

Wide-Format Printer for Textiles Silk, Cotton, Polyester



Yuhan-Kimberly UJet MC3-Premium



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THE BASICS

1. Brand name, model?

Yuhan-Kimberly UJet MC3 Premium.

2. What is the nature of the company behind the brand name? Is this company the manufacturer, distributor, or rebranding?

Yuhan-Kimberly is the Korean branch of Kimberly-Clark, the giant Fortune 500 company that makes Kleenex and other products used around the world. Yuhan-Kimberly is dedicated (among other things) to ink chemistry for printing on textiles and making systems that can transport a wide range of fabrics through an inkjet printer.



DTP Link headquarters and demo room in Korea. This is the textile division of Yuhan-Kimberly.

3. Does the machine manufacturer also manufacture inks for textiles?

Yes, Yuhan-Kimberly is capable of designing and brewing ink. In those instances when perhaps there are reasons to obtain ink elsewhere, they have the knowledge and equipment to test all inks to find which is the best chemistry for the applications they wish to address for their clients. But the two primary inks are designed by Yuhan-Kimberly chemists: Nano-pigmented ink and reactive dye ink.

4. Does the machine manufacturer also make textiles to print on with this machine?

No, most manufacturers of textile printers do not manufacture textiles, but Yuhan-Kimberly has the ability to test and specify which fabrics work on their transport system and with their inks.

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

Since this is a Mutoh ValueJet (made in Japan) it is a standard frame, chassis, and print engine that is accessible to any other manufacturer. But it is not the print engine which is crucial with a textile printer, it is the transport mechanism. This is why HP has not entered the textile printer market yet, to gain experience in handling fabrics is a challenge. Yuhan-Kimberly has experience dating back to the days of learning what needed to be improved on the textile printers designed by Encad and the 12-ink textile printer designed by ColorSpan.

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

At present, the first generation will be at the standard width.

7. When and where was this model first introduced?

FESPA Mexico, August 21-23, 2008.

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

This is model version "3" so this model benefits from years of experience with models 1 and 2. The MC3 is now available for shipping.

9. How does this model compare with comparable previous printers?

The MC3 has added features which experience with version 2 revealed could benefit from a different approach (primarily to feeding various fabrics). When you start with a textile printer, you need to decide which fabrics you wish to facilitate. If you select four kinds of fabrics, then you will build your feeding system one way. If you select a wider range of fabric types, you will need to design a different more adaptive transport system: this is the MC3.



Yuhan-Kimberly UJET MC3-Premium at FESPA Mexico 2008



The MC3 has good advantages like the fabric transport system. Yuhan-Kimberly has acquired valuable experience in textile printers over the years. The photo at left shows the UJET MC3-Premium, at PIS 2008. The photo at right shows the previous model, the UJET MC2 at Yuhan-Kimberly demo room.

10. Is there enough new on this printer to make it worthwhile buying it if I already have another recent model?

The advantage of this printer is its lower cost than complex textile printers that use moving transport belts. The other advantage is eight inks. The third advantage is the fabric transport system that is better than that of the early Mimaki textile printer (which used only grit roller on pinch roller). An advantage over a Roland is that trying to run 12 colors through their system results in only half a printhead per color. Plus, the Yuhan-Kimberly machine makes use of Intelligent Interweaving software to assist in overcoming banding (allowing you to print faster without banding artifacts on some materials).

11. List price?

List price for all printers depends on what continent you are on, and other local factors, but a general figure would be around \$60,000.

12. What comes with the printer: stand, network connection already installed, take-up reel?

You receive

- RIP software
- First ink set
- Sample fabrics for installation and training
- On-board heater for drying ink from the surface (not to set the ink; only to dry it)
- Installation
- One year warranty for materials and workmanship on the chassis and print engine.

Printheads have a separate warranty because printhead failure is usually affected most by end-user; printheads are warrantied for six months.

You receive the printer complete with stand, network connection, and take up reel. It is only Epson or some other low-price 24" printers that charge extra for these features.

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

A power line conditioner would not be needed in most parts of the world.

14. Do you need to supply a compressed air source?

No outside compressed air system is required. Vacuum systems are not used because most fabrics can't be sucked flat by a normal vacuum table.

15. Do you need a coating machine, steamer, washer, calendering machine?

You need a separate heating system to fix or set the ink.



The UJet MC3 Premium at Yuhan-Kimberly factory.



Heat unit and sample fabrics for installation also come with the printer. Here, the machine at FESPA Mexico 2008.

16. How does the total cost compare with other Inkjet printers?

	MC3, Premium
Base price	\$60,000
RIP software, lite	
RIP, full version	included
Transportation	Depends on location
Installation	included
Training	included
Ink	included
Warranty	included
Spare parts kit	
Total Cost	\$60K plus transportation

PURCHASING

17. Where are demo centers located?

In addition to the main demo center in Seoul, there is a demo center at the textile printer research facility of TC2 in the textile printing industry area of the Carolinas in the US. They presently have the MC2 model.



Yuhan-Kimberly has one of the most impressive demo rooms FLAAR has visited so far.

18. Are end-users welcome to visit the factory and the main headquarters demo center?

Yes, end-users are welcome to make a reservation to visit the main headquarters demo center. There is no particular need to visit the factory; what you want to see are the display and demo centers.

SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

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

Printers are available from stock: delivery by air is 3 to 5 days; delivery by ship is 3 to 4 weeks.

20. What kind of exhaust system is either required, or if not required, what would common sense dictate?

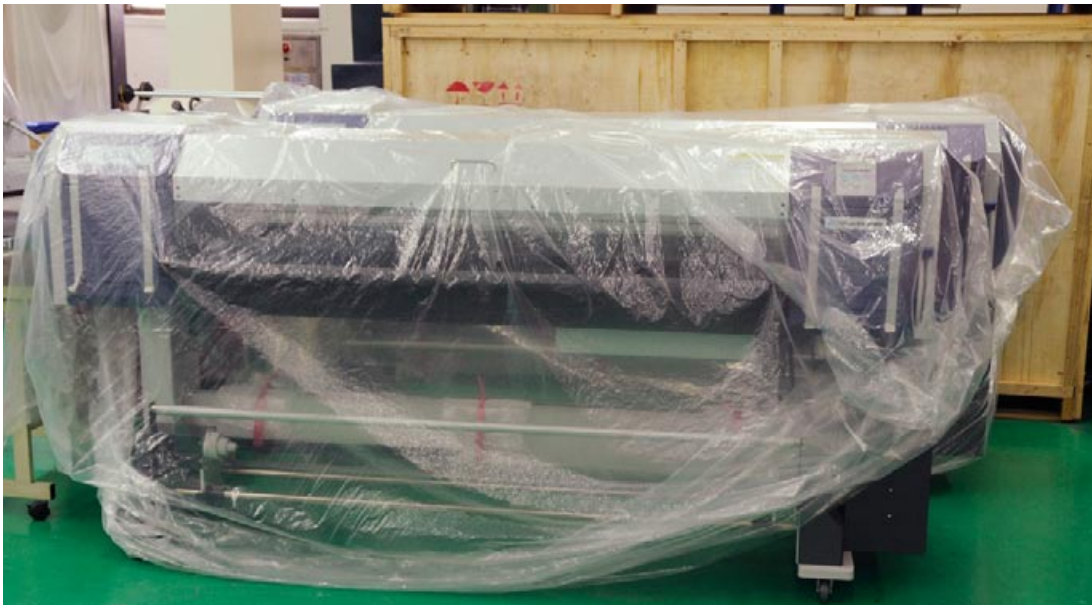
I did not notice any unpleasant odor.

21. How many boxes arrive?

One single large crate arrives, with the printer and everything inside.

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

Yes, you need either a loading platform or a fork lift truck to off-load the crate.



Units ready to be shipped.

As you can see behind, the printer comes in a large crate. Unlike other textile printers we have evaluated before, the Yuhan-Kimberly printers do not require major assembly.

INSTALLATION OF THE PRINTER

23. How many people does it take to lift the printer out of the box?

You absolutely need a total of two people to move the printer; three people are better.

24. Is installation included in the purchase price?

Yes, installation and training is usually a minimum of three days.

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

I tend to smile when a printer manufacturer says that end-users can achieve full productivity the same week as the install. This reminds me of all the printshops that I have visited where owners of the Luscher JetPrint said their learning curve was many months. Same with owners of Durst Rho printers (when they buy a Rho within a few months of it first being launched). So it was refreshing to hear a more realistic answer from Yuhan-Kimberly, that you will achieve reasonable productivity within the first month.

INSTALLATION OF THE PRINTER: INSTRUCTIONS & MANUALS

26. How many manuals are available?

There is a User Manual of 204 pages and a separate technical service manual.

27. Does the user's manual have a glossary?

Most user's guides lack a glossary. The Gandinnovations AquaJet manual has a nice glossary of three pages.

28. Is the Service Guide available to the end-user, or only to the service tech engineer?

In a country that is far away from a full-time service center the end-user will probably desire to obtain service training and obtain the service manual as well.

INSTALLATION OF THE PRINTER: TRAINING

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

Yes, three days.

30. Is factory training available?

Factory training is available and indeed it is preferable. By factory training we mean at the DTP Link headquarters demo center in southern Seoul, a beautiful location. The grounds have oriental gardens and generally the campus atmosphere is relaxing. Korea in general and Seoul in particular are worth the visit.



The factory location is nice with beautiful gardens in Seoul.

31. What about follow-up training after you have had the printer a month and know enough to ask better questions?

"After two months people start asking more questions." After six months DTP Link offers advanced training if the printshop desires this.

TECH SUPPORT & WARRANTY

32. Can the manufacturer remotely diagnose the printer?

No remote diagnosis.

33. Do the tech support people understand fabrics and textiles?

Since this company has a textile ink and fabric printing focus there is more experienced back-up from the home office.

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

The majority of the people at Yuhan-Kimberly are bi-lingual. Dr McCraw is tri-lingual (English, German, Korean). The person who worked with me the several days in the R&D demo room, Kim, Dongmin, spoke fully acceptable English (had lived in Australia). His English was fluent as well as using the words that are usual, rather than translations that are too literal and hence usually not understandable.

35. Who provides the service? The Dealer or the manufacturer?

If the service from a local dealer or distributor is not adequate, then DTP Link in Korea will provide tech support on a case by case basis.

CONSTRUCTION: AESTHETICS

36. How can you describe the design of the printer?

Attractive; not clunky, not industrial, not dull.

37. Can you easily tell which is the "front" and which is the "back"?

Yes, the front is obviously the front and the back is clearly the back.



The front hood is ample and made of sturdy plastic.

CONSTRUCTION: BUILD QUALITY

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

Other than a slight shaking due to acceleration and deacceleration of the printhead carriage, the printer is solid. Some Epsoms and many HP printers actually shake even more.

39. Is there a front hood and also a back hood?

Yes, there is an ample front hood (too many printers are stingy on a front hood, with the result that you can't see inside to check on your print). There is no back hood, as is typical on many printers. But there is about 20 cm open at the back, which is enough to peek inside if you needed to.

40. The front hood, is it strong, or cheap plastic?

The front hood is plastic with no frame across the bottom or along the sides (because the hood is not large enough to really need a frame).

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

The printer is sturdy, but with most printers (even quarter-million dollar ones that are built like a tank), there is some slight movement of the frame when the printhead carriage reaches the end of its pass and quickly moves back in the opposite direction.

42. How many wheels?

There are four wheels, and four separate leveling devices. Not many printers under a quarter-million dollars have leveling systems, but this one does. Since the leveling units are separate from the wheels, once you have the printer up on the leveling units, you don't need any brakes or locks on the wheels themselves.

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

In the EU gradually either law or customer expectation means that a product should last about five years under normal circumstances. There are no comparable laws in Asia, but five years is nonetheless the expected lifespan for the structure of the printer, excluding parts that are obviously consumables. The grit paper on the special roller is an example of a consumable; it can be replaced by a technician, for example, when he is visiting to take care of something else.



The expected lifespan of most of the components is five years. Whether the training includes complex tasks like dealing with electronics and fuses or not will depend on the manufacturer.

FEATURES: MEDIA: Heaters

44. How many heaters are used?

There is one special heater in front of the unit.

45. What is the purpose of the heater(s)? To dry the ink, or to fix the ink?

The purpose of the on-board heater is so that the ink on the surface, or ink that has gone through the material, will not continue to wander, drip, or stain another layer of the fabric as the material is wound up on the take-up reel.

This is a 3 kw IR heater consisting of two long heating units, each of 1.5 kw. The unit can be set up to 100 degrees C, but to be safe should be limited to a maximum of 60 degrees C.

46. Is there an air blower as dryer? Where is it situated?

There is no air blower.

47. Do you need to buy a separate additional heater?

Yes, most textile inks need to be "set" with heat. It is more efficient to do this on a separate machine than to handle it on-board. Of course if you are using disperse dye ink you need a dye-sublimation heat-press.

