

# Super Wide-Format Dedicated Roll-to-Roll UV Printer



## ***EFI VUTEk GS 5000r***

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# EFI VUTEk GS 5000r

## Super Wide-Format Dedicated Roll-to-Roll UV Printer

### THE BASICS

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

EFI VUTEk GS5000r. The "R" in the name of model of a printer usually refers to the ability to print roll materials.

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

The other members of the VUTEk GS series are combo printers (combo means with transport belt), so there is no other smaller version of this machine.

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

EFI is the designer and manufacturer of the VUTEk GS series. The factory and demo room are located in Meredith, New Hampshire.

Reportedly, the smaller member of the EFI family, Rastek will be moving to the Meredith plant in the near future. Currently Rastek is located in San Jose, California. FLAAR has visited both the Meredith and San Jose facilities. We have full evaluation reports on the Rastek H650 and H700.



EFI VUTEk GS5000r at EFI's demo room, Meredith, New Hampshire. This report was written based on notes taken at several trade shows around the world but mainly from notes to our visit to EFI headquarters in August 2010.



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

As mentioned earlier, the other VUTEk GS printers use a transport belt to move media. The previous series, the VUTEK QS has a 3-meter wide dedicated roll-to-roll printer, but the GS series is considerably improved, compared to the QS series.

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

EFI VUTEk printers are not being rebranded.

**6. What other printers of other brands are comparable?**

There are not many other dedicated roll-to-roll printers this wide, but we can mention the HP Scitex versions of the former NUR Expedio, Durst Rho 500r, the Matan Barak5 and its Fujifilm version, the UViStar, and the WP Digital RR50. These would be the only comparable models. However, at APPPEXPO Shanghai 2010, JHF launched their 5-meter-wide roll-to-roll printer. A year before (APPPEXPO 2009) Zhongye also introduced a 5-meter roll-to-roll UV printer. So the interest in grand-format printers is beginning to grow among Chinese printer manufacturers. However we do not yet recommend any large and really complex such printer made outside the brands whose factories we have inspected. For a grand format printer, it is best to stick with the international brands who have experience with engineering and manufacturing to high standards.

**7. How does this model compare with comparable previous printers?**

The following chart describes some of the differences between the VUTEk QS3250r and the VUTEk GS5000r.

	VUTEK QS3250r	VUTEK GS5000r
Print width	Up to 3.2 m.	Up to 5 m.
Simultaneous rolls capability	2	3
Print resolution	Up to 1080dpi	Up to 1000dpi
Print speed	Up to 172 sqm/h	Up to 288 sqm/h
Print thickness	0.125"	0.25"



EFI VUTEk QS 3200r at SGIA 2009. This and the QS3250r are EFI's previous dedicated roll-to-roll models but these printers handle rolls up to 3.2 m. With the GS5000r, EFI VUTEk enters the super-wide format printer segment: print width is 5 meters.

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

The purpose of this machine was to enter the super wide format segment of roll-to-roll printers with UV ink and especially to provide alternatives to the HP Scitex 5-meter roll-to-roll printers which date back to 2004.

**9. When and where was this model first introduced?**

This printer was first shown at FESPA Amsterdam 2009. The initial print quality shown at FESPA 2009 had improved considerably by ISA 2010.



The printer was officially launched at FESPA Amsterdam 2009. However, the GS5000r had been shown months earlier at ISA 2009 in Las Vegas (below).







The EFI VUTEk GS5000r had another release, this time for the China market. Here, the printer at APPPEXPO Shanghai 2010.

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

The printer was totally out of beta stage a month before FESPA Munich 2010 which was held in June. It is currently being commercialized.

**11. List price?**

The official price is US\$599,000. For Europe, €460,000 was the price in June 2010. For any printer there is no one set price because each part of the world has different costs to get the printer to that location.

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

Everything is included.

**13. What other costs are involved?**

There are no other major costs involved other than installation costs, explained further on.

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

The printer comes with a starter set of inks.

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

Air pressure system will need to be installed near the printer. An exhaust system is suggested, although not totally required.

**16. 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, all VUTEk printers need air pressure.

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

Vacuum system is already integrated into the chassis of the printer.

The only cases where I have seen vacuum equipment not included in the printer is on some entry-level Chinese flatbed printers.

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

Yes it is recommended. Besides the standard training, EFI has an advanced level training for those individuals who wish or need to do more complex repairs by themselves.

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.

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

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

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

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

**PURCHASING: DISTRIBUTORS & DEALERS****20. Does the manufacturer have distributors in all continents? Or only a few dealers and missing key world areas?**

There are distributors in nearly all Europe. In the cases where there is no local distributor, printers are sold through a neighbor country's dealer. For example, the distributor that covers Scandinavia (Norway, Sweden, Denmark, and Finland) also covers Eastern European countries.

Sun LLC has no major recognized dealer in North America and none in Latin America that I know of. DYSS lost their master distributor (each side tells a different story) and lost their US dealer also. Now DYSS has a completely different set of distributors. D-gen has switched distributors in the US as well. Teckwin has lost their US distributors and had to set up their own distribution company. But Durst tends to work mainly through their own company's US office, so no one single setup is automatically bad, or good.

EFI has Master Distributors in most major cities in the world. TSG, the Mexican Master Distributor at FESPA Mexico. The company itself has branches in 4 Mexican cities.



**21. Are there issues between the distributors and the manufacturer? Can you rely on the distributor today being willing to stay together with the manufacturer, or jump ship and potentially leave an end-user somewhat abandoned when there may not be a new distributor?**

The only recent movement in dealership is Pitman. This distributor company was recently acquired by Agfa, so no more VUTEk printers will be distributed by them. But EFI has already contacted another distributor to cover the area Pitman is going to leave. Only in the United States there are other 6 to 10 distributors.

There are several manufacturers who are well known in the industry for having issues with distributors. This is no reason that their printers are faulty as a result, but if the distributor abandons the manufacturer because of squabbles with the owner of the manufacturing company, then an end-user may be stuck with no one to provide warranty service or after-warranty service at a fair price.

**22. 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?**

Depends on the dealer, but in the USA most dealers are national for the VUTEk printers such as Global Imaging. Global Imaging is the VUTEk dealer that I know the best.. As for the smaller Rastek, some distributors are regional.



EFI VUTEk QS3250r roll-to-roll printer at Pitman booth, ISA 2010, perhaps the last time the company exhibited EFI VUTEk printers, before being bought by Agfa.

#### FEATURES OF THE PRINTER: Vacuum

**23. Is there a vacuum function?**

Yes, vacuum is used to hold media down and perfectly flat.

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

Vacuum is created by 2 pumps.

**25. In how many sections?**

There are three vacuum sections which are fixed, not user-definable.

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

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

Yes, you turn the sections you need depending on the width of your material.

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

The strength of the vacuum can be determined via software. There is a field where you type in the value.

**29. Does setting a substrate profile activate a higher or lower vacuum automatically?**

Yes, each substrate profile has a vacuum value.



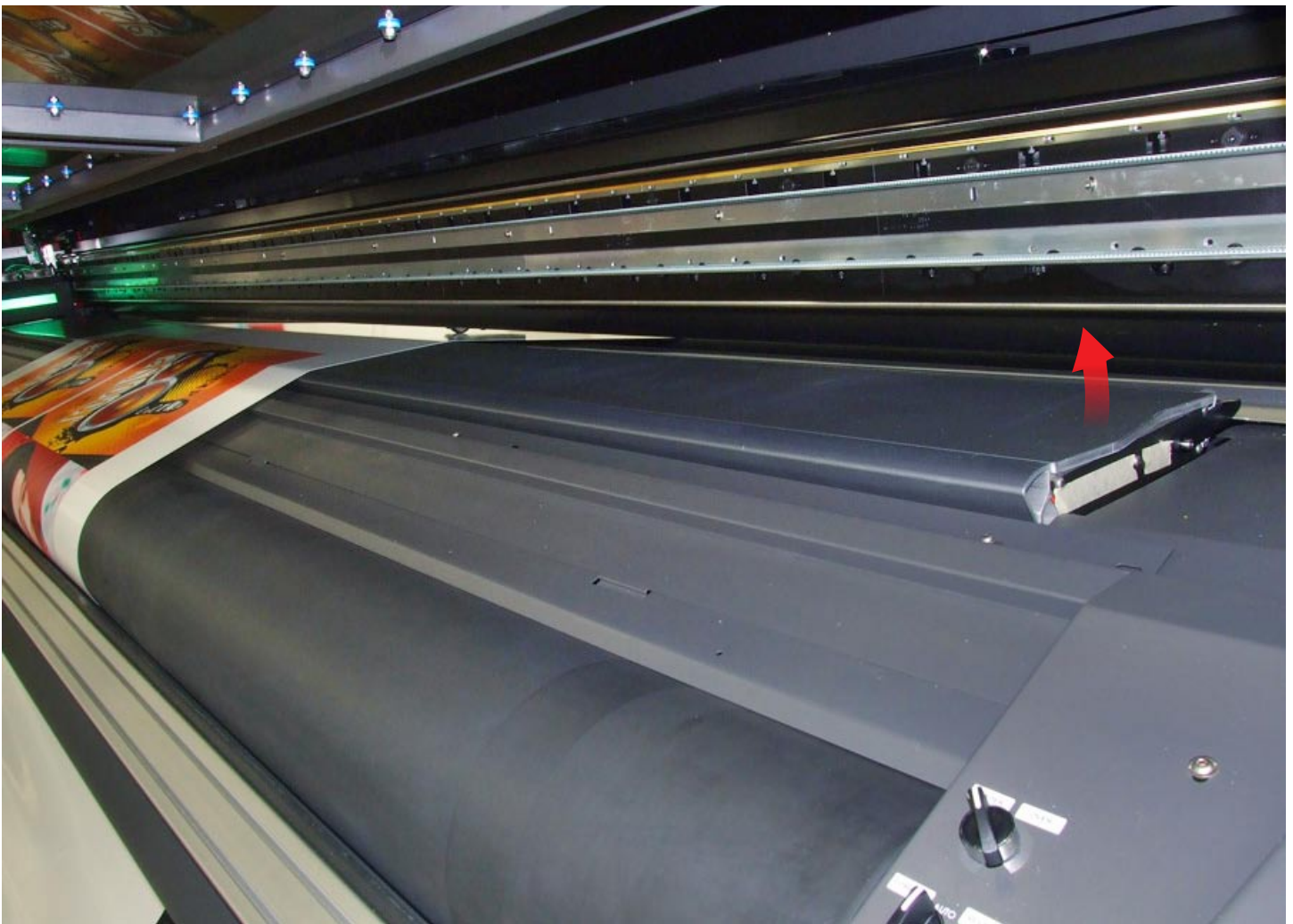
**STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path****30. Is this a dedicated flatbed with no roll-to-roll capability? Or is this a true flatbed or just add-on feeder platforms at front and back?**

This is a dedicated roll-to-roll printer. Although the printer does have the capacity to print media of a certain thickness, it was not designed to handle rigid boards.

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

**31. Describe the platen.**

The platen is composed by a number of heavy planks with perforations for the vacuum system. Each plank can be removed to install the mesh kit to print on textiles, mesh, and similar substrates.



The platen is formed by three solid planks that can be lifted individually.

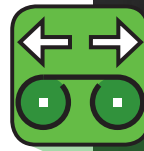
## ROLL-FED

**32. How is media held flat? Vacuum table? Pinch rollers?**

Media is held flat by tension, which is controlled by a Tension Media button in the user's interface. In the print area vacuum also helps to keep media flat.

**33. How is roll media fed? Pinch roller against grit roller?**

The GS5000r uses a set of two continuous rollers. One is the drive roller, the other is the pinch roller. At the factory, some people also called them nip rollers.



Once media is loaded, tension can be applied with the drive rollers by clicking on the tension icon. This tool makes front and rear drive rollers rotate in opposite directions tensing media before printing.

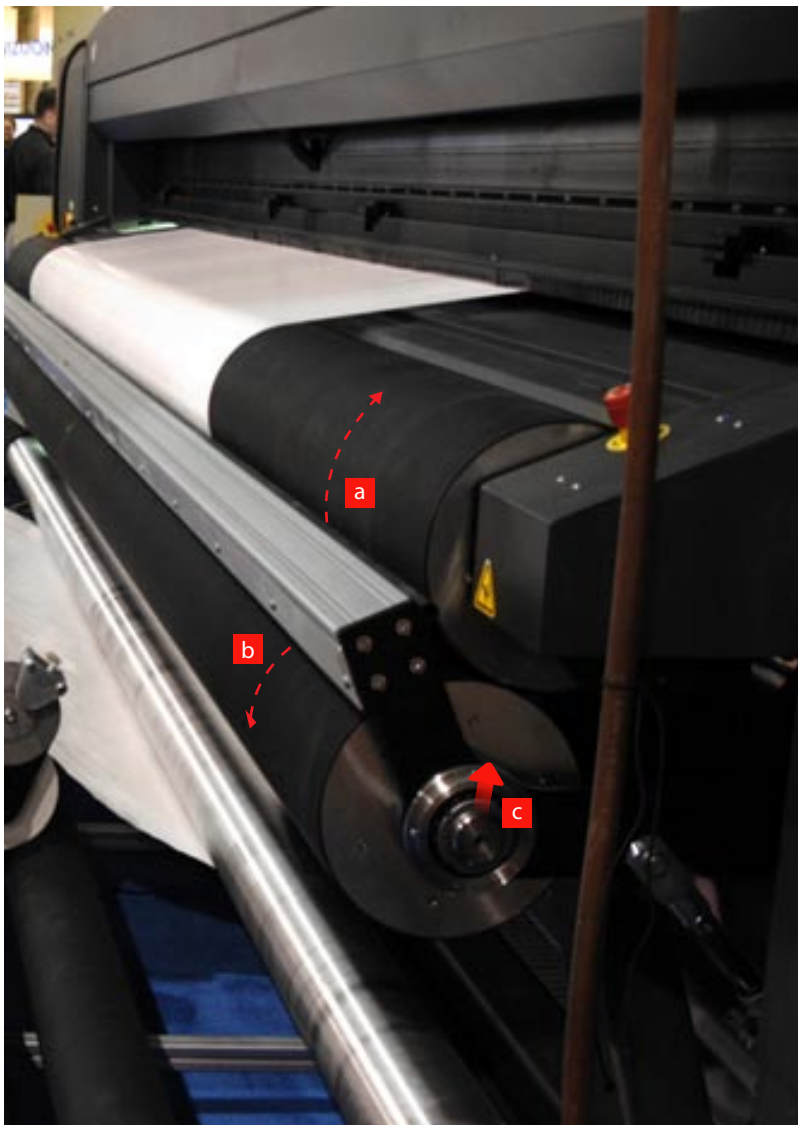
**34. Or does the printer use tension rollers instead of grit rollers?**

The drive rollers are used as tension rollers.

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

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

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



Rear view of the EFI VUTEk GS5000r. The drive roller rotates clockwise to move media into the printer (a). Pinch roller rotates counter-clockwise (b) and also exerts pressure by moving upwards (c).

