed the material in. I call that the back. But many printer companies call the feeding area the front. It makes no difference as long as you define what you mean in advance.

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

Considering that the Shark is completely bilaterally symmetrical there is no way to know which is front or back. And, you can load, and unload, at either side, because the transport band can move forwards or backwards (depending on your preferences or needs).



The front and back are identical in size and shape (because the printer core is bilaterally symmetrical). But you can identify the front by the presence of the LCD monitor and keyboard. Thus by definition, the "back" (see here) is the side with no LCD and fewer user controls.



Dr. Nicholas Hellmuth evaluated the Shark UV printer at VisCom Italy.

The majority of the times, the control area will be at the front, and the loading area will be at the back, although a couple of months ago, we evaluated another UV Combo printer that had an unusual media path: the loading was at the front.



SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

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

At the early stages of this printer, four months would be a realistic time frame for manufacturing. Later two months would be achievable.

61. 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 ever 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).

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

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

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

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

64. 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.

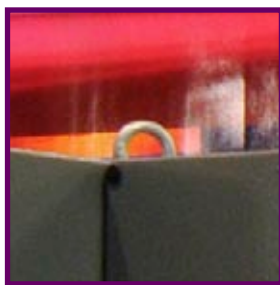
65. What is the size and weight of the printer?

The footprint of the printer itself is less than most others of its class.

INSTALLATION OF THE PRINTER

66. Does the printer have spaces for the forks of a forklift truck to get a balanced hold on the bottom of the printer?

Most sophisticated UV printers of most brands have rectangular brackets built into the underside of the printer, usually both front and back, so you can get use a forklift truck.



At the top you can see industrial-size screw-eyes to lift the printer.

INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS

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

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

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

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

The best exploded views of any product in the world are those by Canon camera.

69. How hard, or easy, are the manuals to obtain BEFORE you buy the printer?

Some printer manufacturers hide their manuals because they don't want anyone to see them. Yet MacDermid ColorSpan offered their manuals openly on-line (on their web site). So the policy varies by manufacturer. We do a full report only on those printers where the manual is available to us.

TRAINING

70. 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).

71. Is classroom training available?

No, classroom training is not common.

72. Is factory training available?

No, factory training is rare, though some companies such as Grapo do welcome factory visits, and a few companies do indeed offer training at the factory.



73. What on-line training is available?

Fewer than 5% of the UV printer manufacturers offer on-line training.

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

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

TECH SUPPORT & WARRANTY

75. What happens if the tech support from your local distributor is uninspired or inadequate? Can you telephone the manufacturer directly? If so, will be manufacturer actively assist you, or only begrudgingly?

MacDermid ColorSpan was good at providing direct manufacturer's tech support. Whether this will continue under HP ownership is not yet known. Dilli also can provide manufacturer's tech support if absolutely needed. Some other manufacturers simply don't provide tech support themselves, or only begrudgingly: they expect their dealers to provide support. We have received information of several instances in Australia of poor tech support for various brands of printers, probably because of the time and expense of sending tech support people to a factory in Japan, Europe, or the USA for training on each model.

I recently visited a printshop with two Grapo UV printers: one Manta flatbed and one Octopus combo roll-fed printer. He was receiving tech support directly from the Grapo factory and was content.

An inadequate dealer or distributor is a good recipe for endless headaches. Choosing a distributor is as important as selecting a brand and model of printer.

76. Can the manufacturer remotely diagnose the printer?

Remote diagnosis is rare, and not available on any mid-range UV-curable inkjet printer. That said, the Shark has the potential to add remote tech support diagnostics.

77. What is the native language of the tech support person?

English and Czech are the two common languages among the tech support people in Grapo headquarters. If you obtain your printer from a local distributor, then they will naturally speak your own local language.



Grapo personnel talk in Czech and English.

CLEANING & MAINTENANCE NEEDS

78. Are there wipers?

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

MAINTENANCE

79. What is the average number of maintenance calls per printer per year?

One infamous UV printer reportedly had an average of 52 service calls per year.

SAFETY & HEALTH CONCERNS

80. How is safety treated in the printed literature?

Each user's manual tends to give a standard list of warnings. But so far the manuals for GCC's StellarJet 250 UV have among the best treatment of safety aspects; in other words, they tell you point blank some of the reality of UV ink and UV lamps. If the warnings do not make you cringe, they are not realistic.

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

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

If you were to ask a dozen people at a trade show which is the ink that smells the worst, unanimous answer is the "HP ink from South Africa." Second UV ink that people comment on the smell is from VUTEK.

82. Is there any ozone suppression system inside the printer?

There is one hose dedicated to sucking the ozone out of the UV lamp housing area of the carriage.

83. Is the machine enclosed, or exposed?

This printer is completely enclosed.

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

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

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

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

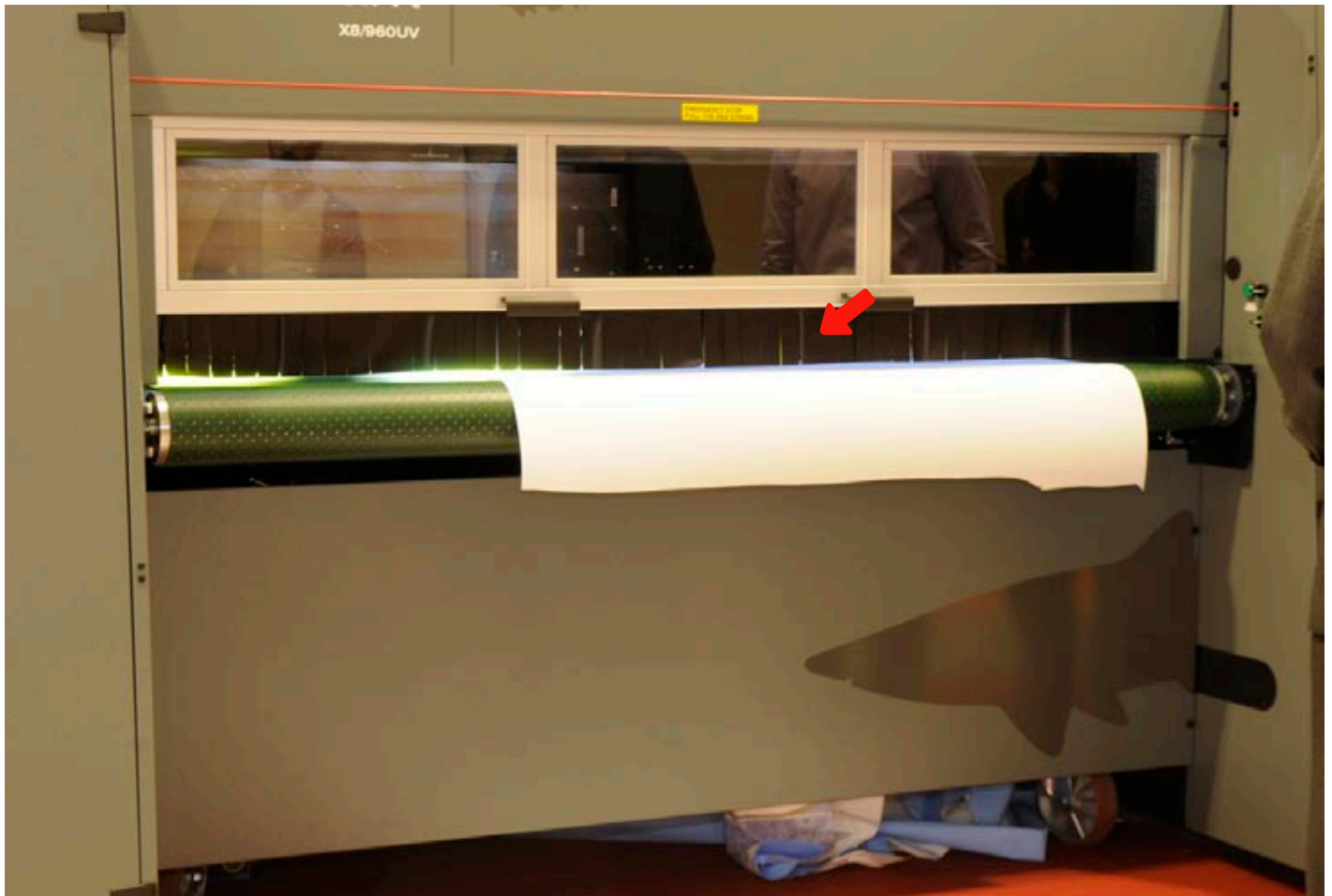
There is a typical skirt of flexible black material segments along the front bottom of the front hood.

