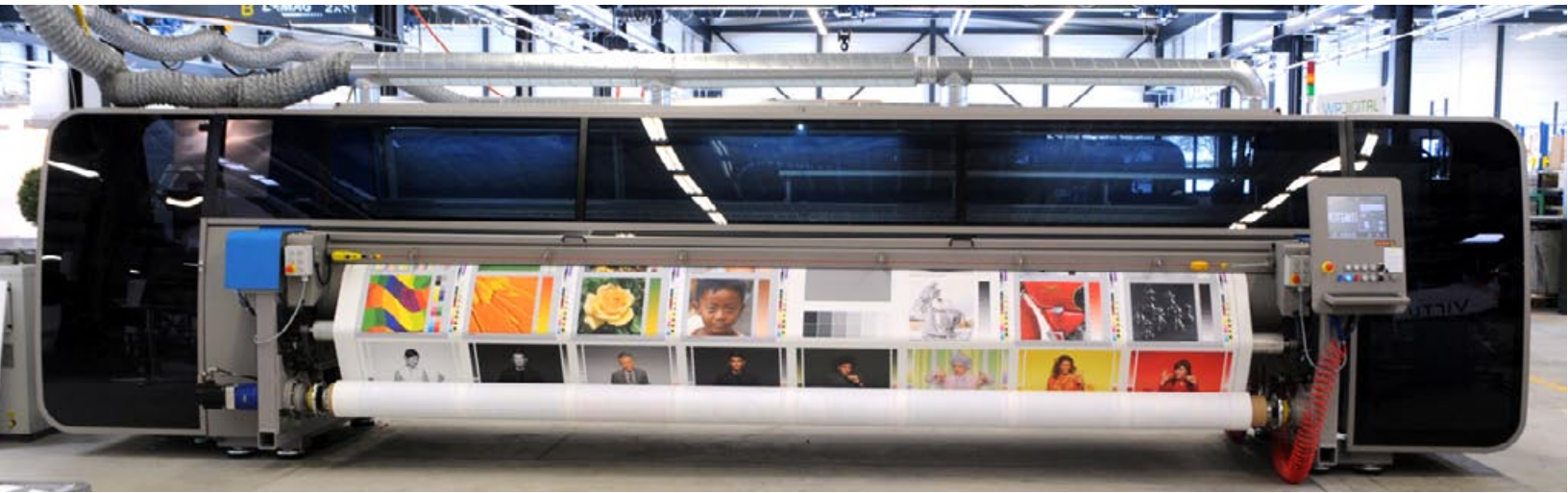


Grand Format Roll-to-Roll UV Printer



Polytype Virtu RR50



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Polytype Virtu RR50

(Previously WP Digital Virtu RR50)

THE BASICS

1. Brand name, model?

Polytype Virtu RR50.

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

At present there is only one width: 5 meters. But there will be several options (see below and see later in this description).

- 36M-4C-30 (36 Module; C,M,Y,K; 30pl)
- 36M-4C-80 (36 Module; C,M,Y,K; 80pl)
- 36M-6C-30 (36 Module; C,M,Y,K,LM, LC; 30pl)
- 36M-6C-80 (36 Module; C,M,Y,K,LM, LC; 80pl)
- 36M-4C+2W-30 (36 Module; C,M,Y,K + 2 x W; 30pl – only Spotcolor)
- 36M-4C+2W-30/80 (36 Module; C,M,Y,K + 2 x W; 30pl for C,M,Y,K and 80pl for W– only Spotcolor)
- 36M-4C+2W-80 (36 Module; C,M,Y,K + 2 x W; 80pl - only Spotcolor)

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

WP Digital is the designer of the Virtu printers manufactured by Spuehl in Switzerland. WP Digital (now Polytype) does not own Spuehl, they own the rights to the former digital printers only. The factory itself is still owned by Spuehl.

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

In past years the European model (from Switzerland) was slightly different than the printers made in the US (in Florida by L&P). L&P no longer designs or makes any UV printers whatsoever; everything is done in Europe (in Switzerland).

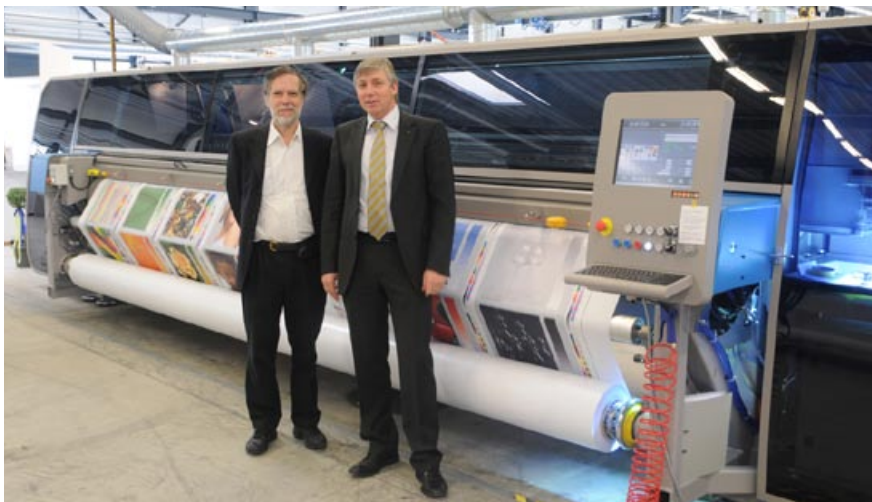
5. What other printers of other brands are comparable?

As of May 2009, a number of 5-meter roll-fed UV printers from different companies are already out there in the market. For instance, the HP Scitex XP5300 and XP5100, the efi VUTEk GS5000r, Matan Barak5 (these three have been manufactured in Israel), the new Durst Rho 500R, introduced at FESPA '09.

Also the 5-meter versions of the roll-to-roll printers of Gandinnovations, the Jeti JetSpeed and the Jeti Galaxy, but Gandinnovations, filed for bankruptcy on May 21st 2009.

6. When and where was this model first introduced?

The RR50 was first shown to the public in late February 2009 during an InHouse event in Wittenbach, Switzerland.



Nicholas Hellmuth, president of FLAAR and Peter Ruth CEO Polytype group at the event where the WP Digital Virtu RR50 was launched.

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

At the first public showing of this printer two fully functional printers were printing every day all day for all days of the event. This is a good omen. It would be appropriate to consider the printers (as of the last days of February 2009) as between alpha stage well advanced to near beta stage. As it was planned, it was successfully shown at FESPA 09 in Amsterdam, and even when it is still in beta-stage, WP Digital is already taking orders.

8. List price?

€330,000 to €395,000. The price varies according to the options you select.

Polytype is the new company name formerly known as WP Digital. Because this report was written during the WP Digital era, the old name gets mentioned throughout the text, but further updates will refer to the company as Polytype



WP Digital Virtu RR50 at FESPA Amsterdam '09. The booth of WP Digital had a lot of visitors every day.

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

Options include the ability to unload as well as load from the front. I do not know any other UV printer that facilitates these options.

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

Yes, end user must provide compressed air.

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.

The operator training covers printhead exchange and necessary maintenance, for the most common machine consumables replacement.

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

Depending on the country and technical skills and company strategy, there are dealers that do get implicated in technically support the machine.

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 do allow end-users to take advanced service training.

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?

There are sales partners all over Europe: Croatia, Cyprus, France, Great Britain, Greece, Hungary, Italy, Lithuania, Macedonia, Moldova, Poland, Portugal, Rumania, Russia, Serbia, Slovak Republic, Slovenia, Spain and of course, Switzerland.

There is also a Polytype office in the US, in New Jersey. Arrangements are being made for Asia.

14. What kinds of leasing or other financing are available?

Leasing or financing programs vary according to the sales partners (dealers).



Rear view of the WP Digital Virtu RR50 at FESPA Amsterdam '09.

FEATURES OF THE PRINTER: Vacuum

15. Is there a vacuum function?

Yes.

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

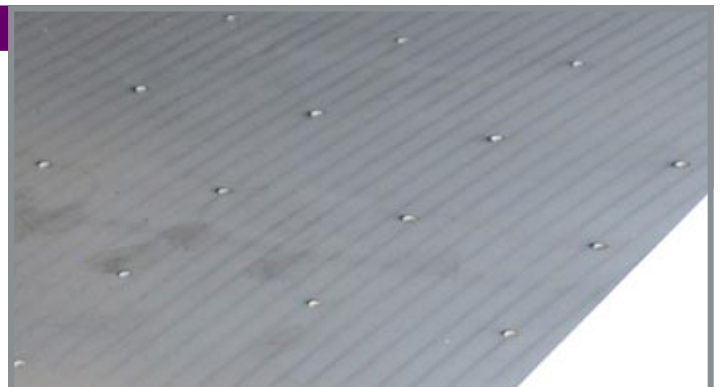
Sophisticated air pump.

17. If pumps, how many pumps are there?

Four, in the current models.

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

No.



Here you see the vacuum holes in the platen.

STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path

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

This is a dedicated roll to roll printer which (correctly) makes no attempt to jerry-rig any additional things such as a table to handle thick or rigid material.

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

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

Stationary platen

21. Describe the platen.

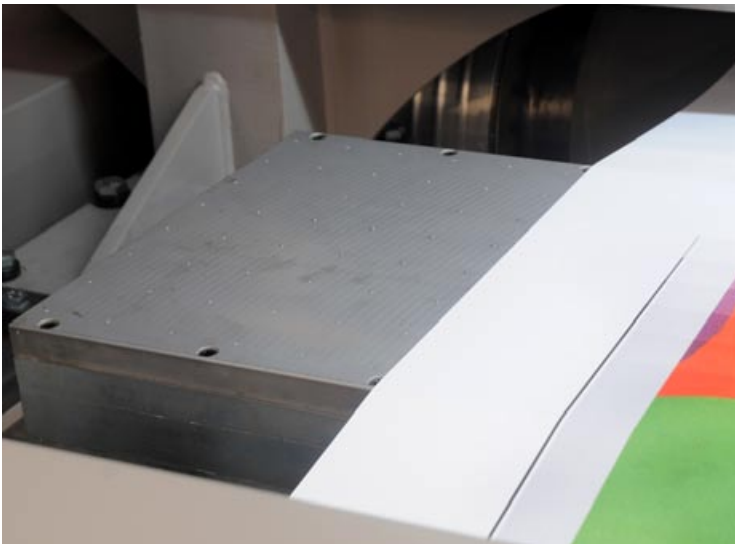
The platen is about 1ft wide and has eight widely spaced rows of vacuum holes.

22. Are there edge guards at each side (end) of the platen? At left, or at right, or both?

There are no edge guards in the platen.

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

This printer was designed and manufactured from the ground up to be a UV printer.



Left end of the platen.



Right end of the platen.

ROLL-FED

24. How is media held flat? Vacuum table? Pinch rollers?

When the substrate reaches the printing area, it is held flat by the vacuum. It is essential that the media does not have wrinkles or bumps that could cause head strikes and printing defaults.

25. How is roll media fed? Pinch roller against grit roller?

Media is moved by the system of rolls. There is a continuous pinch roller at the back, but it is used only for certain materials.

26. Or does the printer use tension rollers instead of grit rollers?

Yes, the system of rolls moves media by creating tension.

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.

