FLAAR Reports

Learning about Digital Flatbed Cutters
to pair with your
UV-Cured Flatbed Inkjet Printer

Kongsberg XL
Series Cutter-Routers

Nicholas Hellmuth and Pablo Martinez

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Cutter-Routers

Kongsberg XL24 flatbed cutter view, SIGN Africa 2009.

This is the first stage of a long-term evaluation of XY contour cutter-routers. They are also called digital cutters. The technology we are currently evaluating in this project is flatbed cutter-routers. They also handle roll-fed materials, but we are not talking about simple Graphtec vinyl cutters. Today's sophisticated printshops need to cut thick materials being printed upon by UV-curable flatbed inkjet printers. Signage and display are the primary applications but there is a trend to also cut thick cardboard for disposable recyclable chairs, tables and bookshelves.

FLAAR has our own a long-range interest in XY cutters for their ability to cut signage and display materials for museum exhibits and to cut materials for making recyclable furniture (with X board by Xanita, Re-Board, BioBoard, etc). In other words, we are inherently interested in evaluating which XY cutter is the best for our own applications. As we acquire knowledge and do our evaluations we issue them to the rest of the world as FLAAR Reports.

This is a polite way of saying that we are not a PR agency. We do our own research, using our own team. And most importantly, our first step is to ask end-users whether a particular brand is adequate. Earlier this year we asked the owner of the other main brand of cutter if he was satisfied: he said no, he did not like that other brand because it was not made specifically for cutting really hard material (this was not their G3 model, it was the earlier model from three years ago). So it was okay for normal foam board, but he needed to cut other materials (for giclee and interior décor). This was a spontaneous question and answer session since FLAAR was visiting this giclee atelier to inspect their Cruse scanner (which he liked so much be bought a second one). So this is how we undertake our studies.

The initiation of the present report is the result of seeing a large Kongsberg model i-XL cutter in a printshop in Illinois (halfway between St Louis and Chicago). I was in this printshop to test their new Drytac VersaCoater and an equally new Seiko ColorPainter H-104s.

Several days later, through the courtesy of several Esko managers it was possible to have an entire day of training on an XL and also and XP series cutters at the world Headquarter of *i*-cut Inc. (previously MGE)". Then the following week it was possible to inspect a Kongsberg i-XL24 flatbed cutter over a three-day period at VISCOM Paris.

The week after this I was in Kiev, Ukraine doing research for a translation into Russian language of FLAAR Reports on UV-cured printers. While in Kiev the local distributor of Kongsberg printers provided hospitality and answered questions.

So, you will notice the hallmark of a FLAAR Report: abundant research on multiple examples of a specific digital imaging technology plus an international coverage. To undertake this much research involves thousands of kilometers of travel, day after day of taking notes, and then an entire team of graphic designers to prepare the final report. Next comes the team of web designers who put the finished FLAAR Report onto the Internet (we currently have a team of five web designers and programmers). So it is rather obvious that a publication would not be possible without at least modest funding. Thus I appreciate research funds from EskoArtwork to make this report possible.

Because most printshop owners know flatbed UV-curing printers many of the comments in the evaluation of the flatbed aspects of the cutter make comparisons with printing tables, since some aspects are indeed comparable: both have gantries, both have vacuum systems, etc. There are many similarities between cutter tables and flatbed printers.

THE BASICS

1. Brand name, model?
Kongsberg XL series, i-XL when offered with *i*-cut vision system.

Kongsberg have also two other machine series:
Kongsberg XE series, i-XE when offered with *i*-cut vision system.
Kongsberg XP, available with *i*-cut vision system as an option
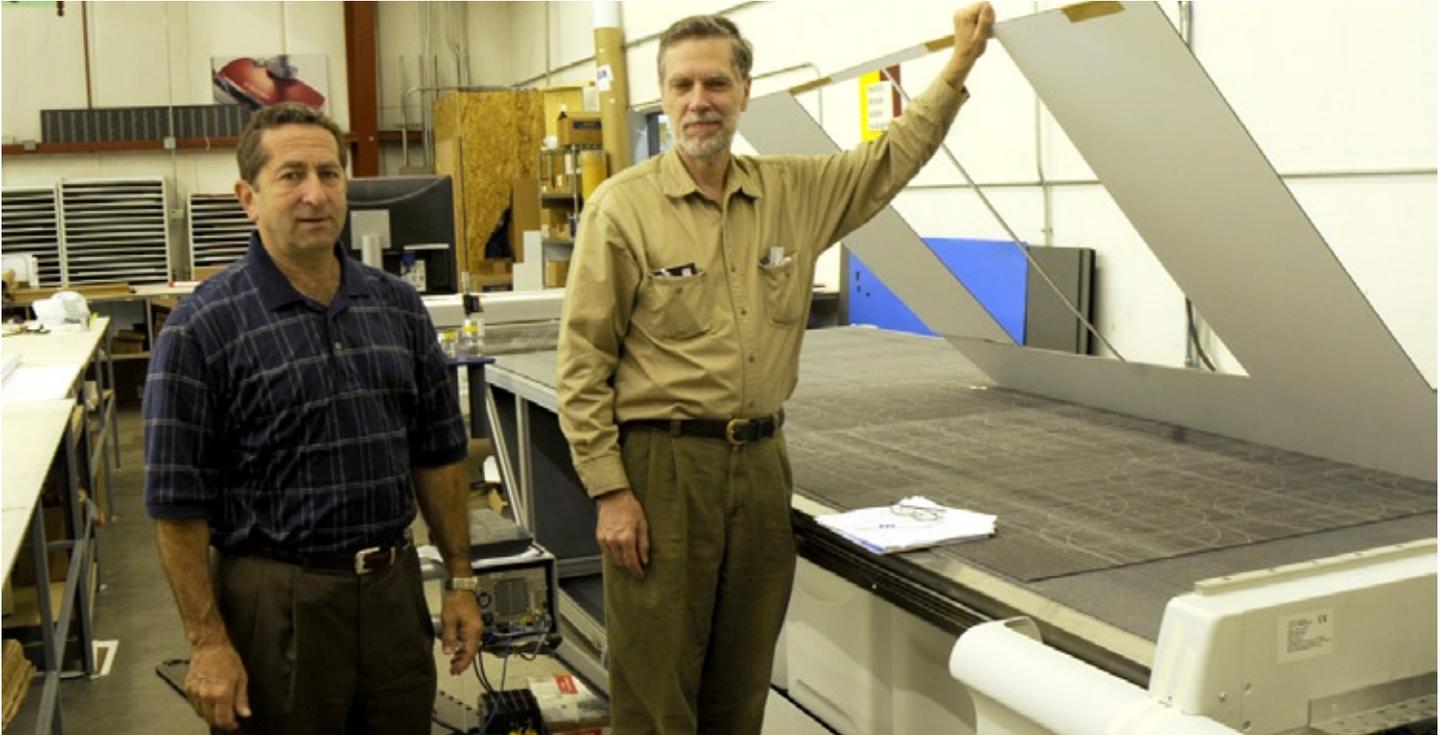
Harvey Meister GDS printshop owner and Dr. Nicholas Hellmuth evaluating the Kongsberg i-XL24 flatbed cutter, at his recent GDS site visit.