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

Yes, there is a typical segmented skirt, but since it is only one layer light can leak out especially when the skirt segments are moved a bit by the rapid passage of the printhead carriage.

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

Normally the vacuum pump is the noisiest part of any UV-curable flatbed or combo-style printer. Roll-to-roll UV printers do not need as much vacuum table area so are not as noisy in this respect. When I was next to the Shark while it was printing I did not notice any specially unpleasant noises.



There is a skirt at the front and at the back.

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

There is nothing sticking out that would hit anyone.

89. 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.

90. Does the ink used in this printer contain chemicals suspected of causing cancer? Does the ink in this printer contain chemicals that may cause problems with genes?

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

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

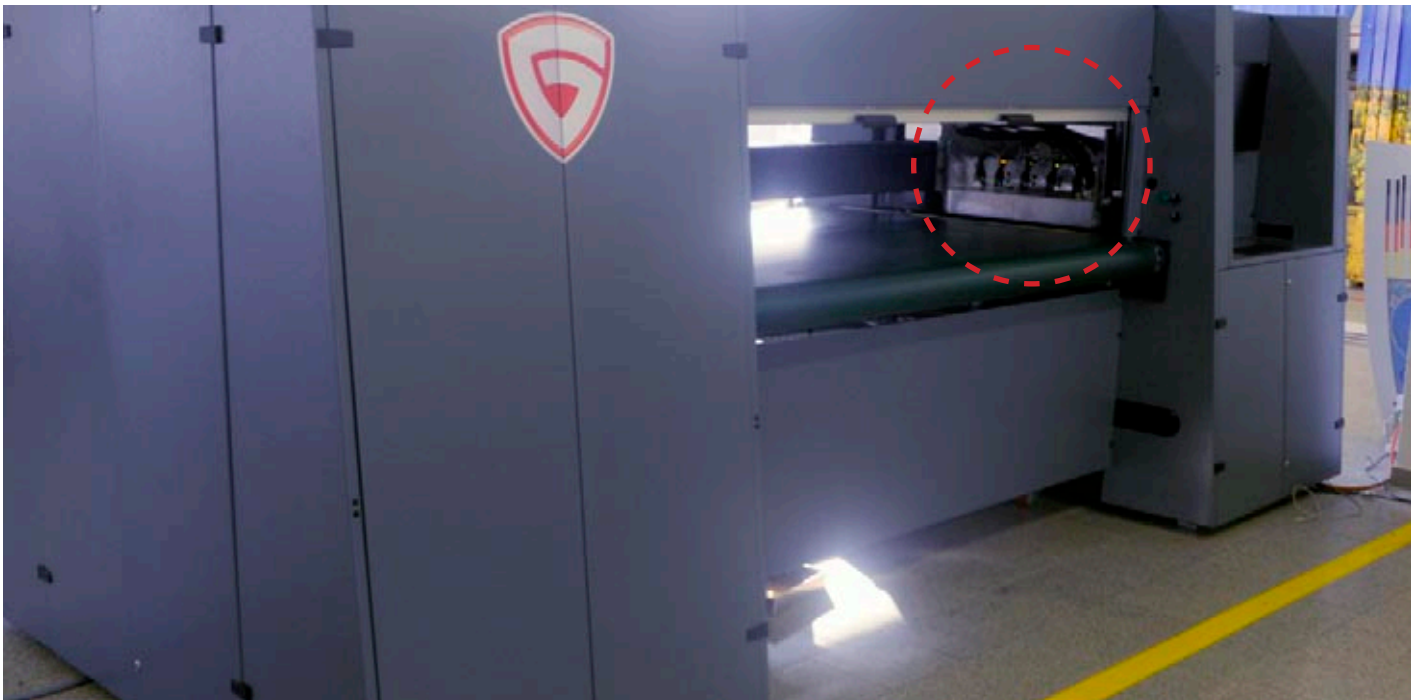
The tables of Oce, Mimaki, and some other flatbeds are bright polished metal (aluminum?). So you have an almost mirror-like surface directly below your UV lamps.

PRINthead TECHNOLOGY

92. Which brand printhead is used?

The printheads are from Xaar, the OmniDot 760.

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



Printhead carriage.

93. Is the printhead identified in the spec sheet brochure by brand or also by model, or not at all?

Grapo is honest and open about precisely which printheads are used and why they selected these heads over other brands.

94. What are the benefits of this printhead?

The printing speed is possible through the ability of the selected printhead to jet ink fast. The variable droplet sizes are essential to avoid needing six colors. Four-color printing is faster than with six colors and four-colors use less ink (so costs less).

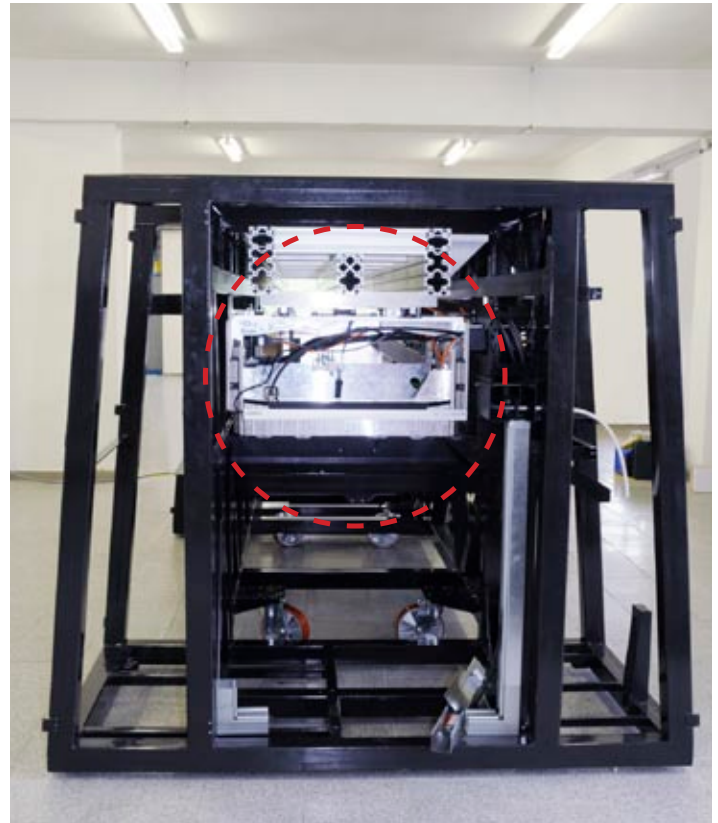
This printer is well thought out. The engineering team knew what they wanted, knew the main problem that had to be overcome (the mis-match between one printing pass and the next adjacent printing pass). They selected a good printhead to take advantage of variable drop size (Xaar 760 Omni-Dot head). DPI is 360 x 360 up to 360 x 720 dpi, with an apparent resolution of 960 x 960 dpi. So you get speed together with acceptable quality: this is not a printer where you are stuck only with billboard resolution.