27. What size? What positions are the rollers relative to each other?

The pinch roller at the back is a continuous roll.

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

Opposite of the expected, rolls are held on a spindle.

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

29. Is there an air (pressure) core system?

Yes, the cores of the rolls are held by tight by a compressed-air system in the feeding and take-up spindles. You feed air into the spindles with the air gun.

Air core spindles tend to be used only on grand-format printers costing over a quarter of a million dollars.

30. 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?

Yes, there is a dancer bar

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

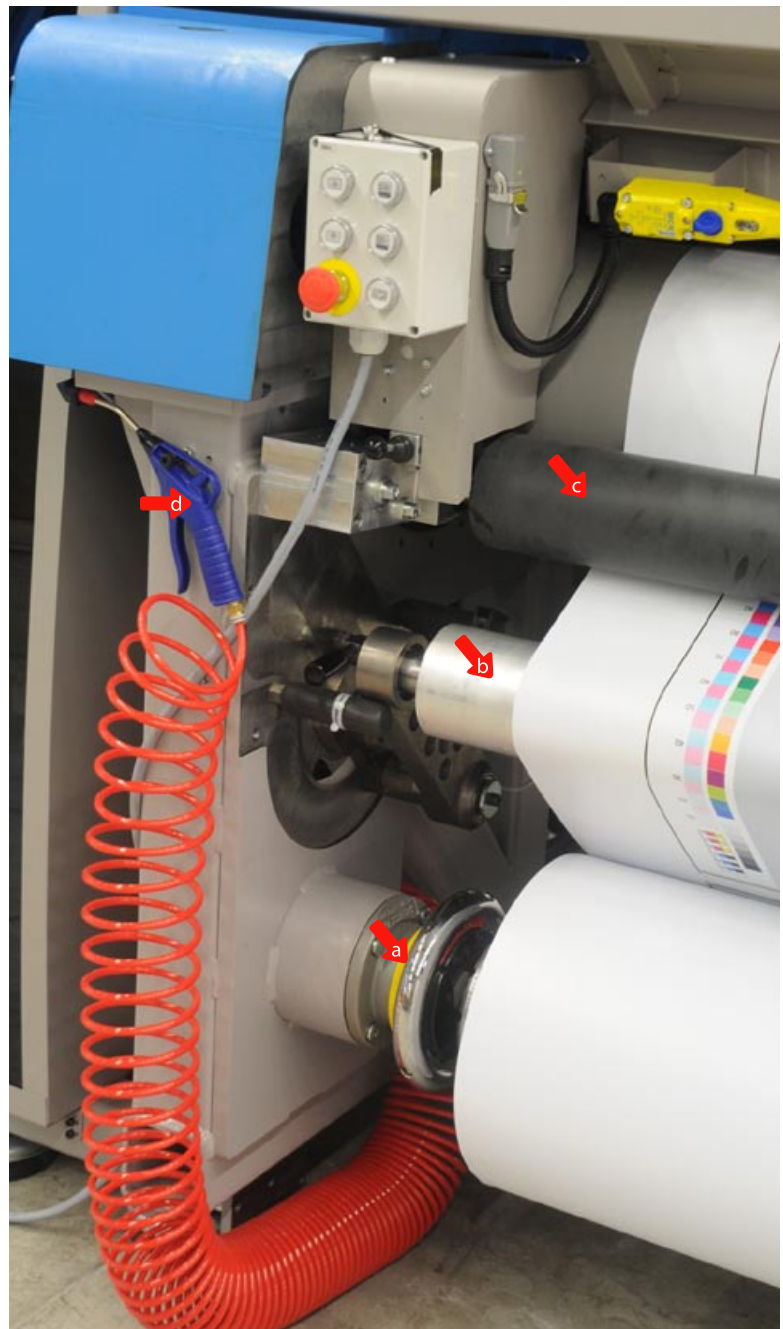
31. After the feed roller (or spindle) is there a set of two fixed bars, one above either other (a tension set)?

Yes. There are two rollers one above the other that create tension.

32. Is the feeding area for roll-fed material physically attached to the printer or is it out in front and not attached?

The feeding and take-up system are physically attached to the printer.

Skew is a common downside of a conveyor belt transport system. The reason is because the belts are flexible. To some degree the



Rolls of media are held by a spindle (a). Tension is created by a system of rollers (b, c). The back and front spindles hold the core of the rolls of media with pressurized air supplied by the air gun (d).

flexibility is inherent, since most belts are woven material. The heat will also cause the belt to become flexible. These aspects are not specific to Grapo but are one of the pros and cons of the combo transport belt system.

As a result Grapo learned that it is actually more practical to have the media roll out in front of the printer rather than the roll-fed mechanism being bolted to the front of the printer. If the roll-fed system is rigidly affixed to the front of the printer, and has no manner of fine-tuning the position of the feeding rollers, after many months the rolls may not be 1000% parallel to the transport belt. By having the roll-fed mechanism free, and movable, you can allow the paper to feed itself in a parallel manner.

Plus, the movable roll-fed unit allows you easily to move your media around and change media (if you have a second roll-fed unit you can simply switch the entire unit rather than having to off-load and on-load a different kind of substrate.

The movable roll-fed unit is common and not harming an entry level, or mid range printer running speeds that allow a steady unroll of the material from this unit. In industrial usage and construction of a machine such as RR50, the movable roll –fed unit is not appropriate for usage.

33. How is the roll media handled at take-up position? For example, is there a dancer bar? If there is no dancer bar, is there at least a tension bar?

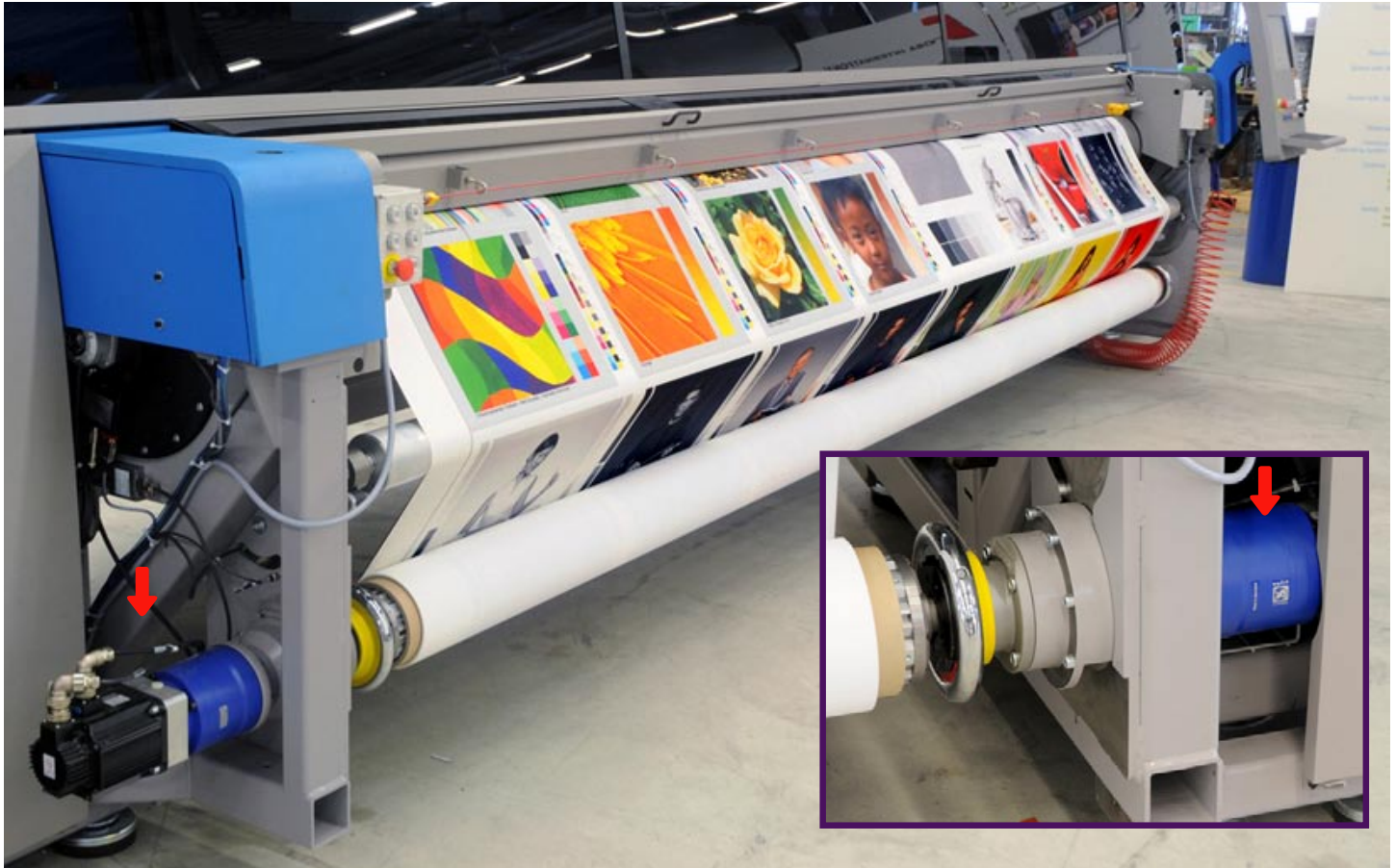
Just before being wind up, media rolls over a dancer bar.

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

You tape it down, as is usual in most wide-format roll-fed printers.

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

Yes, it works unattended. It has a motor at the left that is synchronized with all the other elements of the roll-fed system.



The feeding and take-up systems are physically attached to the printer. As you can see in the lower left corner and the inserted photo at the right, the feeding and take-up spindles are moved by independent motors.

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

Yes. You can print on up to 3 rolls at a time. The printer is still in beta stage, and WP Digital is still doing tests to print on more than 3 rolls.

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

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

There is a trough to capture 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.

At the front there is an optional cutting system—the slitting unit—to cut media in the Y axis. For example if you are printing 3 banners in the same piece of media, you will need to cut them apart.

When you finished printing, the cutter is adjusted manually.