2. If there are two or three (or more) widths of this cutter, what differences exist other than the width?
i-XL is a multi-purpose cutter /router. Available models:

		i-XL20	i-XL24	i-XL42	i-XL44
Work Area	mmIn. In.	1680x1270 66x50	1680x3050 66x120	2210x1270 87x50	2210x3050 87x120

The XP is the brand new cutter/router for short run production.

		XP20	XP24	XP44
Work Area	mmIn. In.	1680x1430 66x56	1680x3200 66x126	2210x3200 87x126

The i-XE models are dedicated cutting machines for rollbased material and light duty sheeted material. The i-XE models available are:

		i-XE10	i-XE32	i-XE54
Work Area	mmIn. In.	800x1100 31x43	1300x1620 51x64	1600x3050 63x120

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

The single company is "Esko Artwork". Esko Artwork has operations in many countries. The cutters/routers are made in Kongsberg Norway (legal entity Esko Graphics Kongsberg), the i-cut vision system in Lake Geneva, Wisconsin (legal entity *i*-cut Inc.).

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

There are three series of cutters from Longsberg: XE, XL, and the new XP. XL is the model series that I tend to see at most printshops. XP is new and I will see it more often in the future.

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

Although *i*-cut vision system is available with other brands, Kongsberg cutters themselves are not rebranded elsewhere.

Esko Artwork booth at SGIA 2009.

6. If this is a rebranded cutter, what features are different than the original cutter?

No, this is a original brand of Esko Kongsberg.

7. When and where was this model first introduced?

The initial XL model was launched in 2000, the upgraded i-XL (enhanced with *i*-cut vision system) was introduced in 2005. The XE / i-XE was introduced in 2006, the XP in 2008.

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

This cutter is mature. So you are not stuck with an untested beta machine.

9. List price?

List price varies by model and by how many options you select. As with all machinery, price also varies by world region. But this is not a low-bid brand; you get European technology from an experienced manufacturer. If you prefer a really cheap cutter they are available elsewhere.

10. What options are extra charge?

A sheet feeder, a take-up system, and a conveyor belt cleaning system are examples of some of the available options for the Kongberg XL series. Other series may have slightly different options.

For the XL series you can also obtain the conveyor belt and also a roll material holder.

11. Do you need to provide air pressure for the vacuum table? Do you need to provide compressed air for any other purpose?

Yes, you need to provide air pressure for the vacuum table, the valves and the tooling.

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

The table has a vacuum sistem dividen in two areas, with four section each one that you can turn on and off.

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

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

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

Every cutter manufacturer and distributor has their own policy on whether they wish the end-users to make their own repairs. But there is no right or wrong policy. In general, the end-user is usually not encouraged to take the cutter apart and do repairs on their own. Only later on, when you have considerable experience, and have taken advanced tech support training, would doing your own repairs be realistic.

However I have visited many printshops where the cutter operator prefers to receive this training precisely so they can do their own repairs. After all, if the manufacturer can train their own tech support person surely a cutter operator, who also works with this cutter every day all month all year, can also learn how to maintain and repair it (if they have the interest and inclination).

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

15. How does the total cost compare with other XY routers or cutters?

You can fill out the other columns for the other brands of cutter that are on your short list. We can't fill this out for you, since we don't know what is on your short list.

If you buy low-bid, you may not receive all the tool options that you will need later. If you shop by price alone the unit you end up with may not be heavy duty construction. Nonetheless, obviously price is a factor. However some printshops prefer to have the absolute best and realize that its price will be a few points higher than a lesser brand.

PURCHASING

16. Are dealers national (most companies) or regional (Roland allows a dealer to operate only within a limited regional area)? Does a buyer have any choice in dealers?

Every country is different. In South Africa I have met their dealer (same dealer as Screen UV printers). In the US one dealer is Pitman, a large company that covers all the USA.

FEATURES OF THE CUTTER: Vacuum

17. Is there a vacuum function?
Yes, the flatbed table has a vacuum.

18. Is the vacuum created by simple fans, or by an air pump?
The vacuum is created by an air pump.

19. In how many sections or zones?
Yes, the vacuum is in several user-selectable sections, which naturally depends on which model you have. There are eight zones on an XP24; you can obtain other options. Your Vacuum Setup button will show you the vacuum setup configuration for your model.

20. Are the vacuum areas (size and position) user definable?
Yes, you can define the vacuum area, acording to the material size.