95. How many printheads per color?

Two printheads per color.

96. How many total number of printheads?

Eight is the total number in the current model, but the carriage has space to allow for four more.



In this lateral view of the structure of the printer, you can see the position of the printhead carriage.

PRINTHEAD DPI & Features

97. What is the drop size in picoliters?

This specific printhead offers a grayscale droplet size, 8 to 40 pl. Most other production printers have a fixed drop size of 30, 50, or 80 picoliters.

98. 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?

Apparent resolution is rated at 960 dpi.

99. How many passes can this printer achieve?

This printer is intended to print one and two pass mode primarily, but can also print up to four passes. In theory it could be set to 16 pass but that would be atypical.

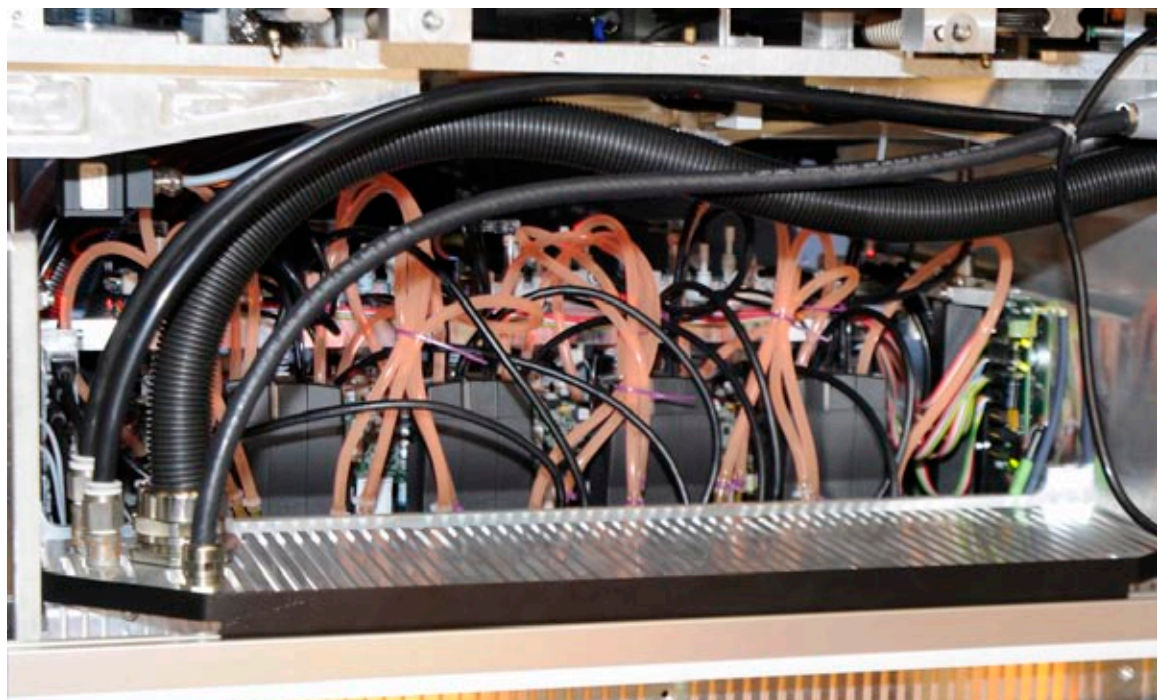
The lower the number of passes, the faster the printer prints, but the lower the quality. At a printer's fastest rated speed, the output is usually unusable for most applications other than distant viewing for a billboard or banner. To achieve viewing quality for Point of Purchase or an honest photo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

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

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



UV printers in general are not characterized by their ability to print small text. So when you see a UV-Curable machine printing a detailed map such as this, you know its printheads are definitely a plus when comparing it to other UV printers.



Grapo Shark inkheads at VisCom Italy 2008.

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.

101. Is nozzle compensation available?

Not yet, but the software and sensors can already detect which nozzle is out, so adding nozzle compensation can come later.

Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING

102. Is printing bi-directional or uni-directional?

You can print either bi- or uni-directionally.

PRINthead Positioning

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

The printheads are staggered.

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



Grapo has their own CNC machining tools. Here is Nicholas with a precision tooled printhead plate for a test prototype of a predecessor of the Shark. The actual printer model today has a different configuration. When you have your own CNC machine in-house you can build a better printer more quickly.

104. How wide is the path of a printhead, or the carriage full, for a single pass (one movement from right to left, or left to right (but not both together)?)

One-pass for this printer does not mean page-array; it means wide-path-one-pass. I can better explain how one-pass is defined in the hardware and software of this printer when I issue the full FLAAR Report after the printer is more accessible. Because of my interest in sophisticated technology that allows speed but does not sacrifice quality, this printer has attracted our attention. The path is about 11 centimeters for each advance of the media in 1-pass mode.

Since it is a CMYK printer, you naturally have to print each color on top of each other, so four movements of the carriage (twice in each direction if you count it that way). It does not print all four colors in a single movement of the carriage. The sequence is YMCB.

PRINthead: Associated Features

105. How is the ink heated? Heater, or hot water?

Water is used to heat as well as to cool the printheads.

PRINthead Life Expectancy

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

Yes, all printheads are considered a consumable. But during testing the printer over the last two years, only three nozzles were lost in four heads. This is in part because the ink is always circulating.

Warranty for a printhead is one year; operator errors are not included. An example of a non-included error would be a head strike.

107. Is the printhead user installable?

If the printer operator is trained and has a personal interest in learning how to do basic service tasks, then yes, the printhead is user installable. The operator would also need to be patient in the printhead calibration (positioning) that needs to be accomplished after putting in a new printhead. This is true of changing printheads in all production printers, and is not a specific issue with the Grapo Shark.

PRINthead CARRIAGE and GANTRY

108. Describe the overall "bridge" the rail structure along which the printhead carriage travels, especially for dedicated flatbed printers that have no hood?

The carriage needs a robust bridge to carry its rapid acceleration and deceleration at the end of each pass. The bridge is a triple truss which includes two rails. The carriage slides along these two rails, propelled by the magnetic linear motor.