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

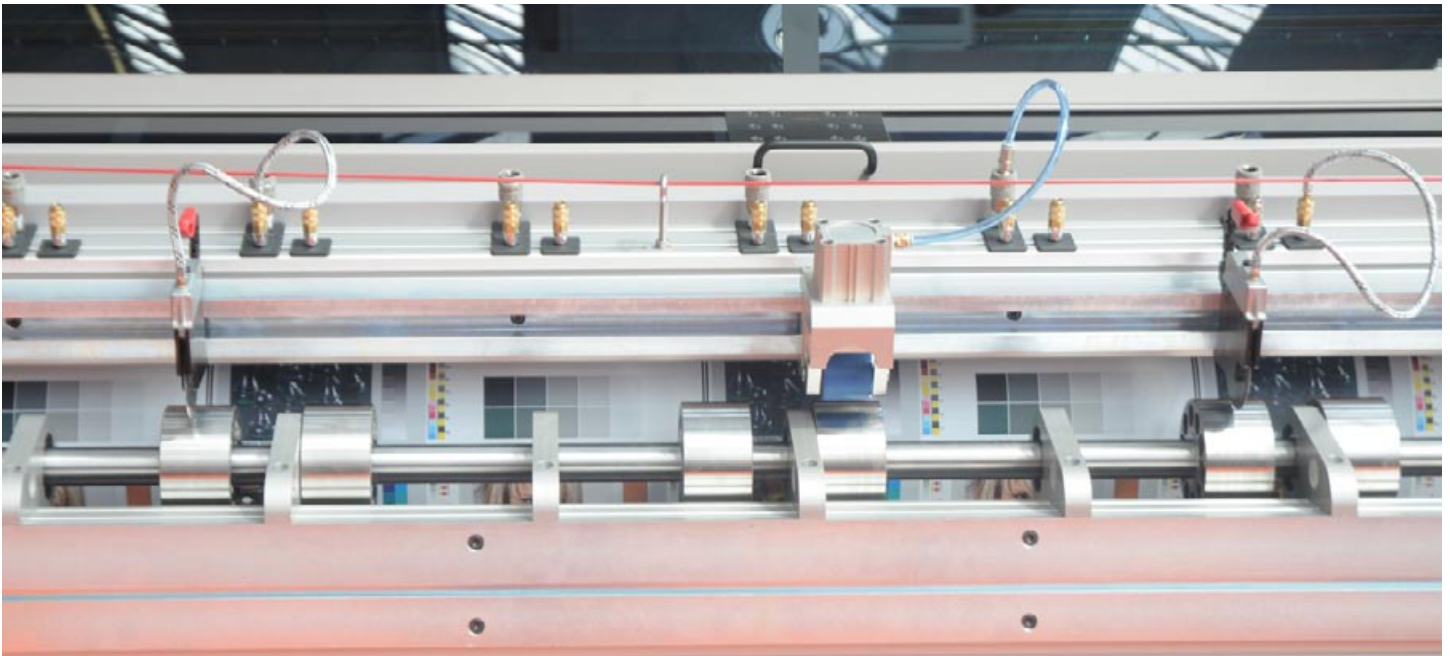
The slitting unit is up near the platen.

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

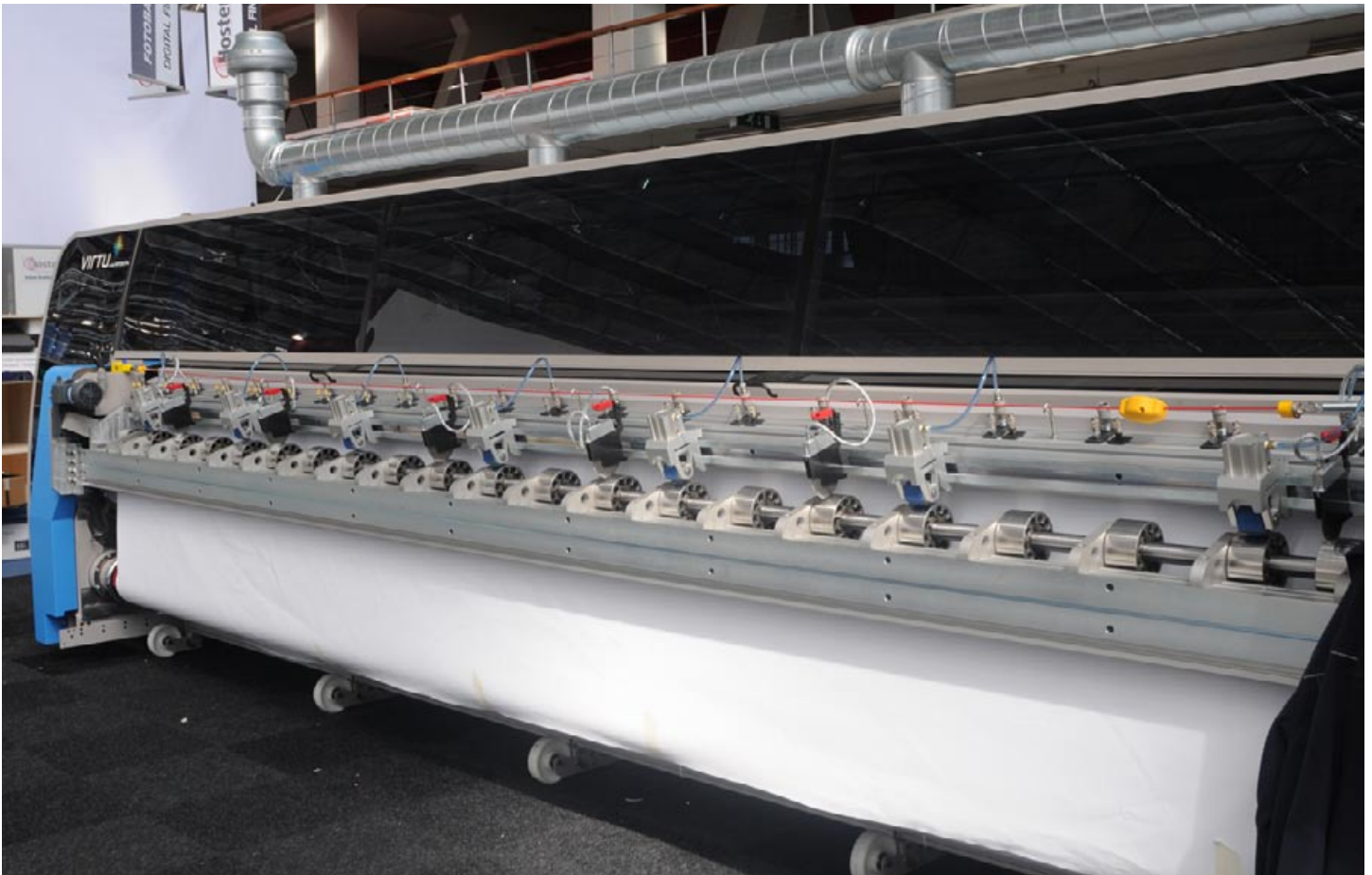
Most combo-style printers have no area to put such a knife slot.



The slitting unit is located at the front, just after the printing area. These knives are adjusted manually but they work automatically.



Front view of the slitting unit.



This cutting mechanism you see at the front is optional. However, this accessory can help you speed up your production times.

STRUCTURE: Miscellaneous

41. 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.

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

Yes, the printer has two leveling supports at each corner, so a total of eight leveling systems.

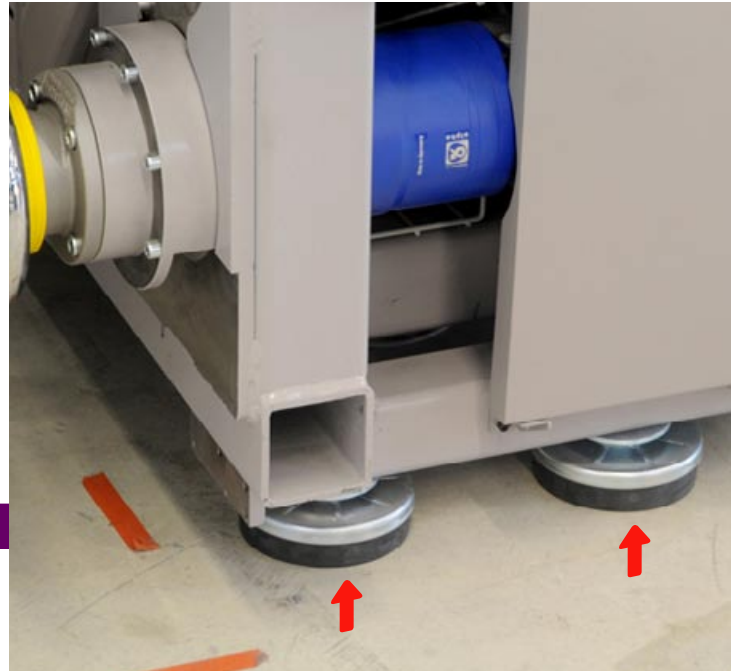
43. Do the wheels have a lock on them?

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.

UPGRADES, Future Improvements?

44. Since this printer is new, when will it be possible to see upgrades or improvements?

Engineers at WP Digital plan to have it ready for late summer or autumn 2009, with all its options.



The printer has two leveling supports at each corner.

Miscellaneous

45. 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?)

This is a dedicated roll-to-roll. The printhead carriage moves in X direction as the media is moved in Y direction.

For example, on the Inca Columbia the flatbed itself moves in and out for every line of print. The WP Digital Virtu RS series machine is unique in that it has two options for movement, both the material and the head assembly in X, Y directions.

Most traditional combo style UV printers move 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.

46. 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.

As a heat prevention the operator interface software is allowing carriage overtravel that can be manually modified according to the needs of specific materials that are deforming with heat.

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

Yes.



The WP Digital Virtu RR50 is a dedicated roll-to-roll printer.

OPERATING THE PRINTER

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

There are hotfolders at the level of the operator interface allowing possible direct Rip to Virtu machine communication.

49. What sensors does the printer have?

There are sensors in the printhead carriage, sensor on motors. At the back, the rolls have a tension sensor; if the printer runs out of media, the feeding rolls will detect there is 0 tension and the printer will stop.

50. In the main area for operation, is the machine software based (touch screen), or with physical control buttons? Or both?

The machine is software-based but there are also physical buttons, levers and gauges.

The Durst Rho printers are touch-screen operated. The Gandinnovations are keyboard operated. The Fieldcenter Formosa UV printer has many cranks and manual switches. So clearly there are several equally valid ways of operating a computer.

51. Do you get an LCD screen in the printer or other real computer monitor? How big is the screen or monitor?

Yes you get a real computer monitor. It is bigger than 17".

52. Is the position of the LCD screen or monitor user-adaptable?

The main control area was designed as an independent surface that can be swiveled to certain degree.

53. Can the keyboard be moved or is it fixed into the structure of the printer?

The keyboard is fixed into a ledge of the control panel.

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

Increasingly too many UV printers have slick exterior skins. They look like a designer style, but are impractical because there are no ledges for storing cleaning fluid, wipes, Coca-Cola cans or coffee mugs, etc.

55. Where does the operator stand or sit?

At the right.

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

At the back there are small button panels to control the unwinding system. There is also a lever to control the dancer bar and a smaller lever to control the pressure rollers.

Most of the operations are done at the front.

57. What controls are on either end?

There are no controls at either end.

At the back you find small control panels to control basic tasks of winding system, and pinch roller. There is also an emergency stop button.



Most of the operations are controlled via software, but below the keyboard you see levers, toggles and gauges.



58. Can you do unattended printing? For how long? How about overnight?

Yes, you can do unattended printing. The time that the printer can operate unattended will depend on the length of the material. The tensor bars have a sensor to indicate via software that there is no tension (the printer ran out of media). That stops the printer.

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

Considering the size of the rolls, two or three operators are required.

60. Is there a pole with beacon lights?

Yes, this is one of the few wide-format printers that have a beacon light pole.

Dilli was among the first to use a vertical pole with beacon lights. One person said that DuPont's UV printer from RTZ (Flora) was the first of all. Most other printers do not have such a beacon. Presence of a beacon is not a major plus point; absence of a beacon is not a significant minus point. The GCC StellarJET 183UVK also has a pole with beacon lights.



Considering the size and weight of the rolls of material, at least two operators would be required.

You can see the beacon light at the top of the machine.

CONSTRUCTION (BUILD QUALITY)
61. 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.

62. Is there a hood?

Yes there are hoods that you open upwards.

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. Yet in the real world most printshops run their printers with the hoods completely off (or opened).