If you wish to be frugal you can use forced air or a household iron.



Heater unit is in the front.



STRUCTURE OF THE PRINTER: Media Transport Mechanism & Media Path



48. Was this printer made originally as a textile ink printer, or is it retrofitted for textiles? If retrofitted, what was the original brand or model?

The printer chassis is a standard Mutoh ValueJet, but the feeding system was designed from the ground up to handle fabrics. In other words, Yuhan-Kimberly throws away the normal Mutoh rollers and installs a completely independent system especially made to handle textiles.

Although the MC3-Premium is based on a Mutoh printer, the whole feeding system has been redesigned to handle textile media.

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

There are edge guards. You can select to use them, or not, depending on the needs of the fabric. If the textile has a rough edge, or has a wavy edge, it is best to use an edge guard. You can move the guards to any reasonable position.

You can also raise the height of the edge guard, in theory up to 8 mm, but the printhead can be raised only to 2.5 or 3.5 mm max. So edge guard needs to be lower than the passage of the nozzle plate (to avoid a head strike). So usually use an edge guard height of 2 or 2.5mm. 3 mm would be a potential issue; but usually fabric is not that thick anyway.



Edge guard. Since you are going to print different widths, these guards are movable.

50. Describe the platen.

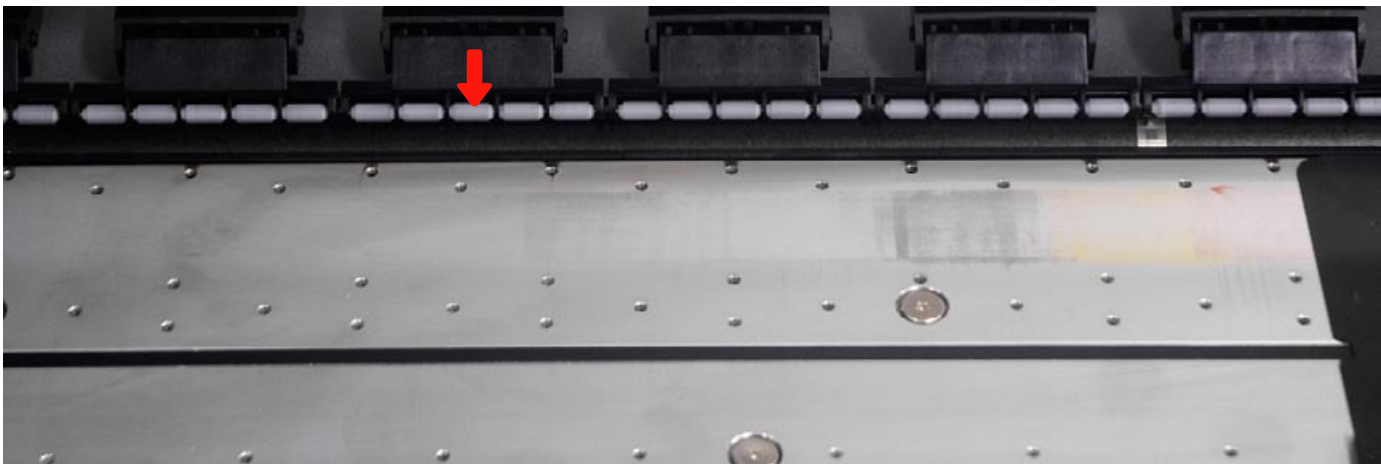
There is no moving transport belt (that would be too costly). The original Mutoh platen has been removed in order to put a trough that is more appropriate for textiles (to collect the ink that passes through the weave of the fabric).

FEATURES: MEDIA: Roll-to-roll feeding

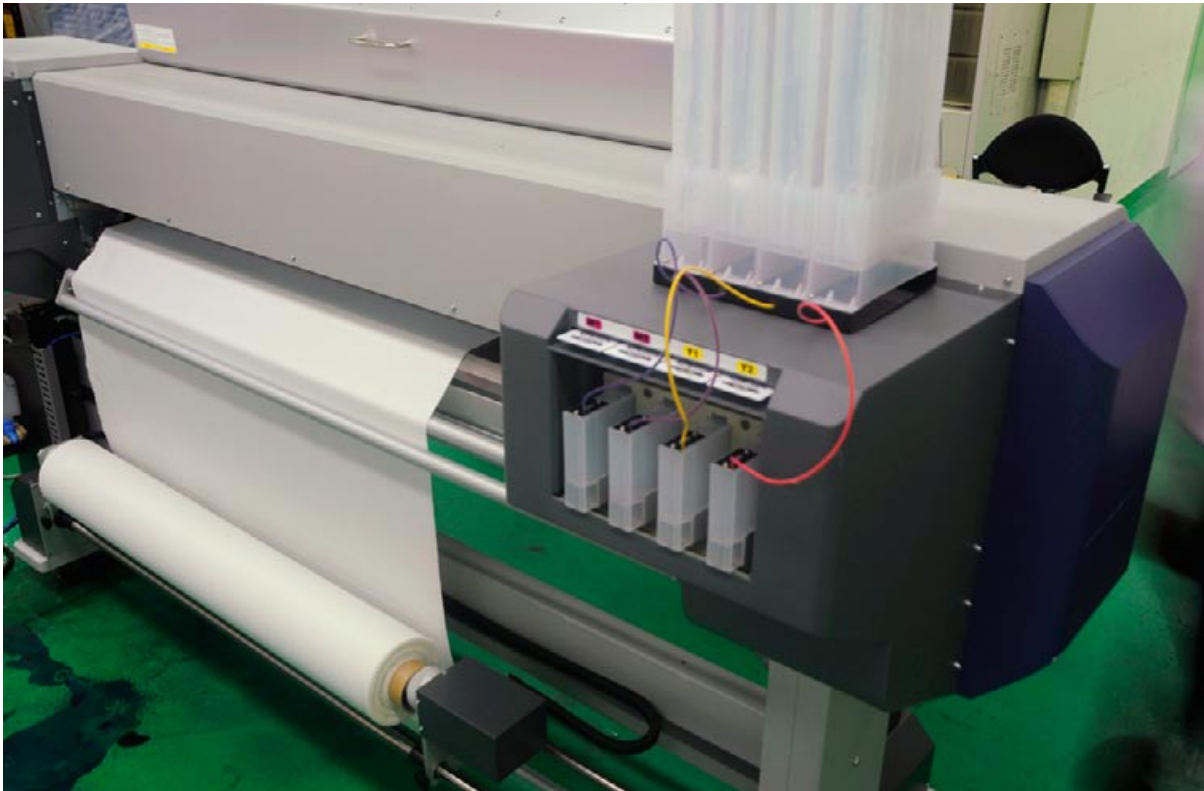
51. How is roll media fed? Pinch roller against grit roller?

Old-fashioned grit-rollers require the fabric to be backed with paper. This makes the textiles expensive. The original Mimaki textile printer tried to use pinch rollers on top of grit rollers.

So this new generation Yuhan-Kimberly printer uses a sophisticated tension system to feed the material through. There is grit on the front roller, but this roller is the full width of the printer. The two rollers in the middle position are smooth-surfaced.



Pinch rollers.



The MC3-Premium printer uses a sophisticated tension system to feed the material through.

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

There are three drive rollers working in synch. All rollers are full-width.

53. Are pinch rollers traditional or a special size/shape/position?

A positive feature is that not much about the fabric feeding mechanism is traditional. Yuhan-Kimberly spent eight to ten months testing different options. The crucial factor was not to stretch a stretch fabric.

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

On a spindle. You do not need a saddle unless you have width of 5 meters or huge weights to handle.

55. Is the feeder roller have an air core?

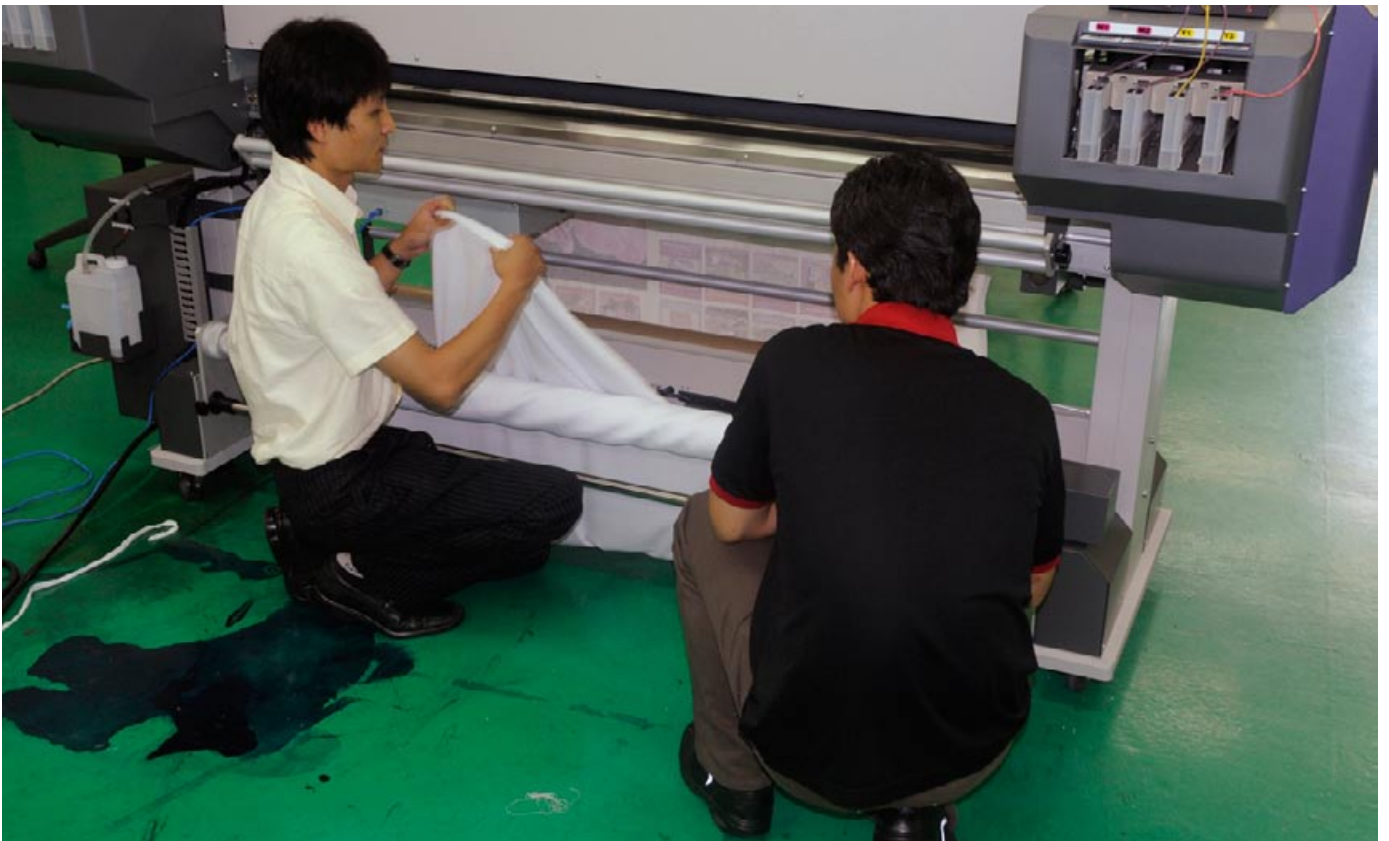
No air cores; an air core is usually on a printer costing over a quarter of a million dollars.

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

The material starts on the feeding roller, at the back, towards the bottom. The fabric then does down under a rack and pinion bar which is a dancer bar with rack and pinion gear at both ends.

From here the fabric goes up and over a tension bar and immediately under and around its mate (two bars which work in unison as a pair). The material goes up and towards the platen area from here. Before the platen (the printing area) there is a continuous smooth pinch roller atop a drive roller. Then there is the platen with trough with another drive roller immediately parallel to the outside of the trough.

At approximately the level of the platen, out in front, is a roller with a rough surface on it. Then there is a positioning roller so that the fabric is the same position in front of the heater. Below the heater is the torque motor roller for winding up the material in either direction.



Feeding the Yuhan Kimberly from the back. These and the following photos illustrate the procedure to load media.







Once fed from the back, the media is ready to be printed on.

OPERATING THE PRINTER

57. Can you manage print jobs via the Internet with your printer?

Although there are no remote diagnostics that Yuhan-Kimberly can perform onto your printer, you, from inside your own office network system, can look at your own printer from the Internet. The printer has TCP/IP capability.

58. What sensors does the printer have?

The most obvious of the many sensors would be

- Ink level sensors
- Tension sensors
- Waste bottle full sensor
- Etc.

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

Mutoh, like Roland and Mimaki, still uses an old-fashioned button and arrow system, and a miniature LCD panel that shows only two lines of text. Of course for the RIP you have a full-sized LCD monitor on your RIP server.