109. Describe the carriage "box" that carries the printheads?

The carriage proportions are unique. The carriage, and its interior arrangement, is one of the key features of this new printer.

110. Where are all the electronics situated? Above the heads, behind the heads? On the back side of the carriage?

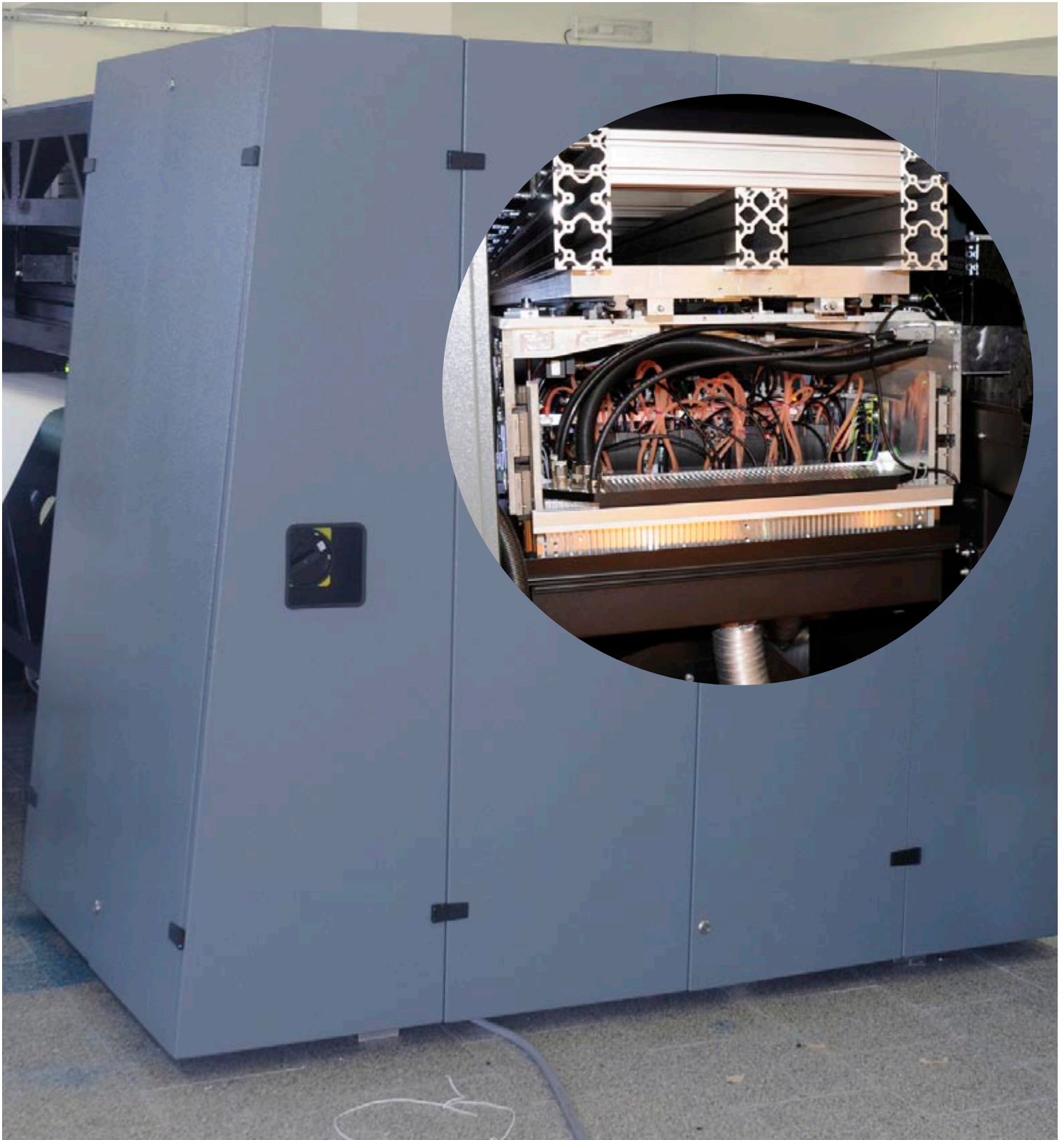
There are two electronics cabinets, one in each back wing of the printer.

Note: the Igus e-chain, motor drives, and other aspects of the carriage movement are discussed in other sections.

MOTORS: Stepper, Linear, Magnetic ?

111. Is the carriage moved by a magnetic field or a traditional motor?

A magnetic linear motor is used to provide significant speed on the Shark, especially acceleration speed. The Inca Columbia Turbo was the first printer to use this system. Then in the last year Durst has added magnetic linear motors to all its Rho systems. Recently Gandinnovations has switched its carriage drive system also to magnetic linear motors. When your printer has a magnetic linear motor, in addition to precision, you don't need all the other miscellaneous parts that an old-fashioned carriage drive system required.



Superimposed photograph; of course there is no actual circular opening at the end. The purpose of this photograph is to document that this is a serious printer for serious printshops who wish to produce lots of signage, fast, and relatively economically.

SUBSTRATES

112. What about edge-to-edge printing (borderless)?

Yes, you can print edge to edge.

113. Can you adjust the rate of media feed?

You need to adjust the rate of feed to remove banding lines caused by media feed that is slightly off. This is not entirely the fault of the printer but a result of the fact that each different kind of material feeds slightly differently.

LOADING MEDIA

114. What thickness can this printer handle?

Not many UV printers can handle the height of materials that the Shark can handle: 9 cm. There is also a minus setting, at the parking area, so you can lower the printhead nozzle area down one unit.

115. Can you measure the height of the material with a sensor, or is it manual?

What you really want to measure is the printhead gap height: the space (gap) between the top of the material and the nozzle plate (the "printhead").

116. If you have to load a really long roll, are their clamps or any other system to allow you to secure the first portion so the first portion won't undo itself while you are several meters away trying to load the other end?

The Durst Rho 351R has clamps so if only one person is available to load a long roll, he can clamp down the first portions that he feeds up and over into the platen area while he is still working on the other end of the roll to get that up and into the roll-feeding system.



SUBSTRATES, Materials, Applications, and Issues

117. What materials can this printer print on perfectly?

At present the tests have been on blueback paper and vinyl, since of course these are among the lowest cost materials. All print samples at VISCOM Italy were done on blueback paper.

118. What materials can this printer print on okay?

It helps if the material is a clean, homogeneous surface, and should all be the same thickness.

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

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

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

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

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

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

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

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

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

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

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

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

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

The Shark has static control material across the full width of the printhead carriage.

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

During dry periods (with low humidity) static problems may increase. With a high static charge (such as with PVC materials), the ink is attracted to charged areas of the material. This results in overspray (ink laydown in unintended areas). Dust can be a problem in places and seasons with low humidity. This is one of several reasons why you should have humidity control in your printshop, to allow maintaining proper humidity level for optimum performance of your printer.

SUBSTRATES: Cleaning, Priming, Preparation

122. 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.

123. How often is pre-treatment required, either receptor coating or other special surface treatment to the material to be printed?

For normal billboard materials no primers are needed.

124. Which substrates must be or ought to be prepared before printing by being corona treated? Corona treatment is to improve surface tension to promote adhesion.