The hood opens upward. In the photo at the left you see the hood down; in the photo at the right, the hood has been lifted.

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

Yes, there are hoods at the front and back.

64. The hood opening, is it strong, or cheap plastic?

The printer has dark-tinted Plexiglas windows.

65. Does the hood opening have a frame?

Although it is not visible from outside, the hood does have a solid frame.

66. Is the frame plastic or metal?

Metal.

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

The printer looks sturdy. It has a clean design and impressive elegance.

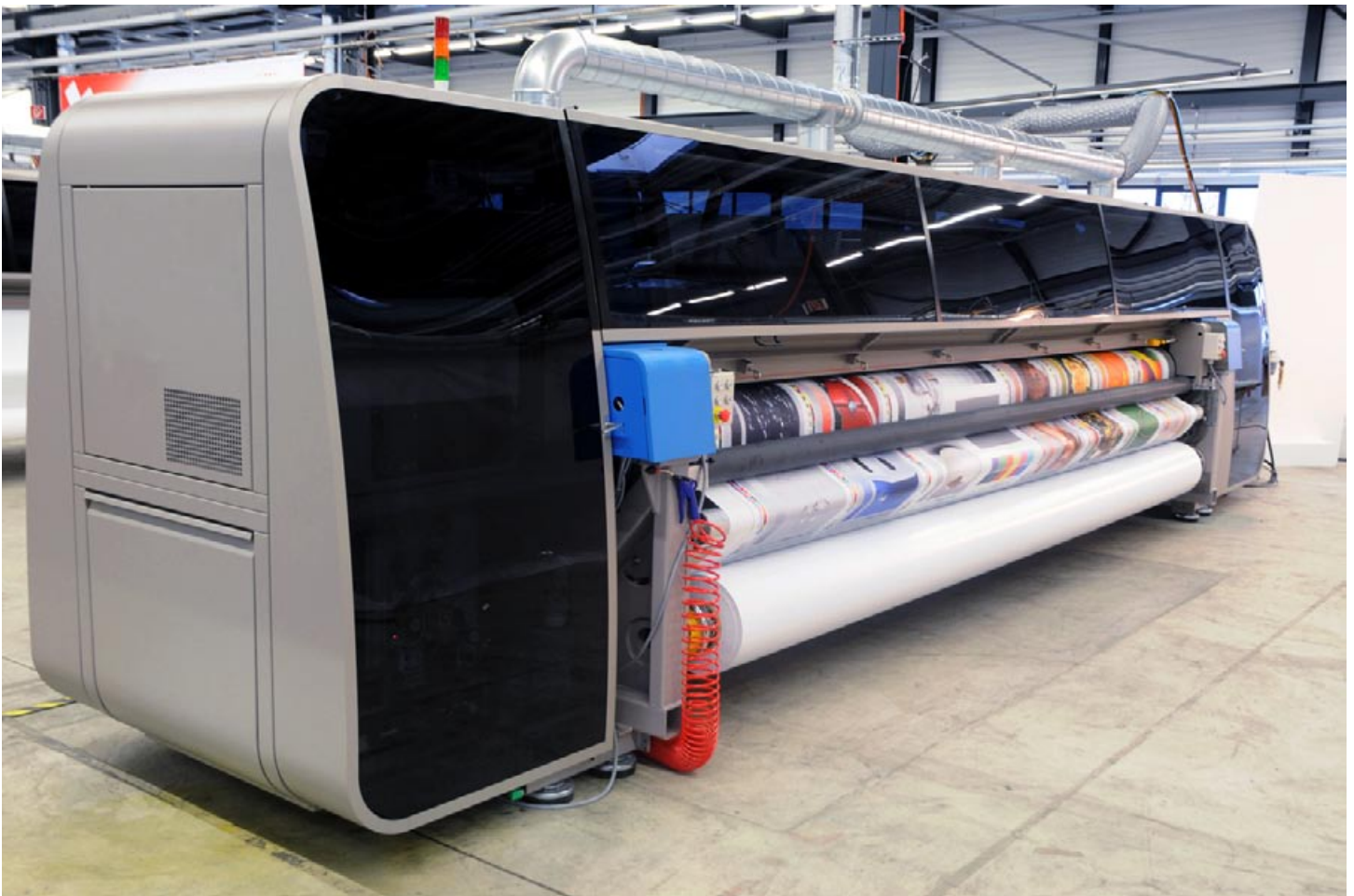
68. Does the printer wobble back and forth when printing?

There is no vibration. This machine is strongly built. However, all machines tend to have a little vibration when set to print at high speeds.

AESTHETICS

69. How would you describe the design of the printer?

This printer is perhaps the most attractive industrial-size printer for its combination of sturdy metal frames and shiny dark windows. However I need to point out that too much Plexiglas area makes it look fragile if we consider that sign shops are industrial workplaces where heavy machinery, rigid media and other tools need to be moved around constantly.



Rear view of the Virtu RR50. The front and back look very similar.

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

Not really. Except for the main control panel, you wouldn't be able to tell which is the front and which is the back. It gets confusing especially for the ability to load at the back and unload at the front or vice versa. Of course this is not necessarily a significant downside.

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

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

SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

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

Delivery time is 14 to 16 weeks after the customer has signed the contract.

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

	Power Requirements
Input voltage	3 x 400 V/50
Continuous rating	16kVa
Input fuse	32A
Lighting circuit	1 x 230V/10A – 3 x 1,5mm2
Cable Selection	4 x 6mm2

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

Yes. As you can see in the photos, an exhaust system is required.

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

74. 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.



WP Digital booth shot from above at FESPA '09. You can see the exhaust hose necessary to maintain a healthy work environment.

75. 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.

76. 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.

77. What is the connectivity? Network, SCSI, FireWire, USB or USB 2, or other?

Ethernet 10/100/1000 Mbps

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

The air consumption in standby mode is approximately 1m³/h. When the printer is in use, it is required approximately 6m³/h at 6bar air pressure.

Air pressure is needed 24h/day , 7 days / week.

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

The operation of the printer per se does not require a lot of space. But considering the size of the rolls you can handle with this printer, you will need at least 1.50mt at each side.

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

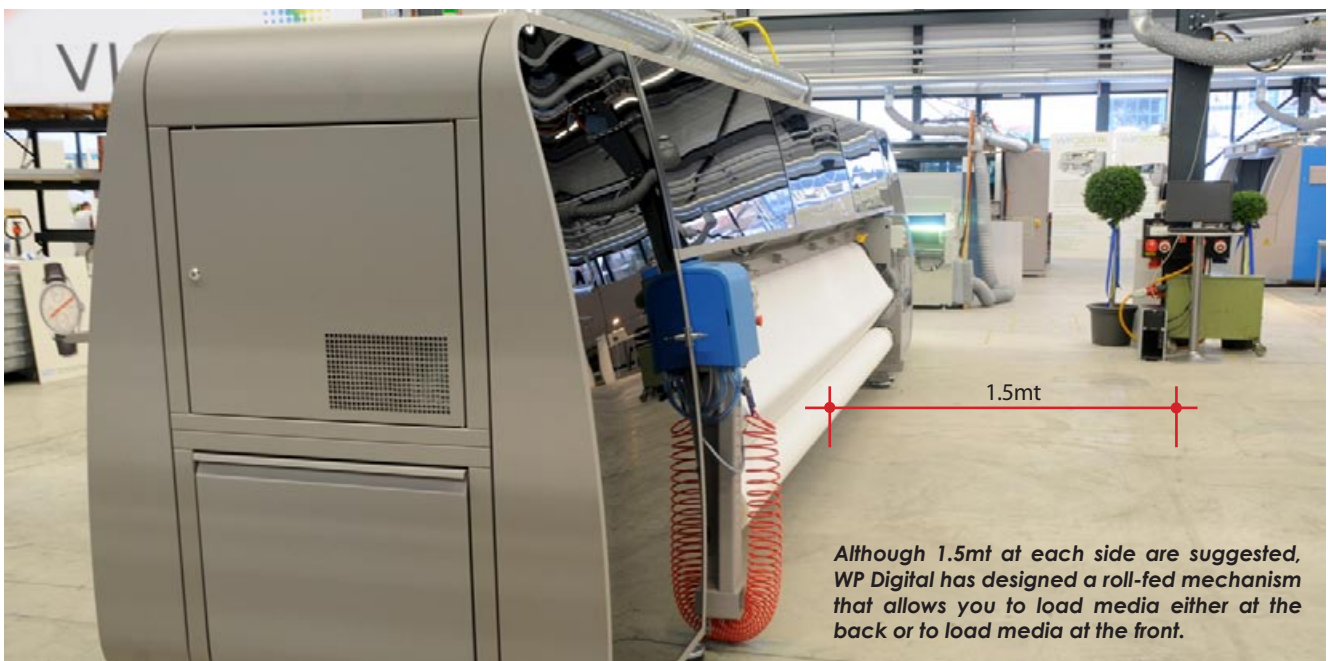
The machine itself comes in one piece, but you have another elements come apart, like the cooling unit for the UV system. The unwinding-rewinding unit comes separately also. The slitting unit normally comes with the machine.

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

Width (length)	Breadth	Height	Total Weight
840 cm (330.7 in)	220 cm (86.61 in)	200 cm (78.74 in)	10,000 kg (whole system)

82. How many boxes arrive?

The printer comes in one crate. Some elements come in boxes inside the printer crate.



Although 1.5mt at each side are suggested, WP Digital has designed a roll-fed mechanism that allows you to load media either at the back or to load media at the front.

INSTALLATION OF THE PRINTER

83. How many people come for the installation?

Normally WP Digital sends one person. But the company that manufactures the transport system sends another person.

INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS

84. How many manuals are available?

This is a new printer. So far, the User Manual is available in German. It will be soon available in English.

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

The User Manual was originally written in German.

Once it is finished it will be translated to English and all the languages in the European Union. Companies based in Europe have to issue documents such as Manuals in the languages spoken in the European Union by law. So WP Digital needs to have the manual translated to 26 or 28 languages. This represents a lot of work and a lot of money, but it is a UE law.

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.

86. 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.

87. 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.



WP Digital is developing the final official User's Guide.

TRAINING

88. 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).



Training is necessary. Here you see one of the technicians explaining software procedures to potential customers. We visited a factory of another company and most of the young operators were graduate engineers.

89. Is classroom training available?

No, classroom training is not common.

90. Is factory training available?

The basic operator training is provided within the WP Digital headquarters, usually on the same machine that the customer is going to have in their own facilities. Application training and Color Management training is indeed provided at the customer facilities.

91. What on-line training is available?

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

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

Replace the existing with the following: If a printing machine is entering as a new system in a printing house, then it is expecting that a period of couple of good months is necessary until the printing house personnel is getting used with the concept of digital printing, let aside the machine itself. The advantage of a high end machine is that it is entering usually on an already existing digital base, thus the period of getting to know each other is tremendously reduced.



Full productivity time also depends on the operators' skills or previous experience with wide-format printers.

TECH SUPPORT & WARRANTY**93. What is the original warranty period?**

The printer is covered by a one-year warranty.

The normal original warranty period is one year but Gerber has had a special offer of "second year free if you buy before such-and-such a date.

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

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

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

95. Does it include parts, labor, printheads?

The warranty does not cover the printheads. Printheads are covered only for six months.