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

One operator is enough, though it is quicker to load a full-width roll if you have a person to assist during the loading and feeding the front end of the cloth through the back of the printer.

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

Overnight printing, unattended, is not very practical since most rolls of fabrics are not very long, so you would eventually run out of cloth.

62. What controls are at either end of the printer?

The electronics cabinet is at the lower right end of the printer. The electronics are for the rollers that move the fabric, heat-dry the fabric, etc. All power supply electronics are easy to access so they are easy to replace if necessary.

- Heater
- Supply motor
- Take-up motor
- Driving motor for rollers.



The LCD panel is located at the right of the printer.



The electronics cabinets are for all the power supply.

SAFETY & HEALTH CONSIDERATIONS

63. How many emergency stop buttons are there, and where are they located?

Emergency stop buttons are not traditional on solvent printers or textile printers until they reach grand format size (over 74 inches).

64. Is there auto-shut down if the operator sticks their hand into the system while it's operating?

To stick your hand fully into the front of the printer would normally require that you lift the front hood. This would by itself (lifting the hood) trigger a sensor which would stop the printer carriage.

65. Is the machine enclosed, or exposed?

The printer is considered enclosed.

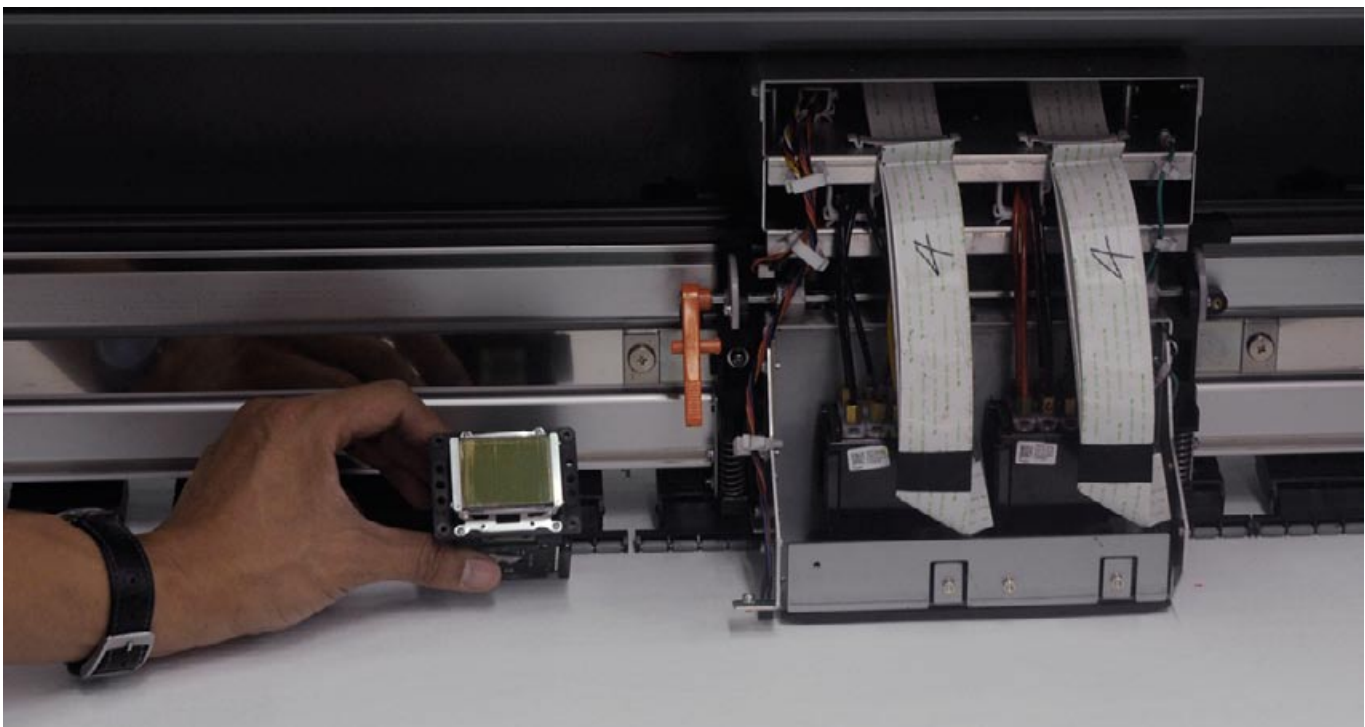
66. What system of ventilation or exhaust system is built into the printer? Or if not required, what would common sense dictate? Is it adequate to clear the work area of gasses and fumes?

Since this printer uses water-based ink there is no particular need for industrial ventilation. So there is no duct and no exhaust fan system either.

PRINthead TECHNOLOGY

67. What is the brand of the printhead, and model?

The brand of printhead is clearly Epson.



The MC3-Premium uses Epson printheads.

68. Is the brand and model of printhead clearly identified in the published specifications?

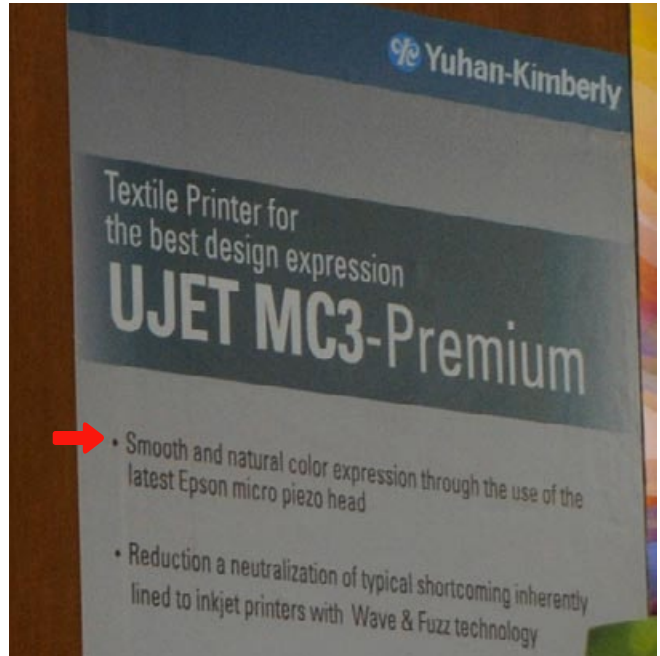
Most Roland, Mimaki, and Mutoh printer brochures do not identify either the brand or model of the printhead. Only Epson tends to identify its own printheads in brochures for its own Epson printers.

69. What other printers use the identical printheads or a model very similar?

The size and shape of the printhead in the Mutoh ValueJet is identical to that used in the Epson GS6000. But it is possible that this printhead shares some features with that used initially in the Mimaki JV5 (though the exterior shape of that Mimaki printhead is different). However the JV5 head is slightly older generation than that used in this Yuhan-Kimberly textile printer.

70. What is the width of the printing pass of this printheads?

The printing path is about 1/4 inch in regular mode and 1/8th inch in quality mode.



At SGIA 08 you could read one of the banners at Yuhan-Kimberly booth clearly stating the use of Epson heads, however it didn't mention the printhead model.

PRINthead DPI & FEATURES

71. How many printheads are used?

There are two printheads.

Each printhead has 8 lines of nozzles, so 8 x 180 nozzles for one head.

Each color uses two rows of nozzles, so 2 x 180 nozzles = 360 nozzles per color (in effect 360 nozzles per inch).

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

Neither the Epson head nor the associated software can detect a clogged nozzle and replace it on the fly with another nozzle. That kind of sophisticated tends to be on either more industrial piezo heads or on thermal printheads.

73. How many printheads per color?

One-quarter printhead per color because these new generation heads have everything in a single unit. In previous years each color would have had it's own separate head. In effect this printer has the equivalent of one full (old) print-head per color but in reality these printheads are a newer better generation.

74. Is their variable droplet size capability?

Yes, ever since Roland first developed variable droplet technology many years ago, Epson itself has picked up and used this also.

75. Is printing bi-directional or uni-directional? What are the different results in speed; in quality?

You can print either uni- or bi-directionally. In the past, with earlier generations of technology, you had to use uni-directional to get rid of all banding. Now, with Mutoh's Intelligent Interweaving technology, you can print with bi-directional speed and not worry as much about most kinds of banding.

76. How many passes can this printer achieve?

You can select from 2, 4 or 8 passes; most printshops do not tend to use 12 or 16 passes.

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

"720x720 dpi is normal. When you print at 1440 x 720 dpi you achieve only half speed, so this is rarely used since on fabrics you would not notice the difference of increased dpi.

Just realize that as you select more passes to achieve a higher quality, your production time will slow down. Also have in mind the ink consumption.



PRINthead LIFE EXPECTANCY

78. How long do your printheads really last? Do you have that written in a warranty? If your longevity specs are in drops, please translate that into liters of ink or square footage of media.

With textile inks the printheads are rated at six months with production usage. This is the most honest and up front estimate of any company using Epson printheads that I have ever seen.

In early years most Roland sales reps and distributors claimed their piezo printheads were permanent to try to distinguish from thermal printheads of HP and Encad (which had to be replaced every few months). But in reality no Epson printhead was really permanent. Indeed in recent years Epson printheads have become infamous for premature failure on any printer that requires constant flushing, purging or cleaning (like some recent model Epson printers, 9800 for example).

These are not bad heads, just that the people make the advertising claims were trying to obscure the fact that piezo heads also have downsides. No printhead, neither piezo nor thermal, is perfect. Each kind of head has its strong points and its weak points. The weak point of an Epson head is that it does not hold up well to constant purging, and this includes when you frequently change from one kind of ink to another (which requires forcing all the old ink out and purging the new ink through the heads as well).

How long your printheads last depend on what kind of ink you use; how often you flush and wipe, and in general how you take care of your heads. Flushing and wiping wear out your heads.

79. If piezo heads fail, who is responsible for paying for replacement heads? If thermal heads, who replaces the heads if they fail before their rated lifespan? What does each printhead cost to replace? Distinguish price for the printhead and also price for the service technician to come and do the installation if it is not user-replaceable?

Printheads are considered a consumable.

80. How often can you expect head strikes? What causes them? Who will replace the printheads and at whose cost?

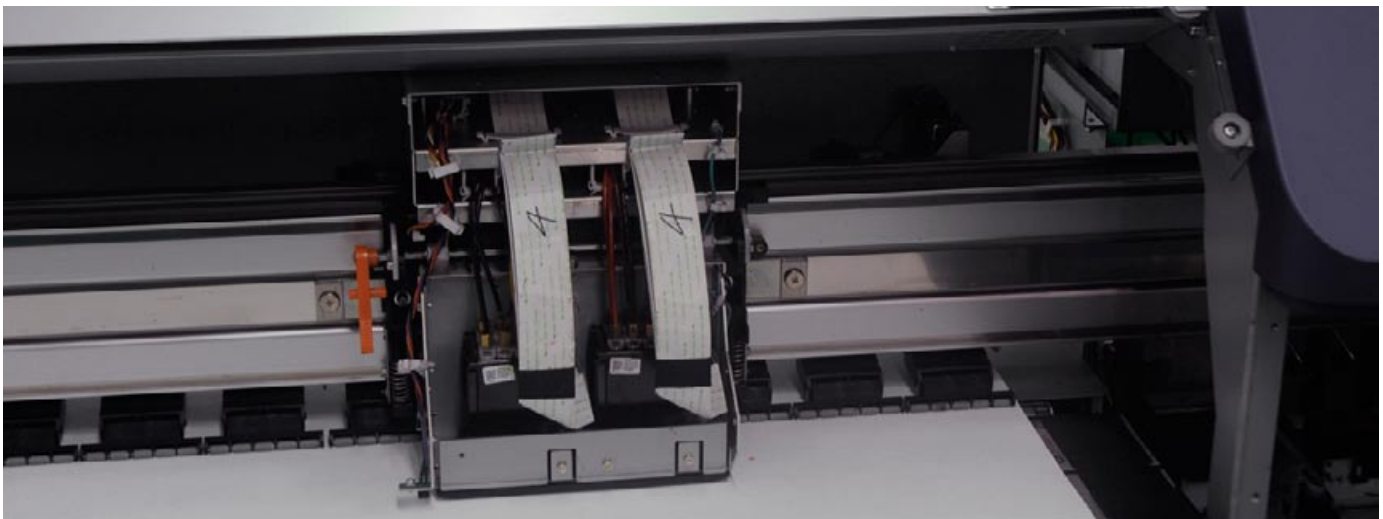
A head strike is the most common cause of premature head failure (another cause is constant flushing; the flushing seemingly wears out the nozzle system). A single head strike may wipe out only a few nozzles, or may kill the entire printhead. Head strikes may be occasioned by a diverse variety of situations:

- Improper loading of the media, which make cause buckling, because the media is caught, or not going through the printer properly.
- Thin media can curl, thereby causing a head strike on the curled part
- Edge guards, which work on thin materials may be raised too high.
- If media is absorbent, too much ink can make the material bubble up
- If media is defective to begin with, or uneven, the head can hit the raised part
- For a textile printer, an additional cause of eventual printhead failure is the fuzz of the threads which may stick up and rub the nozzle plate.
- Some material is like sandpaper to the nozzle plate

PRINthead POSITIONING

81. Are printheads at an angle, or in a row?

The printheads are in a row (in line), with the nozzle rows perpendicular to the printing path of the carriage.