21. Can you turn one or the other section(s) off and on?
The vacuum is divided in two parts, each one has four sections that you can turn on or off.
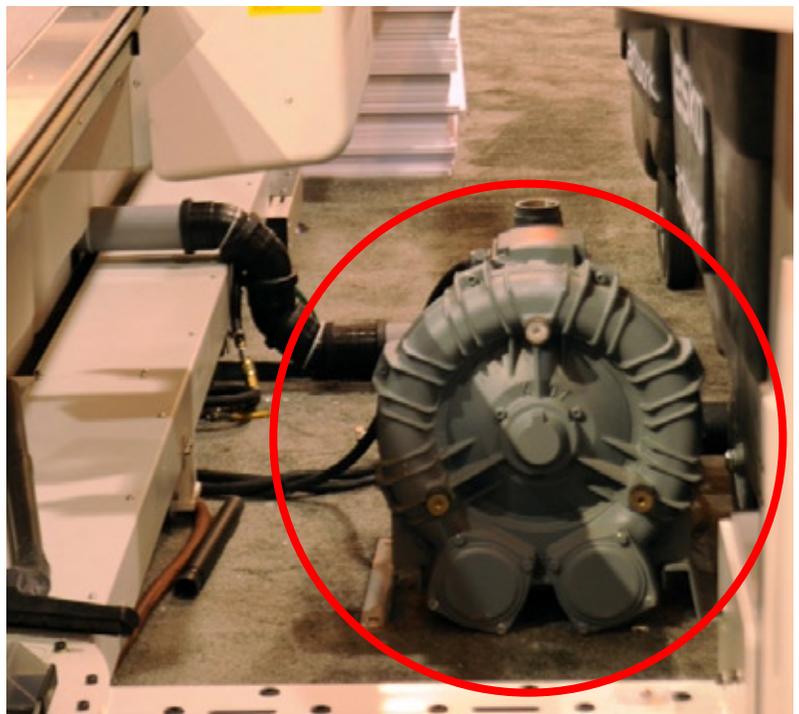
The vacuum system in the table is created by an air pump.

You can define the vacuum area, acording to the material size, this is divided in two parts, each one has four sections that you can turn on or off.

22. Just Off and On? Or variable?

You can turn on, off and variable acording to the material size.

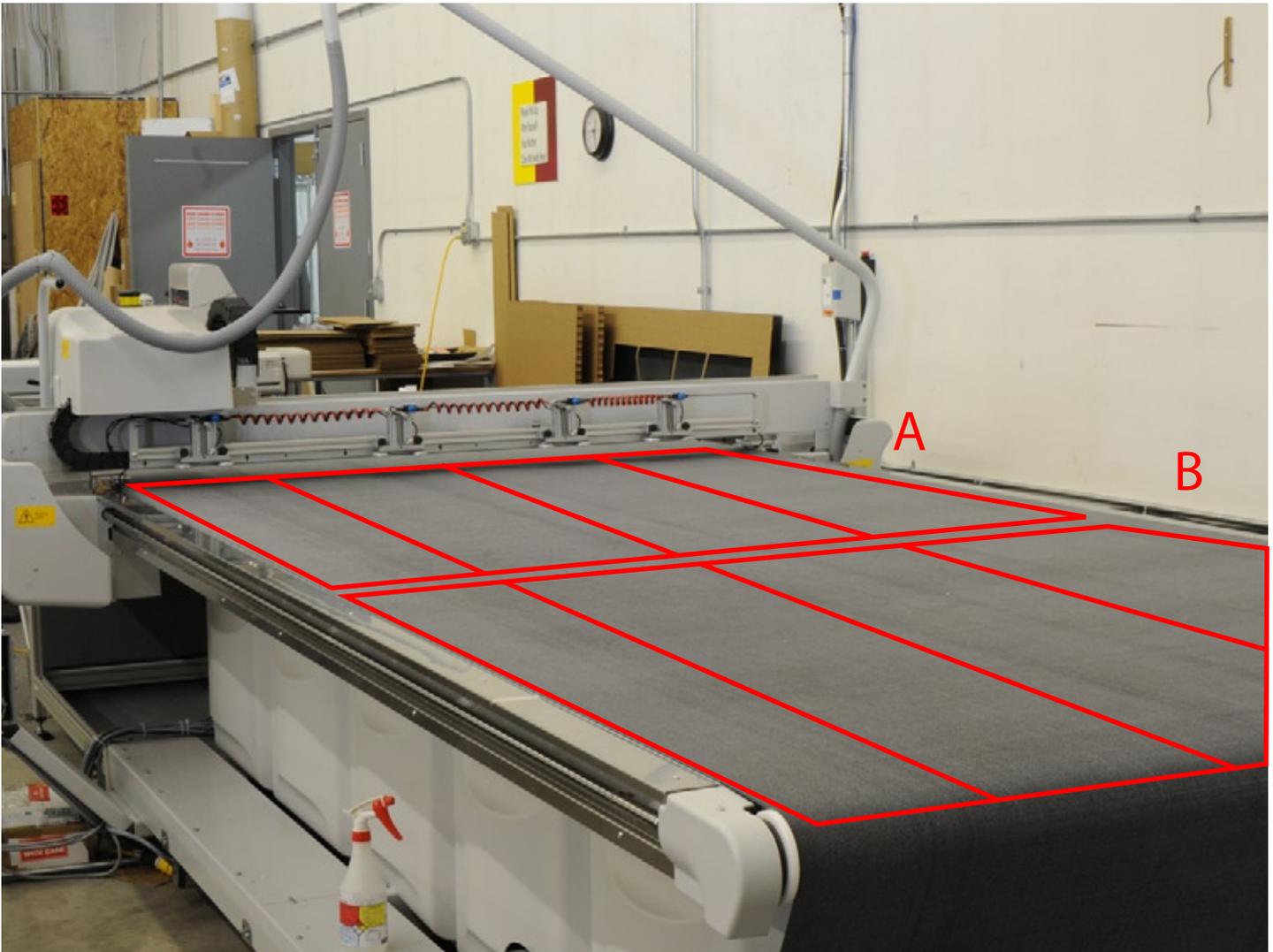### 23. Does the system shut the vacuum off automatically after the cutter has not been used for a certain amount of time?

Vacuum is automatically switched off when the job is finished.

24. Is the vacuum too weak for some materials? Does this mean you have to waste your time and tape materials down to the top of the flatbed table?

With many flatbed UV printers, such as the Mimaki JF-1631, 1610, the Oce Arizona 250, and the Gerber ion it is necessary to put paper or thin foam core material on top of the entire flatbed area where you are not printing. If you don't do this, those vacuum holes will suck open air and there will not be enough vacuum under the piece of material that you need to print on. But I have also seen flatbed printers costing $300,000 also requiring this, such as Gandinnovations Jeti flatbeds.