Some times you have a warranty by the company that manufactures the printer and another warranty that manufactures the printheads.

96. 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.

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.

97. Can the manufacturer remotely diagnose the printer?

Remote diagnosis is rare, and not available on any mid-range UV-curable inkjet printer.

MAINTENANCE**98. What is the most delicate, or complex, or time-consuming cleaning or maintenance chore?**

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

99. 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.

100. How long can the printer sit unused?

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

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

101. How should a printer be prepared for sitting unused for a long time?

Solvent printers need to be used every day. Otherwise the ink dries in the nozzles and nozzle plate of the printheads. It was an early mantra that UV ink escaped all the problems of solvent printers: that you never had to weep (spit at the end of every pass); that you never had to purge; etc.

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

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



Cleaning is done at the right end. You park the printhead carriage, open the right door and you are in front of the printheads.

PRINthead TECHNOLOGY

102. Which brand printhead is used?

This printer uses Spectra with the same carriage as the Virtu RS printer.

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.

103. Which model of printhead is used

You can choose between SE or SL models. These offer 30pl and 80pl drop size respectively.

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

The technical sheet only provides information of quantity of nozzles and drop size.

105. Is this a printhead adapted from solvent ink or a new design made especially for UV ink chemistry?

Spectra SE and SL models are designed to jet organic solvent inks and UV-curable inks.

106. How many other printers utilize the same printhead? Have they shown any problems?

The Gandinnovations Jeti 1224 UV flatbed uses Spectra SL printheads. The Raster Printers 720UV (although phased out) and the Durst Rho 800 use Spectra SE heads.

107. What are the benefits of this printhead?

Spectra heads have a light-weight compact design that is ideal for fast moving systems.

108. What are the downsides of this printhead?

Spectra is a well-known company in the wide-format market. But nowadays there are printhead manufacturers offering less than 10pl drop size.

109. How many nozzles per printhead?

Both the SE and the SL printhead model feature 128 nozzles.

110. How many printheads per color?

Depends on configuration. There are 36 modules and you can choose between 4, 6 or 9 heads per color.

111. How many total number of printheads?

You can choose 36 printheads in different configurations.

112. Is the printhead for the white ink the same model as the printhead for the other colors?

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

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

One instance that I have heard of recently where a new UV printer is designed with special heads for white ink is where the newest L&P Virtu uses Spectra M Class heads which are MEMS technology. MEMS heads are not yet appropriate for using with white ink, so a different model head is used just for the white. By late 2008 the Spectra M Class heads had failed so often that they were withdrawn by Fuji Dimatix.

The Virtu RR50 offers the option of having a 30/80pl head for CMYKcm colors respectively white.



The 50 stand for the 5000mm print width and the 36 represent the number of printheads. So there is a version called WP Digital Virtu RR 50/48.

PRINTHEAD DPI & Features

113. What is the drop size in picoliters?

Either 30 pl or 80 pl; you select in advance which model of Spectra printhead that you prefer. In some models you can select 30 pl for CMYK and 80 pl for White or spot colors in the same machine.

114. Is there variable droplet capability?

No.

115. What is the nozzle spacing?

The nozzles are arranged in a single line, at 0.020 inch between each one.

116. What is the advertised DPI, and is it true dpi or “apparent” dpi? How is dpi presented (with what adjectives)? How is this dpi calculated?

Regarding resolution, the technical data sheet reads “up to 1200dpi addressable”.

117. How many passes can this printer achieve?

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).

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

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

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

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

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

119. If modes, what are the modes called?

There are three modes identified in the printer literature:

Printhead	MODES		
	Speed	Production	Quality
Spectra SE-128 (30pl)	150m2/h (423 x 500 dpi)	100m2/h (423 x 700 dpi)	50m2/h (726 x 900 dpi)
Spectra SL-128 (80pl)	320m2/h (299 x 300 dpi)	210m2/h (299 x 300 dpi)	110m2/h (423 x 500 dpi)

120. How does the resolution of this printer compare with other brands or other models of the same brand?

The Spectra heads used by the Durst Rho 351R roll-to-roll printer offer up to 600dpi, whereas in the WP Virtu RR50, the resolution is 450dpi (Spectra SL) and 900dpi (Spectra SE). The Gandinnovations Jeti JetSpeed UV roll-to-roll has the same printhead options as the Virtu RR50, plus a third alternative; the Spectra SM, that features 50pl drop size and 600dpi.

121. Is nozzle compensation available?

It is not yet available, but it is in preparation.

Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING

122. What is the direction of uni-directional printing? From right to left, or left to right; or both?

From left to right.

123. Is the sequence of ink color laydown the same coming and going? (rare). Or is the sequence of colors bi-directionally a different sequence than uni-directional? (the usual way).

It is not symmetric.

124. Which materials can be printed fast at 2-pass or 4-pass modes?

The number of passes needed may also depend on how worn the printheads are. If the printheads are old you may need more passes than when the printheads are new.

PRINTHEAD Positioning

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

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

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

Manually.

127. How complex is the procedure to align the printheads? When you add a new head, how long does it take to align it?

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

PRINTHEAD: Associated Features

128. Is ink heated in a buffer or elsewhere before arriving near the printhead?

Ink in the reservoirs is pre-heated before the ink arrives near the printhead. This is usual in almost every printer.

129. Is there a heater associated with each printhead?

As far as I can ascertain, there is no heater added by Virtu to the printhead. So unless the printhead module itself already has a heater in or on it, the heat for the ink comes from the plate (see comment in next question's answer).

130. Or is the entire plate heated and thereby some heat gets to the heads?

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

But there is at least one high-end UV printer system that favors the heated plate, namely Virtu. The Virtu RR50 printhead plate is heated. The print modules are thereby heated indirectly via heat transfer from this plate. Also, separately, the ink reservoirs are heated (as mentioned in the comments two questions earlier in this report).

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

For the Spectra SL-128 AA, the firing frequency is 30Khz. For the Spectra SE-128 AA, the firing frequency is 20Khz.

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

Yes, you can vary the firing frequency between 1 to 20 KHz.

133. Is the negative pressure user variable?

Yes.

SUBSTRATES

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

This is a dedicated UV printer that handles roll-fed materials only.

135. What sizes of material can be printed on?

The technical data sheet reads the RR50 has a print width of 5000m effective printable area.

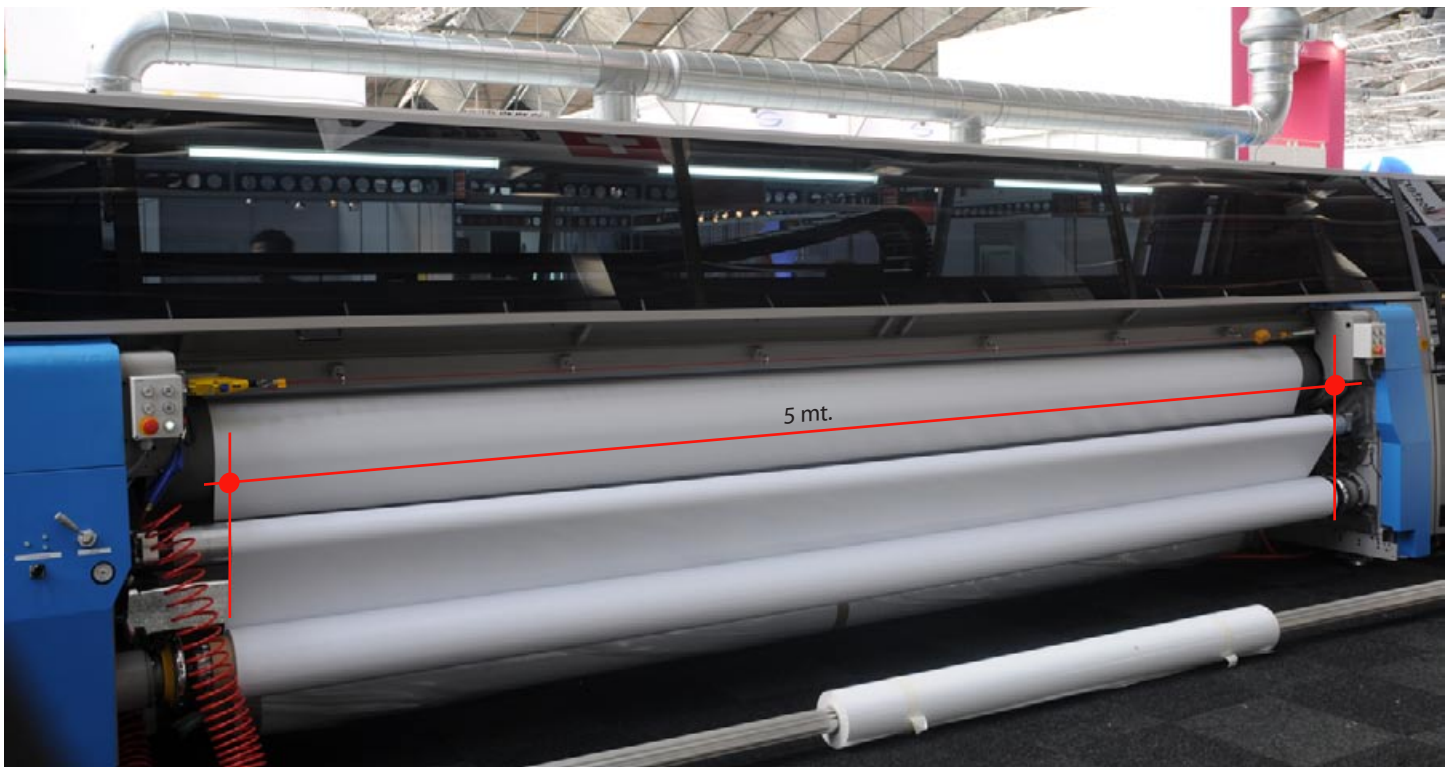
136. What is the difference between media width and actual print width?

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

WP Digital RR50 accepts substrates of 5000meter printable area.

137. Can you adjust the rate of media feed?

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



You can print rolls up to 5mt wide.

LOADING MEDIA

138. How about maximum roll diameter or weight?

50 cm diameter, 750 kg (that’s a large and heavy roll).

139. What thickness can this printer handle?

3 cm but of course most roll-fed material will not be anywhere near this height.

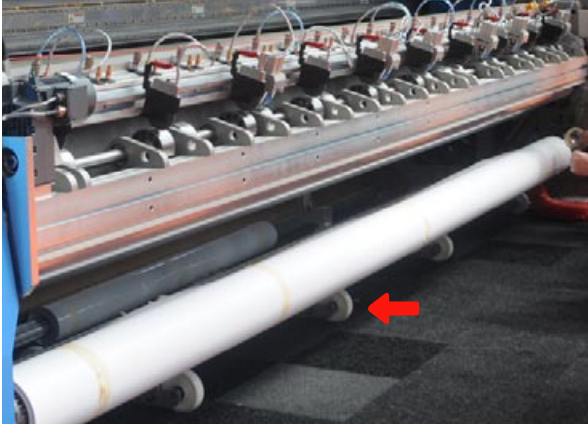
140. Can you measure the height of the material with a sensor, or is it manual? The head carriage can be elevated manually or is it fixed?

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”).