The printhead height can be varied between 2.5mm and 3.5mm.

82. How complex is it to align the printheads?

Since four colors are inside a single printhead, these four colors are always aligned with each other. Since the total number of printheads is two, there is not that much to get out of alignment. There is basic mechanical and electrical alignment that can be done by a skilled end-user. If there is a major mis-alignment, then a service tech should be called.

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

Yes, you can set the gap at 2.5 or 3.5 mm.

CLEANING & MAINTENANCE

84. Has a special maintenance system been installed to handle textiles or textile ink if the printer is retrofitted?

Since the maintenance station is generally engineered to work well with a certain kind of printhead, it makes more sense to leave the original Mutoh service station.

85. How is head cleaning accomplished? Spray, vacuum, suck, manual, other?

Two vacuum pumps; one sucks each head.

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

You can set cleaning to

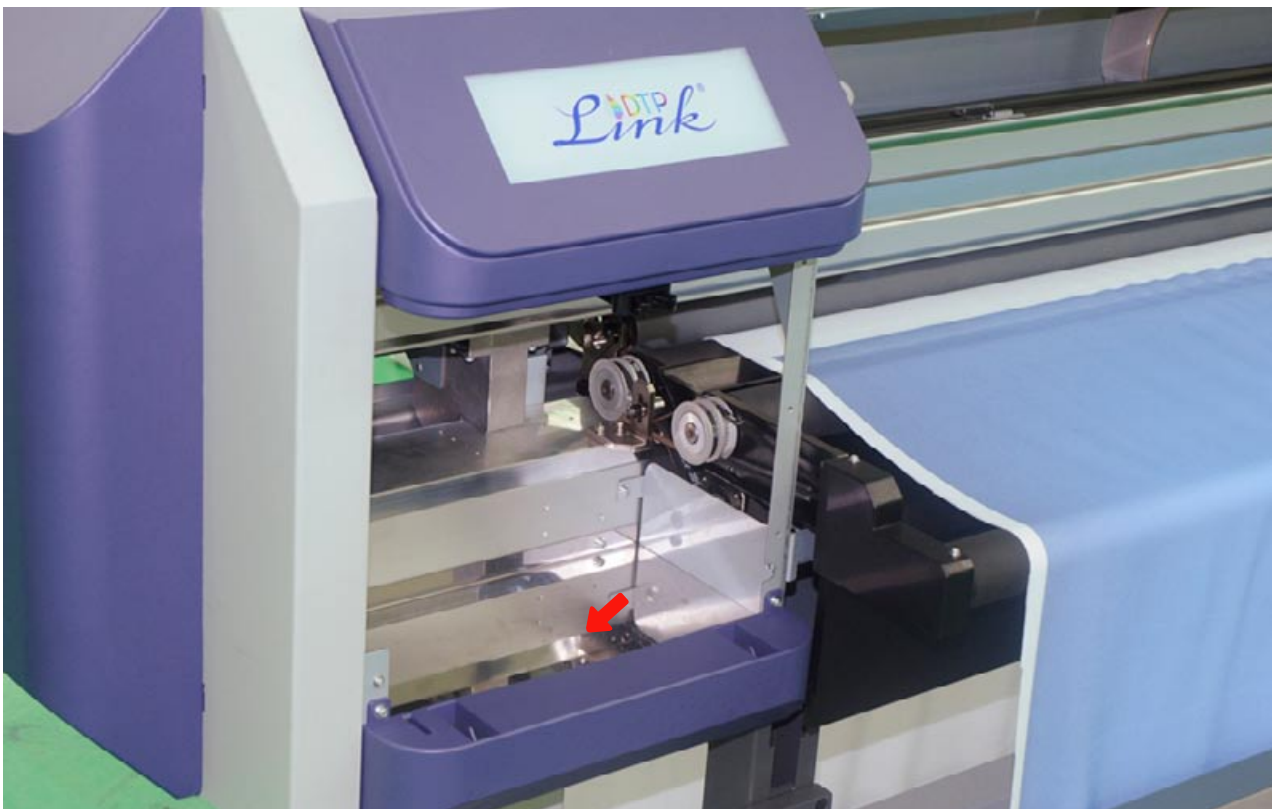
- Economy
- Normal
- Strong.

87. Can you purge an individual printhead, or do you need to purge all at once?

Unfortunately you seem to have to purge all, or nothing: all colors and both heads at once.

88. Where is the service station?

The main service area (the capping station and wiping area) is at the far right. But at the far left there is a printhead inspection station; you use the mirror-like surface of the bottom of the cabinet to see up under the printheads to inspect the nozzle plate."



This is the reflexive surface in the left cabinet.

89. Is the service area the same as the parking area?

Yes, when the printer is turned off it parks in the service area at the right.

90. Is there a capping station?

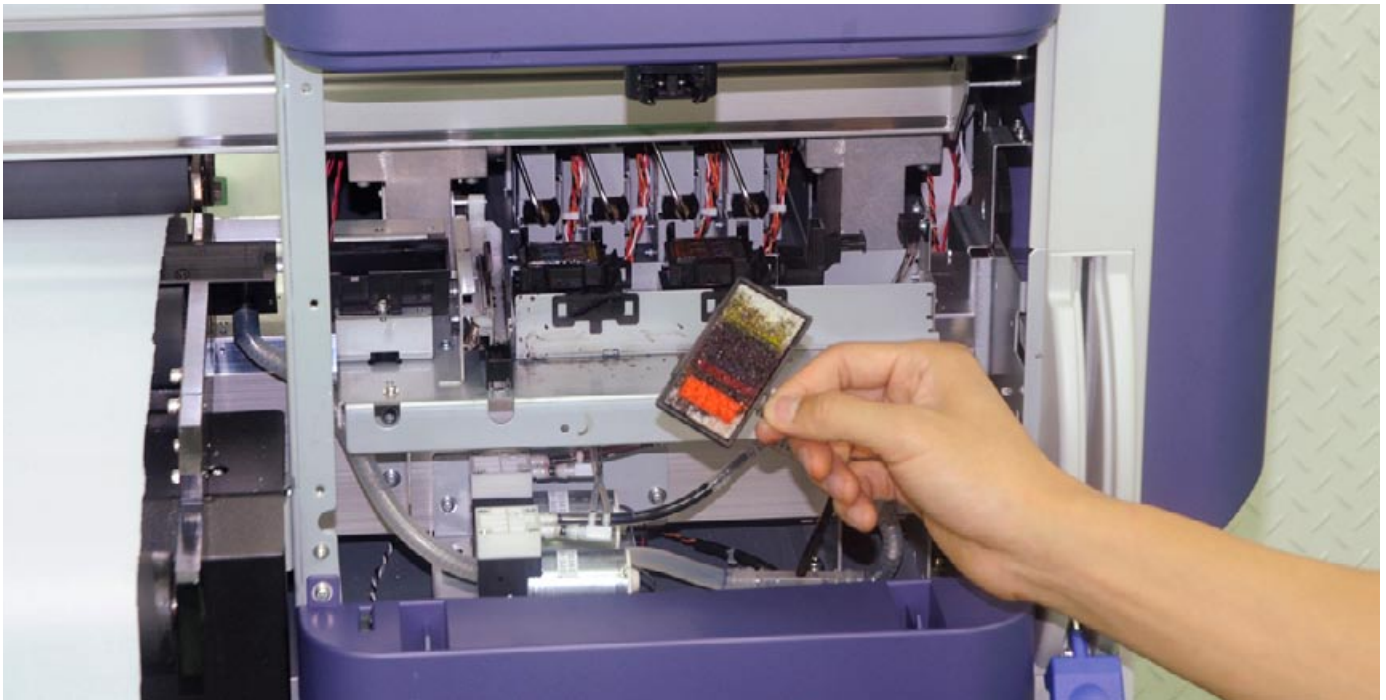
Yes.

91. Does this printer spit, or "weep" at regular intervals?

Yes, this printer normally spits once for every two passes (one full back-and-forth).

92. Where does the spit ink go? How do you eventually dispose of the spit ink?

There is a little platform, at the left of the capping station, that holds the thin sponge for the spit ink. To replace the sponge you simply pick it up and put a fresh one in its place.



Purged ink is absorbed by a sponge in the capping station (the cabinet at the right end) and then led to a waste bottle.

93. What part(s) of this printer tend to break down the most often?

"So far in six months use in the demo and test center, nothing has broken or worn out; but was not in use 24/7."

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

"To replace a printhead; this requires a technician."

95. How long can the printer sit unused? How should a printer be prepared for sitting unused for a long time?

Officially one or two weeks. Sometimes up to four weeks the printer still started okay, but it is not recommended to leave it over two weeks.

96. Do you need to have a band of printable colors along the edge, outside the main printed area, to keep all printheads and their colored inks fresh and ready to print (so as not to dry out when not be used by the colors in the design)?

With water-based inks it is normally not required to have all jets fired on every pass, plus the spit function is an alternative to printing an entire band of each color.

CLEANING & MAINTENANCE: ROUTINE MAINTENANCE

97. What daily maintenance is required at start up in the morning?

Do test print for a nozzle check.

98. What daily maintenance is required at night?

Depends on conditions during the day, whether nozzle plate got dirty.

99. What daily maintenance is required if you print the entire day long?

Because of loose threads getting stuck on the nozzle plate, you should inspect the printheads every hour or so or otherwise pause printing on fabric to check for clogged nozzles.

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

The printer does not do much on its own unless you tell it via software or via the buttons.

CLEANING & MAINTENANCE: WASTE

101. To initiate a purge, where is the control or button? Is it software generated or do you have to press a button? Where is the button located?

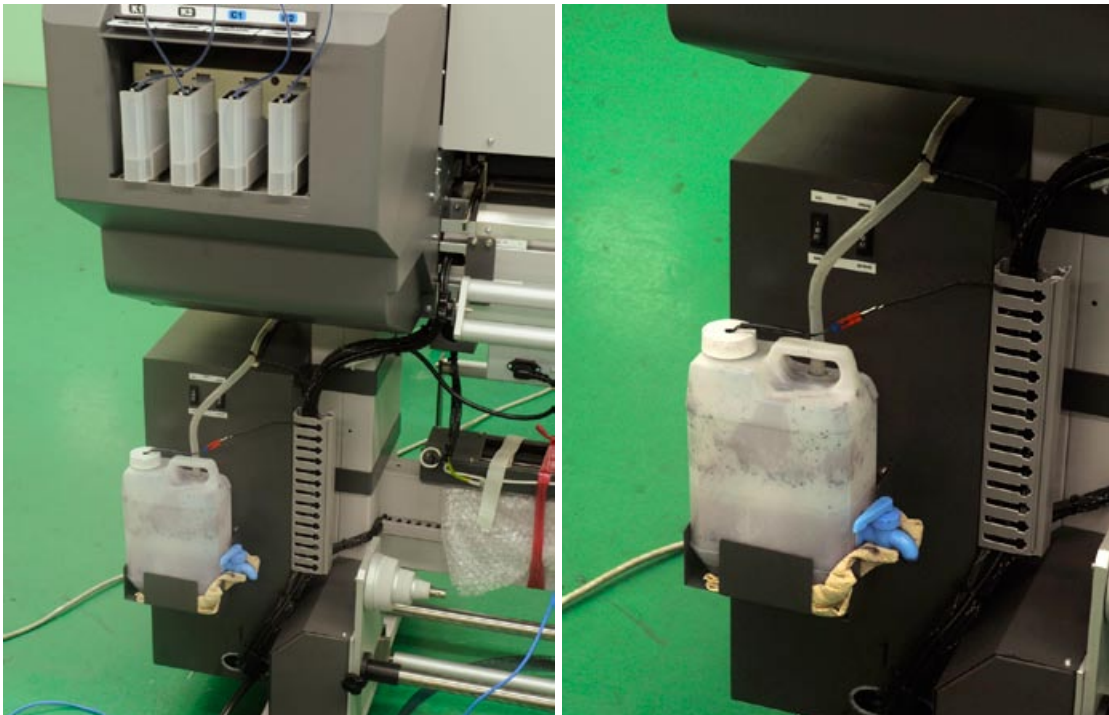
Purge button is under the LCD panel, where all such controls are initiated.

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

Purged ink goes straight down a tube to waste collection bottle.

103. Where is the waste bottle situated? How much waste ink does it hold?

The waste bottle is at the back, lower left. This bottle holds two liters.