STRUCTURE OF THE CUTTER: Media Transport Mechanism & Media Path

25. Is this a dedicated flatbed with no roll-to-roll capability? Or is this a true flatbed or just add-on feeder platforms at front and back?
The model at VISCOM Paris '09 was a dedicated flatbed with no roll-to-roll capability.

26. Is there a moving transport belt (combo style) or a stationary flatbed?
The cutter can be equipped with an optional conveyor belt, that helps to move the material to be cut.

27. Describe the surface(s) of the table.
The surface of the table is usually covered with so many mats that you can't see the actual original surface of the table.

28. What kind of protective mats can be obtained as options?
One other brand of cutter at the Paris '09 trade show had a somewhat crude piece of Masonite-looking material as a cutting mat. It is not always a good idea to have a rigid mat since large rigid boards tend to be warped (as this one was; it was curled up at its ends).

As you would expect on a professional cutter brand, with a Kongsberg you can obtain milling mats to protect the conveyor belt material. Of course a milling mat will also protect the main flatbed table surface below the conveyor belt as well.

29. Are their edge guards at each side (end) of the table? At left, or at right, or both?
No, there are no edge guards at the sides.

30. Was this table made originally as a cutting table, or is it retrofitted from some other purpose? If retrofitted, what was the original brand or model?
The table was originally made for being a cutting table.
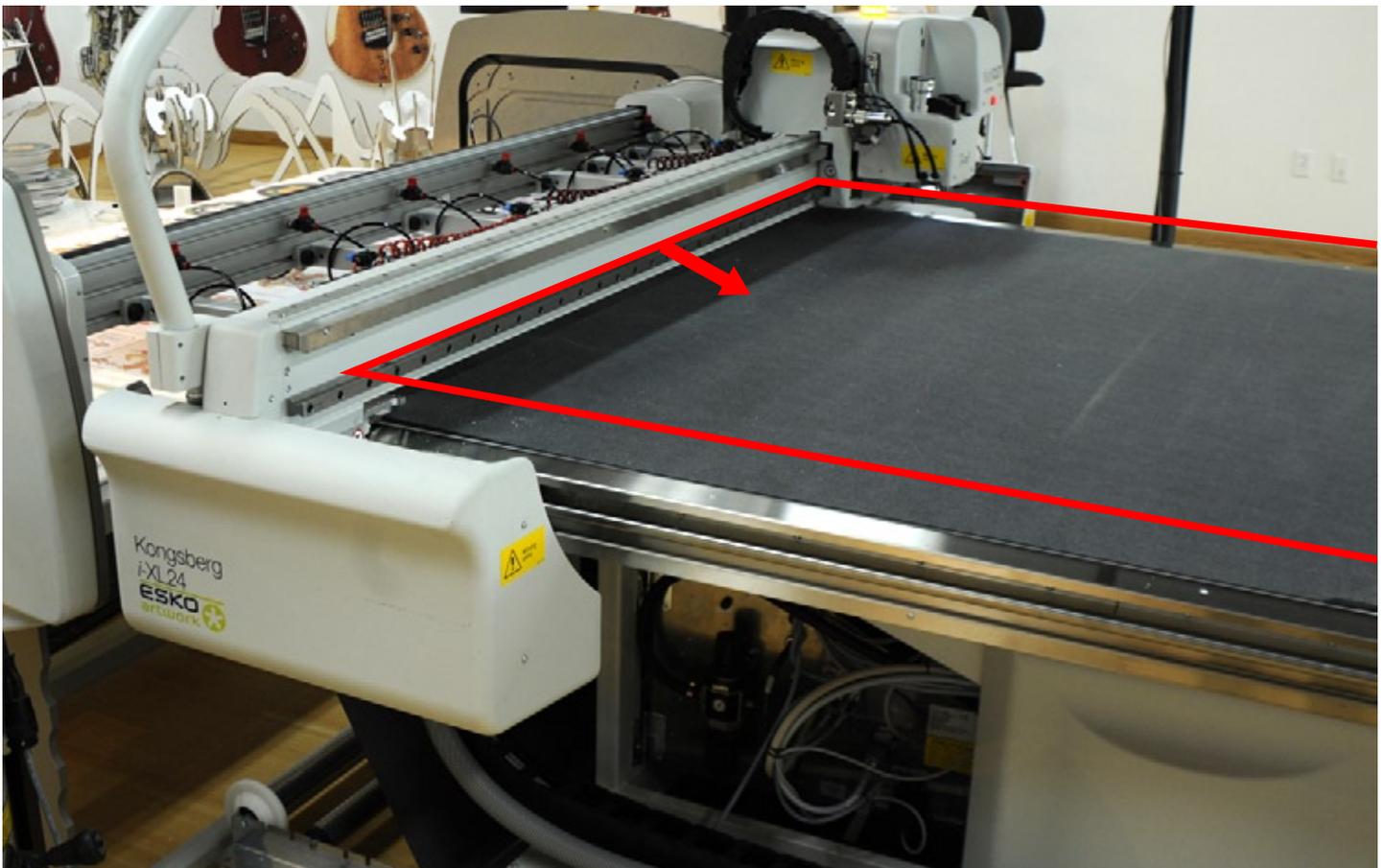
The table is usually covered with so many mats that you can't see the original surface of the table.
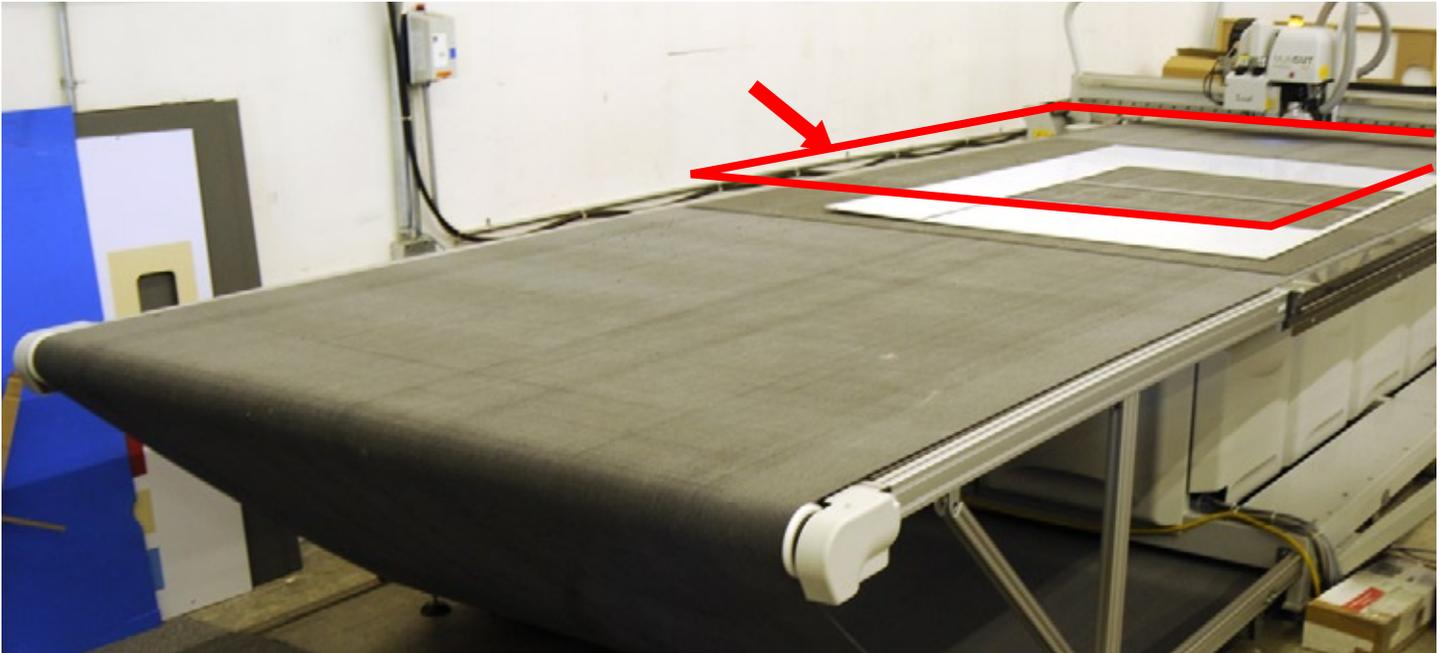
Kongsberg offers milling mats to protect the conveyor belt material.