**35. Can you raise an individual pinch roller, on only the entire row?**

There are continuous pinch rolls instead of rollers.

**36. Can the pinch of the pinch rollers be varied?**

Yes, through the pneumatic regulators.

An important and practical feature is the pinch delay which you can set up via software. It works like the auto shutter in your digital camera: it is a gap of time that lets you make sure there are no feeding issues such as skewing or media bubbles in the printing area, etc.

**37. Is there one row of pinch rollers (normal) or two complete sets of pinch rollers about 20 to 25 cm parallel to the other set?**

Rare but double-parallel rows do exist: Zund 250 and Teckwin TeckSmart among others

**38. Can the grit rollers move the material only forward, or also backwards?**

The Teckwin Tecksmart and the Sun NEO UV LED Evolution can move the material backwards as well as forwards; this helps when you wish to overprint to create Braille, and when you wish to print first white ink and then regular colors. But this is not a recommendation for these printers, since each has issues in other aspects; this comment is only a listing of which printers can print backwards as well as forwards. Each printer model usually has some positive features but then other features that you have to know in advance.

For a grand-format roll-to-roll printer there would not be a reason for reprinting over the same area a second time. Only on a dedicated flatbed, and only to create raised-relief, would you want to print multiple times by sending the material backwards so it can start over again.

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

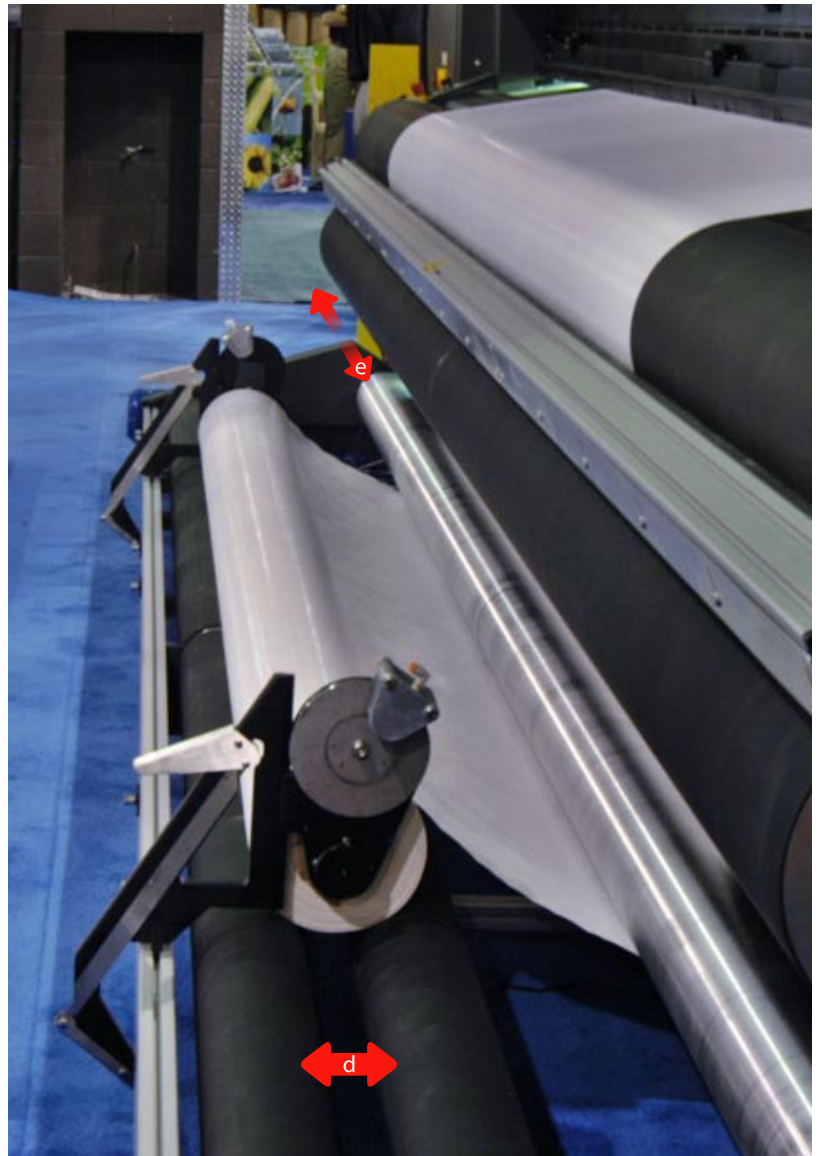
Because of the width, rolls are laid in a saddle or cradle system which rotates to help media feeding. This rotation is generated by a motor.

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.

**40. Is there an air (pressure) core system?**

There is no air core system because the feeding system is not based on a spindle.

Instead, the printer uses two mechanisms in the feeding cradle (or saddle) called Media Brakes—one at each side of a media roll—which consist of pneumatically controlled disk brakes that control the feeding of media from the media roll.



Media is held by a saddle or cradle (d), which is a system of two rotating rolls. The dancer bar moves diagonally (e) according to the tension needed.



At the front, there are other devices called media rewinder assemblies, which is a bracket you knob down to tighten

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

**41. 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 movable dancer bar—more a roll than a bar—that creates tension in the media as it is being fed into the printer.

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

**42. At the front, is there an extra roller bar(s) near the platen or transport belt? Is it a bar to roll under the media, or over the media, or are there both (in addition to pinch roller/grit roller arrangement).**

After leaving the platen area, media is pulled by a pair of rolls at the front.

**43. 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?**

There is no dancer bar because tension is created by the front rollers, after which media goes to the take-up core.

**44. How many rollers exist on the take-up side (between the top edge of the platen and the take-up reel)?**

Two rolls plus the cradle or saddle, which consists of two set of rotating rolls.

**45. How do you fasten roll-fed media to the take-up reel?**

You tape media to the cardboard core.



A front view of the media path. As you can see there is no dancer bar at the front. Once media is passed through the pinch rolls, it goes straight to the core.

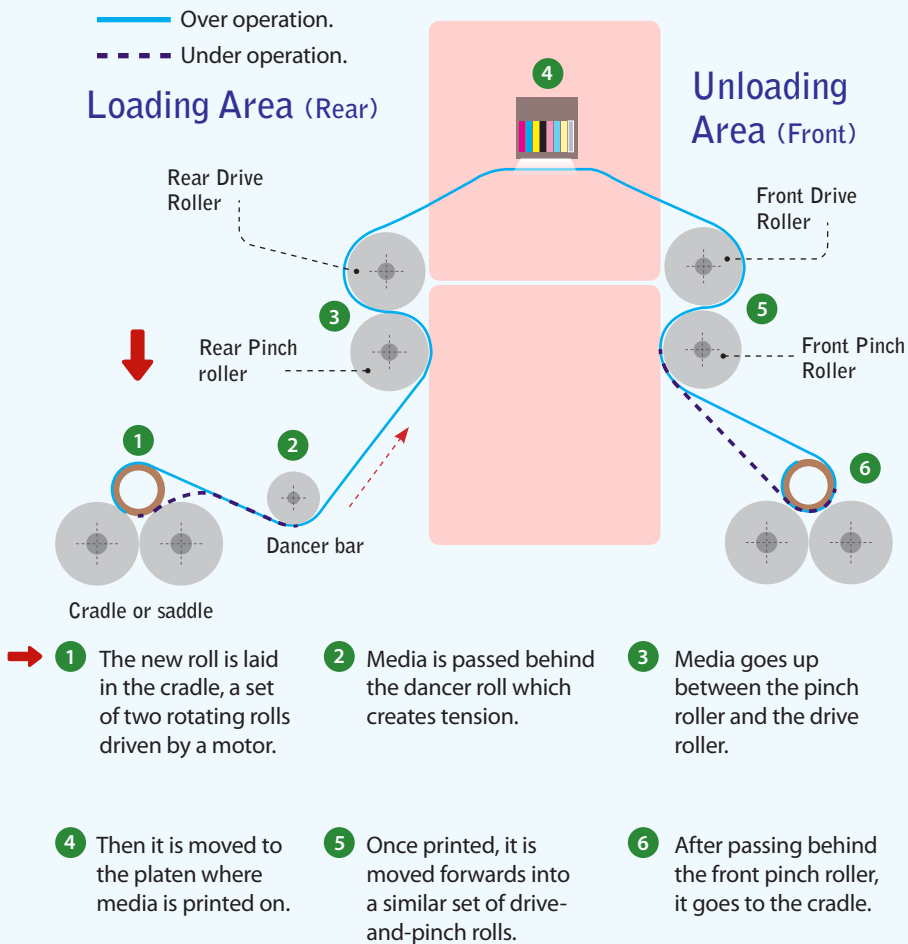
**46. Is a heavy-duty unwinder-winder system available as an option to handle heavy rolls of materials?**

Not at the moment.

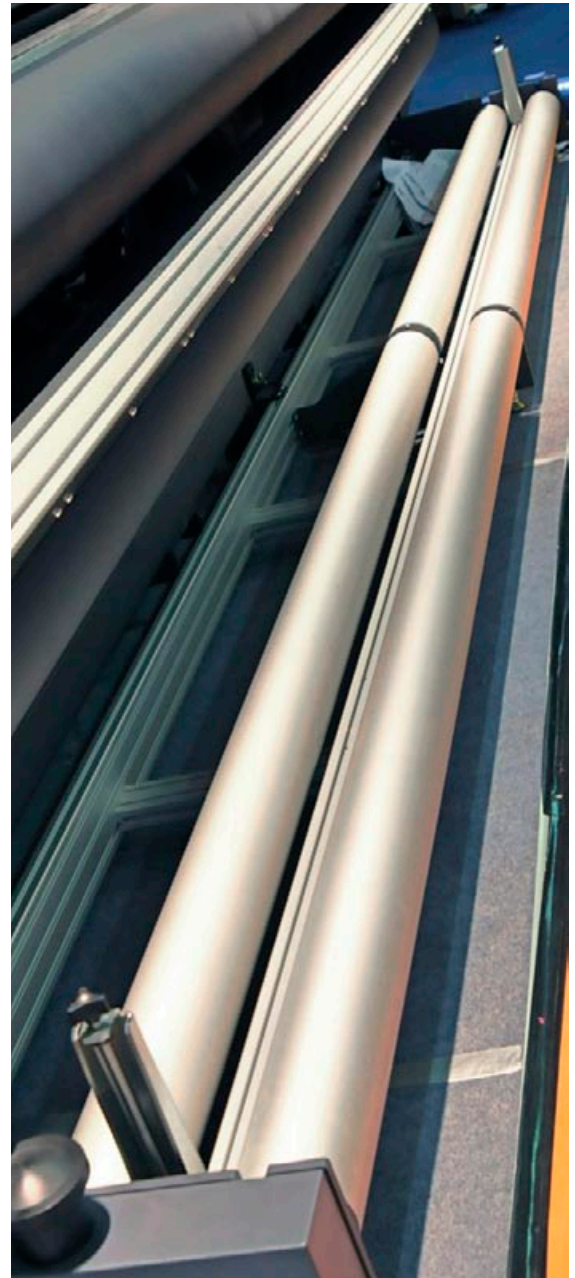
**47. Describe the overall path of the media through the system?**

The new roll is laid in the cradle, a set of two rotating rolls driven by a motor. Media is passed behind the dancer roll and goes up between the pinch rollers and the drive rollers. Then it is moved to the platen, and once printed on, it is moved forwards into a similar set of drive-and-pinch rolls. After passing behind the front pinch roller, it goes to the cradle.

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

**Media Path Diagram, EFI VUTEk GS5000r**

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



Because the GS5000r handles media up to 5 meters, rolls are put on a cradle. Otherwise, a 5-meter spindle will tend to sag.

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

About 3 feet.

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

The amount of waste also depends on whether you need to attach the leading edge of the media to the take-up spool, or whether you can simply leave the leading edge up on the platen or up on the conveyor transport belt (as is possible on the Grapo Octopus II and some other combo printers).

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

#### ***49. Can you print on more than one roll of substrate simultaneously?***

Yes, you can print up to three rolls simultaneously. This is one of the advantages between the GS5000r and the previous dedicated roll-to-roll model, the QS3250r which handles up to two 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.

### **STRUCTURE: Miscellaneous**

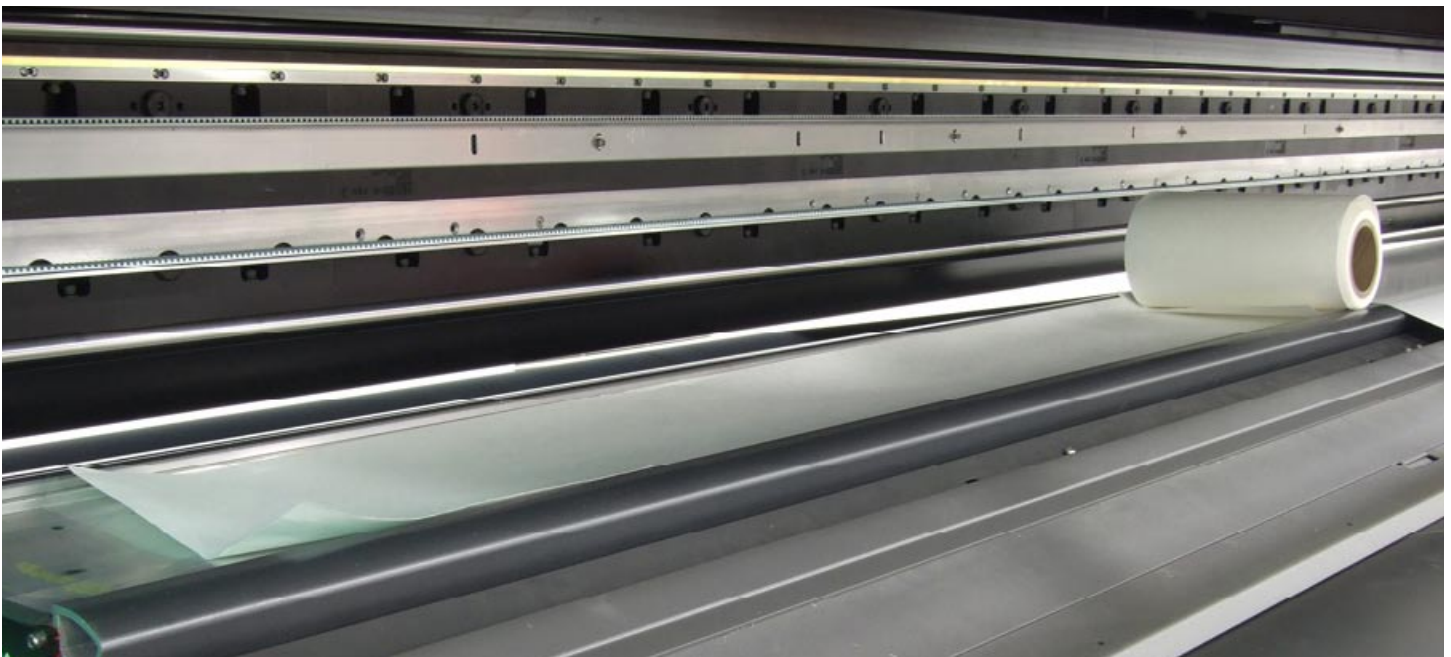
#### ***50. For handling ink that passes through the weave of fabrics or mesh, is there a trough? Or other mechanism to catch the ink?***

Yes there is a trough and a mesh kit: the platen is lifted and you put a piece of paper under it, cap the trough and the paper captures the ink that passes through the media. You can then dispose the piece of paper on which the ink has been cured.