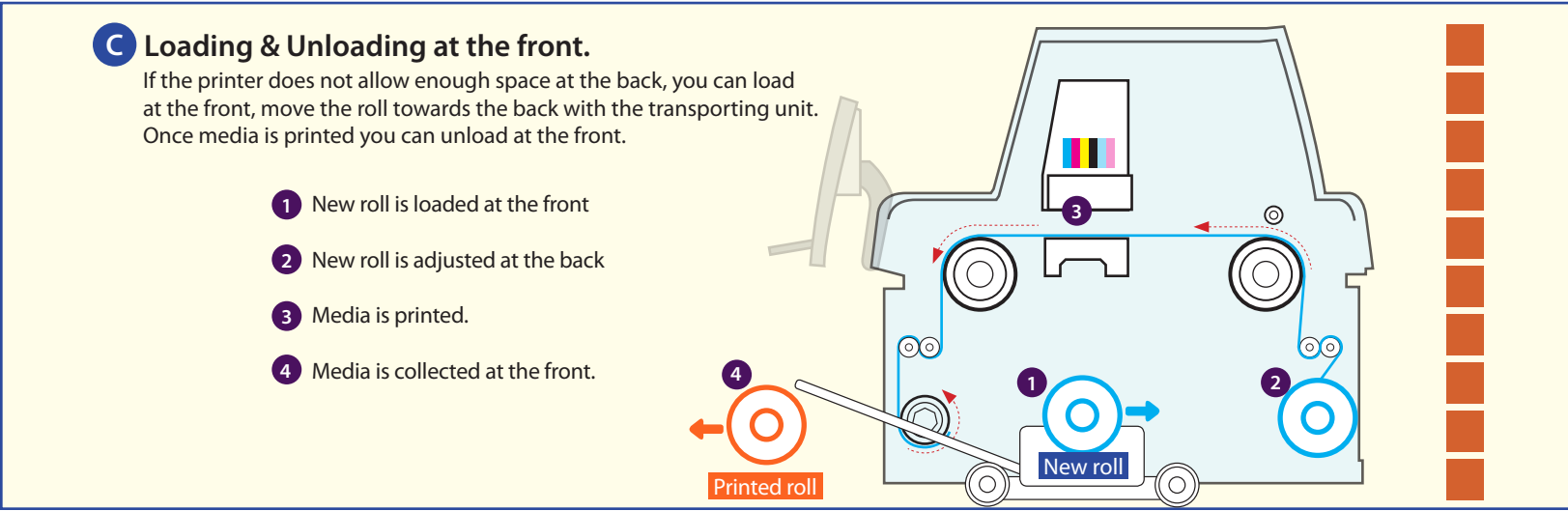
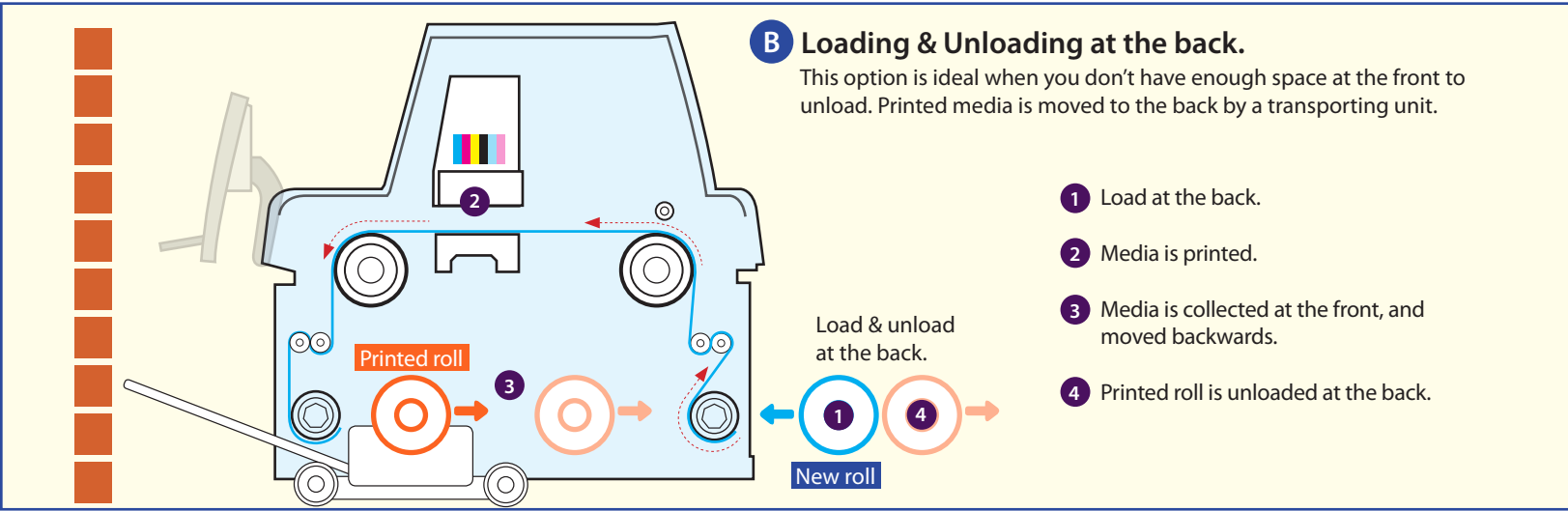
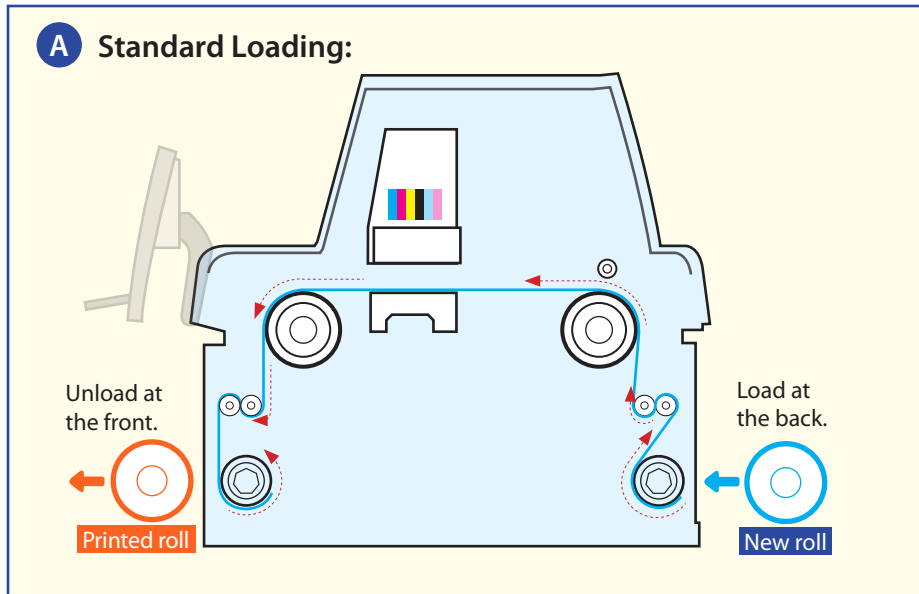
141. If you have to load a really long roll, are there clamps or any other system to allow you to secure the first portion so the first portion won’t undo itself while you are several meters away trying to load the other end?

The Durst Rho 351R has clamps so if only one person is available to load a long roll, he can clamp down the first portion 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.

The loading and unloading of media has been designed to feature three options:

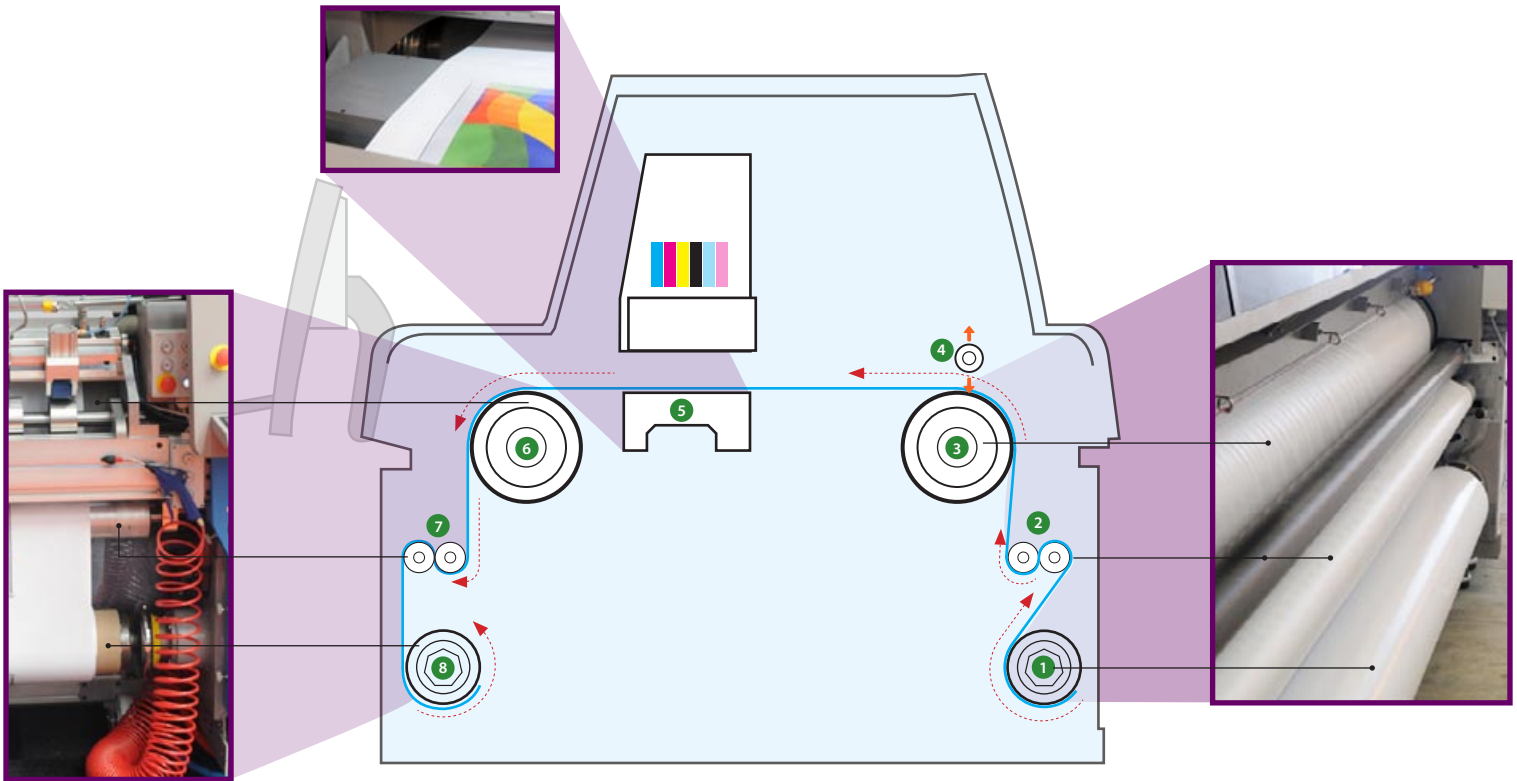


WP Digital has designed a transporting unit. Since it is below the printer, you only get to see the wheels of this mechanism.