Purged ink goes to the waste bottle at the back.

PRINTER DRIVERS & SOFTWARE

104. Are the controls mainly manual or are most actions handled in the software?

This is a typical old-fashioned Mutoh-Mimaki-Roland printer: buttons and arrows in a system that ossified many years ago.

RIP SOFTWARE: FEATURES

105. Is a RIP included in the original price?

Since some RIP software costs more than others, the RIP is an option. You can select between RipMaster from Dr Wirth company (Germany) or the textile version of Wasatch. TexPrint of ErgoSoft is being evaluated.

106. Which RIP software is supported?

- Dr Wirth
- Ergosoft
- Wasatch

107. Is your printer and/or RIP Pantone certified?

Your final colors depend to some degree on the original color of your fabric, since not all fabric is pure white.

108. Although the world tends to use PCs, is your printer equally Mac friendly?

Nowadays the world of digital printing is primarily PC oriented.

PRINTER DRIVERS & RIP SOFTWARE: WHAT SHIPS WITH THE PRINTER

109. Are the RIP(s) that are offered specialized for textiles?

Yes, Dr Wirth is a German RIP for textiles. ErgoSoft is a Swiss RIP for textiles. Wasatch has added a textile component to its signage RIP.

You do not want a "normal" RIP for working with uncoated fabrics with diverse textile inks. You will have better results if the RIP you work with is from a company with long prior experience with inkjet printing on textiles.

COLOR MANAGEMENT FEATURES

110. What ICC profiles are included?

Both Wasatch and ErgoSoft handle ICC profiles. Dr Wirth RipMaster is different. My estimate would be because this Germanic RIP comes from the age of early textile printing, that it is a pre-ICC profile software, so CTB is included by not ICC. As a comment, ICC profiles are by no means whatsoever perfect or desirable in all respects. ICC profiles simply became the de facto standard due to lack of any other standard.

INK

111. How many different kinds of ink are available?

Currently four kinds of textile ink are available:

- water-based disperse dye ink
- Acid dye
- Reactive dye (majority of people use this ink)
- Nano-pigmented (has growing market share due to longevity and it works with more fabrics).

112. If there are several kinds of ink available, can you switch from one to another?

Yes, you can switch from other to another, but anytime you switch to a new ink with any Epson printhead machine, the purging and usage of all the nozzles during loading the ink will cause the nozzles to wear out relatively quickly (on any printer, this is a printhead issue, not a printer issue).

Also, since there is a sub-ink-bag system, you would have to clean all the old ink out of this bag, or replace the bag. So switching ink is something you would unlikely do more than necessary.

113. What company makes the inks? Choices include Yuhan-Kimberly, Ciba, DuPont, Sericol, Sun, Triangle, Inkwin, and many others.

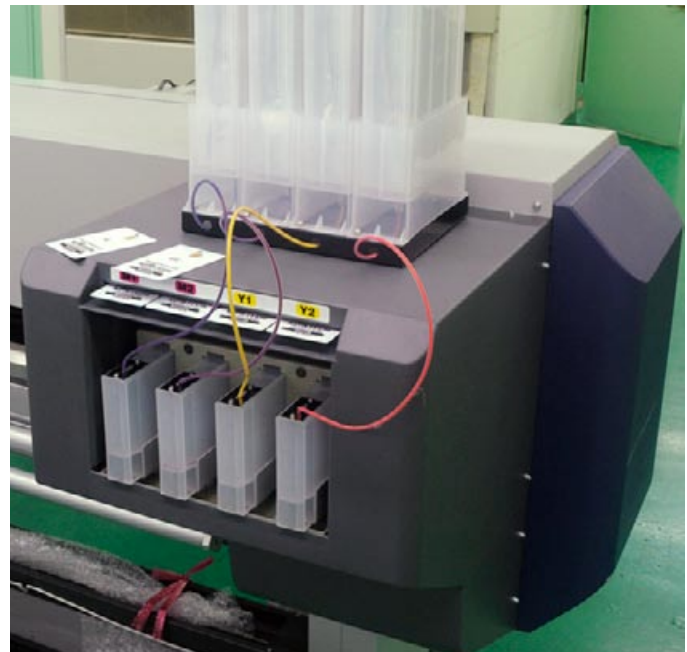
Some of the ink is made by Yuhan-Kimberly, and as with all printer manufacturers, some of the ink comes from other sources.

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

Each RIP handles keeping track of the ink differently. RipMaster counts the actual number of drops fired for each color.

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

Four inks are at the back left; four other inks are at the back right.

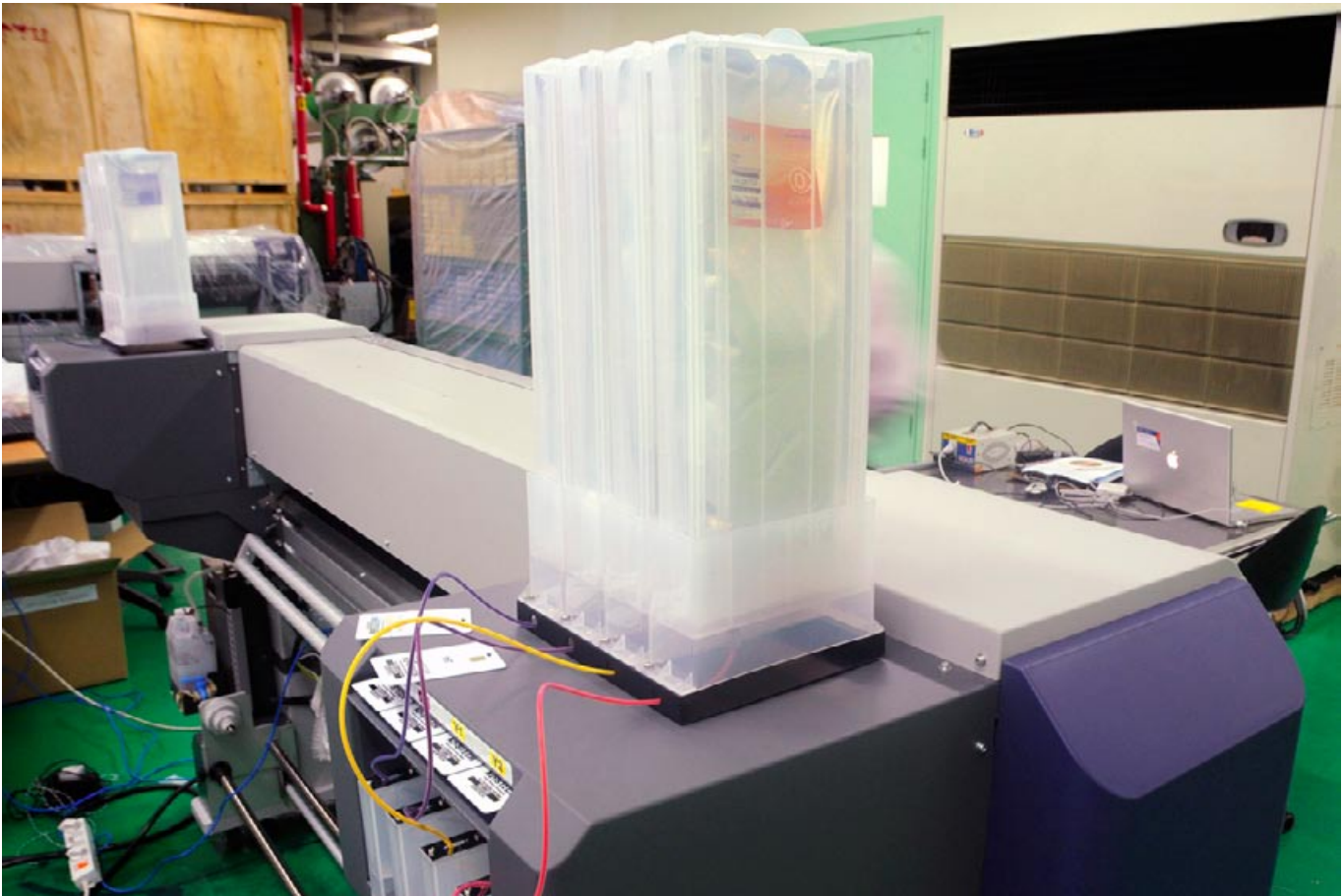


116. How much ink does the ink container in the printer hold?

Exactly one liter.

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

You take the transparent plastic cartridge off the top of the printer, open the cartridge, take out the plastic bag and throw it away. Then you add a new plastic bag of ink, close the cartridge, reattach the cartridge and you are all set. No wastage of old cartridges always needing to be replaced. So this is an improvement over the old Epson system that Mutoh, Mimaki, and Roland still use.



Instead of throwing the whole cartridge away, you only replace and discard a plastic bag inside each cartridge.

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

Each ink line has a card system, like the key cards used to open the door of your hotel. There is no warranty if you use another ink. One fresh new card comes with each new liter of ink.

119. Is there an ink low alarm?

There is an ink level sensor at the base of the sub-tank bag. If the sensor thinks ink is no longer filling the sub-bag, it sets off an "ink low" alarm.

120. What filters are on the ink system to trap particles?

There are no ink line filters.

INK: COST

121. Do you have to buy an entire box? Or can you buy an individual bottle?

You can buy a single liter of ink if you wish.

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

Ink cost depends on what part of the world you are in, and how much you buy at one time, but a rough estimate is \$100 per liter for reactive dye ink and \$150 a liter for nano-pigmented ink.

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

Ink cost per square meter will be between \$1.30 to \$1.40.

124. How much ink is used up during installation of the printer? If a piezo printer, does that mean I have to buy a complete set of ink within a few days of paying off the cost of my printer? Does that mean ink will end up costing more than my printer?

There are two aspects of ink usage during installation of any printer with an Epson printhead; the ink actually used in test prints and purging (which is ink totally wasted) and the ink that fills the tubes and sub-tanks or sub-bags that is no longer in the ink container but is still inside the printer and still usable.

I have two figures for this textile printer, but need to take more notes: 150-160 ml used during installation, and total of 200-220 ml in total when you include the ink in the sub-bag.



Each liter of ink is protected with a card system.

INK: LONGEVITY

125. What is the shelf life of the ink?

Reactive dye ink has a 12 month shelf life, but once you print you really need to steam and wash within 24 hours.

Nano-colorant (nano-pigmented) has a 12 month shelf life.

Disperse dye shelf life is 6 months.

INK: COLOR GAMUT

126. How many colors are used in the ink-set being evaluated here?

There are eight different inks in the Yuhan-Kimberly ink set for the Premium and Express. If you desire 12 different inks, these are available for the larger production printer also from Yuhan-Kimberly.

127. Please indicate what colors your inks cannot achieve?

Color gamut depends on the ink, on the software you use, and on the color of the fabric that you are printing on.

128. What color shift do your dye inks go through during their heat fixation cycle?

Yellow pops out more colorfully, which helps in yellow, but overall there is a yellow shift during heat fixation in any color that has yellow in it.

MEDIA: Size

129. Is the width enough for target applications?

The present width is enough for proofing, for mid-range sizes of soft-signage, for samples, and for scarves, ties, pillow-cases, etc.

130. What core diameter(s) of media will this printer accept?

The printer will seemingly accept a 1" core in addition to the more standard 2" and 3" cores.

131. What length of media tends to be on a roll of material?

Length of material depends on the thickness of the material, but I have noticed that most rolls of fabric are not very long compared with rolls of photo paper or vinyl.

132. Can the printer print edge-to-edge?

Yes.

133. Is printhead height adjustment available? Is it manual, automatic, how much?

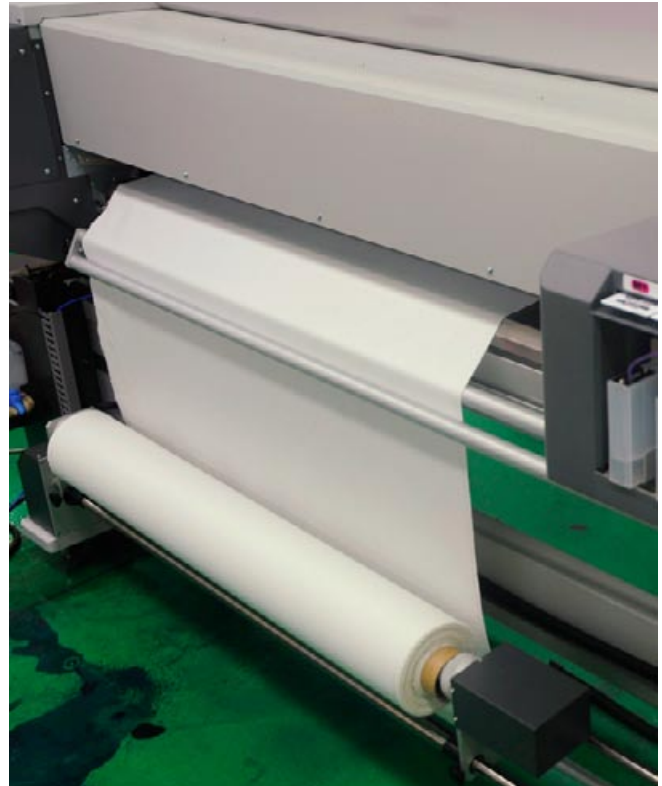
Adjustment is manual.