In other designs, the trough has an outing below in the center through which ink is conducted to the waste tank.

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).



Once the platen planks are removed, the platen surface is covered with a piece of paper, which will capture ink that passes through the weave of media such as fabrics or mesh. This roll of paper is provided by EFI.



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

Not at the moment but is a possibility for the future. Currently, cutting media is manual.

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.

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

No visible levels.

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.

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

Yes. The printer was designed with leveling supports rather than with casters. The printer is brought in and leveled where it will be installed. As for the quantity, only the take-up mechanism at the front has 7 leveling supports, 3 at each side and one at the front, in the middle.

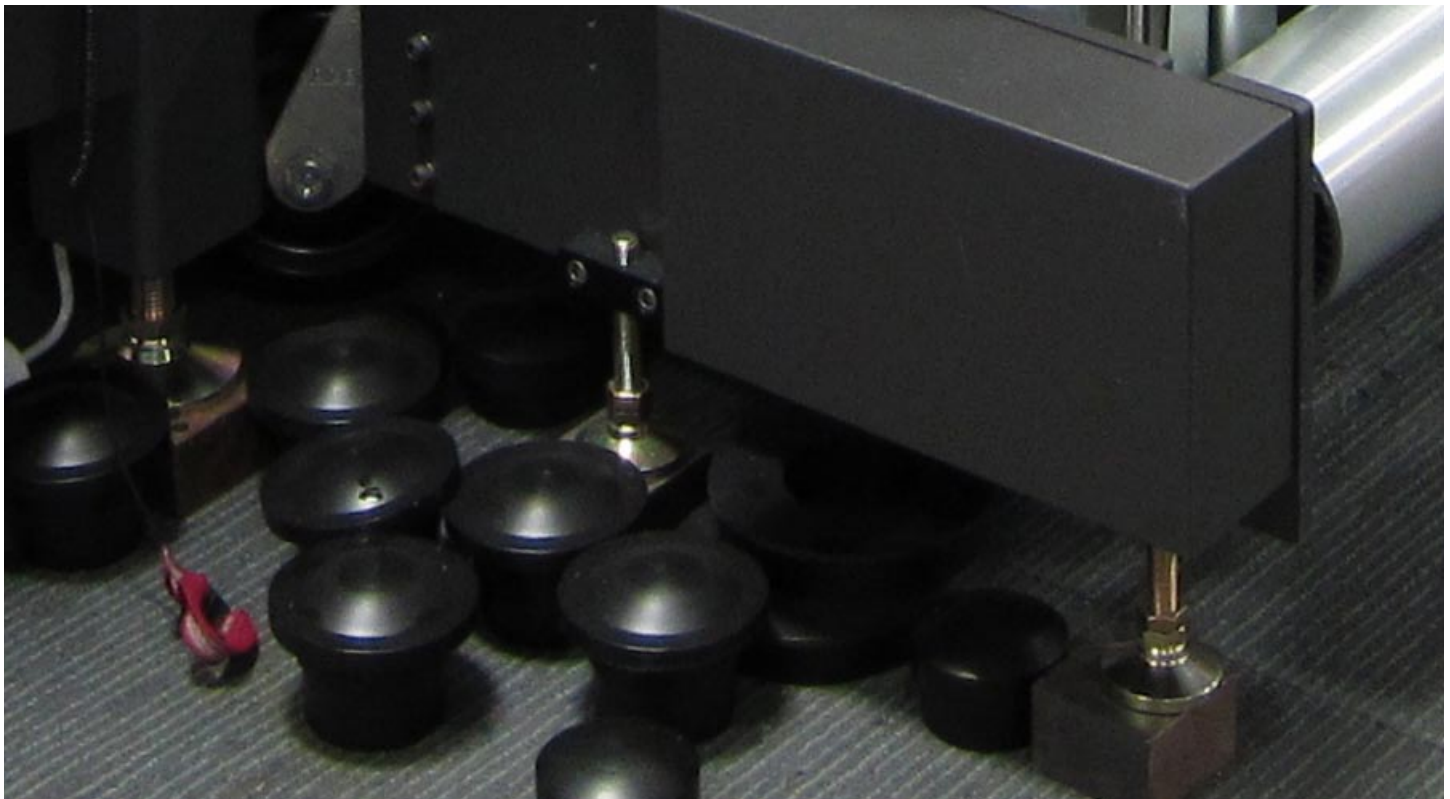
Leveling any UV printer is crucial. Indeed at the NUR factory, once the structure is leveled in the assembly room, rather than roll it from stage to stage, all construction stages take place with the printer not moving from stall to stall.

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

There are no wheels. This printer is not intended to be moved once it has been installed.

**55. 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.



The printer has plenty of leveling supports. There are no wheels because the printer is not designed to be moved.

## UPGRADES, Future Improvements?

**56. What do end-users ask for; what improvements do owners of this printer wish they had?**

Experienced end-users have asked for minor software options. Some wished the printer had a cutter.

## Miscellaneous

**57. 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?*

Being a dedicated roll-to-roll printer, the movement is expectedly generated by the rolls.

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

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.



Movement of rolls is generated by Allen-Bradley motors (h) in the drive rollers, and Rossi Motoriduttori gearmotors (i) for the unwinder and rewinder units.

**58. 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. The right end of the printhead carriage stops at the left end of the substrate.

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

## OPERATING THE PRINTER

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

No.

I have not found any wide-format printer that works with every single option via internet. Although this option would be an interesting feature it is hard to think of a situation where internet could be used to send a file directly to the printer, given that anyways you would need a person in the room to load media, etc. However, reportedly the HP Scitex LX600 and LX800 can be operated via internet, and there is a webcam to check on print job status left during the night, for example.

**60. What is the level of ease of use? Can anyone use this printer or do they have to be trained and certified? What about daily and periodical routine maintenance?**

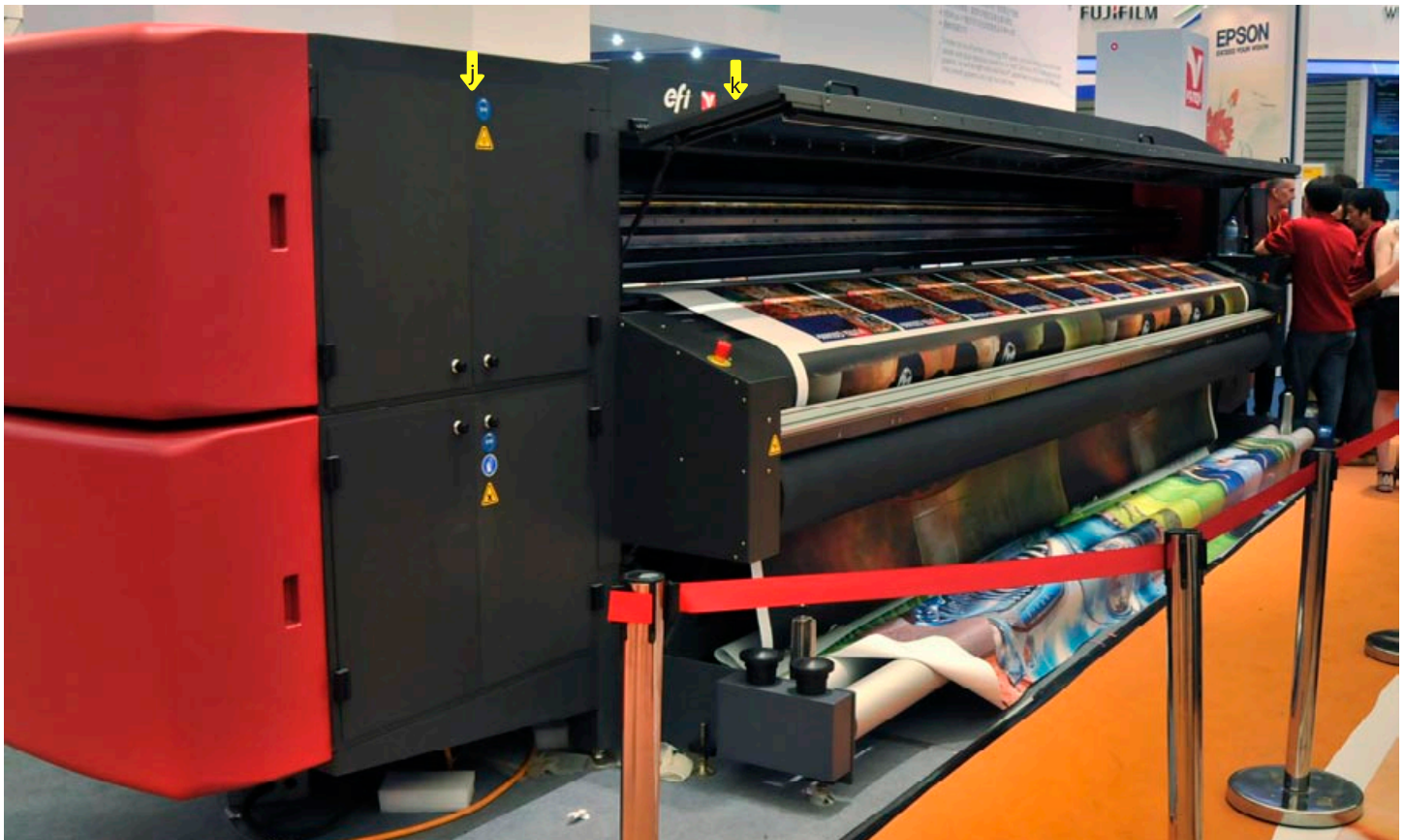
The printer is relatively easy to use. A person would need a day's training to run the printer. However, a formal certified training is necessary to know all the important procedures and safety aspects.

**61. Is the printer user friendly?**

Yes the printer is user friendly. The printer's software displays visual information with icons, levels, etc. in a way that is understandable. Although training is necessary, there are no special skills hidden to operate the printer correctly.

**62. What sensors does the printer have?**

Hoods and cabinet doors are interlocked, so that should a person try to open one of these while printing, the printer will automatically stop.



Left cabinet doors and front hood and are interlocked. If opened, the printer stops. Besides preventing any accident caused by moving parts, this system prevents operators from looking straight to UV light.



**63. Which materials are pre-established in the software, or do you have to create the settings for each class of material yourself?**

Training is troubleshooting. There are no robotic formulas you have to memorize, or a specific profile for each material. Instead you are taught how to create your own profiles for each material. This approach is useful especially because media properties tend to vary from manufacturer to manufacturer.

The printer's Media Database takes four features to establish a new media type:

- Media tension, covers front and rear tension as substrate goes through the printer
- Dancer bar, moves according to the tension needed for each substrate
- Platen Vacuum, the amount of vacuum strength to keep media tight and smooth on the print area.
- Brake Pressure The proper quantity of pressure of the brakes prevents media rolls from unwinding too much or not enough.

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

Operation is carried out in the traditional way: via keyboard and mouse. Most operations are done through the computer. There are only a few physical buttons.

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.

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

You get a real computer monitor.

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

It sits on its base but the position is not fixed, which means you can do a minor rotation.

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

The keyboard is not fixed into the printer.

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

Yes, there is a space beneath the keyboard base to place tools.

Increasingly too many other 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.



**69. Where does the operator stand or sit?**

The operation area is at the right.



The main operation area is at right.

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

At the back you find the main AC disconnect switch, emergency stop buttons and panel knobs to control the loading mechanism. The waste ink tank is also at the back.

**71. What controls are on either end?**

Neither end has control buttons, but the red coverings can be removed in case an internal procedure needs to be done.

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

You can load media, start printing and do other tasks within the room, for example operate another printer, cut a previous print job, etc. but it is not advisable to let the printer running and totally leave the room for a long time.



Since most operations are performed via software, you find only a few buttons at the back.

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

Normally you need only one person to operate the printer but because the weight of a 5-meter roll of media, in reality you would need at least two persons.

In the case of printing multiple rolls, these can be loaded by one person if the rolls are not too heavy.

For heavy rolls, in case there is only one person available, media can be passed under the dancer bar and then hold down with the blue magnets.

#### ***74. Is there a pole with beacon lights?***

No, there are no beacon lights because most of the movements happen inside the enclosed area. In other words, there is no need of a warning because there are no moving parts that might hit a person if the doors are all closed (as they should be during operation).

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.

### CONSTRUCTION (BUILD QUALITY)

#### ***75. 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.

#### ***76. What kind of testing is done in the factory of the incoming parts?***

Each part is tested before it gets to the factory. Each part passes a quality control that is a 2-week process.

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

The printer is built to be a robust industrial machine. You get an idea of the sturdiness of the printer when you close the heavy hoods.

#### ***78. Is there a hood?***

Yes, there is a hood at the front and another at the back.

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).



When closed, the hood encloses the printing area almost totally. The windows of the hood are tinted to block UV light.

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).



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

There is only a front opening.

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

It is solid. In fact, it requires more strength than I thought to be either opened or closed.

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

The workmanship is clean. The printer is professionally assembled.

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

There is no vibration at all. The printer weighs 5000Kg (around 5 tons), so there is not much chance of wobbling.