142. What is the media path?

The fresh roll is held in a spindle. So the media is webbed into a set of tensor rollers. Then it goes to the main roll that drives media into the print area. Once the media is printed, it rolls over a front roller. You have the option to have the material free-fall or have it wound up in the take-up system. If you choose to collect it in a core, it goes into a front tension bar, and then goes down to the take-up spindle.



- ① Fresh rolls are held on a spindle.
- ② At the feeding area, there is a set of two tension rollers.
- ③ The main rear roller functions as a big grit roller that moves media into the printing area.
- ④ There is a continuous pinch roller that is used only with certain materials.
- ⑤ The platen has vacuum holes in its surface, the printing occurs here.
- ⑥ The main front roller pulls media outwards.
- ⑦ At the front there is another set of tension rollers. You can adjust the tension on both the rear and front rollers.
- ⑧ Printed media is collected in the take-up spindle.



Notice that the way you web printed media is not necessarily always the same. Here, media makes contact with only one of the tension rollers and then to the inner side of the take up spindle.

SUBSTRATES, Materials, Applications, and Issues

143. What materials does the manufacturer list?

The manufacturer list textiles from Verseidag, Berger, Neschen, Ferrari, etc. I would add 3P.

The manufacturer lists mesh, vinyl, self-sticking material, banner material, PVC (for trucks), blue back paper, paper.

144. 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.



The samples printed by the Virtu RR50 were awesome. The colors looked real and the quality of the images was also excellent. If you notice the media being printed is being cut in the Y axis (look at the edges) so that the printed image is borderless.

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

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.

146. Does the printer have a pre-heater to pre-condition the media before it faces the heat of the UV lamps?

A temperature controlled table will be optional.

147. 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.

148. 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

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

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

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



Here you see one of the operators about to introduce the spindle to through the core of a fresh roll. Most roll-fed materials don't need cleaning or any major preparation.

150. 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).

151. 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.

APPLICATIONS

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

A trough will be available. A trough captures the ink that pass through the substrate if this has an open thread, like textiles, mesh, etc.

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

153. To print backlit can you set a mode for double-density?

Yes.

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

Not.

INK

155. 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.

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

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

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

INK: Supply System, Tubing, Filters, etc

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

Pouring on on-board container.

158. To what degree is the ink heated?

Can be set, about 45°C to 47°C is ink specific.

159. 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.

INK Color Gamut

160. Which colors print best?

Skin tones like Asian, African, European were very good. Orange prints very good also. Honey, nuts, coffee beans prints excellent.

Light yellow are good but light, other yellows are "dirty" or green.

Gray scale is excellent (neutral).

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

161. What about silver or other metallics?

Aluminum kitchenware was perfect.

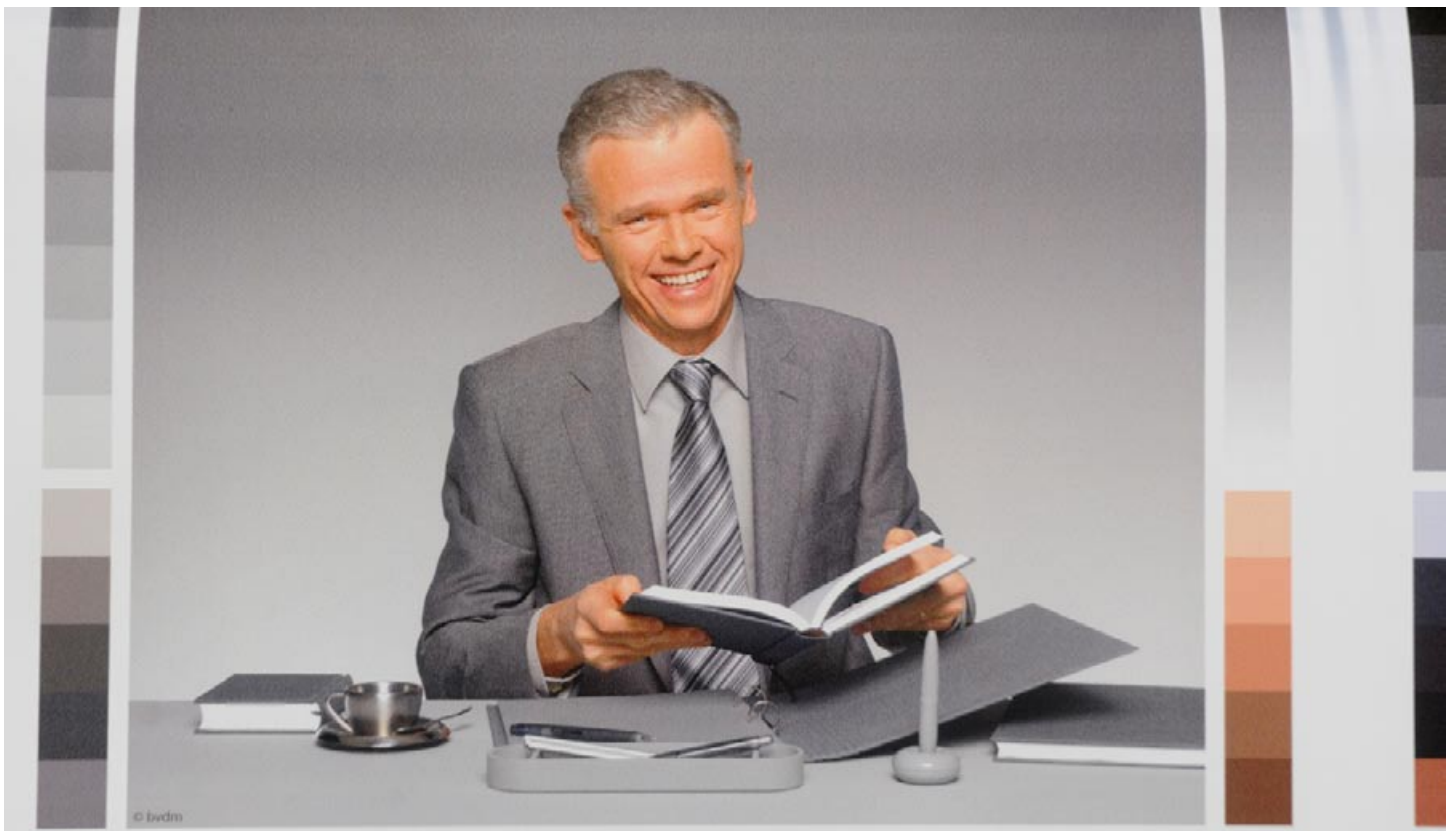
162. Which colors print poorly or not at all?

Light greens are too yellow. Dark greens are a bit strange.

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.



Print sample at WP Digital Virtu RR50 launch event held in WP Digital headquarters in February 2009.



Several prints were made to show the skin tones.

THE UV CURING LAMPS

163. 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.

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

The UV lamps use mercury arc technology.

At the edge of the image, lamp is switched to standby to reduce stray light and to reduce power consumption.

Virtually all UV printers use mercury arc UV lamps. Only NUR and a few others use microwave UV lamps. Pulsed Xenon lamps have failed the few times they were tried (an early VUTEk UV printer circa 2000-2001; a cheap Oce Arizona 60uv printer). LED lamps are now being tried in several UV printers, such as by Sun LLC (in Russia), 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.

165. How many watts are the lamps?

2 x 6Kw so a total of 12Kw

166. What is warm up time?

About 1 minute.

167. How long can the lamps stay on before they automatically shut off?

Lamps stay on for half an hour before shutting off.

168. What brand of lamp is used?

Uviterno, is a company close to the factory.

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.

169. How many lamps does the printer use?

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

The Agfa :Anapurna 100 (a printer that was never finished due to being too complex), 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).

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

This is a crucial question, and one seldom asked elsewhere: if your UV lamps need to be turned off after the printer being unused for 5 to 10 minutes, then your lamps' life gets used up quickly (if they are mercury arc). Each strike (turning the lamp off and on one time) can lower the life of the lamp by one or two hours. So ideally you want a kind of UV lamp system where the lamps can stay on as long as possible to avoid having to turn them off and on all day long.

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

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

Depends on use, but about 1000 hours.

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

GCC is one of the few companies that clearly, specifically, and openly mentions how many hours are wasted by each strike: namely three hours.

173. Is the lamp fan filter a user-replaceable item? How often should this be cleaned or replaced?

If the filter gets clogged with dust then it is less efficient in keeping down heat. Heat build-up is not good for the overall carriage area.

UV CURING, and ODOR of the printed image

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

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

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

UV LAMPS: Cooling

176. Are there shutters?

Reflectors are also 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.

177. 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.

178. How are the lamps cooled? Air? Fans? Water-cooled?

They are cooled by water and air, with a separate water chiller at left of printer.

179. How many fans are there per lamp?

2 per lamp.

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

There are three levels at the moment, but in future there will be more steps.

181. 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.



The UV-curing system is cooled by this unit that works with water.

UV LAMPS: Reflectors

182. Do lamps have dichroic reflectors?

There are two options, either aluminum or dichroic. It depends on how much heat your material can handle.

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

A wrong direction would be light that reflected off the surface of the material up into the nozzle plate.

RIP SOFTWARE & Printer Software

184. Which RIPs are featured?

This model uses Caldera RIP.

PRODUCTIVITY & ROI (Return on Investment)

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

90% of the different brands of printers can't produce usable output at their fastest claimed speed. So I call these speeds "junk mode." It is false advertising in probably half the spec sheets.

The quality of the output in high speed is fully sellable for the colors that are contained within the color gamut of the high speed printing mode. There are no miracles when it comes to having all desired in one single mode of printing. Various modes of printing are existing for various production. Here WP Digital specialists are present upon request and advising every customer on the production speeds and printing modes to be adopted.

186. Does this printer have to be turned off to rest between shifts?

It is not necessary; you can print 24 hours. WP Digital already has customers doing this.

COMPARISONS WITH OTHER PRINTERS

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

Efi VUTEK GS5000r, Gandy JetSpeed and Galaxy, Durst Rho 500 Durst 351R, Matan Barak5, HP Scitex XP5300.

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

The Jeti roll-to-roll printers tend to wobble. Besides, most potential buyers would be skeptical about a company that would be sold. HP has not been very successful with their UV production. Their roll-to-roll was not manufactured by HP, but bought from NUR. Tech support and incoming spare parts tend to take a while to establish when a printer has not been designed and manufactured by the company that sells it.

CONCLUSIONS

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

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

190. Are your customers satisfied with the print results from this UV-flatbed to the point that they recommend you by word of mouth to other potential clients?

Wp Digital was first showed in the InHouse event in February this year in Wittenbach. It was first shown to the public in FESPA where partners and customers have had positive feedbacks on printing quality and impressive design.

191. 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.

So far we have evaluated this printer during a visit to the WP Digital factory in Wittenbach, Switzerland. The printer was evaluated again in May at FESPA Amsterdam 2009.

Conclusions

Pros

A positive feature of the printer is the parent company, WIFAG-Polytype (which create the W and P in the current corporate name WP Digital).

My first experience was at Polytype factory in Fribourg. To make it simple, Polytype machinery is probably what prints most of the toothpaste, shaving cream and comparable packaging tubes and yogurt containers around the world. Polytype makes the machines which do this printing.