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

125. Which substrates ought to be laminated, top-coated, or otherwise post-treated?

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

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

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



SUBSTRATES: General Concerns

126. Although this printer "prints on almost all materials," what is the adhesion rate with most materials? Does the ink easily scratch off certain materials?

Realize that all statements must be judged based on how long the ink has been on the material, and the surface nature of the material. Not all fluted plastic material is the same; and six months later the adhesion could theoretically be different (based on conditions of display and the nature of the surface of the material).

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

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

127. What other problems in feeding exist? For heavy material? For light material?

Just realize that no transport belt on any combo-style design can feed all materials with the same precision. Some materials will go through okay; others may skip or stutter, and some may skew. This also happens on expensive VUTEk 200/600 transport belts.

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

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

Because the Shark has a special tension roller below the two main rollers, in theory the Shark should not have the problems of wandering belts of other cheaper printers.

APPLICATIONS

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

If you had need or desire to print fine art photos or giclee, yes, this printer has the necessary quality, but most artists and photographers prefer more than CMYK.

129. 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 transport belt. Second, the fibers from fabrics or mats can get onto the printhead nozzle plate and sometimes up into the nozzles.



As you can see in this print, the Shark can reproduce photographs at exhibit quality.

130. What other kinds of applications can you print?

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

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

131. Is there a system for assisting double-sided backlit printing?

No.

INK

132. 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?

One general-use ink is available.

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

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

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

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

The initial model is CMYK only, to maximize speed. The concept is that with variable droplet printheads you no longer need light Cyan and light Magenta to make transitions and light colored areas less visible.

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

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

136. What company makes the inks? Choices include Hex-ion, Sericol, Sun, Triangle, Toyo, and several others.

The UV ink is from Sun, one of the largest ink companies in the world that makes UV-curable ink.

137. Does the printer manufacturer have its own ink chemists on staff?

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



The Shark concept is speed, that's why it has a four-color configuration.

INK: White & Varnish

138. Is white ink available?

White and varnish can be added later in subsequent models; the printhead carriage is already designed with space for such future additions.

139. To use white ink does that require not using light colors in order to make space for the white ink?

The Shark does not have light Cyan or light Magenta to begin with. It is claimed that if you have variable droplet heads (and thus can achieve really small ink droplets) that you don't absolutely need light Cyan and light Magenta. But on the Oce 250, they claim this and I am skeptical; or maybe it is just the dithering pattern of their PosterShop RIP that causes the noticeable dithering pattern (this RIP is renowned for this issue).

140. Is the white ink situated in the same area as the other inks?

This question is in the FLAAR FAQs because the Zund 250 situated their white ink up inside the printhead carriage. If you have 500 features on a printer, 200 tend to be standard (similar solutions on most UV printers); another 200 are special or have a few tweaks, and one or two are unique. On the Shark, the white and varnish are adjacent to the CMYK, but accessible from the end.

INK Cost

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

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

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

Cost of ink varies depending on the dealer/distributor, and depends on what country you are in. Usually the smaller and cheaper the printer, the more the ink costs. The larger the printer is, and the more ink it uses, the lower the ink is priced.

143. How much ink is used to print a square unit?

Average estimated ink usage, at 100% coverage, is 11 ml per square meter.

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

Ink drips into a tray then goes through a tube down into the waste ink container below.

145. How much ink does the waste ink container hold?

The waste ink container holds about four or five liters.

146. Is there an out-of-ink alarm? Is there a warning before actually being out of ink?

In most entry-level systems you see the ink level only when the alarm tells you it's about out. With mid-range and high-end printers you can see the actual ink level whenever you need to see this.

INK: Supply System, Tubing, Filters, etc

147. Where are the printer's ink containers located? Front, back, or end? Up on top or lower down?

The CMYK ink containers for CMYK are inside at the front left. The two small tall tubes near the ink containers are for other aspects of the ink system.

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

At least 10 liters.

149. What is the situation with the ink gelling?

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

150. What filters are on the ink system to trap particles or trap gelled ink?

You can see large Pall brand ink line filters, one about 25 cm from each ink container.

151. 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.

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

Igus brand is used. The energy chain is the plastic linked system that holds all the cables and ink tubing so that it does not get rubbed while being moved back and forth to feed the carriage. Most mid-range and almost all high-end UV printers have an energy chain from the company Igus.

The Igus system is at the far back of the printer.

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

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

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

154. To what degree is the ink heated?

Minimum used during testing is 45 degrees C; average best temperature is about 53 degrees. The optimal ink temperature will be pre-set on the printer when it arrives.

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

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

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

Just ask any ink chemist about ink misting; then ask most sales reps. Most people in a typical booth are in a state of denial, or do not fully understand the concept of misting.

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

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

INK: Longevity

157. What is the longevity outdoors? What about in the full sun in direct sunlight?

In some cases the ink may last longer than the material on which it is printed.

INK Color Gamut

158. Which colors print best?

Realize that the color you see on the final print also depends on the surface color of the material you are printing on.

159. Which colors print poorly or not at all?

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



THE UV CURING LAMPS

160. How many different sets of lamps are there? Is there pinning first and then curing later?

95% of UV-curable printers have only curing UV lamps. Only the Inca Spyder 150 and a few other innovative machines have a pinning lamp before the curing lamp. The Shark has two standard curing lamps, one along each side of the printhead carriage.

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

Virtually all UV printers, such as the Shark, use mercury arc UV lamps. Only NUR and a few others use microwave UV lamps.

Pulsed Xenon lamps have failed the few times they were tried (an early VUTEk UV printer circa 2000-2001; a cheap Oce Arizona 60uv printer).

LED lamps are now being tried in several UV printers, such as by Sun LLC (in Russia), Mimaki, and Roland. The Gerber Solara ion uses a rare type of long relatively cool UV lamp that is not used by any other wide-format inkjet printer manufacturer. Cool curing is not yet fast enough for a high speed production printer.

162. How many watts are the lamps?

5 kw each, so a total of 10 kw.

163. What wave length do the lamps cover?

The UV lamps cover the D spectrum of the UV wavelengths.

164. What brand of lamp is used?

The NUR Expedio Inspiration uses Nordson microwave technology. Gandinnovations uses Dr Honle, but these are traditional mercury arc, not microwave. Mid-range and entry-level UV-curable printers tend to use UV mercury arc UV lamps from Integration Technology. Grapo makes their own UV lamp housing. This is why the lamp housing on the Shark is of its unique shape.

165. How many lamps does the printer use?

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

The Agfa :Anapurna 100 (a printer that was never finished due to being too complex), and its recent replacement, the :Anapurna XLS, have three sets of lamps: all curing, not for pinning. The Lüscher JetPrint, due to its über-dimensional size, may also have needed more than two lamps (whatever it had did not function fully adequately).

166. Can you have one lamp on one setting and the other lamp on another setting? Or do both lamps have to be on the identical setting?

Most printers, including the Shark, allow you to have one lamp On and the other lamp Off (this is usually controlled by shuttering them; not actually turning them completely off). If you are doing uni-directional printing you may prefer to have the leading lamp On (Lamp A).