**AESTHETICS****83. How would you describe the design of the printer?**

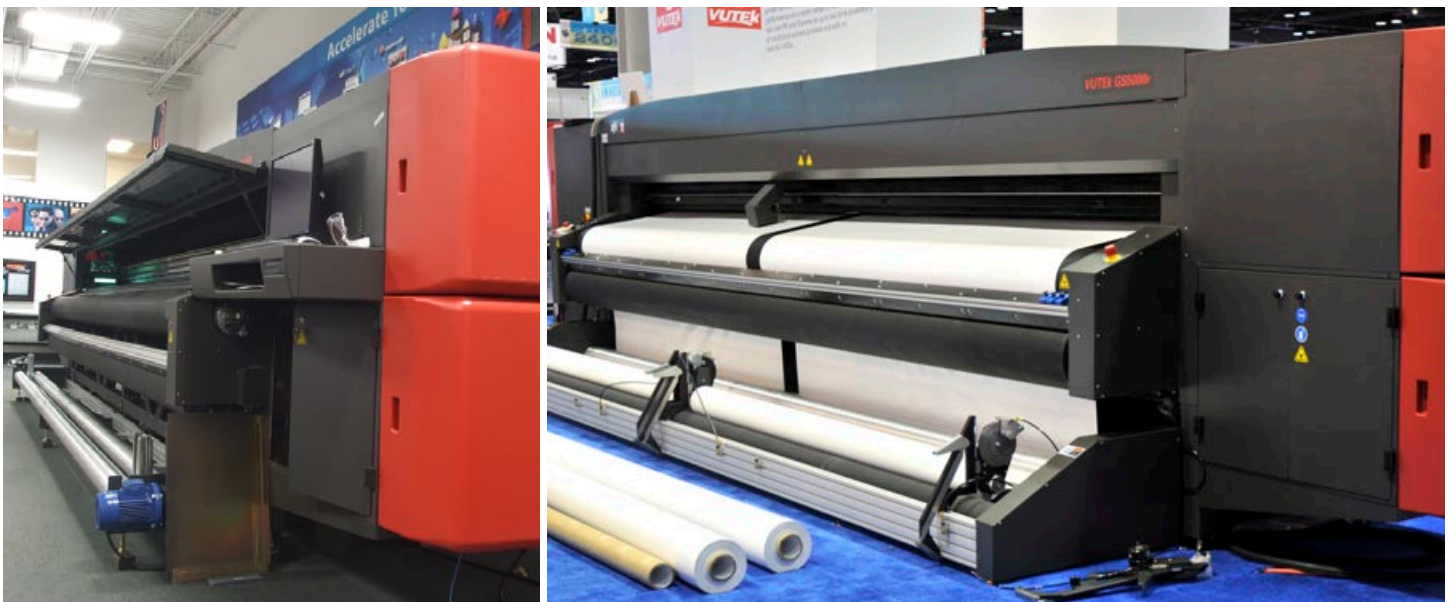
The printer is characterized by its industrial, heavy-duty design.

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

The design of the printer is somewhat square, and if it weren't for the operation area which is basically monitor, keyboard and mouse, it would be difficult to tell which is the front.

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.



There is no significant difference between front and back, other than the monitor area and the hood with tinted windows.

## SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

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

8 to 12 weeks is the delivery time for all the GS printers. The QS printers were less complex, therefore built in a month or so.

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

3 phase, 50/60 Hz, 70 amps (4 or 5 wire), Delta  $220 \pm 10\%$ , 50A (Wye  $400 \pm 10\%$ , 50A).

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

Yes, it is recommended by EFI.

All UV printers need room ventilation, for everything from ozone to misting ink to general odor. Increasingly ozone production is surprising; this has led some companies to claim that "no ventilation is needed." Such a claim is dangerous, especially in a country like the US where litigation is so common. Has Agfa ever heard of misted ink? Ink mist is what the printer operator could potentially breathe if the ink is misting (many printers mist, most notoriously the Infiniti 1600 models; the ColorSpan 72uvX also mists a great deal).

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

Temperature range for optimal performance is between 68°F to 86°F (20°C to 30°C). As for humidity, the range is 30% to 80% (non-condensing).

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.

**89. 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.

**90. 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.



In addition to space, consider the electrical installation of your facilities. Be aware that most wide-format printers will need a more industrial type of electrical wiring.

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

Sending files can be done via Network, USB, and CD or DVD.

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

The compressed air can be in a range of 95 psi (6.7 kgf/cm<sup>2</sup>) to 150 psi (10.5 kgf/cm<sup>2</sup>), at 4cf/m (113 lpm) dry air only.

**93. What space is needed to accommodate not only the printer but everything else to make the printer fit into your workflow?**

Just realize that you would be handling 5-meter long rolls. An initial estimate is 10 feet around the printer.

**94. 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?**

Yes, it comes in one piece. The only thing that needs assemblage is the unwinder and rewinder mechanisms.

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

Width (Length)	Breadth	Height	Total Weight
8.69 m (28.53 ft.)	2.5 m (8.20 ft.)	1.91 m (6.26 ft.)	11,023 lbs. (5000Kg.)

**96. How many boxes arrive?**

2 boxes. One is the crate with the printer plus the PC. The other contains the unwinder and rewinder mechanisms.

The printer should have plenty space around to handle long media rolls.



## INSTALLATION OF THE PRINTER

**97. Realistically, what expenses must you incur for the installation, such as a fork-lift truck or crane to lift the printer off the truck?**

The major expenses would be to meet EFI VUTEk specifications for installation which imply power and ventilation needs.

**98. Does the printer have lifting hooks on the top, or elsewhere?**

There are no lifting hooks on the top but lift guides below.

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

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



**100. Can you install this printer yourself?**

No. Installation must be done by a certified field engineer.

**101. Is installation included in the purchase price?**

Yes.

**102. How many people come for the installation?**

One person.

**INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS****103. How many manuals are available?**

There is User's Manual and a Maintenance Manual.

**104. Which manuals are hard-copy? Which manuals are only on CD?**

Manuals are hard-copy, but they also exist in PDF version.

**105. Is there a Site Preparation Guide? If so, is it helpful?**

Yes.

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

Yes. In the Basic Operations Guide there is an alphabetical index of themes, in addition to the table of contents at the beginning.

**107. Is there a Service Manual?**

Yes, that would be the Maintenance Manual.

**108. Is the Service Manual for the end-user or only for tech-support?**

The Maintenance Manual is for the end-user. Certified field engineers are provided with more complex documentation.

**109. Is any part of the service (maintenance routines) available in video?**

There are instructional DVDs.

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

The native language is English.

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.

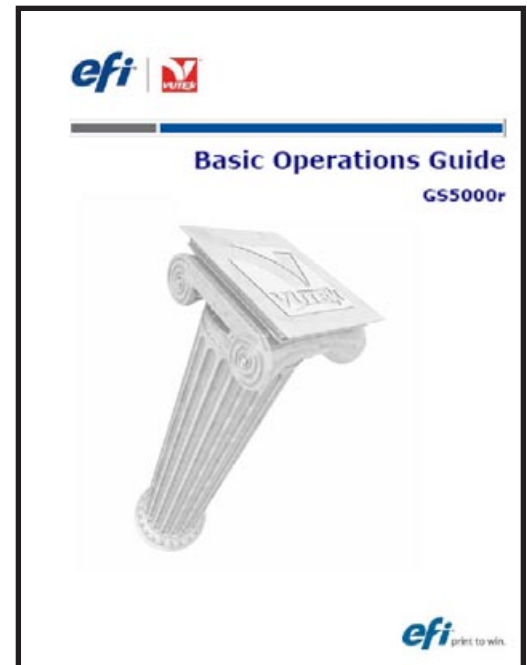
**111. What kind of cut-away drawings or other drawings exist that show the various parts of the printer?**

The Basic Operations Manual uses photographs, 3d renders, and charts to explain parts and procedures.

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

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

Manuals and other documentation can be easily obtained online in EFI's website, but you have to create an account where the serial number of your printer is requested. This means you at least have closed a purchase contract.



The Basic Operations Guide is a full color 105-pages document illustrated with photos, 3d renders, and diagrams

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

## TRAINING

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

Yes it is included. EFI offers training for up to two operators.

### **114. Is training necessary?**

Yes. In spite of being very user-friendly, training is necessary.

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).

### **115. Is classroom training available?**

Yes, classroom training is available and there is also a hands-on practice.

### **116. Is factory training available?**

Yes it is available.



Factory training takes place in EFI VUTEk building, in Meredith, New Hampshire.

### **117. What on-line training is available?**

The end user is provided with a web access for software questions. As mentioned earlier, there is also a complete documentation and instructional DVDs online.

The website [superwideformatprinting.com](http://superwideformatprinting.com)<sup>1</sup> offers tips and suggestions on

- Curing levels for proper adhesion,
- Adhesion testing,
- Media storage, use, and handling.

There is also a list of media and media distributors.

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

<sup>1</sup> **Note:** by the time this report was being laid out, the web site mentioned had apparently been discontinued. However, similar information can be found at <http://w3.efi.com/VUTEk/Support>.

**118. What expenses do you have to pay relative to training? Is training at your site (so you have no transportation costs) or do you have to send your people to be trained at the manufacturer (you have to pay airfare, hotel, and meals)?**

As mentioned at the beginning of this section, training is included. Should the buyer choose on-site training, there is a charge of \$1600.

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

The estimated time to be in full production is one week.

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

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

## TECH SUPPORT & WARRANTY

**120. What is the original warranty period?**

At FESPA Munich 2010, I was told the warranty was for 13 months.

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.

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

Most UV inkjet printers are covered for 12 months. In the case of the WP Digital (the company is now Polytype) Virtu RR50, the warranty is 12 months, but printheads are covered for 6 months.

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).

**122. Does it include parts, labor, printheads?**

The warranty includes one jet pack for free per color.

**123. Is there an extended hardware warranty? What price?**

Yes, there is a program of warranty extension. There are also in-hands service programs for all VUTEk GS series.

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

The Tech Support personnel is VUTEk certified.

**125. What are the hours of tech support? If support is from eastern time zone, hours should be at least 8 am through 8 pm to cover users on the West Coast.**

Tech support is offered 24/7.



**126. Can support technicians talk users through how to achieve the color of a corporate logo or do you have to take an expensive course to learn ICC profiles and color management?**

Yes, there is application tech support personnel who can assist you in such a case.

**127. 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.

**128. Can the manufacturer remotely diagnose the printer?**

Yes, as long as the printer is networked, it is possible.

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

**129. What is the native language of the tech support person?**

Regional distributors also have their own technicians, which means tech support is not centralized in EFI's main offices.

This decentralized service has two advantages:

- You get to speak with a tech-support in your own language.
- Tech support is available within your time zone.

**130. Who does repairs? Dealer, manufacturer, distributor, or third-party?**

This depends on the country. Dealers' technicians get trained but usually EFI handles tech. support.

**131. Do spare parts come from another country? If so, what is the wait time?**

There are regional distribution centers, so that spare parts can be easily delivered regardless of your location.

**132. How far does tech support person have to travel to reach my printer?**

There are field engineers if not within, at least near most major cities in the world.

**133. How long are spare parts maintained for discontinued printers?**

Spare parts are maintained for about 10 years. EFI VUTEk has discontinued solvent printers and spare parts are still available.



EFI has local tech-support, and management staff in several countries. Here, Jose Melgar, Technical Writer for FLAAR and SungJin Kim, Sales Development Manager, Inkjet Printers, EFI Asia Pacific, in a visit to RGB Digital Wide Color, a sign shop a few kilometers away from Seoul, South Korea.

## CLEANING &amp; MAINTENANCE NEEDS

**134. How easy is it to access the area where you have to clean the heads?**

You open the cabinet and you are right in front of the printhead carriage.

The EFI VUTEk printers are designed so that the red covers at both ends can be removed so that internal parts are more easily accessible.

**135. How is head cleaning accomplished? purge, suction, manual, other?**

Heads are cleaned by suction.

**136. To what degree is purging automatic (once you press a button), and to what degree is it manual?**

There is an auto-purge system, but it can also be done manual.

**137. To initiate a purge, where is the control or button? Is it software generated or do you have to press a button? Is the button on the outside of the printer, or inside on the carriage?**

It is software generated.

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

The levels of purging are not measured in terms of strength but in terms of time. You can vary the purging time from 1 to 10 seconds.

**139. How often should you purge? Does the User's Manual honestly indicate how often you should purge?**

The printer is configured to purge automatically every 3 print jobs. In other terms, you need to purge 2 or 3 times a day.

**140. Is purging done with ink, or with a flush solution?**

It is done with ink, but you could solvent-flush.

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

There is a bottle at the back, next to the waste ink tank.

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

**142. Can you select which ink lines/print-heads to purge, or can you only purge in clusters or all or nothing?**

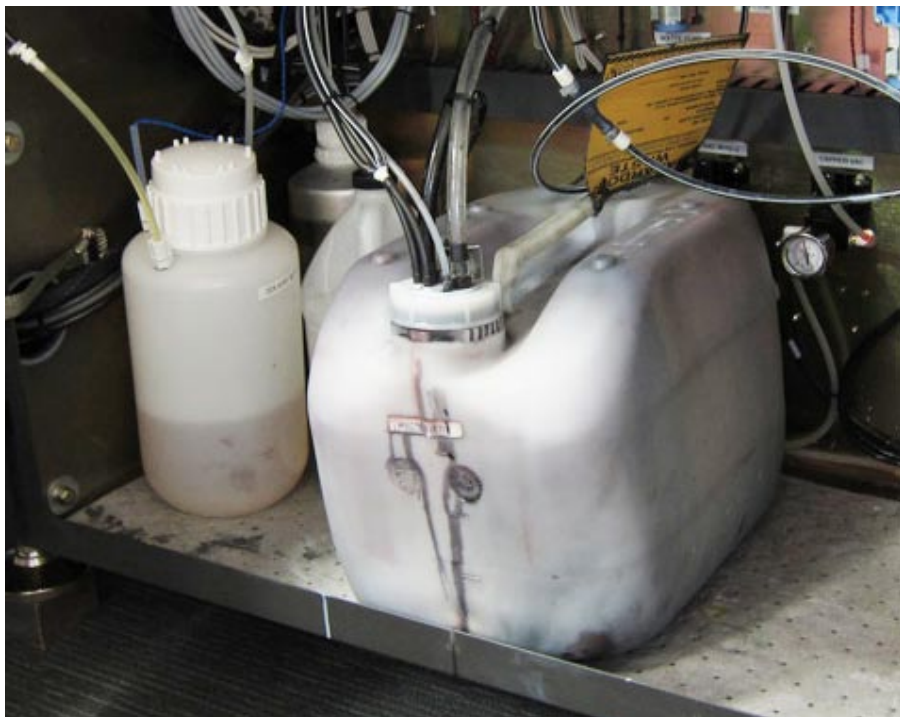
Yes, purging is individual.

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

Purged ink goes to a waste ink tank.

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

There is a vacuum purge tray at the left, which cleans the printhead surfaces and covers the printheads when not printing.



Ink that is purged is collected in a 5 liter tank located below in the rear cabinet.

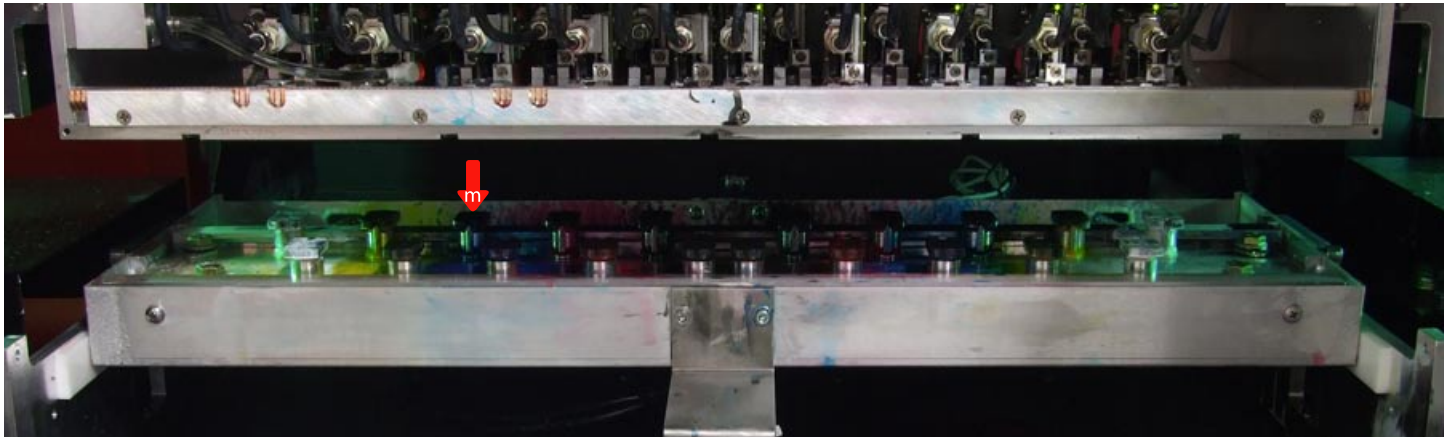
**145. Where is the service area, at the left, or at the right?**

Service area is at the left.