134. Is there a cutter on-board? Is it manual or automatic?

There is no cutter on board and no knife slot. An on-board cutter would wear out quickly trying to cut fabrics.

135. Do you have media length-remaining sensors on your printer? Is it manually set or automatic?

First you tell the software how much media is on the fresh roll. Then software keeps track. But "we turn this off because the actual roll may be shorter or longer than advertised."



The MC3-Premium prints on media up to 1,615mm wide. The maximum roll diameter is 250mm.

MEDIA: what materials

136. Can this printer accept non-coated fabrics?

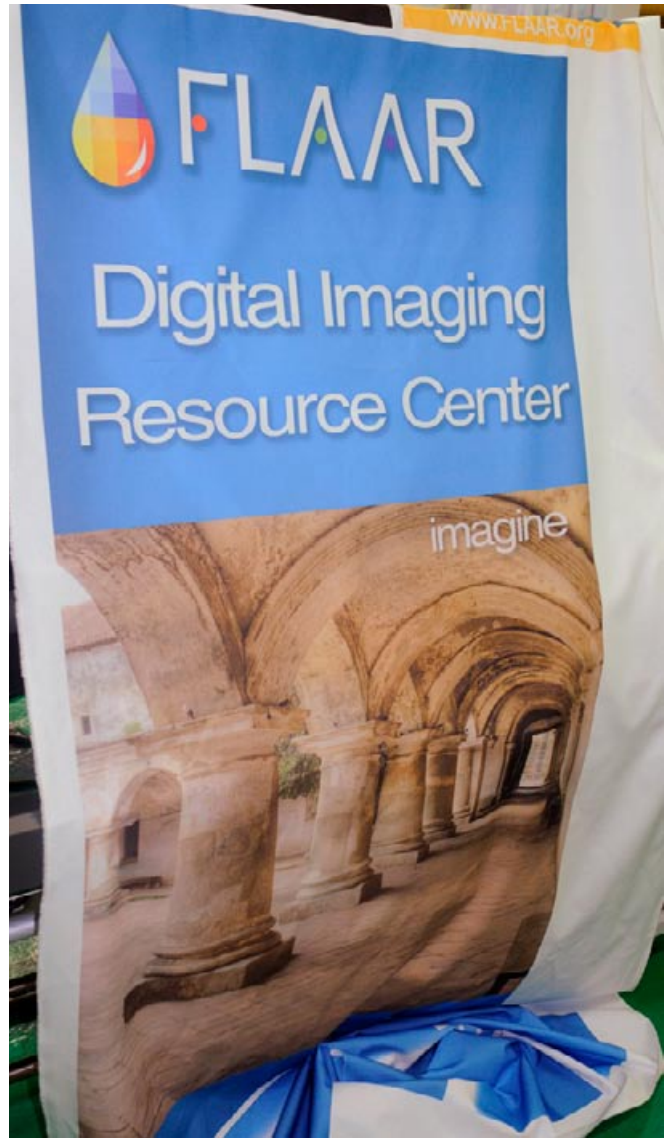
At FESPA Mexico Yuhan-Kimberly used nano-pigmented ink in order to document the ability of their inks to print acceptably on uncoated cotton. Uncoated cotton is of course much less cost than inkjet-coated cotton media.

137. Can this printer accept fabrics with no paper backing?

Yes, this printer can accept many kinds of fabrics that have no paper backing.

138. What textiles does the manufacturer list?

Other than basic generic names such as silk and cotton, it is difficult to make a specific list of printable fabrics because of the considerable variation between different countries and between differences even of the “same” material, such as different thicknesses.



FLAAR banners were printed by the MC3-Premium on Oxford cotton.

139. What textiles are a problem but can be handled, more or less?

The edges of fabrics may cause more problems than the surface of a fabric. For example with rayon span the edges are irregular. In most cases it is best to trim off the edges first, before you start printing (and then brush off the cut edge so you don't get frizzles of loose threads).

140. What fabrics are best not to try at all?

Do not try to print on materials that are thicker than the printer can handle. Fortunately most textiles are not too thick.

141. What about thin or stretchable fabrics?

“Some, but not all.”

With thin materials, especially with an open weave, the color saturation will be weaker, so your image will need to be more sophisticated. Otherwise, a normal image will look washed out.

142. What about rugs and comparable thick materials?

Some materials may simply be too thick. Other materials may have a surface that is so uneven that the image would print okay but simply won't look good due to the depressions in the surface of the material. So this is an issue with the material, not with the printer.

143. Does the printer manufacturer also make coatings?

Yes, Yuhan-Kimberly offers its own coatings, which naturally work especially well with its own inks.

144. Can the manufacturer toll-coat for an end-user who needs a significant amount of one or two coated fabrics?

Yes, if your printing company needs container loads of specific fabrics, Yuhan-Kimberly can either provide you with the coating material, or can coat for you in their own facilities.

145. How much acclimatization time is needed for the media?

It is always best to let the materials come up to room temperature.



Nicholas Hellmuth and Yuhan-Kimberly personnel examining the print tests.

MEDIA: ISSUES

146. How do you handle media whose edges are uneven or otherwise irregular?

You should professionally trim the edges of loose floppy material. Edge guards probably won't work on an irregular edge anyway.

IMAGE QUALITY ISSUES

147. What is the situation with metamerism?

Metamerism is a fact of life with most printers and most inks, but is not considered a consistent or serious problem with textile printing so far.

148. Is there banding in areas of solid black?

In some instances you may experience bi-directional banding in solid black or solid brown; depends on the fabric (thick fabric where the ink does not bleed). Best is to talk with the ink and fabric specialists of Yuhan-Kimberly to review your planned applications to learn from the manufacturer about their own experience with each fabric.

149. Is ink drying time an issue?

The on-board dryer is effective but depends on the ink type and ink load. The situation is that there is only a limited amount of space available to insert an on-board dryer, so a few customers with special applications may need a separate stand-alone dryer.

APPLICATIONS

150. What applications does this printer encourage that are innovative?

Here is a list of web pages where you can see high fashion made out of digitally printed fabrics using Yuhan-Kimberly inks and printers. I assume the printer is the MC2 since the MC3 is still new. But the MC3 is the current generation and can print the same quality. The designer, Lie Sang Bong, is Cultural Ambassador for the City of Seoul in 2010.

Daily Telegraph (UK)

www.telegraph.co.uk/core/Slideshow/slideshowContentFrameFragXL.jhtml;jsessionid0VUPF3SXEAOKFQFIQMFCFGGAVCBQYIV0?xml=/fashion/2008/09/28/pixliesang128.xml&site=fashion

Guardian (UK)

www.guardian.co.uk/lifeandstyle/gallery/2008/sep/29/parisfashionweek.catwalk?picture=338074491

Fashion Mag (France)

http://fr.fashionmag.com/photos/photo.php?id_event=356509

Yahoo News(U.S.A.)

<http://news.yahoo.com/nphotos/model-wears-creation-South-Korean-fashion-designer-Lie-Sang-Bong/photo//080928/481/c7e35f12cfe948e19f7cb1612e9c5/>

Dazed Digital

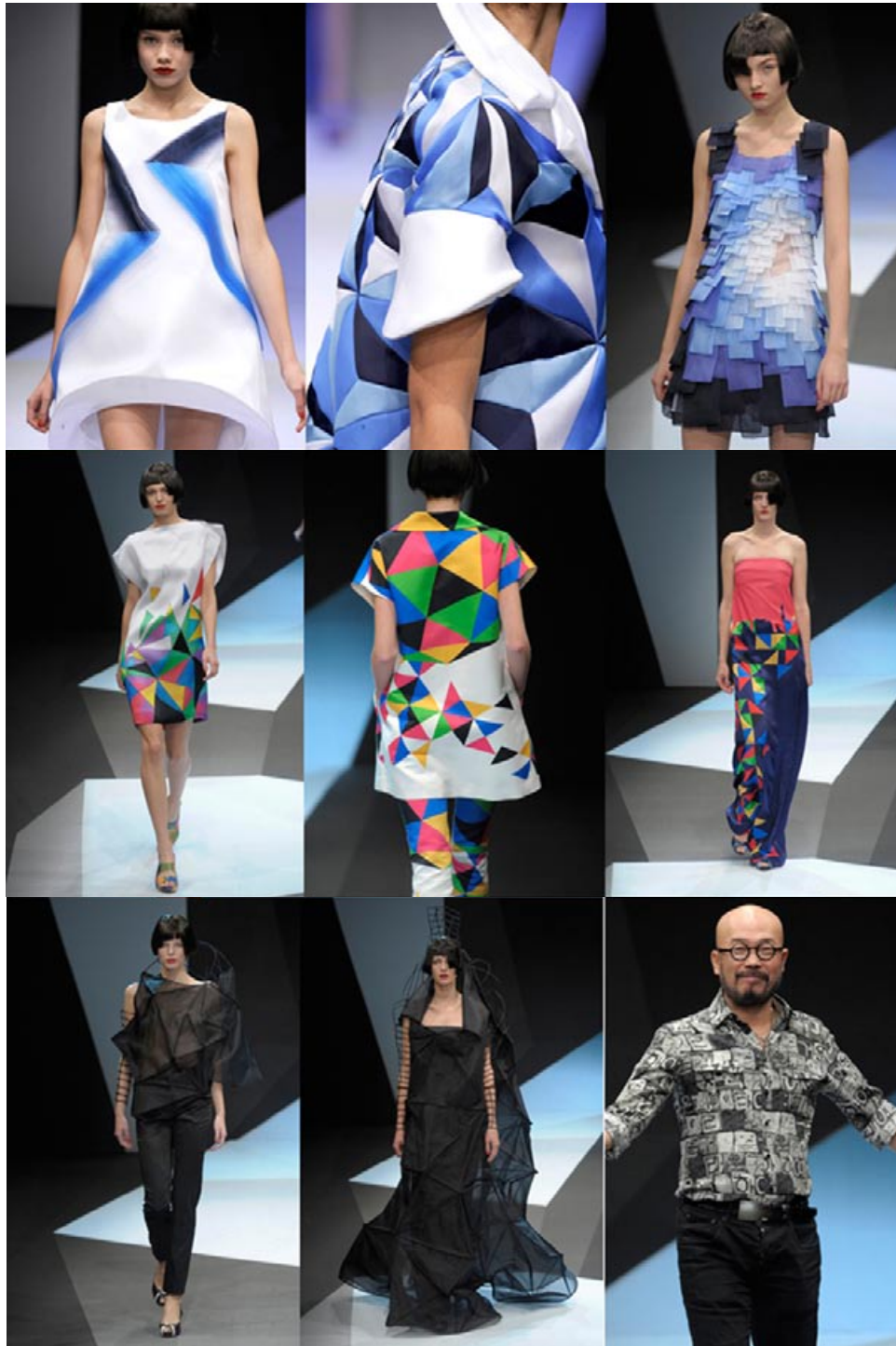
<http://www.dazeddigital.com/article/1193/1/LieSangBongSS09>

Coutorture(France)