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

Since these are high-powered UV lamps, they last 850 hours. High power is needed to cure at fast production speeds. A weaker lamp might last 1000 hours or more, but would not cure ink at one-pass or even two-pass speeds.



The GRAPO Shark uses traditional mercury arc lamps.

UV CURING, and ODOR of the printed image

168. 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.

169. Is there any heater to assist in drying the inks (drying as opposed to curing)?

I believe (if I remember correctly, I am writing this on a train from VISCOM Germany in Frankfurt, to inspect two UV printers in a printing company in Hamburg), the Mimaki LED-curing model 160 has a heater to assist curing; if not the Mimaki, then the Roland; one of the two appeared to have a heater. The Durst Rho printer for printing onto traffic signage material also uses a heater.

The Shark does not use any heater for the substrates, neither pre-print nor post-print.

UV LAMPS: Cooling

170. Are there shutters?

Yes, the UV lamp assemblages on the Shark 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. But shutters are primarily for controlling the extreme heat of mercury arc UV curing lamps.

171. How often do the shutters stick?

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

But it may be safer to have no shutters at all rather than have shutters, then depend on them, and if they fail nonetheless, then the UV lamps can set the printer on fire.

172. How many fans are there per lamp?

Because the lamps are water cooled I did not see any fan vents.

173. What other fans are there in the printer, or exhaust ports?

The printer shell has absolutely no exhaust fan openings anywhere on the ends or back. The only exhaust ports that I have noticed so far are two at the top. These are intended to be connected to a suction (ventilation) pump in your printshop to suck out the odor, ozone, misted ink, and heat.

174. How long does it take to cool the lamps down before you can touch them to change them?

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

UV LAMPS: Reflectors

175. Are the reflectors at an angle? What angle, and why?

The reflectors inside the lamp assemblage are slanted so that the light does not reflect in the wrong directions. A wrong direction would be light that reflected off the surface of the material up into the nozzle plate.

RIP SOFTWARE & Printer Software

180. Which RIPs are featured?

Grapo has their own software engineers so they offer their own RIP. But you can also utilize one of the major independent RIP software packages, such as Wasatch, Caldera, etc.

COLOR MANAGEMENT FEATURES

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

ColorSpan has color management tools built into its UV printers, but otherwise this feature is not yet available on other brands of UV-curing wide-format inkjet printers.

PRODUCTIVITY & ROI (Return on Investment)

177. What productivity claims does the printer manufacturer make?

Productivity is listed to be 225 square meters per hour. Naturally I would need to time this to certify it. This is single-pass per color, uni-directional, with acceptable quality for viewing at a normal distance (two to three meters with normal eyesight).

If you prefer “billboard mode” this would be bi-directional, one pass per color, and 300 square meters per hour.

COMPARISONS WITH OTHER PRINTERS

178. When people are considering buying this printer, what other printer(s) are they also looking at?

The owner of Grapo sign printing company seeks a quality better than that of any HP grand format printer, and better speed+quality than the Inca Columbia Turbo.

179. What features on the other printers may be issues?

The NUR Expedio printers can create all four colors on top of each other in two passes, but each CMYK path (which is complete in itself) naturally has a noticeable white or dark band alongside the edge of the next path. This is considered normal, and expected, for billboard, banners, and building wrap: you can't see these defects even at two meter distance, and never at normal viewing distance for a building wrap or billboard (which can be 20 to 50 meters or more). So no engineer has needed to get rid of banding defects on a billboard printer.

But the owner of Grapo billboard, banner, and building wrap printing company also prints POP and signage for close-viewing: in restaurants, bars, grocery stores, airports, malls, etc. He does not want to need two completely different printers: a separate printer for billboards and a completely different printer for quality images and small text. That is too much tech support headache. Plus he may want to print some rigid materials and even some very thick substances.

So the owner of Grapo decided to engineer a single printer that can handle all these needs within one chassis and one print engine. It took him two years to develop the new prototype (since he already had four years prior experience designing, engineering, manufacturing, and using wide-format UV-curing inkjet printers).

If your clients need to have the prints in a retail environment, or where anyone will notice an awful odor, any printer that uses UV inks from some other ink companies may have clients that refuse to accept the prints. Several current UV inks have a legendary smell, Ink Tech being the most offensive, but there are others that are close to their unfortunate record for bad smell. So ink odor is an issue that end-users need to consider.

SUMMARY: Image Quality Issues: Banding

181. How can banding be avoided?

More passes tend to get rid of banding on almost any and all inkjet printers. Of course it helps if the machine is precision engineered so you don't get much banding at four passes and above. Banding at two passes is normal; banding at one-pass mode is expected. So if the Shark has less banding, this would be exemplary. You can eliminate pass-overlap banding by using an interweaving technique (which Mutoh developed and now Roland and others have copied).

SUMMARY: Image Quality Issues: General

182. Is text sharp or fuzzy? What is the smallest text that you can easily read?

Even small text is legible in two pass mode. You can also read the text on a map in 1-pass mode but its sharpness will improve. Sharpness for this kind of printer means getting each color precisely on top of the other color. Otherwise, with a lupe (magnifying glass), you can see that some colors are a micron or so off, so you see a shadow-like effect of that color on one edge of each letter. Nonetheless, the quality of small text on its first day in front of an inquisitive public was as good if not better than most competing production printers. Remember, in the past roll-to-roll UV printers have been designed to print billboards and banners, and not POP. The Shark is an example of a growing class of UV printers which are intended to do both: speed when you want billboards and building wrap yet switchable to a high quality mode for in-store advertising.

Since VISCOM Italy was the first public appearance of the Shark, the engineers and software team still have some tweaks to make for alignment. What is important is that the structure of the chassis and the structure of the carriage all have the necessary precision to accept the improvements in the electronics and firmware to facilitate even a higher level of precision that was shown in Milano.

183. 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.

184. Is enough ink laid down? Density of ink-laydown may affect color to some degree and definitely will effect saturation. A printer that attempts speed may result in less ink being laid down.

The ink saturation has improved noticeably from when I first inspected the printer in summer and when I returned for three more days inspection in November. Now there is plenty of ink even in 1-pass mode.

CONCLUSIONS:

185. Are you satisfied with this printer to the point that you would recommend it to someone else?

I would not waste my time spending days inspecting this printer and weeks preparing this report if I did not find that this printer's potential had merit.

186. If so, why would you recommend that others buy this same printer?

There are four stages to a FLAAR evaluation:

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

The present inspection is based on a factory visit and three days checking on how it printed every day at VISCOM Italy in Milan (November 2008). Since the printer was being prepared and packed for VISCOM Italy, it was not practical to do demo room printing. So there is lots more to come from FLAAR on this printer. The next step is to wait until the printer is in the beta test site, wait until they have used this printer for several months, and then check to see how they like the printer as well as learn about any features that need improvement.

Pros

The software controls the grayscale waveforms to allow the nozzle firing to conform to speed modes. Then the acceleration of the movement of the material conforms to the nature of the material: paper can be accelerated more than a heavy sheet of glass or an MDO board.

At the Shanghai sign printer trade show in July 2008, I noticed that most of the printhead carriages had a spaghetti of cables and stacks of electronic boards. The Fieldcenter Formosa (Anderson Group) was the most "spectacular" in this not necessarily complimentary aspect. The Shark, in distinction, has most of the electronics not weighing down the printhead carriage. This carriage is built for speed, but for bulk. The mass of circuit boards and other electronics are in a separate cabinet, but not on top of the carriage.