**146. Are there wipers?**

There is a suction system that cleans remaining ink in the surface of the printheads.

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



Heads are cleaned by suction units called vacuum purge blocks (m). There is one per printhead.

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

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

At the left.

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

There is no need for the printers to be spitting ink at regular intervals. Solvent models do.

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

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

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

**149. Does the manufacturer provide any special cleaning tools?**

There is no need for cleaning tools because the printer itself does the cleaning of heads.

**MAINTENANCE****150. What daily procedure is required at start up in the morning?**

Clean the heads and oil the rails.

**151. What daily maintenance is required at night?**

There is no special cleaning procedure you would have to perform on a daily basis at the end of the shift.



**152. What other periodic maintenance is required by the operator?**

You need to clean the pinch rollers and drive rollers every two days to avoid accumulation of particles and substrate remains.



EFI VUTEk GS5000r at SGIA 2010. Cleaning the rolls ensures media will move smoothly through the printer. This needs to be done especially if you have printed on textiles.

**153. How often do filters have to be checked? Cleaned? Changed?**

There is a schedule to check/replace every filter, ink line, etc. There is a software tool called Timers and Counters, which keeps track of

- UV Lamps
- Lamp filters
- Rail Lubrication
- Primary Ink Filter
- Secondary Ink Filter

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

Printheads and rails.

**155. What maintenance do the UV lamps require, such as cleaning the quartz?**

You have to change the lamp filters every month but it depends on the usage.

**156. What self-maintenance does the printer do on its own?**

As mentioned earlier, every 3 print jobs the printer does a head cleaning cycle.

There is an application in the software called Autoclean Settings, where you can define:

- Purge level (measured in time)
- Wipe Time (measured in number of passes)
- Cleaning interval (measured in minutes; to define frequency of cleaning cycle).

In this application you can also define the automatic cleaning procedure by job interval or by time interval. Between these two options, the best is the job interval setting, because a time-based setting will interrupt the print, although the print will continue after cleaning process.

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

You need training to handle the unwinder unit.

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.

**158. If you change ink, how much hands-on work is required to set up the ink system? Is hand priming or sucking the ink down the tubes required of the operator? Is head priming automatic, or operator initiated?**

There is currently only one type of ink for the GS5000r which is manufactured by EFI.

**159. How much time, media, and ink are used during regular cleaning, calibration, and maintenance?**

Ink that is purged is the only thing consumed during cleaning.

**160. 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.

**161. Is there a sleep mode? Should the machine ever be turned off? At night, how much do you turn off? Does this entail having a UPS unit to guarantee it is on all the time?**

There are three modes of printer inactivity, and each one implies different printer preparation procedures:

Sleep Mode, ideal when the printer will be idle for periods during the day. It turns off lamps without purging printheads. This mode reduces startup times and reduces ink purges.

Standby Mode, used if the printer will be idle overnight or for periods of up to three days. This mode, turns off lamps and moves the vacuum purge tray under the printheads without purging solvent through them, reducing startup times and the amount of ink used during ink purge.

Shutdown Mode, is used if the printer will sit unused for more than three days. The following procedures need to be performed:

- Clean the vacuum purge blocks using head conditioning fluid and a clean printhead wipe.
- Perform a 60 second solvent purge on each printhead
- Perform a 30 second solvent purge on each printhead twice.
- Clean surface of printheads using head conditioning fluid and saturated wipe.
- Shutdown via software.

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

Heavyweight printers like the GS5000r are built to print. It was not designed to be unused, but in any case 3 to 4 days are the maximum.



Although it is easy to use, the unwinder unit is indeed a complex structure that requires a trained operator.

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.

### ***163. How should a printer be prepared for sitting unused for a long time?***

You need to flush ink out and leave the printheads in solvent.

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.



As expected from a printer this size, the EFI VUTEk GS5000r was built for industrial production and it is not recommended to have it turned off for long periods of time.

## **SAFETY & HEALTH CONCERNS**

### ***164. How is safety treated in the printed literature?***

Safety is one of the first aspects covered in the Basic Operations Guide. Throughout this document you will find a number of full-color warning signs in the subjects that require caution.

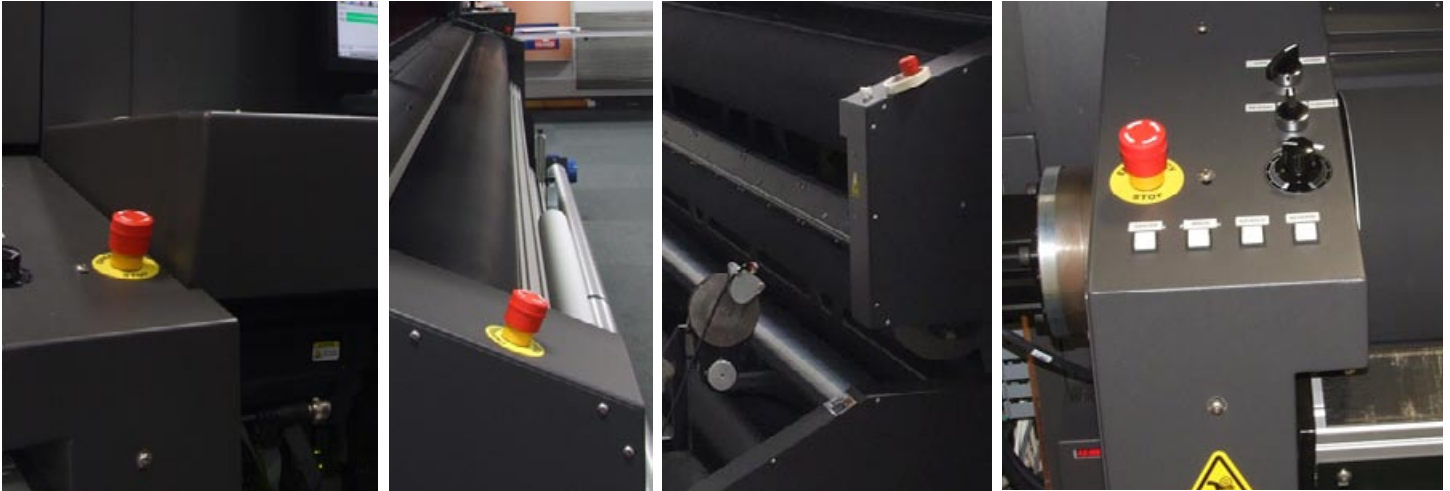
GCC's StellarJet 250 UV manuals have among the best treatment of safety aspects; in other words, they tell you point blank some of the reality of UV ink and UV lamps. If the warnings do not make you cringe, they are not realistic.



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

There are four emergency stop buttons. When pressed, the button:

- Shuts off the UV lamps
- Stops all printer mechanical movement
- Stops the unwinder and rewinder
- Displays an error message in the monitor.



The emergency stop buttons are located near each corner of the printer. As mentioned earlier, in addition to these buttons front hood and left cabinet doors are interlocked.

**166. Have you employed an emergency stop yet?**

Emergency stop buttons are normally used in the factory for testing.

**167. Is there auto-shut down? If so, what triggers it?**

Service station door and main printer hood are interlocked. If they are opened while printing, the printer will stop.

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

I have been in the demo room with at least 4 printers running at the same time, and there was no disgusting odor, at least not perceptible.

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

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

The hood is closed almost completely. The small gap between the hood and the printer is covered by the skirt. But this gap is particularly narrow because there is no need to leave space for thick materials, since the maximum thickness is "0.25.

There is no light leakage at front.

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

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

**170. What kind of “skirt” exists along the bottom of the hood to prevent light leakage?**

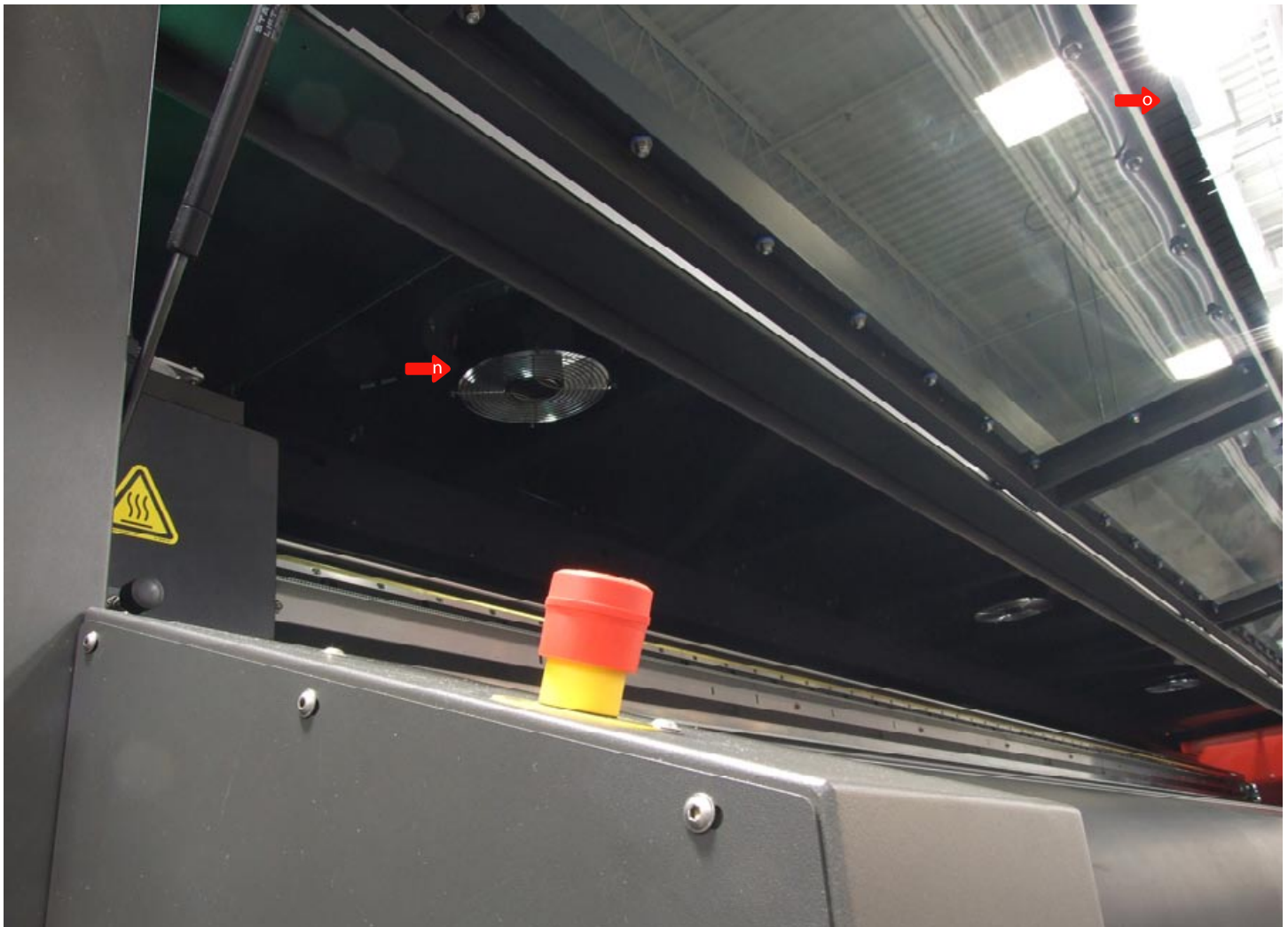
The printer uses rubber flaps.

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

No, there is a skirt only at the front. Although you can see a bit of reflection of the UV light at the back, it doesn't hit you directly in the eyes.

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

The printer has 3 outings above to install the exhaust system.



The printer has three exhaust outings (n) to get rid of heat and UV ink odor. The skirt (o) at the end of the hood shields UV light.

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

Although the printer is not noisy, the only perceptible noise is the hum of the vacuum.

Normally the vacuum pump is the noisiest part of any UV-curable flatbed or combo-style printer. Roll-to-roll UV printers do not need as much vacuum table area so are not as noisy in this respect.

**174. Do the printer specs list the noise level?**

There is no mention of the noise level in the Basic Operations Guide document.

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

The printer is very safe in terms of moving parts.

An external part moving is the drive roller and the pinch roller, but these rollers are covered by the finger guard. So although it is not impossible, the design makes it highly unlikely for a person to suffer any physical damage due to moving parts.

The winder and unwinder units are rotating systems that are not covered by such a guard.

**176. Are any other safety or health issues involved? Does the operator need to be concerned with any other safety precautions?**

Operator vulnerability to UV light, propensity to allergies caused by contact with UV ink are aspects discussed in training.

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

It can be obtained online. Again, it is easy, but you need to create an account, and to create an account, you have to enter the serial number of your printer.

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

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

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



The UV light is adequately shielded by the front hood. In fact, should you try to open it while printing, the GS5000r will stop.



## PRINTHEAD TECHNOLOGY

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

Seiko 508 heads.

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.

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

Printhead specifications are not commonly published. However, it is open knowledge that this model uses Seiko printheads.