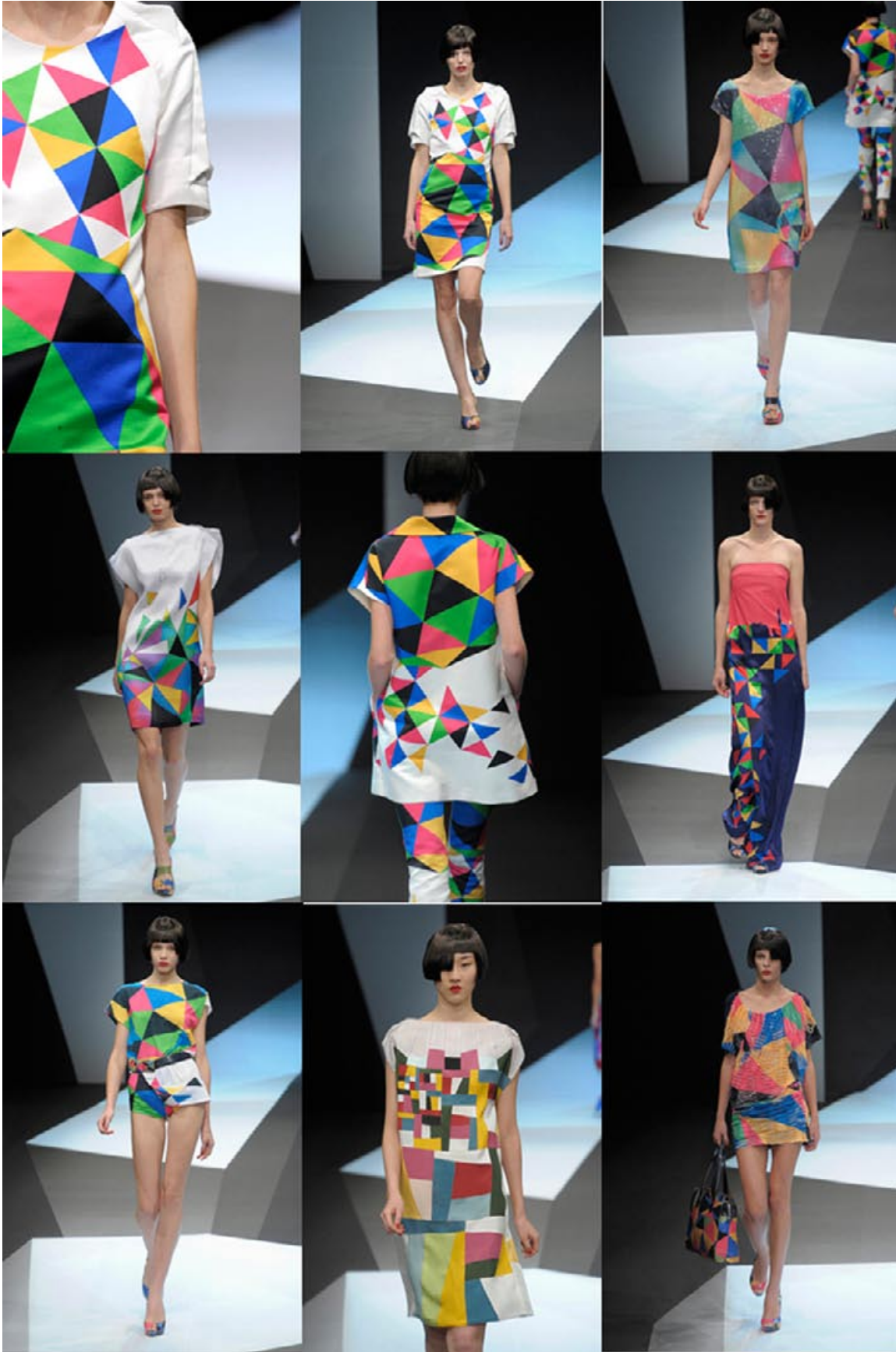
<http://content.coutorture.com/2108901>

Fashion Windows(France & U.S.A.)

<http://www.fashionwindows.net/2008/09/lie-sang-bong/>



High fashion printed fabrics using Yuhan Kimberly inks and printers. The designer was Lie Sang Bong.





More samples in the display room of DTP Link; all printed with Yuhan-Kimberly textile inks.

151. Does the printer allow for perfect registration if printing double-sided?

It is not usual to try to print on both sides of the fabric. Most normal inkjet printers (under half million dollars) do not have any special mechanism to register two-sided printing.

HISTORY and RELATIONSHIPS OF THE MANUFACTURER

152. What is the recent history of the manufacturer?

History is a subject that a professor enjoys looking at.

Since Yuhan-Kimberly designs and makes textile inks, it is logical that they will wish to build inkjet printers that use its own inks. So over the years Yuhan-Kimberly has looked at both combo transport belt printers ("belt printers") and hybrid printers ("cylinder printers" in local jargon). The two textile printers to look at would be Roland and Mutoh, since Mimaki does not often offer OEM solutions. In distinction both Mutoh Europe and Mutoh Japan offer OEM opportunities, as does Roland.

If you visit any major manufacturer of any kind of wide-format printer you will see all the printers that they have purchased for testing. Yuhan-Kimberly is no exception. There are row after row of earlier printers parked in corners, long ago tested and rejected (in other words, the engineers found all the weak points and were able to engineer better solutions).

Since most textile printers in Italy use a moving transport belt (often a sticky belt), the logical question is why Yuhan-Kimberly did not go this route. The answer is because transport belts would also almost double the cost. So it is best to reserve moving belts to high-end production machines, such as their own K2, a 12-color production machine.

COMPARISONS WITH OTHER PRINTERS

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

Roland, Mutoh, and Mimaki also offer textile printers, but only Mimaki offers a serious fabric transport system. Roland and Mutoh's main markets are signage, and their textile printers are intended primarily for soft-signage, including dye sublimation onto paper. So the Roland and Mutoh transport systems are adequate for normal materials, but not for most other fabrics, and rarely for un-backed fabrics (textiles with no paper backing). If the transport mechanism depends on grit-rollers, this is a give away that the system is only rudimentary.

Yes, there are many Roland printers that have been retrofitted with combo transport systems or other manners of handing diverse fabrics, especially by Italian companies. During 2007 there was a lot of PR released about a collaboration between ATP and Roland. But word on the street suggested this system was complex. I never really saw much more of this textile printer, for example, it was not present in either of the two giant Roland exhibit booths at Sign Africa, in September 2008.

But the advantage of Yuhan-Kimberly is that obviously Kimberly-Clark corporation has vast resources. And their division in Korea is dedicated to textile printing, so they have incentive to make a good product.

154. What features on the other printers turn them off?

Needless complexity often begs for Murphy's Law to create havoc.

Complex systems may also be very expensive.

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

None of the mid-sized Italian printer retrofitters make their own ink. And now that I have spent a week at Yuhan-Kimberly facilities, I doubt most of the companies that retrofit Mutoh, Roland, or Mimaki printers in Italy or elsewhere in Europe have the number of engineers and ink scientists as does Yuhan-Kimberly.

GENERAL CONSIDERATIONS

Pros

This textile printer has several patents-pending:

- Patent on the transport drive mechanism for the fabrics
- Patent on the heating (so wet ink on the weave does not come off when wound around on the take-up reel)
- Head height movement relative to the fabrics.

Realize that your feature must be novel to patent it. Yuhan-Kimberly has a policy to prefer to be innovative rather than merely copying other printers.

A definite benefit of not having a combo transport belt is saving \$\$\$\$. It can cost between \$35,000 to \$50,000 for a moving transport system. By avoiding using a transport belt, the cost of the printer was further reduced.

The difference between this MC3 and any Roland or Mutoh printer is that neither of those companies is a textile company. Neither Roland nor Mutoh make textile inks. They make solvent printers and adapt one or two models to handle simple fabrics. But neither Roland nor Mutoh have the size of R&D department in fabrics and textile inks as does Yuhan-Kimberly.

Mimaki has a slightly larger textile printer team than Roland or Mutoh, but their newest textile printer has not made much inroads in market share.

A plus of the Yuhan-Kimberly printer is that the ink is not stuck in the old-fashioned Epson 220 ml cartridges. This is a downside on most Mutoh, Roland, and Mimaki printers: small and potentially wasteful ink systems. The MC3 uses a 1-liter ink delivery system developed by Yuhan-Kimberly. This is superior to the old Epson system.

Reality Check

The reality check with every textile printer is that you need to learn how to tweak the printer to get the best results. A good example would be the fact that during heat fixation overall there is a yellow shift in any color that has yellow in it. Thus you need to tweak the original colors so that when the yellow shift happens during heat fixation, that the final color is acceptable.

Discussion

The idea behind creating this printer was to make a machine to avoid complexity (and hence avoid unnecessary costs).

The second goal was to do away with requiring pre-processing (such as inkjet coating). So if you print with nano-pigmented ink, you do not normally need to coat the material.

This is a printer created for short production and samples.

Comments

The fashion designer who uses the Yuhan-Kimberly inks and printer for customized digitally printed cloth reveals one clever application which of course is highly profitable.

Making customized wallpaper is also an intelligent niche market, but you can employ the lower cost Express version to do wallpaper. Or, if you prefer the Premium, you can also run wallpaper material through this.

If you visit the display room in the DTP Link office, and see all the applications: silk ties, clothing, upholstery, you can quickly understand why fabric printing can be so profitable for a printshop. But if your printer has a grit-roller system and is thereby limited to paper-backed materials, then your raw materials are inherently expensive. The Premium gets away from a grit roller concept and instead provides more sophisticated tension rollers.

My next step is to inspect a printshop with this printer in action. As with any printer, seeing it at a trade show is the first step. Inspecting the company headquarters (to see who stands behind the printer) and testing the machine in a printshop is a second step. The final step in a FLAAR evaluation is to visit a printshop out in the real world and ask both the owner and the printer operator how the printer actually performs.

As of 2009, Yuhan-Kimberly has ceased manufacturing textile printers and ConVerd has ceased selling wide-format textile printers.

Our suggested brand is DigiFab textile equipment. Besides the inkjet printer for textiles, the StampaJet, DigiFab has several related products such as heat transfer sublimation equipment and RIP software especially for textiles.

If you need more information about **DigiFab textile printers**, please contact:

Los Angeles - Main Office - Factory

5015 Pacific Blvd.
Vernon, CA 90058
Tel. (323) 581-4500
Fax. (323) 582-4500

New York Office

1412 Broadway, Suite 2100
New York, NY 10018
Tel. (212) 944-9882
Fax. (212) 944-9659

emails:

Avedik Izmirlian (President): avedik@digifab.com,

Alex K. Izmirlian (VP Engineering): alex@digifab.com and
webmaster@digifab.com

Enjoy visiting other FLAAR network web sites

 **FLAAR Reports**
www.Wide-Format-Printers.org



Water-based Inkjet: photo, indoor signage, advertising, proofing, CAD, GIS, , including textile printers
www.wide-format-printers.org

www.FineArtGicleePrinters.org



Giclee

Fine Art
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& Fabrics

Interior
Decoration

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www.fineartgicleeprinters.org

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 **FLAAR** Digital Imaging Resource Center



Printing for outdoor use: UV-cured, solvent, eco-solvent, etc.

www.large-format-printers.org

www.flatbed-scanner-review.org



Scanning

www.flatbed-scanner-review.org

[Home](#) [Index](#) [Directory of Printers](#) [Consulting Services](#) [Contact Us](#)



Large Format



Medium Format



35 mm



www.Digital-Photography.org

Digital Photography

www.digital-photography.org

Reality Check

Being a university professor for many years does not mean we know everything. But intellectual curiosity often leads us to enter areas that are new to us. So we do not shirk from entering areas where we are obviously not yet expert. In your years of wide format printing experience have encountered results different than ours, please let us know at ReaderService@FLAAR.org. We do not mind eating crow, though so far it is primarily a different philosophy we practice, because since we are not dependent on sales commissions we can openly list the glitches and defects of those printers that have an occasional problem.

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

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Update Policy

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

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

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

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

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

Please Note

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

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

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

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

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

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

Citing and Crediting

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

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

The material in this report is not only copyright, it is also based on years of research. Therefore if you cite or quote a pertinent section, please provide a proper credit, which would be minimally "Nicholas

Hellmuth, year, www.FLAAR.org.” If the quote is more than a few words then academic tradition would expect that a footnote or entry in your bibliography would reference the complete title. Publisher would be www.FLAAR.org.

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

Legal notice

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

Advisory

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

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

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

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

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

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

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

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

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

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

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

any ink or media will be acceptable for your specific needs in your specific print shop. As a result, products are described “as is” and without warranties as to performance or merchantability, or of fitness for a particular purpose. Any such statements in our reports or on our web sites or in discussions do not constitute warranties and shall not be relied on by the buyer in deciding whether to purchase and/or use products we discuss because of the diversity of conditions, materials and/or equipment under which these products may be used. Thus please recognize that no warranty of fitness or profitability for a particular purpose is offered.

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

The user is advised to test products thoroughly before relying on them. We do not have any special means of analyzing chemical contents or flammability of inks, media, or laminates, nor how these need to be controlled by local laws in your community. There may well be hazardous chemicals, or outgassing that we are not aware of. Be aware that some inks have severe health hazards associated with them. Some are hazardous to breathe; others are hazardous if you get them on your skin. For example, some chemicals such as cyclohexanone do not sound like chemicals you want to breathe every day. Be sure to obtain, read, and understand the MSDS sheets for the inks, media, and laminates that you intend to use. Both solvent, eco-solvent, and UV-curable inks are substances whose full range of health and environmental hazards are not yet fully revealed. It is essential you use common sense and in general be realistic about the hazards involved, especially those which are not listed or which have not yet been described. FLAAR is not able to list all hazards since we are not necessarily aware of the chemical components of the products we discuss. Plus, there is no way to know if all MSDS sheets are honest to begin with! Our reports are on usability, not on health hazards.

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

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

Results you see at trade shows may not be realistic

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

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

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

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

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

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

Factors influencing output

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

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

ware and software. This is why Nicholas Hellmuth is considered the “Johnny Appleseed” of wide format inkjet printers.