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

31. Describe the transport belt? What material? What manufacturer?
The belt on the model at DSW in Illinois was the typical lightweight somewhat flexible material that is typical for this type of transport system.

32. Can the belt move forwards and backwards, or only forwards?
The conveyor belt can move only forward.

33. How many rollers control the belt: is the path of the belt horizontal, or triangular?
You can check this yourself to some degree by looking at the edges of the transport belt from either side. What you want to see is whether the belt edge has remained straight, or whether it has shifted from stress and strain.

Beware of any cheap brand or model where the belt is so low-bid , hence so unstable that they "wander."

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

Several other UV printers have an infamous record of belts that may be so unstable that they "wander."

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

35. How often does the main flatbed transport belt need to be replaced? At whose expense? What is the cost of a re-placement belt?
Approximately every 18 months, depending on usage and treatment.

The trasport belt is made of lightweight material, that is typical for this type of transportation system.

LINING UP FLAT MATERIAL (to help it feed straight)

36. How is rigid media fed?
If you have a dedicated flatbed model (with no transport belt and no feeder) you simply place the board on with your hands.

37. Is a feeder-stacker option available?
Yes, feeder-stacker option is available on some Kongsberg models.

38. What kinds of raised guide bars (alignment bars) along the side of the table exist? Left or right? How long?
On a cutter with a vision system you do not need to align the board; the vision system can figure out the precise position and can cut perfectly even if the board's position is not parallel to the sides of the table.

39. Is there a registration gate that is lowered across the back printing area?
Most printshops report that most rigid media is crudely cut at the factory and rarely are the edges really at 90° to each other. So you don't really want to align a corner, you want to align one side (on one end).

40. Can you be feeding or aligning new material at one end of the cutter while the previous job is still being moved out the other side?
Yes, some models have feeding and also take-up systems.

41. Do you have to hand measure the media height, to enter it manually into the software?
The Kongsberg can measure where the top of the surface of the material is, automatically. The operator does not have to waste his or her time with such a task.

42. Do you have to measure the media size (width and length) manually and then enter it yourself into the software?
The media is autimatically measured by the software.

Kongsberg take-up feeding media system.

FLATBED ASPECTS (for dedicated flatbeds)

43. Does the table move? Or only the gantry above it?
The table itself is always fixed in one position. If there is a conveyor belt running over the top, that can move. Each model offers one option, or the other. But in all cases the gantry can move in X and Y axis.

44. How much weight can the table hold?
The table can hold almost 1,600 pounds but is not recommended put so many weight

45. Is pin registration present? How many pins? What is their position(s)?
Not normally ever used on a cutter as you have auto edge detection with the *i*-cut camera or the work habit is to use a lay-edge or lay guides similar to Screenprint and on rigid UV printers.

Pin registration means different things for different kinds of machinery. Page 35 of the instruction manual lists positioning pins to assist registration of a material. Once the vacuum is turned on, you need to remove the positioning pins before you start cutting.

46. If no pin registration system is present, what kind of other registration system is available?
You can use the ARS (Automatic Registration System):

- Manual reading of 2 registration marks by use of laser pointer (standard).
- Manual reading of 2 registration marks by use of camera as pointing device (option).
- Automatic reading of up to 4 registration marks. Linear transformation (option).

The table is always fixed in one position, the gantry can move in X and Y position.

ROLL-FED

47. How is media held flat? Vacuum table? Pinch rollers?
The material is held in position by a vacuum aspect of the table.

48. How is the roll held at the feeding position? On a spindle? On a saddle?
Some table models can accept roll-fed material still on the roll; other models are strictly flatbed (you can of course put roll-fed material on top of the table by hand).