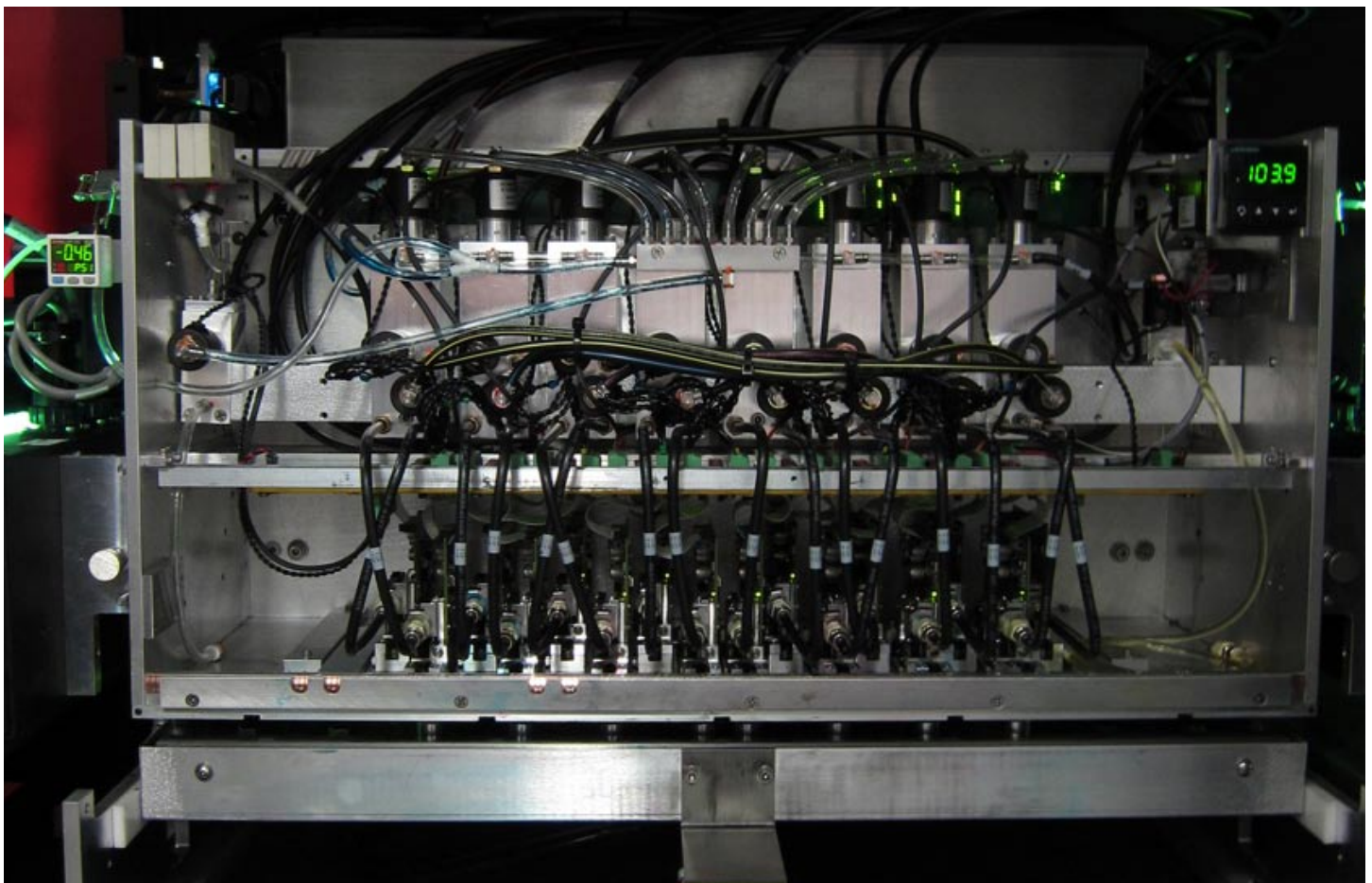
**181. Is only the printhead used by itself, or is an entire electronic assembly also from the printhead manufacturer?**

The electronic assembly related to printheads is designed by EFI VUTEk, but assembled by another company.

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

The only other wide-format inkjet printers I can think of that use Seiko heads are solvent printers. EFI VUTEk printers are perhaps the only wide-format UV inkjet printers using this brand.

All components used to build the printer are evaluated and compared. Seiko met the specifications of what VUTEk engineers conceived for this printer.



All options of components were evaluated. Seiko was selected because it meets the standards of what EFI wants to offer in the GS5000r.

**183. What are the benefits of this printhead?**

The printhead's native resolution and number of nozzles were the aspects that inclined the balance towards Seiko.

**184. What are the downsides of this printhead?**

A person mentioned he wished the printhead system allowed for more heads installed in the printer.

**185. How many nozzles per printhead?**

508.

**186. Can a sensor(s) detect clogged nozzles and can software provide backup nozzles to cover that missing area on the next pass?**

Not currently. You detect clogged nozzles by doing a nozzle test, which is a printed pattern that shows the performance of each nozzle.

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

Two heads per color.

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

My notes from the demo room read 20 heads. The Basic Operations Guide read 16 heads.



Nozzle test pattern. Absent or interrupted lines in this pattern are the sign that a nozzle is blocked.

**PRINTHEAD DPI & Features****189. What is the drop size in picoliters?**

24pl (in a 600dpi print mode) or 12pl (in a 1000 dpi print mode).

The printhead's own literature explains that the drop size can be varied in multiples of 12pl up to 7 drops, but a drop size bigger than 48 pl (12pl x 4) would tend to decrease the print quality.

**190. Is there variable droplet capability?**

The drop size can be defined through the RIP.

**191. 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?**

The brochure lists the two possible resolutions, 600dpi and 100dpi as true.

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

The GS5000r can print at 2, 4 and 8 passes.

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).

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

Quality levels are described in terms of smoothing, which is the technology used to get rid of print issues such as banding.



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.

#### **194. If modes, what are the modes called?**

- Heavy Smoothing (8 passes)
- Light Smoothing (4 passes)
- No Smoothing: (2 passes)



The printing matrixes at the demo room specified the type of smoothing used in each print sample.

#### **195. At trade shows, how many passes is the printer operating at to show the results?**

Half of the print samples are produced at 8 passes, and the other half at 4. But this depends on what the potential customers want to see.



## Bi-DIRECTIONAL VS Uni-DIRECTIONAL PRINTING

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

The print system was designed to print bidirectional mainly. It is possible to print unidirectional, but that would be in rare cases.

**197. Is the sequence of ink color lay-down the same coming and going? Or is the sequence of colors bi-directionally a different sequence than uni-directional? (the usual way).**

Yes and no. Printheads are placed in a mirrored disposition but the colors are alternated so that each full color (CMY) is followed by a light color (lc, lm, ly). In the resulting arrangement, printheads at the opposite side are each full color's corresponding light color. This is better explained in the following diagram.

**198. Is printing bi-directional or uni-directional?**

Bidirectional.

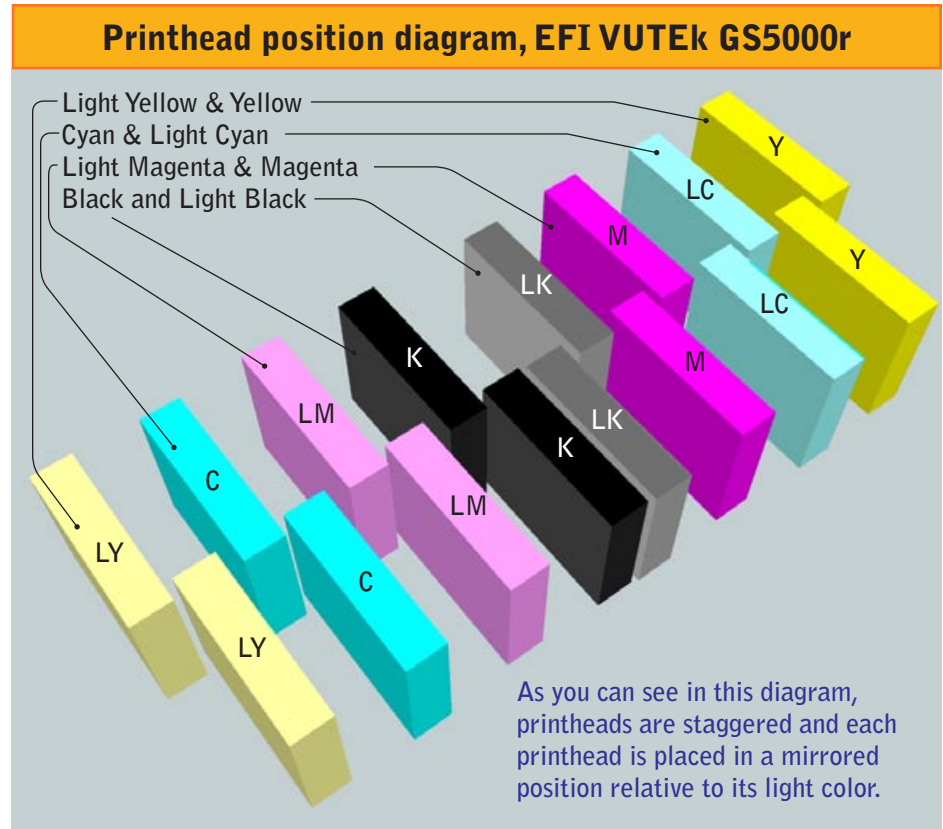
**199. What are the different results in speed; in quality?**

Uni-directional printing decreases the speed in about 50%.

As for the Smoothing options, the highest the smoothing level, the slowest the machine prints, and vice versa.

**200. 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

**201. What is the position of the printheads relative to the media? Above, jetting down (the common position) or alongside, jetting horizontally (rare)?**

Above, jetting down.

**202. Are the printheads at an angle to the movement of the carriage, or at 90-degrees?**

Printheads are at 90-degrees relative to the movement of carriage.

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

Printheads are staggered, as shown in the diagram above.

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.

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

There is a set procedure explained in a 3-page document.

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.

**205. Is there an alarm system to stop the head from hitting substrate if head is not high enough?**

There is no alarm system, but the printheads are recessed, so chances of printhead damage are minimized.

**206. Can you vary the gap (the distance from the printhead to the media, which is the distance the ink droplets fly)?**

Yes, the vertical position of the printhead carriage can be varied.

**PRINthead: Associated Features****207. Is ink heated in a buffer or elsewhere before arriving near the printhead?**

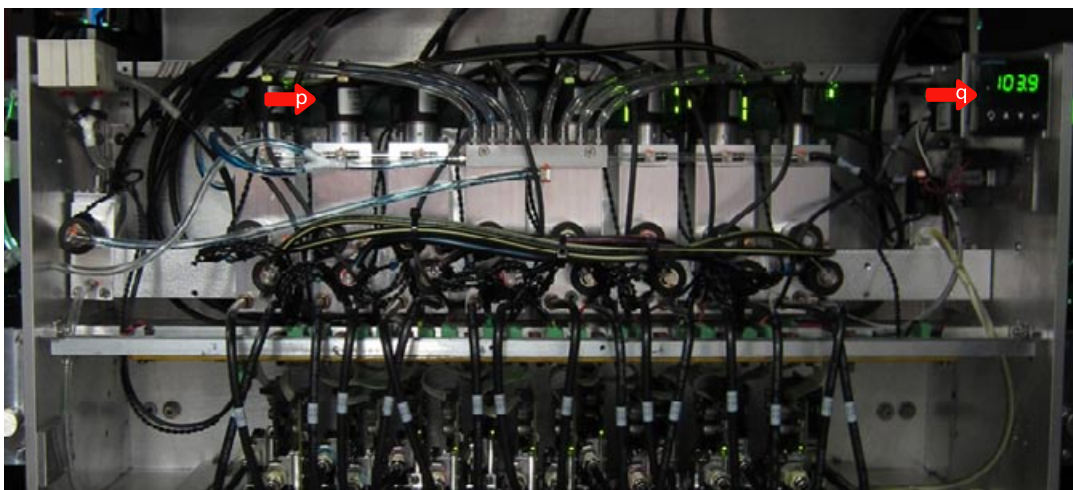
Ink is heated in the carriage.

**208. Is there a heater associated with each printhead?**

Yes, the temperature for each printhead can be adjusted if desired.

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

Heating the metal plate that holds the nozzle-plate area of the printheads as a group (the base of the printhead carriage so to speak) is a cheap way that early Chinese printers did their heating. Today GRAPO is one of the few serious UV-curable inkjet printer manufacturers outside China that uses a heated plate to heat their ink (but with 45 manufacturers, there are always surprises).



Ink is heated in the secondary ink containers (p). These secondary ink containers have a heater controller (q) in the upper right side of the print-head carriage.

**210. Does any other part of the printer have heat, such as the platen?**

No, with the Seiko 508 heads, ink is heated externally.

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

18 kHz.

**212. Is negative pressure required to maintain the ink (without the ink dripping out the printhead when the machine is turned off)?**

Yes, negative pressure is needed.

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

Yes, depending on the environmental conditions, negative pressure can be increased or decreased.

**214. How is air eliminated from the ink lines or from the print-heads?**

You purge with solvent.

**PRINthead Life Expectancy****215. What is true life expectancy of this print head?**

The life of the printhead depends on usage and maintenance. Customers are encouraged to follow cleaning schedules and not to use after-market ink to guarantee the best performance of the printhead.

**216. Is the printhead considered a consumable?**

No.

**217. How many nozzles have to be out before the manufacturer will replace the head under warranty?**

If there are more than 6 nozzles failing, the printhead will be replaced.

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

Depends on the nature of the purchase, the responsible depends on whether the machine was sold through a distributor or it was a direct sale.

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

Head strikes can be avoided simply by the adequate loading of media.

**220. What are the most common causes of printhead failure?**

Lack of maintenance.

Maintenance of parts tells a lot about a sign shop's culture and self perception. We have visited print businesses that resemble an improvised auto mechanic shop and print businesses that are as shiny and neat as a Mercedes-Benz demo room.

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

Each printhead cost US\$5,000.

If you consider that the printer uses 20 printheads, you have US\$100,000 worth of printheads. This is around 17% of the total price. The point is to emphasize the importance of adequate printhead maintenance.

**222. Is the printhead user installable?**

Yes. But these procedures are part of the reason why training is necessary.



The solvent container is located in the rear cabinet, next to the waste ink tank.

**PRINthead CARRIAGE and GANTRY****223. Describe the carriage "box" that carries the printheads?**

The printhead carriage looks much more simple (in a good sense) in the GS series than in the QS series.

As for the appearance, it is an assemblage of planks. Not that it needs a trendy design, but it looks too industrial, as if it needed a cap to be completed.



## ELECTRONICS &amp; FIRMWARE (Software)

**224. Where are the electronics made (circuit boards that control various functions)? Japan, Korea, Taiwan, Mainland China, Europe, or USA?**

The electronics are designed by EFI but assembled elsewhere.

**225. Where is the firmware developed (the software that controls the printer)? Japan, Korea, Taiwan, Mainland China, Europe, or USA?**

In the USA.

**226. Is the dot pattern affected by the brand of circuit board or firmware that is used in this printer?**

It is essential in the future to check to see whether the dot pattern (laydown pattern of the inkjet droplets on the material) is adversely affected by the circuit board and firmware that is used in the printer. If the ink laydown has mottle or a splotchy mottle-like pattern, then this is a minor concern: not visible at billboard or banner viewing distances but noticeable on POS signage especially if backlit.



Electronics are located in the rear cabinet, behind the main operation area.

## SUBSTRATES

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

No. Although the printer accepts media up to 0.25" thick, there is no system to move a rigid board into the printer, nor a structure to receive such a board. In other words, this printer is designed to the ground up to be 100% roll-to-roll printer.

Consider that the best printer to print on rigid materials is a dedicated flatbed and the best printer to print on flexible materials is a dedicated roll-to-roll. Printers that try to print other materials than what they were designed for tend not to be successful.

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

You can print up to 5 meters wide.

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

There GS5000r can print up to 1/8" larger at each side than the media width selected.

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.