Therefore this report does not warranty any product for any quality, performance or fitness for any specific task, since we do not know the situation in which you intend to use the hardware or software. Nor is there any warranty or guarantee that the output of these products will produce salable goods, since we do not know what kind of ink or media you intend to use, nor the needs of your clients. A further reason that no one can realistically speak for all aspects of any one hardware or software is that each of these products may require additional hardware or software to reach its full potential.

For example, you will most likely need a color management system which implies color measurement tools and software. To handle ICC color profiles, you may need ICC color profile generation software and a spectrophotometer since often the stock pre-packaged ICC color profiles which come with the ink, media, printers and/or RIPs may not work in your situation. Not all RIPs handle color management equally, or may work better for some printer-ink-media combinations than for others. Please be aware that our comments or evaluations on any after-market ink would need the end-user to use customized ICC profiles (and not merely generic profiles).

Be aware that some RIPs can only accept ICC color profiles: you quickly find out the hard way that you can't tweak these profiles nor generate new ones. So be sure to get a RIP which can handle all aspects of color management. Many RIPs come in different levels. You may buy one level and be disappointed that the RIP won't do everything. That's because those features you may be lacking are available only in the next level higher of that RIP, often at considerable extra cost. Same thing in the progression of Chevy through Pontiac to Cadillac, or the new Suburbans. A Chevy Suburban simply does not have all the bells and whistles of the Cadillac Escalade version of this SUV.

Don't blame us... besides, that's why we are warning you. This is why we have a Survey Form, so we can learn when you find products that are inadequate. We let the manufacturers know when end users complain about their products so that the manufacturers can resolve the situation when they next redesign the system.

Most newer printer models tend to overcome deficiencies of earlier models. It is possible that our comparative comments point out a glitch in a particular printer that has been taken care of through an improvement in firmware or even an entirely new printer model. So if we point out a deficiency in a particular printer brand, the model you may buy may not exhibit this headache, or your kind of printing may not trigger the problem. Or you may find a work-around.

Just remember that every machine has quirks, even the ones we like. It is possible that the particular kind of images, resolution, inks, media, or other factors in your facility are sufficiently different than in ours that a printer which works just fine for us may be totally unsatisfactory for you and your clients. However it may be that the specific kind of printing you need to do may never occasion that shortcoming. Or, it may be that your printer was manufactured on a Monday and has defects that are atypical, show up more in the kind of media you use which we may not use as often or at all during our evaluations. Equally possibly a printer that was a disaster for someone else may work flawlessly for you and be a real money maker for your company.

So if we inspect a printer in a printshop (a site-visit case study), and that owner/operator is content with their printer and we mention this; don't expect that you will automatically get the same results in your own printshop.

In some cases a product may work better on a Macintosh than on a PC. RIP software may function well with one operating system yet have bugs and crash on the same platform but with a different operating system. Thus be sure to test a printer under your own specific work conditions before you buy.

And if a printer, RIP, media, or ink does not function, return it with no ands, ifs or buts. Your best defense is to show an advertising claim that the printer simply can't achieve. Such advertising claims are in violation of federal regulations, and the printer companies know they are liable for misleading the public.

But before you make a federal case, just be sure that many of the issues are not user error or unfamiliarity. It may be that training or an additional accessory can make the printer do what you need it to accomplish. Of course if the printer ads did not warn you that you had to purchase the additional pricey accessory, that is a whole other issue. Our reviews do not cover accessories since they are endless, as is the range of training, or lack thereof, among users.

The major causes of printer breakdown and failure is lack of maintenance, poor maintenance, spotty maintenance, or trying to jerry-rig some part of the printer. The equally common cause of printer breakdown is improper use, generally due from lack of training or experience. Another factor is whether you utilize your printer all day every day. Most solvent and UV printers work best if used frequently. If you are not going to use your printer for two or three days, you have to put flush into the system and prepare it for hibernation (even if for only four or five days). Then you have to flush the ink system all over again.

Also realize that the surface of inkjet prints are fragile and generally require lamination to survive much usage. Lamination comes in many kinds, and it is worth finding a reliable lamination company and receiving training on their products.

Also realize that no hybrid or combo UV printer can feed all kinds of rigid materials precisely. Some materials feed well; others feed poorly; others will skew.

Although we have found several makes and models to work very well in our facilities, how well they work in your facilities may also depend on your local dealer. Some dealers are excellent; others just sell you a box and can't provide much service after the sale. Indeed some low-bid internet sales sources may have no technical backup whatsoever. If you pay low-bid price, you can't realistically expect special maintenance services or tech support later on from any other dealer (they will tell you to return to where you paid for the product). This is why we make an effort to find out which dealers are recommendable. Obviously there are many other dealers who are also good, but we do not always know them. To protect yourself further, always pay with a level of credit card which allows you to refuse payment if you have end up with a lemon. A Gold American Express card allows you to refuse payment even months after the sale. This card may also extend your warranty agreement in some cases (check first).

Most of the readers of the FLAAR Reports look to see what printers we use in our own facilities. Readers realize that we will have selected the printers that we like based on years of experience and research. Indeed we have met people at trade shows who told us they use the FLAAR web site reports as the shopping list for their corporate purchases.

Yes, it is rather self-evident that we would never ask a manufacturer to send a product which we knew in advance from our studies was no

good. But there are a few other printers which are great but we simply do not have them in our facilities yet.

So if a printer is not made available by its manufacturer, then there is no way we can afford to have all these makes and models in our facility. Thus to learn about models which we do not feature, be sure to ask around in other print shops, with IT people in other corporations, at your local university or community college. Go to trade shows.... but don't use only the booth...ask questions of people in the elevator, in line at the restaurant, anywhere to escape the smothering hype you get in the booth.

Realize that a FLAAR Report on a printer is not by itself a recommendation of that printer. In your local temperature, in your local humidity, with the dust that is in your local air, with your local operator, and with disorientation of the insides of a printer during rough shipment and installation, we have no knowledge of what conditions you will face in your own printshop. We tend to inspect a printer first in the manufacturing plant demo room: no disjointed parts from any shipment since this printer has not been lifed by cranes and run over a rough pot-holed highway or kept in smelting heat or freezing cold during shipment.

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

Availability of spare parts may be a significant issue

Chinese printers tend to switch suppliers for spare parts every month or so. So getting spare parts for a Chinese printer will be a challenge even if the distributor or manufacturer actually respond to your e-mails at all. Fortunately some companies to have a fair record of response; Teckwin is one (based on a case of two problematical hybrid UV printers in Guatemala). The distributor said that Teckwin sent a second printer at their own expense and sent tech support personnel at their expense also. But unfortunately both the hybrid UV printers are still abandoned in the warehouse of the distributor; they were still there in January 2009. But Teckwin has the highest rating of any Chinese company for interest in quality control and realization that it is not good PR to abandon a client or reseller or distributor all together.

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

Lack of Tech Support Personnel is increasing

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

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

Any new printer, no matter who the manufacturer, or how good is the engineering and electronics, will tend to have teething issues. Until the firmware is updated, you may be a beta tester. This does not mean the printer should be avoided, just realize that you may have some downtime and a few headaches. Of course the worst case sce-

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

Counterfeit parts are a problem with many printers made in China

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

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

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

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

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

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

Be sure to check all FLAAR resources

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

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

Acknowledgements

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

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

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

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

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

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

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

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

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

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

the better brands before we seek sponsorship. After all, out of the by now one million readers, we have heard plenty about every single printer out there.

We thank MacDermid ColorSpan (now part of HP), Hewlett-Packard, Parrot Digigraphic, Color DNA, Canon, Gandinnovations, and other companies for providing funding for technology training for the FLAAR staff and our colleagues at Bowling Green State University in past years and for funds to allow us to attend all major international trade shows, which are ideal locations for us to gather information. We thank Caldera, EskoArtwork, EFI Rastek, EFI and VUTEK, OTF (Obeikan), Drytac DigiFab, Barbieri electronic, Seiko II, Parrot Digigraphic, AT Inks, Sepiax inks, Sam-Ink, Dilli, Grapo, and WP Digital for providing funds so that we can make more of our publications free to end-users. During 2000-2001 we had grants to cover all the costs of our publications, and all FLAAR Reports were free in those early years. As that early grant naturally expired after a few years, we had to begin charging for some of our reports to cover costs. Now (in 2010), we are seeking corporate sponsorship so we can gradually make another 20% of our publications free to our readers.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Contributions, grants, sponsorships, and funding for surveys, studies and research is, however, open to a company who has an accepted standing in the industry. It is helpful if the company has a visible pres-

ence at leading trade shows and can provide references from both end users and from within the industry. Where possible we prefer to visit the company in person or at least check them out at a trade show. Obviously the product needs to have a proven track record too. Competing companies are equally encouraged to support the FLAAR system. We feel that readers deserve to have access to competing information. Competition is the cornerstone of American individualism and technological advancement.

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

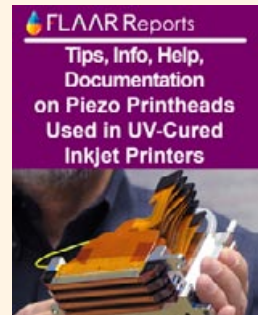
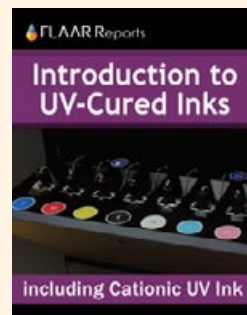
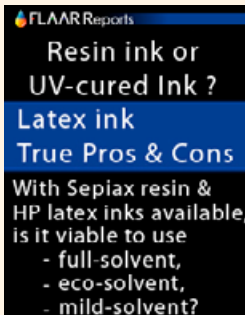
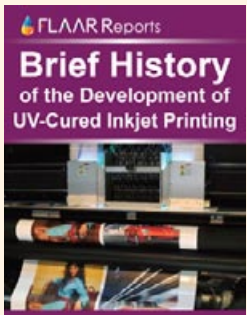
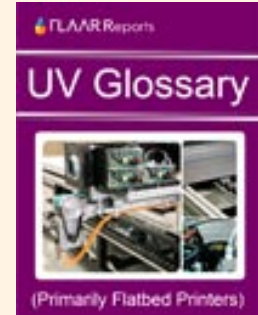
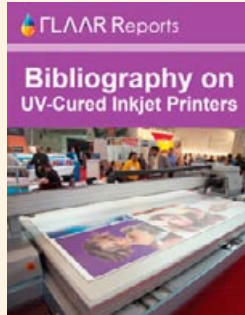
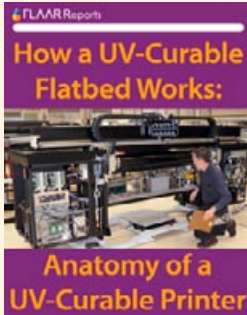
FLAAR also serves as consultants to Fortune 500 companies as well as smaller companies and individuals who seek help on which printers to consider when they need digital imaging hardware and software.

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

These are some of the most
Recent FLAAR Reports (2008-2010)

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Introduction to UV Curable Inkjet Flatbed Printers



Most recent UV Printers



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

<p>List of UV Printers Manufactured in Taiwan 2010</p>	<p>UV Market TRENDS</p> <p>Observable at FESPA Digital Europe 2009</p>	<p>TRENDS, Part II: Markets & Technologies</p> <p>UV-cured printers at ISA 2009</p>	<p>TRENDS, Part I: Analysis One by One of the UV-cured printers</p> <p>ISA '09</p>	<p>UV Cured Printer TRENDS at Dubai 2010</p>
<p>TRENDS of UV-Cured Wide-Format Printers</p> <p>Shanghai '09</p>	<p>UV COMBO FLATBEDS</p> <p>Shanghai 2009</p>	<p>TRENDS IN HYBRID STRUCTURE UV PRINTERS</p> <p>Shanghai 2009</p>	<p>UV Roll-to-roll</p> <p>Observable at Shanghai 2009</p>	<p>UV Flatbed Printers</p> <p>at APPEXPO, Shanghai '09</p>
<p>Trends in Wide-Format UV Printers</p> <p>Observable at SGIA '09</p>	<p>UV-Cured Inkjet Printers at VISCOM ITALY 2009</p>	<p>Learning more of UV-Curable TRENDS</p> <p>By visiting viscom Paris '09</p>	<p>UV Printers Trends 2008</p> <p>SGIA '08 PART I</p>	<p>Flatbed & Roll-to-Roll UV Printers</p> <p>SGIA '08 Part II</p>

UV Printers Manufactured in China, Korea and Taiwan

<p>Chinese UV Inkjet Printers 2009</p> <p>Comprehensive FLAAR Inventory</p>	<p>UV Printers Manufactured in Korea 2009</p> <p>Trends, Markets & Applications</p>	<p>UV Printers Manufactured in KOREA 2010</p>	<p>List of UV Printers Manufactured in Taiwan 2009</p>	<p>List of UV Printers Manufactured in Taiwan 2010</p>
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