These are sophisticated printing systems that make a UV printer look like a simple item in comparison. ISiegfried Joneleit, Sales & Marketing Manager took me through every aspect of the factory. Naturally I am under NDA in respect to what we discussed, but suffice it to say that it is frankly more impressive than I had expected.

The next day it was possible to spend several informative hours at the WIFAG factory in Bern. Noel C. McEvoy (Director, Sales for many portions of the globe) provided a private introduction and then Matthias Kobel (Sales Director) provided a personal guided tour of the factory. Later in the week a night session was arranged inside an actual functioning newspaper printing plant (near St Gallen? Since the newspapers are printed at about midnight, it was so late at night I was not sure precisely what city we were in by the time I had been driven around since 6 pm and had been at the InHouse event since the early afternoon).

WIFAG rotary offset press printers are in the 20+ million Euro price range and print the major daily newspapers in cities around the world.

In other words, the W and the P in the new division WP Digital are substantial corporations that make significant printing equipment. Their success in each company is based on Swiss quality: namely precision.

Trying not to be impolite, WIFAG and Polytype are more appropriate parent companies than L&P which made machines to make coil mattress springs. In 2001 (when their first UV printer was revealed in Atlanta), I was told that their intent was to print on the mattress covers. Ironically although L&P Digital Technologies did make several textile printers, they were more successful in the non-textile UV models. And by 2008 L&P had dropped the textile models. Of course today textile printing is staging a comeback.

Options include the ability to unload as well as load from the front. Another option allows loading from the front (instead of the back). I do not know any other UV printer that facilitates these options.

Updated October 2010.

First issued July 2009.

WP Digital (WIFAG Polytype) has changed its name and management. The new company name is Polytype, but the WP Digital web site continues as before. The name of the printer models remains "Virtu."

A specific advantage of a European manufacturer over one in America

WP Digital has a growing relationship with a major technology-savvy Swiss university. Since I have taught at universities both in the US, Europe, and Latin America, I can say rather pointedly, that most US universities have so fraught with internecine politics and meltdown when a new Dean or new Provost or new department Chair arrives, there is little continuity. Plus every university I have spoken with (spoken with their faculty, and spoken with printer manufacturers who have had to deal with the university), the faculty themselves admit that their own university is not prepared to realistically deal with an actual commercial corporation out in the real world.

In effect, other than Durst (which has relations with universities near it's factories), it is unlikely that any manufacturer in North America or Latin America will get a meaningful return on investment attempting to connect with any university. They will get good intentions, they will get an occasional hard-working student, but the politics of American universities, and their dependence on "scholarly tradition" renders them next to hopeless in the present millennium (especially in an economic recession).

I spent several hours in Switzerland with the head professor of the Swiss technical university that is working with WP Digital. There is nothing like this available anywhere in the Americas whatsoever, period. Nor will anything at this level be available in the next few years.

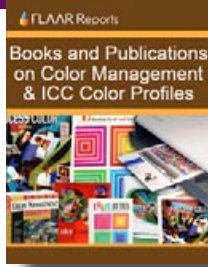
And even if you flew a dozen European professors over to the American universities nearest to the printer manufacturers in America, you would still not get fully what many European universities offer.

Acknowledgements

We wish to thank the people who assisted in our understanding of this sophisticated printer in 2009-2010. They are listed here. Four of them are no longer working for WP Digital, especially since WP Digital has been folded back into Polytype.

Peter Ruth, CEO of Polytype.
Markus Schawalder, Sales and Marketing Director
Kaspar Widmer, CEO WP Digital
Sylvia Muhr Regional sales Manager
Markus Gleissner Regional Sales Manager
Michael Boesch Service Competence Center
Rudolf Jauk Development Manager
Andreas Huber Customer Service(Pict IPOS)
Erwin Heimgartner Software Project Manager
Diana Dogaru, Senior Consultant Glass Team

FLAAR also thanks **Marco Frangi**, Design Manager for answering some of the questions for this evaluation at FESPA '09.



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

RIP, COLOR MANAGEMENT, and ICC Color Profiles options

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

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

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

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

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

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

When I visited a large printshop in Maribor, northern Slovenia, they were using Caldera RIP and the manager of technical services for this company said, "Caldera does a good job." This company in Slovenia has about eight UV printers (about five of them from Durst) and an equal number of large solvent printers. They originally used a GretagMacbeth color man-

agement system but switched to BARBIERI because the BARBIERI spectrophotometer can read more efficiently and can handle textiles, backlit, wood and other materials that are either awkward or difficult on other brands of color management instruments. You can learn about the BARBIERI equipment either from their headquarters in Brixen or their distributors worldwide.



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



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

Reality Check

Being a university professor for many years does not mean we know everything. But intellectual curiosity often leads us to enter areas that are new to us. So we do not shirk from entering areas where we are obviously not yet expert. If in your years of wide format printing experience have encountered results different 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).

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Update Policy

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

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

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

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

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.

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Legal notice

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

Advisory

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

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

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

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

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

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

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

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

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.

It is also crucial to realize that an ink (that we inspect, that works well where we inspect it), your printer, your printhead, the heat, humidity and dust conditions in your printshop, may cause that ink to react differently in your printer. And, there are different batches of ink. Even in the really big multi-national billion-dollar ink companies, occasionally one batch will have issues. There are over 100 ink companies; six colors per company, many flavors of ink per company per color. We have no realistic manner of testing each ink. The same is true of media and substrates. One production run can have a glitch: chemical or physical, even in the best of companies. A major Swiss-owned media company, for example, had several months of media which were almost unusable. Yet other kinds of media from the same company are okay (though we stopped using that brand and stopped recommending them after all the issues we ourselves experienced).

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. Plus, there is no way to know if all MSDS sheets are honest to begin with! Our reports are on usability, not on health hazards.

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

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

Results you see at trade shows may not be realistic

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

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

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

Trade show examples tend to be on the absolutely best media. When you attempt to save money and use economy media you will quickly notice that you do not get anywhere near the same results as you saw in the manufacturer's trade show booth, or pictured in their glossy advertisement. Five years ago we noticed Epson was laminating prints to show glossy output because their pigmented inks could not print on actual glossy media. The same equipment, inks, media, and software may not work as well in your facility as we, or you, see it at a trade show. All the more reason to test before you buy; and keep testing before you make your final payment. Your ultimate protection is to use a gold American Express credit card so you can have leverage when you ask for your money back if the product fails.

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

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

Factors influencing output

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

Actually you may have people with even more experience than we do, since we deliberately use students to approximate newbies. FLAAR is devoted to assisting newcomers learn about digital imaging hard-

ware 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. Please be aware that our comments or evaluations on any after-market ink would need the end-user to use customized ICC profiles (and not merely generic profiles).

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

Recently we have heard many reports of issues of getting parts from manufacturers in other countries (not Asia). So just because 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 recession resulted in tech support issues: 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 sce-

nario for this was the half-million dollar LUSCHER JetPrint: so being "Made in Switzerland" was not much help.

Counterfeit parts are a problem with many printers made in China

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

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

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

It is typical for some enthusiastic vendors to claim verbally that their printer can print on anything and everything. But once you unpack the printer and set it up, you find that it requires primer on some materials; on other materials it adheres for a few weeks but then falls off. And on most hybrid and many combo printers, some heavy, thick, or smooth-surfaced materials skew badly. Since the claim that the printer will print on everything is usually verbal, it is tough to prove this aspect of misleading advertising to a jury.

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

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

Be sure to check all FLAAR resources

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

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

Acknowledgements

With 19 employees the funding has to come from somewhere, so we do welcome project sponsorship, research grants, contributions that facilitate our educational programs, scholarships for co-op interns

and graduate students, and comparable project-oriented funding from manufacturers. The benefit for the end-user is a principle called academic freedom, in this case,

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

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

Besides, it does not take any money to see which printers and RIPs function as advertised and which don't. We saw one hyped printer grind to a halt, malfunction, or otherwise publicly display its 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 Caldera, EskoArtwork, EFI Rastek, EFI and VUTEK, OTF (Obeikan), Drytac DigiFab, Barbieri electronic, Seiko II, Parrot DigiGraphic, AT Inks, SepiAx inks, Sam-Ink, Dilli, Grapo, 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 2010), we are seeking corporate sponsorship so we can gradually make another 20% of our publications free to our readers.

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

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

Barbieri electronic (color management), Caldera (RIP), ColorSpan, DEC, Durst, EFI, EskoArtwork, Gerber, Grapo, IP&I, Mimaki USA, Mutoh, Obeikan, Dilli, Drytac, GCC, NUR, Oce, Shiraz (RIP), Sky AirShip, Sun, Teckwin, VUTEK, WP Digital, Xerox, Yuhan-Kimberly, Zund have each brought FLAAR staff to their headquarters and printer factories. AT Inks, Bordeaux, InkWin, SepiAx, Sam-Ink, and Sunflower ink have brought us to inspect their ink manufacturing facilities and demo rooms. Notice that we interact with a wide range of companies: it is more helpful to our readers when we interact with many different companies rather than just one.

We have visited the world headquarters and demo rooms of HP in Barcelona and received informative and helpful technology briefings

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

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

We thank 3P Inkjet Textiles and HP for providing inkjet textiles so we could learn about the different results on the various textiles. IJ 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 primarily income is from Encad printers. Kinkos has settled on the HP 5000 as its main money maker production machine, and so on.

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

Grant funding, sponsorship, demonstration equipment, and training are supplied from all sides of the spectrum of printer equipment and software engineering companies. Thus, there is no incentive to favor one faction over another. We receive support from three manufacturers of thermal printheads (Canon, ColorSpan and HP) and also have multiple printers from three manufacturers of piezo printers (Epson, Seiko, Mutoh, and Mimaki). This is because piezo has definite advantage for some applications; thermal printheads have advantages

in different applications. Our reviews have universal appeal precisely because we feature all competing printhead technologies. Every printer, RIPs, inks, or media we have reviewed have good points in addition to weaknesses. Both X-Rite and competitor GretagMacbeth provided spectrophotometers. Again, when all sides assist this program there is no incentive to favor one by trashing the other. Printer manufacturer ad campaigns are their own worst enemy. If a printer did not make false and misleading claims, then we would have nothing to fill our reviews with refuting the utter nonsense that is foisted on the buying public.

It is not our fault if some printers are more user friendly, print on more media than other brands. It is not our fault that the competing printers are ink guzzlers, are slow beyond belief, and tend to band or drop out colors all together. We don't need to be paid by the printer companies whose products work so nicely in both our universities on a daily basis. The printers which failed did so in front of our own eyes and in the print shops of people we check with. And actually we do try to find some redeeming feature in the slow, ink gulping brands: they do have a better dithering pattern; they can take thick media that absolutely won't feed through an HP. So we do work hard at finding the beneficial features even of printers are otherwise get the most critique from our readers. Over one million people will read the FLAAR Information Network in the next 12 months; 480,000 people will be exposed to our reports on wide format printers from combined total of our three sites on these themes. You can be assured that we hear plenty of comments from our readers about which printers function, and which printers fail to achieve what their advertising hype so loudly claims.

An evaluation is a professional service, and at FLAAR is based on more than 11 years of experience. An evaluation of a printer, an ink, media, substrate, 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 pres-

ence 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, inks, cutters, laminators, and color management systems.

These are some of the most
Recent FLAAR Reports

Inkjet Printer Trends Reports:

www.wide-format-printers.net