Print Width	Material Width	Claimed by how the Model is Named
5.006 meters (16.42 feet)	5 meters (16.40 feet)	EFI VUTEk GS 5000r



The advantage of a 5-meter roll-to-roll UV printer is that you can print several images in the same print job, which increases productivity, in the sense that production times are reduced, as compared to a smaller printer. For example, the advertised print speed of the VUTEk GS5000r is 288m<sup>2</sup>/h, whereas the print speed of the QS3250r is 172m<sup>2</sup>/h.

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

Yes, it is possible.

### **231. Can you adjust the rate of media feed?**

No. Feeding speed is constant.

Media movement is tracked by a device called Media Encoder Wheel, located at the back. The information read by this encoder wheel is sent to the printer computer for more synchronized media movement.

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.

### **232. Can you adjust carriage speed?**

The speed of the carriage depends on the resolution selected.

- At 1000 dpi, speed is 58 inches/second.
- At 600 dpi, speed is 68 inches/second.

## LOADING MEDIA

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

Any size because the roll is laid on a cradle, so the core diameter is not a limiting factor.

**234. How about maximum roll diameter or weight?**

Maximum roll diameter is 14". Maximum roll weight is 1000 pounds.

**235. What about minimum size that can either be loaded or handled by the system?**

Anything smaller than 36" is not recommended.

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

At the demo room I was told the printer handles media up to a quarter of an inch thick. The brochure handed out at FESPA 2010 reads maximum thickness is 0.125".

Although the VUTEk GS5000r is a dedicated roll-to-roll printer, certain thickness is allowed for special applications such as carpets.

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

Measuring media thickness is manual.

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

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

Media is loaded at the back.

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

In case there is only one person available to load media into the printer, the operator can hold media to the metal roller guard with the blue magnets. These magnets are strong enough to hold any material, yet they are easy to move.



The magnets help you hold the end of a substrate as you handle the opposite end. This is especially useful when there is only one person operating the printer.

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



**240. Can you manually sheet-feed media? Does it feed easily?**

No. The system was not designed to sheet-feed media.

**SUBSTRATES, Materials, Applications, and Issues****241. 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.

**242. 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](http://www.dotprint.com/fgen/prod1297.htm)).

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

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

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, not only to remove some of the heat but to suck out the odor and ink mist, too.

**243. 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?**

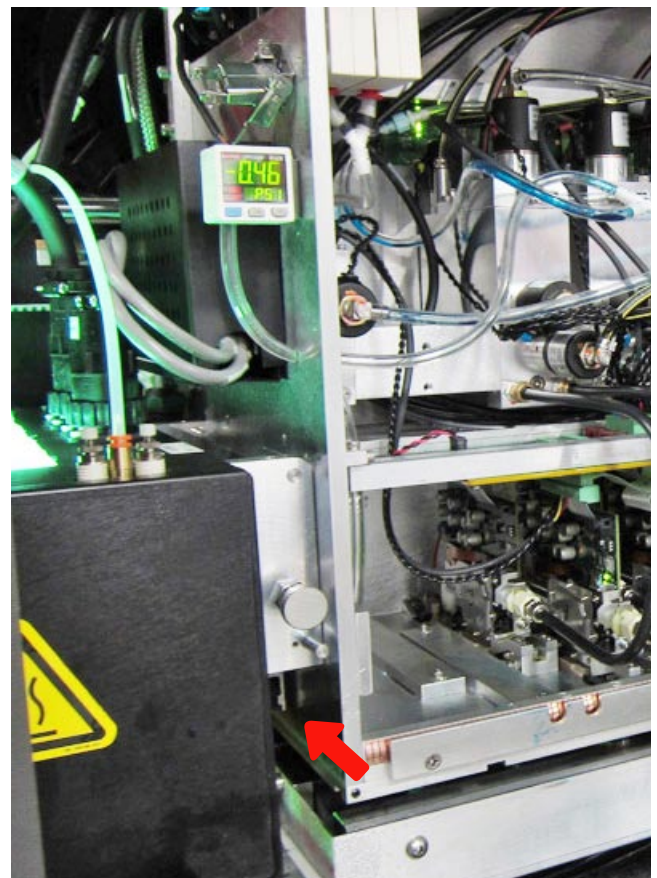
The printer is equipped with two static bars, one at each side of the printhead carriage, between the UV lamp and carriage assembly. These bars are static dissipaters.

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



The static bars are located between the UV lamp and the printhead carriage assembly.

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.

#### ***244. 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.

Static control is as much an issue with your printshop environment as it is with the pros and cons of the individual printer, though some machines handle static better than others.



In general, it helps if media is stored in a climate-controlled environment. You should also avoid stacking more than three rolls in a pile because the lower rolls would get damaged.



**SUBSTRATES: Cleaning, Priming, Preparation****245. 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.

**SUBSTRATES: General Concerns****246. What problems in feeding exist, such as skew to one side?**

Media skewing is not an issue because the take-up roll uses roll stops so it doesn't move to the sides as it rotates.

**INTENDED MARKET FOR THIS PRINTER****247. What is the market that the manufacturer has designed this printer for?**

High-quality billboards, signage, interior POP, museum exhibits.

**248. What markets that printshops aim for might be prospective buyers of prints from this printer?**

Advertising for large buildings such as airports, stadiums, race tracks.

**249. What kinds of companies have bought this printer models in the last two years?**

Sign shops, art reproduction, and general signage.

**APPLICATIONS****250. What are the applications listed by the manufacturer?**

- Billboards
- POP
- Pressure sensitives
- Staging for construction work.

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

Yes, digital textiles are among the materials listed. To print on textiles, mesh, or similar substrates of open weave, you lift the plank(s) of the platen and place a



Super-wide-format outdoor signage is one of the main target markets of the EFI VUTEk GS5000r.



piece of paper (this mesh kit comes with the printer) that will receive the ink that passes through the substrate's weave. You can then remove the piece of paper and dispose it.

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.

### ***252. What other kinds of applications can you print?***

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

That said, today (2010) the inks are a lot better and you can consider experimenting with UV-curable vehicle wrap especially since 3M inks are specifically directed towards allowing vehicle wrap. Actually I have seen vehicles being wrapped with prints from GRAPO Octopus, using their normal UV ink.



Mesh is one of the applications listed for this printer.

## **INK**

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

There is only one type of ink for the VUTEk GS5000r: flexible inks.

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

There are two options: either four (CMYK) or eight colors (CMYK, lc, lm, ly, lk). With 4 colors, the advantage is a higher print speed. With eight colors the color gamut is wider.

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

Self life of ink is one year.

The expiration date is written in the box and also encoded in the RFID tag in the box. The printer reads this tag and detects expired ink dates and does not allow the use of the ink.

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.



As explained earlier, the GS5000r comes with eight colors.

**256. What company makes the inks? Choices include DuPont (who could be considered as cheating by claiming the ink is theirs; it probably comes from Triangle), Jetrion (now InkWare/VUTEK), Hexion (now owned by Collins), Sericol, Sun, Triangle, KonicaMinolta, Toyo, AT Inks and several others.**

Inkware is the manufacturer, but it is engineered and designed by VUTEk. Both Inkware and VUTEk are divisions owned by EFI.

However, there is an official EFI website where you find a brochure about the VUTEk GS series where 3M inks are featured. Apparently you have two options.

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

Yes, EFI has PhD's in the ink formulating 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.

### ***258. How often do ink formulas change? What are the implications for color management?***

EFI tries to avoid change in ink formulas. This is said in a good sense. The aim is ink consistency to avoid incompatibilities with print-heads and curing system. However, during the lifespan of the printer, it is possible that the ink changes at least once.

## **INK: White & Varnish**

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

Currently there is no white. It would be easy to incorporate white to the system although in reality, because of the width, it would be difficult to find an application that requires white. In other words, white tends to be used more often in POP signage and backlit applications that are seen at a closer distance and therefore are printed with a machine no longer than 3-meters wide.

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

Varnish is not available for this printer.

## **INK Cost**

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

Ink comes in bags in a cardboard box.

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

### ***262. How many liters of ink does the on-board ink container hold in the main tank?***

The GS5000r uses 5-liter containers.

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

A liter of ink costs \$69. Usually the larger the printer the lower the price of ink per liter. For some smaller UV printers of other brands ink can cost up to \$200 per liter, or more.

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



A cardboard container is a much more environmentally friendly option than a any synthetic fiber (PET, PVC, etc) container.



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

At FESPA Munich I was told 18¢ per square foot. At the demo room I was told 8¢ per square foot.

**265. How many square units does 1 liter of ink print?**

600 to 1000 square feet per liter.

**266. Can the printer software estimate the cost per print job?**

Yes, the software has an Ink Cost Parameters application where you enter the cost per liter to determine the cost of a print job.

**267. How many liters of ink does an average user of this printer use, per month, or per year?**

At FESPA Munich 2010 I was given the estimate of 140 liters a month in a real full production environment.

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

In a waste tank.

**269. How much ink does the waste ink container hold?**

5 liters.

**270. How often does the waste container need to be emptied?**

Frequency depends on the usage.

**271. Where is the waste container situated? Is it outside, or inside a cabinet?**

It is in the rear cabinet.

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

You get a visual alarm on the screen.

**273. How can you see the remaining ink level? Do you have to ask to see the ink mode, or is the ink status available at all times?**

Yes, you can see the ink level through the software. The Ink Details tool displays:

- Percentage of ink level
- Date ink was installed,
- Field to define percentage of ink level at which the printer will warn you

Ink level is also calculated based on the weight of each ink box.

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

Yes. User sets the alarm. The normal level is 5% of ink in the tanks.

**275. What if the operator is out of the room? Does the printer stop?**

In general it is not recommended to abandon the printer for a long time.

**276. Can you hot swap the ink (refill with ink while the printer is running)?**

Yes, you can refill without stopping the print job.

**277. Can this printer use after-market ink? If yes, what are pros and cons? If no, why is no after-market ink available or widely utilized?**

No. After-market ink has so many complications that it is not worth a try. EFI tries to keep the ink in a competitive price range so that print shops don't run into using after-market ink.



The Ink Cost Parameters tool estimates the price based on the cost of the ink.

**278. What kind of protective devices are on the ink system to keep you from using after-market ink?**

The box has a special spout that goes plugged to the printer's ink box couplers. So any after-market ink would need to match this design (if ink was sold in bottles, after-market ink would be much more feasible). In addition, each ink box has a RFID tag that is read and recognized by the printer.

**INK: Supply System, Tubing, Filters, etc****279. Where are the printer's ink containers located? Front, back, or end? Up on top or lower down?**

At the front left, in the lower cabinet.



Superimposed image to show the location of ink containers.

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

Each box holds 5 liters.

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

You totally replace the container.



**282. What is the situation with the ink gelling?**

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

**283. How often do the ink filters have to be checked? Cleaned? Changed?**

Filters need to be replaced every six months.

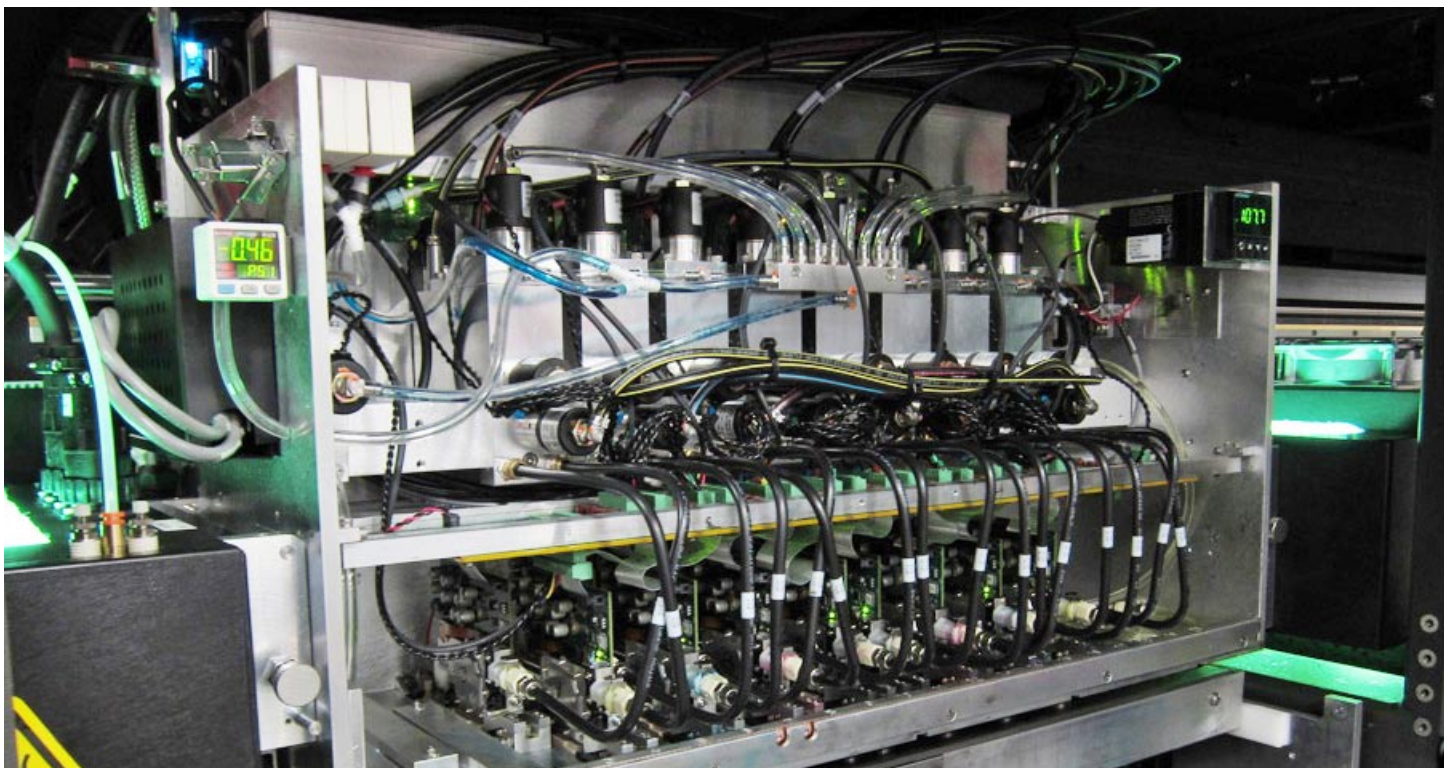
**284. Is there an issue with “ink starvation?”**

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

**285. Are ink tubes black, opaque but white, another color, transparent?**

All of the ink tubes are black.

The first year’s production of the hybrid UV printer of Infiniti used ink tubing so flimsy that the tubes split, dissolved, or became disconnected on a regular basis. This is what happens when you take a solvent printer and try to retrofit it to take UV-cured ink. But something similar happened when Roland and other companies tried to run the first generation eco-solvent ink through their printers which previously were made only for water-based ink: the fittings and other parts of the original ink delivery system were made to handle water, not solvents. There were endless tech support issues for more than a year as a result. At least Roland and Splash of Color finally fixed these issues (and two different eco-solvent ink chemistries were developed in subsequent years as well).