On most Kongsberg printers the roll is simply placed informally at one end and then it can be fed on a conveyor belt or pulled by hand when needed.

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

49. Describe the overall path of the media through the system?
On a dedicated flatbed there is no path: you place the board wherever it is more comfortable and the *i*-cut vision system finds it.

On a flatbed with conveyor belt the conveyor belt can move your material.

There are also loading and unloading systems: so the overall path of the material through the system depends on which size and model you have.

MAIN TABLE

50. Is this table size adequate?
There is no need to build a larger flatbed cutter for what is produced by the larger flatbed UV printers because 5x10' is about the largest printer available (2x3 meters is today's limit). Luscher attempted to create a larger UV printer and it was not successful. The double-sized Oce Arizona 350 XT is not really to print the entire table size, but rather to print on only half while the other half is used for loading another 4x8 board.

51. Do you need to provide an additional table at the front or back?
In most cases it should not be necessary for a print shop to jerry-rig an extra table at the front or back, since once a job is finished the cut pieces are much smaller than the original board. And cut pieces tend to be moved elsewhere in the printshop.

It should not be necessary for a print shop to add extra table at the front or back, since the final job is smaller than the original board.

STRUCTURE: Miscellaneous

52. Does the cutter have levels built into the structure of the cutter?
Levels are not common.

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

53. Does the cutter have leveling supports? How many, and how strong?
There are six leveling supports on the XP cutter that I inspected at VISCOM Paris 2009.

54. Does the cutter have wheels? How many, and how strong?
The cutter has 3 very strong wheels each side.

55. Are the leveling supports part of the wheel, or are the wheels and leveling supports separate?
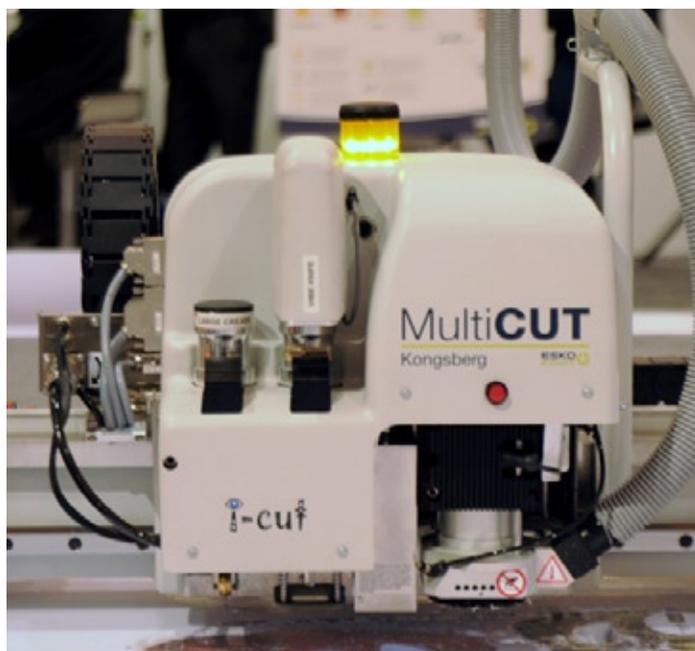The leveling supports are separate from the wheels.

56. Do the wheels have a lock on them?
For any cutter weighing over one ton it is assumed that no locks or brakes are needed on the wheels because a tank will not roll anywhere if parked on a level floor.

There are six leveling supports on the XP cutter that I inspected at VISCOM Paris 2009.

UPGRADES, Future Improvements?

One of the features that have been changed since the cutter first appeared is the i-cut registration system.

57. What features have been added, or changed since the cutter first appeared?
- Registration avility (*i*-cut system)
- Cutting speed

58. What features are being added, or changed, further out in time?
As hundreds more UV-curable flatbed printers are installed around the world, new kinds of thick, flat, or rigid material are being printed on. So new tools, or variations on traditional tools, are being designed. Kongsberg is such a company; their engineers are not obsolete. So you can expect European innovation and quality engineering.

Miscellaneous

59. What moves:
- **conveyor belt over the flatbed area**
- **the gantry**
- **and when desired the material (fed by transport belt)**

"what moves" and how it moves is determined by whether you have a stationary table model (with no conveyor belt) or a version with a conveyor (transport) belt. But in all cases the gantry can move the cutting tool in both the X, Y, and Z axis.

Kongsberg XL24 stationary table with no conveyor belt, at Miami GoA 2008.

Kongsberg XL24 stationary table with transport belt, at GDS printshop, site visit 2009.

OPERATING THE CUTTER

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

The operational area has a keyboard, a regular computer monitor (about 15 or 16"), and a control pad area with a usual set of buttons to make various selections. But there are no old-fashioned metal knobs or other antiquated controls from the last century.

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

You get a real computer monitor about 15 or 16 inches.

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

The LCD monitor is fixed to the table but the entire table can be swiveled to any position that the operator prefers.

63. Where does the computer keyboard sit?

The computer keyboard is on top of the operator's table area. The keyboard can be moved anywhere on the table.

64. Is there a drawer under where the computer keyboard is (a drawer for storing odds and ends)?

No drawer.

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

The work space provided by Kongsberg is indeed large enough so the operator can put a few small tools, cell phone, coffee mug or bottle of water, etc.

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

66. Where does the operator stand or sit?

The operator stands in front of the LCD computer monitor that is on the table affixed to the right corner near the front of the machine.

67. What aspects of the cutter can you operate from behind (the loading area)?

There are no controls along either of the long sides of the machine nor at the end.

68. Is a foot pedal included (for operating aspects of the cutter)?

I did not see any foot pedal.