The UV lamps are best described in one word: powerful. This power is needed to fully cure the ink in a single pass.

The UV lamps must be water-cooled in order to moderate the heat. Plus this printer is intended to be able to print in many modes: more than just 1-pass. What if you wish to print multi-pass for POP. So you don't want to melt the material with the power needed when in one-pass mode.

The printer is simple in a complimentary sense. By this I mean the printer is not complex. Complex printers would have too many parts (structures, components). A complex printer has more to conflict with each other and break down. Being non-complex, the printer is relatively easy (and quick) to assemble.

Modes (print style modes) are to some degree based on the kind of material you are printing. So if you tell the system you are printing on glass, it knows this is heavy and should not be accelerated at the same speed as PE or paper.

Can handle more height than 95% of the other high-end production printers: 9 centimeters.

Another positive aspect of the Shark is that on its first public appearance it printed all day every day. There were no gaffes, no discomforting failures, no obvious weak points. Actually the Shark performed better than most complex UV printers on their first launch.

Speed is obviously relative to quality. We all know that speed statistics vary from ludicrous to outright misleading. When I was in the booth I overheard people every day comment favorably that they actually noticed the speed, yet they did not have to be subjected to "billboard quality" that tends to be embarrassing to see up close. I listened especially carefully to the top managers and CEOs of competing companies who were standing in front of the Shark.

Cons

The downsides and issues will become apparent as the printer becomes more mature. It is rare that any complex UV printer actually functions adequately on the day of its launch in front of the public. The VUTEk DS at DRUPA was so non-functional its printing was

simulated! The machine had no ink and no printheads. A finished image was put on top, to pretend it was being printed.

The million-dollar HP Scitex FB7500 had a yellow ink issue and a few other glitches at its launch at SGIA '08.

The Gerber ion failed to print adequately for nine months after its launch. Yet since SGIA this cationic printer has been functioning well (other than being slow). So all printers improve with time (except for the Crystal Jet, the Kodak 5260, the Encad VinylJet, the Océ Arizona 60uv, and the half-million dollar Luscher JetPrint. Even the unfortunate Chinese-made DuPont Cromaprint 22 improved every six months. At its first trade show appearances it could barely print more than an hour or so. And 95% of the first generation printers had to be junked.

However these issues are not expected of the Shark. But it is statistically unlikely that any major new printer will actually print flawlessly on the day it is first shown to the inquisitive viewers at a trade show.

Comments & Suggestions

Obviously we can't inspect every single printer in the world at its factory demo room, but when access is facilitated, we are on an airplane: last year over 400,000 kilometers, this year a bit more. So although I have been in the Gandinovations factory twice (each time for two days), in the Durst factories twice this year alone (both Lienz and Brixen total time over a week), twice at the Yuhan-Kimberly textile printing demo room and test facilities in Korea, I have never been to any Scitex Vision or HP Scitex facility for a comparable actual inspection of any of their printers. But I have been to VUTEk four times, to Teckwin factory in China twice (most recently for two days), L&P Virtu factory and demo room, Spuhl factory and demo room, etc.

As soon as testing is completed in a demo room or at a best test site, this FLAAR Report will be updated with photographs of print samples, if you are in Milan you will see it yourself.

This printer is the result of a very simple situation: the owner of a printshop (Grapo is a billboard and banner printing company) needs faster production printers for his growing signage business. But he does not want to have a giant CORjet and a huge TurboJet in his printshop (he has plenty of space, enough for several rows of these actually). But he would rather spend that same million+ dollars on developing a printer more suitable to a real-world signage printshop such as his own.

So he made a list of features that his printshop needed, mostly aspects not present on competing printers, and he then had his electrical, mechanical and software engineers design the ideal printer. This is the Shark.

Most recently updated Nov. 21, 2008.

First issued Autumn 2008. Previously updated Nov. 3, 2008.

Updated again Nov. 7, 2008.

Enjoy visiting other FLAAR network web sites

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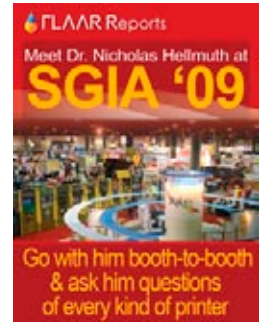
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What's next at FLAAR ?

Our report on Caldera RIP is being updated. We are receiving more training on the HP latex ink printers, since more people are writing asking FLAAR about this ink than we anticipated. FLAAR was initially trained on HP latex ink first in Israel and then at the world headquarters of Hewlett-Packard wide-format printers in Barcelona (all before the printer was even released to the public or shown at any trade show).

To meet Nicholas and ask questions directly, you can make a reservation for consulting with him at SGIA in New Orleans.

If you are in Europe, you can make a reservation for consulting with Dr Hellmuth at VISCOM Madrid, VISCOM Dusseldorf or VISCOM Milano.



[click here](#)

XY Cutters options



Once you have a UV-curable printer, the next item you should consider is a digital XY contour cutter-router.

FLAAR has been inspecting various brands of XY contour cutters and routers, including visiting factories where they are manufactured and doing site-visit case studies.

During October more FLAAR Reports will be issued on this subject. Here are a few photos to show you what we will be evaluating





Complete Workflow for wide-format inkjet printing

Once you have a UV-curable flatbed, hybrid, combo, or roll-to-roll printer, there are several other components of the workflow that you need:

- RIP software
- an understanding of color management and ICC color profiles
- and an awareness of when and whether you need lamination or top coating

Every printer manufacturer will tend to say that the output with their inks do not require lamination....

- But what about floor graphics ?
- What about vehicle wrap ?

And what about covering over cure-banding and banding from feeding inaccuracy ?

- What about the fact that 75% of UV-cured printers can't produce gloss and some not even satin surface appearance?

leading brand of coater, found that it did not work to his expectations. So he looked around at several trade shows and then bought a Drytac UV coater.

FLAAR sent Dr Nicholas Hellmuth and one Technical Writer to inspect the liquid coating system, spending two days at the printshop in Illinois. The FLAAR Report is now coming out this week or next week.

So whether you print giclee, or décor, or signage of all sizes, shapes, and materials, you can now look forward to the FLAAR Reports bringing you innovative reports on more than just printers.

If you need information now (since the FLAAR Report will take another week or so to finish) you can contact Drytac for spec sheets and information on applications: toll free (USA) **1-800-975-6336**, Toll free Canada: **1-800-353-2883**

If from elsewhere in the world, write info@drytac.com

To see the FLAAR video on our inspection for the evaluation, [click here](#)



Hmmm, So now you know why FLAAR is evaluating liquid top-coating equipment and studying film laminators and liquid laminators. Indeed one of the several new staff that we hired is an experienced printshop operator with practice on VUTEK solvent printers and Seal brand liquid laminators.