From the ink containers to the printheads, all ink tubes are totally black.



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

Yes all EFI VUTEk printers use Igus e-chains.

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

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

Ink is heated only in the secondary tanks and in the printheads.

In over 80% of the UV-curing printers that I have inspected, ink tends to be heated in two locations: in a sub-tank, and on the printhead. Most UV printheads have special features in or on the printhead to facilitate heating the ink. This is to prepare the viscosity so the ink is liquid enough to jet out the nozzles; this ink heating has nothing to do with the ink needing to be cured. So far, the only printer whose ink does not get heated at the printheads is the new Roland LEC-300. This is also the only UV printer, so far, which successfully uses an Epson printhead.

**288. 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.

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

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

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

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

**INK: Longevity****290. To what degree can you expect cracking of the resultant image if on a flexible substrate?**

EFI Inkware manufactures the ink especially for flexible applications, so cracking is unlikely to occur, although ink might crack on textured tiles.

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

Three years is the average lifespan.

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

## THE UV CURING LAMPS

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

The lamps have 5 settings:

- Low (40%)
- Medium (60%)
- High (80%)
- Maximum (100%)
- Custom (operator enters percentage)

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.

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

Mercury arc.

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.

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

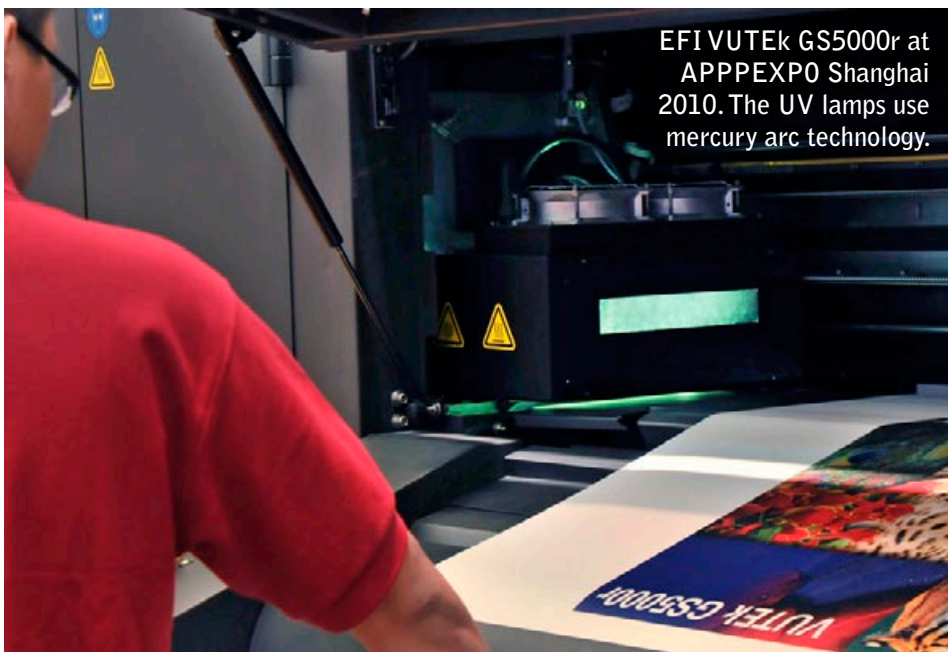
Two lamps.

Most normal UV printers have two lamps, one for each direction of printing. 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).

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

The sleep mode is user-definable.

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

Lamps will go off 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.

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

1000 hours.

**298. 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.

**299. 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.

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

There is a counter in the software that shows the hours used up.

**301. How much does each replacement lamp cost?**

It is \$400 to replace each lamp, which is considered a consumable.

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

Lamps are designed by EFI VUTEk but the bulb is manufactured by another company.

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.

**303. Can you get a replacement lamp easily in your country, or are you stuck with ordering one from China?**

EFI has stocked divisions in several regions of the world, so that parts such as a lamp can be delivered in a short time.

**304. Is the UV curing assembly (lamp included) user-replaceable? If so, how easily or difficult is self replacement?**

Yes, but procedures like lamp replacement are part of the reason why training is necessary.

**305. Can the lamp alone be replaced or does the whole assembly need replacement?**

You can replace just the lamp.

## UV LAMPS: Cooling

**306. Are there shutters?**

Each lamp has a slider that blocks light.

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.

**307. What settings to the shutters have?**

The sliders or shutters can be set at Single, Double, or Post settings.

- Single: Cures with the trailing lamp only.
- Double: Cures with both lamps
- Post: Cures with the leading lamp only.

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

2 fans per lamp.



## RIP SOFTWARE &amp; Printer Software

**309. Which RIPs are featured?**

EFI Fiery XF RIP; ColorBurst is also an option but at an additional US\$2,400. Caldera and Onyx can also be featured but these are not EFI's first suggestions.

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

Yes, the XF RIP is included. The ColorBurst would be extra cost.

**311. If a RIP is included or part of a package, is it a lite RIP or a full-featured RIP? Can this RIP be updated? Can it run any other printers?**

The RIPs available are full versions.

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

It is not included, but there are recommended brands.

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

You get a 19" Acer monitor.

**314. What is the operating system of the RIP software?**

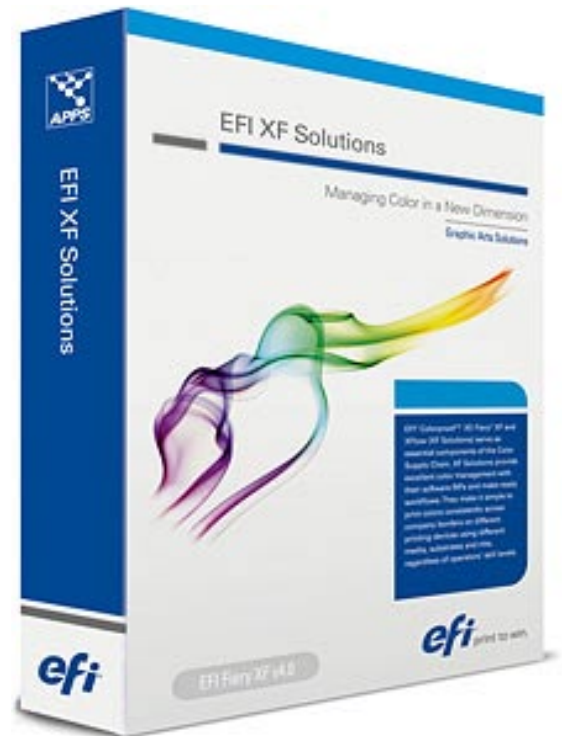
You can run the RIPs either in Mac or Windows.

**315. Is the included RIP fine-tuned for this printer, or merely the RIP that the manufacturer happens to favor. For example, how does this RIP handle the sequence of placement of white ink? How will this RIP handle spot varnish or other spot colors in the future?**

The Fiery XF RIP is manufactured by EFI in Germany.

**316. Is your printer and/or RIP Pantone certified?**

Yes, the RIPs are Pantone-Certified.



EFI offers its own RIP, the Fiery XF. (Image taken from EFI website).

## COLOR MANAGEMENT FEATURES

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

There is no system built-in to color-manage files; this equipment is external and part of the workflow. The options are X-Rite and Barbieri. FLAAR has a glossary on color management terms and an evaluation of Barbieri spectrophotometers you can get in our [Free FLAAR Reports section](#).

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

## PRODUCTIVITY &amp; ROI (Return on Investment)

**318. 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?**

At EFI's demo room, there was a matrix displayed of the different print modes. Although the quality of the slowest print mode was noticeably better than the quality of the fastest output speed, the latter was in fact more than acceptable, considering that this mode can be perfectly used for long range view applications such as billboards and external building graphics.

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.

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

This printer is designed to run 24 hours a day, so the productivity is high.

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

No. It is not recommended to shut down the printer between shifts.

## GENERAL CONSIDERATIONS

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

There are 7 in the USA. 12 installed in other parts of the world and 3 more on their way.

By FESPA 2010 there were 2 GS5000r installed in Germany, and at least 5 in other parts of Europe.

It is crucial for a printshop owner, who is making their short list of which printers to consider buying, to know how many printers of each brand have been sold.

**322. What will the resale value of your printer be in three to five years?**

The resale value will be about 50% of the current list price. This estimation is based on the current price of the VUTEk solvent model compared to its original list price a few years ago. This solvent printer has been already discontinued.

## COMPARISONS WITH OTHER PRINTERS

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

The Durst Rho 500r and the HP Scitex XP5300 are the most mentioned printers when potential costumers talk about other options.

EFI VUTEk sales personnel have not detected a strong interest on the other 5-meter roll-to-roll UV printers in the market.

**324. What features on the other printers may be issues?**

There have been comments about the print quality of the Durst Rho 500r, described by some potential buyers as "too matte color" and "unsaturated".

**325. What aspects of the selected printer help decide in its favor?**

The main advantage of the GS5000r is the image quality and the media handling.

If a printer manufacturer is weak, about to go out of business, or has an iffy reputation, the resale is close to zero. Most printers from Chinese manufacturers have a low resale value.

So a DuPont Cromaprint 22UV printer would have a low to poor resale value. But a Durst Rho 205 or even earlier Rho 160 has an acceptable resale value (considering most printshops have paid for their printer already by the second or third year).

Just be aware that resale value varies tremendously: WP Digital and Durst would have good resale value.

## SUMMARY: Image Quality Issues: Banding

**326. Is there banding in areas of solid black?**

There is some banding in the fastest modes, but EFI is trying to improve this aspect.

Between 50% to 75% of all UV printers at a typical trade show exhibit at least bi-directional banding. Some printer booths cheat and set their printer on uni-directional mode. Normally this gets rid of bi-directional banding. But you may also have banding from a nozzle being out. Or there may be banding from inaccurate feeding of the material or movement of the gantry between passes.

### ***327. What causes banding in this particular system?***

According to a key staff member at EFI demo room, it is caused because of the ink not being absorbed.

See above; but there may be other causes.

### ***328. How can banding be avoided?***

The higher quality modes on the EFI VUTEk GS5000r totally get rid of banding issues.

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

### ***329. Does this printer have a gradient mask or other interweaving system? What do they call this system? How does it work?***

The system is called "smoothing". In general terms it consists of a blend of the ink being laid down.

Mutoh was the first company to publicize this. Then Roland copied with a similar but slightly different technique. Gandinnovations also followed this trend. Now many companies use this clever trick. It does not get rid of the banding, it merely makes the banding harder to notice.

## **SUMMARY: Image Quality Issues: General**

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

Splatter of ink means droplets outside the intended area. Learning about satellite drops gets technical quickly. The ink, the ink delivery system, the printhead, and the selected printing mode may all affect whether or not you have satellite drops.

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

You can print 4pt text.

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

Five years ago the dot pattern was like sand. This is because each ink droplet is cured as a physical bit of ink, on top of the substrate. UV ink is not supposed to sink into the substrate (water based ink goes deep into the media to interact with the chemicals in the coating that are made specifically for water-based ink).

Today, in 2010, the better UV-cured printers have a texture that is not as sandy or textured as in past years. But the printing mode (speed) and other factors may influence what the surface texture is really like.

### ***333. Do you need "Pantone markers" to do touch-ups?***

No. That technique has been left in the past.

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

### ***334. When the media flexes, does the ink hold on? Stretch? Break with stretch marks? To what degree can we expect cracking of the resultant image if on a flexible substrate?***

Whether this issue exists depends on what kind of ink is used. There are many kinds of ink:

- Only for rigid materials (will crack if used on roll-fed material).
  - Only for roll-fed materials (not ideal for thick rigid material)
  - Half-and-half ink: not perfect for any material but not unusable either. This is the most common ink for hybrid and combo printers.
- Speciality UV ink (for 3-dimensional heat molding, for example).



## Conclusions

### Pros

#### Printer Technology:

The EFI VUTEk GS5000r was designed to enter the grand-format segment and although most applications will tend to be seen from a long distance, the print quality is very impressive.

This is a very versatile machine in the sense that you can print at two resolutions, either 600dpi or 1000dpi. You get options in speed and quality too, because you can print with 4 or 8 colors.

The printer is very user-friendly even with 5-meter-long rolls. The media loading procedure is very simple. In case of the longest media rolls, it needs no more than two operators, but there are mechanisms in the printer such as the "pinch delay" which is a window of time between you set the pinch roller and the pinch roller actually moving, or the magnets to hold media at one side; these type of options make it possible for just one operator to run the printer.

The VUTEk GS printers are the result of years of experience building wide-format printers and knowledge from the demands of print businesses.

I would also point out how much improved the GS5000r is today compared to its debut as a prototype about two years ago. The quality is much better since early 2010.

#### Company's Business Style:

EFI has branches practically all over the world, and tech-support is not centralized in the main buildings, therefore a customer can have assistance in his own language, and within his local time zone. On this aspect, spare parts are delivered in short time because EFI has stocked branches near major cities in the world.

EFI has been conservative in terms of the applications possible with the VUTEk GS series. In other words, EFI is not trying to persuade potential customers with applications that would turn to be not viable in the real world.

The one-year printer warranty also covers the printheads for the same amount of time. On another dedicated roll-to-roll UV printer, the WP Digital (now Polytype) RR50, printheads are covered only for 6 months.

In general, EFI VUTEk personnel have been very accessible at trade shows, and although there are pieces of information that are only discussed privately with potential buyers, most questions are easily answered by operators, sales reps. and managers.

There are financial and leasing options available.

### Cons

Loading requires 3 feet of media for proper webbing through the printer's rolls. If you think of a 16.4 feet (5 meter) roll, you get 49.2 square feet (4.57 square meters) of your substrate unused.

A cutting system would be ideal at the front. Slitting (vertical) and cutting (horizontal) would accelerate the time to have a finished product.

#### If this printer is available used, should you consider it?

The average resale value of the GS5000r in five years would be around half the current price (This is based on the current resale value of previous VUTEk models, compared to their original price). Tech support is offered for as long as you have the printer. And spare parts are maintained in stock for as long as 10 years even after the printer has been officially phased out.

So yes, you should consider it. The used printer market is more active than you think.

Potential issues (not serious enough to be a fully negative point) Experienced operators will know how to service Spectra, Toshiba Tec or KonicaMinolta printheads. But Seiko heads are not common in UV printers. In fact, the only other printer I know that uses Seiko printheads is the 3-meter Challenger solvent printer.

#### Things to check before you make your decision

We always recommend that you visit at least one and possibly two print shops that have the printer you wish to consider.

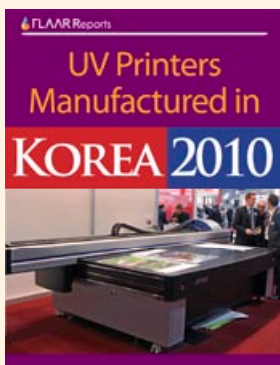
We also suggest you should visit the Meredith demo room, or demo room nearest to your country.

First Posted November 2010

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