69. How many operators or operator assistants does this cutter require?
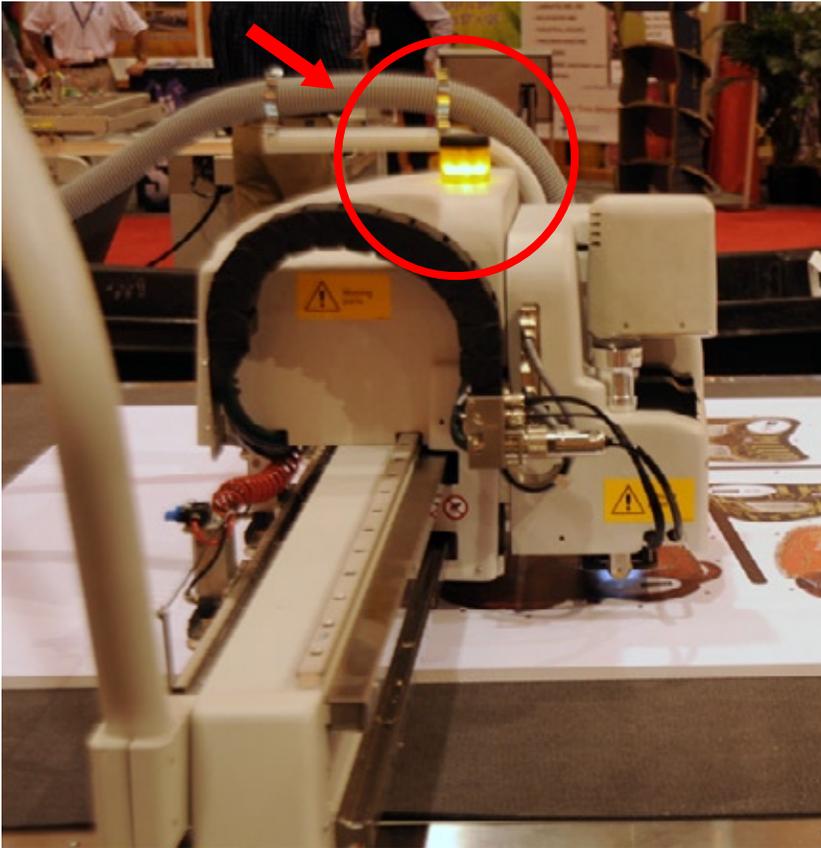
You only need one operator unless you are loading a really large thick MDF board, which may require two people to pick up and move onto the table.

The operational area has a keyboard, a regular computer monitor (about 15 or 16"), and a control pad area with a usual set of buttons to make various selections.

The operator stands in front of the LCD computer monitor that is on the table affixed to the right corner near the front of the machine.

There is a small light sticking up from the carriage that covers the took area. But it is not a pole, only one light (yellow when the cutter is turned on).

70. What can you control, as operator?
- Start button/ Stop button
- Vacuun on/off
- Initialize the system
- Servo on/off
- Move the tool head in the desired direction
- Incremental jog
- Tool down
- The air pressure
- The camera

71. Is there a pole with beacon lights?
There is a small light sticking up from the carriage that covers the took area. But it is not a pole, only one light (yellow when the cutter is turned on).

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

CONSTRUCTION (BUILD QUALITY)

72. When designed, what is the life-span that each part is tested for?
For many manufacturers, parts life-span is a new concept, especially when the cost of the printer needs to be kept down. But if the EU requires a guaranteed parts life-span, this will impact Chinese printer manufacturers in particular.

73. What is the solid-ness of the construction of the outer body? Is it plastic? Metal? Heavy gauge?
This cutter is designed and made in Europe so the construction is what you expect: solid.

74. Is there a hood?
There is a hood over the carriage but not over the overall gantry area.

75. How would you describe the overall workmanship of visible parts? Clean (Swiss made), or flimsy and uneven (several Chinese-made printers)?
This is not a flimsy machine.

There is a hood over the carriage but not over the overall gantry area.

76. Does the cutter wobble back and forth when cutting?
The cutter is not cheap so it does not shake or wobble when working.
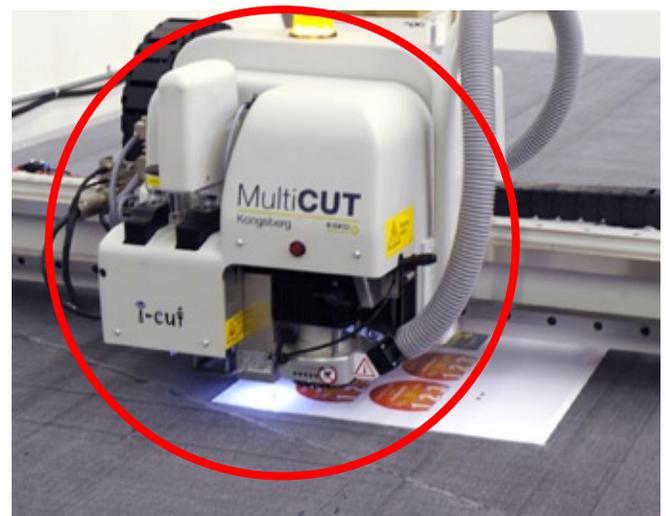
This cutter is designed and made in Europe so the construction is what you expect: solid.

AESTHETICS

77. How would you describe the design of the cutter?

The design is functional. This is a professional machine for accomplishing work; it is not intended to be chic.

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

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

We call the front the area where the LCD and operator panel(s) are situated.

Kongsberg iXL24 at FESPA 2007.

SET-UP OF THE PRINTER: PRACTICAL CONSIDERATIONS

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

All cutters need room ventilation (to remove particles from the air); particles are bad if they land on printable material elsewhere in the printshop.

80. Are there any special temperature or humidity requirements or preferences of this cutting system?

The User Manual is very clear:
Never run a spindle when ambient temperature is below 10 °C, 50 °F.

Continuous operation at temperatures above 30 °C, 86 °F is not recommended!

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

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

82. What about dust and cleanliness of the air?

Dust in the printing environment is an aspect that is often neglected. It is crucial that if a sign shop, that no sanding, sawing, routing, drilling, sandblasting, or grinding operations be nearby. The dust and debris from sawing and comparable operations are extremely unhealthy for a UV inkjet printer.

Printhead manufacturers, especially of Toshiba Tec heads, say that dust from flatbed cutters causes failure in these Toshiba Tec heads (Oce Arizona 25 owners had better select a cutter that does not spew chips and particles all over the printshop).