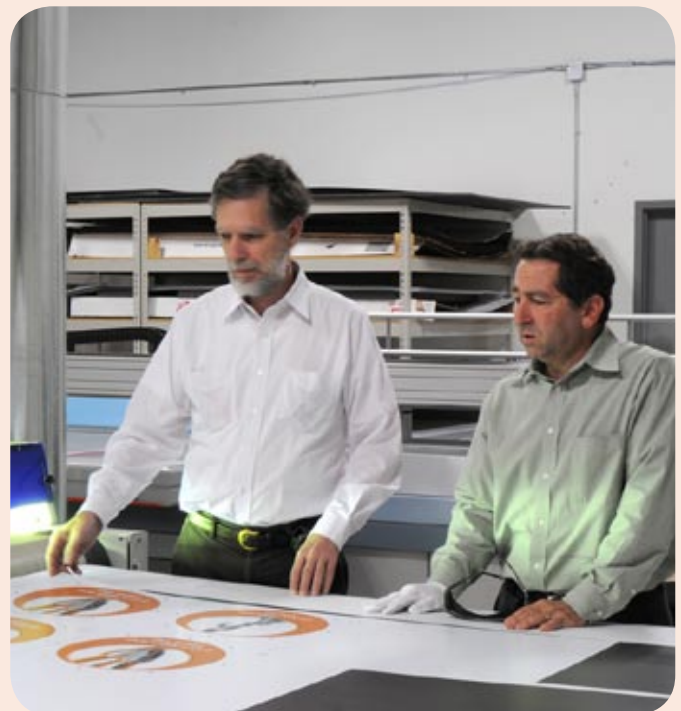
Our first major research project is on the UV-cured liquid top coating system of Drytac. We found a printshop that had bought a the #1



Here is the printer and coater operator, Jacob Duquenne. Notice that FLAAR actually makes printshop inspections and actually checks out how the equipment performs.

The print shop is a 6-hour round trip drive from the FLAAR office in St Louis, so it was relatively easy to reach. You can also download the FLAAR Reports on the other equipment at this printshop: Seiko ColorPainter H-104s.

And, while we were preparing the Seiko evaluation, we decided to issue a complete glossary on solvent printers: eco-, mild-, lite-, and bio-solvent.



Here is Nicholas interviewing the owner of the coater. Previously he had bought the biggest name brand, but their UV coater did not function adequately and he asked them to take it back. Then he spent time checking out every single other brand: he selected the one you see here.

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. We do not mind eating crow, though so far it is primarily a different philosophy we practice, because since we are not dependent on sales commissions we can openly list the glitches and defects of those printers that have an occasional problem.

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

Licensing Information

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

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

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

Update Policy

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

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

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

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

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

Please Note

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

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

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

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

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

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

Citing and Crediting

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

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

The material in this report is not only copyright, it is also based on years of research. Therefore if you cite or quote a pertinent section, please provide a proper credit, which would be minimally "Nicholas Hellmuth, year, www.FLAAR.org." If the quote is more than a few

words then academic tradition would expect that a footnote or entry in your bibliography would reference the complete title. Publisher would be www.FLAAR.org.

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

Legal notice

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

Advisory

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

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

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

Or the product may indeed have a glitch but one that is so benign for us, or maybe we have long ago gotten used to it and have a 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 laminat-

ing 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 lifted 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 to have a fair record of response; Teckwin is one (based on a case of two problematical hybrid UV printers in Guatemala). The distributor said that Teckwin sent a second printer at their own expense and sent tech support personnel at their expense also. But unfortunately both the hybrid UV printers are still abandoned in the warehouse of the distributor; they were still there in January 2009. But Teckwin has the highest rating of any Chinese company for interest in quality control and realization that it is not good PR to abandon a client or reseller or distributor all together.

Recently we have heard many reports of issues of getting parts from manufacturers in other countries (not Asia). So just because you printer is made in an industrialized country, if you are in the US and the manufacturer is X-thousand kilometers or miles away, the wait may be many days, or weeks.

Lack of Tech Support Personnel is increasing

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

The recession resulted in even more: some manufacturers may need to skimp on quality control during a recession, or switch to cheaper parts suppliers. Plus they are not hiring enough tech support during a recession. So the bigger and more successful the company, in some cases the worse these particular problems may be.

Any new compiled printer may take a few months to break in

Any new printer, no matter who the manufacturer, or how good is the engineering 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 LUSCHER JetPrint: so being "Made in Switzerland" was not much help.

Counterfeit parts are a problem with many printers made in China

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

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

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

It is typical for some enthusiastic vendors to claim verbally that their printer can print on anything and everything. But once you unpack

the printer and set it up, you find that it requires primer on some materials; on other materials it adheres for a few weeks but then falls off.

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

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

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

Be sure to check all FLAAR resources

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

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

Acknowledgements

With 12 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, Raster Printers (EFI Rastek), DEC LexJet, DigiFab, Barbieri electronic, Seiko, 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.

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

Barbieri electronic (color management), Caldera (RIP), ColorSpan, DEC, Durst, Gerber, Grapo, IP&I, Mimaki USA, Mutoh, Dilli, GCC, NUR, Oce, Shiraz (RIP), Sun, Teckwin, VUTEK, 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. 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 improvement in the next generation, we let people know. If a product is hyped by what an informed user would recognize as potentially false and misleading nonsense, then we point out the pathetic discrepancies very clearly.

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

Actually, most of our reviews are based on comments by end users. We use their tips to check out pros and cons of virtually every product

we discuss. You can't fool a print shop owner whose printer simply fails to function as advertised. And equally, a sign shop owner who earns a million dollars a year from a single printer brand makes an impact on us as well. We have multiple owners of ColorSpan printers tell us that this printer is their real money earner for example. We know other print shops where their primary 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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<p>FLAAR Reports</p> <p>Brief History of the Development of UV-Cured Inkjet Printing</p> 	<p>FLAAR Reports</p> <p>How does a UV-Curable Printer differ from a Solvent or Eco-Solvent Inkjet Printer?</p> 	<p>FLAAR Reports</p> <p>UV Lamps for flatbed Inkjet Printers</p> 	<p>FLAAR Reports</p> <p>Introduction to UV-Cured Inks</p>  <p>Including Cationic UV Ink</p>	<p>FLAAR Reports</p> <p>Tips, Info, Help, Documentation on Piezo Printheads Used in UV-Cured Inkjet Printers</p> 

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<p>Trends in UV printers at VISCOM Germany 08</p>	<p>TRENDS, Part II: <i>Markets & Technologies</i> UV-cured printers at ISA 2009</p>	<p>TRENDS, Part I: <i>Analysis One by One</i> <i>of the UV-cured printers</i> ISA '09</p>	<p>UV Market TRENDS Observable at FESPA Digital Europe 2009</p>	<p>TRENDS in 2009 <i>Analysis One by One</i> <i>of the UV-cured printers at</i> FESPA Digital Europe</p>
<p>TRENDS of UV-Cured Wide-Format Printers Shanghai '09</p>	<p>UV COMBO FLATBEDS Shanghai 2009</p>	<p>TRENDS IN HYBRID STRUCTURE UV PRINTERS Shanghai 2009</p>	<p>UV Roll-to-roll Observable at Shanghai 2009</p>	<p>UV Flatbed Printers at APPPEXPO, Shanghai '09</p>

UV Printers Manufactured in China, Korea and Taiwan

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