In other words, you need to ventilate away more than ozone and ink odors; you need to ventilate away everything else that is already in the printshop environment.

During VISCOM Paris '09 I went to the booth of each router and digital cutter manufacturer. The dust and detritus of one French CNC router was totally unacceptable: there were chips all over the floor: looked like a recent snowfall. Another CNC router had a vacuum cleaner suction hose that looked like it was made not only in China, but from the absolute cheapest low-bid Chinese supplier.

Frankly the Zünd (in the Oce booth) did not impress me as a model of cleanliness. I would rate the Kongsberg as the least dust, least detritus of all the machines at the show.

As a footnote I would add that the mess which is generated depends considerably on what took is used and what material is being cut.

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

The air pressure is needed for the vacuum table, the valves and the tooling.

The cutter has a suction hose with a vacuum cleaner to reduces the dust and detritus of the material that is being cut.

84. What is the size and weight of the cutter?

Model	Width (length)	Height	Total Weight
i-XL20	2.25 m.	1.98 m.	405 Kg.
i-XL24	2.25 m.	3.72 m.	580 Kg.
i-XL42	2.78 m.	1.99 m.	440 Kg.
i-XL44	2.78 m.	3.73 m.	7.65 Kg.

INSTALLATION OF THE CUTTER: INSTRUCTIONS & MANUALS

85. What is the rating of usefulness of the User's Manual and other associated materials?
The User Manual is 177 pages long.

86. What is the native language of these guides? Is the translation acceptable?
It would be logical for the instruction manuals made in Norway to be translated from Norwegian. But the manual is either well translated, or prepared by a native English speaker (or both). The only idiomatic words I can find so far are things such as "transverse" for the front of the gantry. And "hard board production," (page 31) which I assume means "milling hard dense fiberboard material."

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

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

Too many manuals for Japanese products are based too literally on the original Japanese text. These translations into English are stilted and not similar to standard English words. They have the comparable issues in their product spec sheets. Most manuals of Chinese products vary from totally inadequate to almost unusable.

87. What kind of cut-away drawings or other drawings exist that show the various parts of the cutter?
The best exploded views of any product in the world are those by Canon camera.

88. How hard, or easy, are the manuals to obtain BEFORE you buy the cutter?
Some cutter manufacturers hide their manuals because they don't want anyone to see them. Yet MacDermid ColorSpan offered their printer manuals openly on-line (on their web site). So the policy varies by manufacturer. We do a full report only on those cutters where the manual is available to us.

TRAINING

89. How many of your staff should be trained?

When the cutter is installed it is recommended that a graphic design person be present to receive training (in addition to the printer/cutter operator(s) and a plant manager).

There are several kinds of graphic design software that can prepare cut-out lines, such as Adobe Photoshop. But the recommended software is Adobe Illustrator.

90. Is training necessary?

Yes, training is essential for any cutter, whether an entry-level machine or high-end. Lack of training, incomplete training, and lack/or of experience are a factor in about a third of the problems that people have with cutters. Another third is often inadequate cleaning and maintenance of the ink and printhead system. The other third cause of problems would naturally be weak parts (that wear out before they should), wear-and-tear (happens even to the strongest parts made in Switzerland), and features that need improvement, etc).

91. Where is training location? On-site, or in demo room?

Several manufacturers prefer that training be away from the print-shop (because too many things can cause disruption if you are still in your own building). So increasingly, when you purchase a large high-end level of equipment, the manufacturer will recommend that training be in their main demo room.

92. Is classroom training available?

No, classroom training is not common.

93. Is factory training available?

No, factory training is rare, though some companies do welcome factory visits, and a few companies do indeed offer training at the factory.
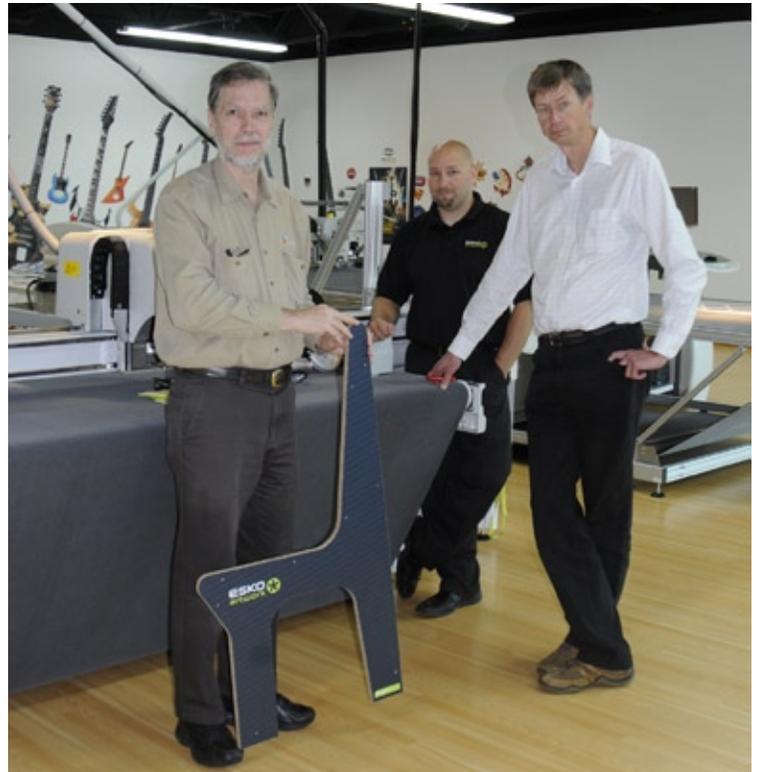
94. What on-line training is available?

Not many cutter manufacturers offer on-line training.

Nicholas, Marc Rannow, Applications Specialist and Reidar Evju, Product Coordinator, Sign/Short-run Graphics, EskoArtwork.

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

If a cutter is mature (and out of beta stage) you can achieve full productivity within a few days or week. The longest time before a cutter is really productive is when a cutter is still in beta stage when you buy it. It takes a while for the firmware and hardware to be improved and updated.

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

TECH SUPPORT & WARRANTY

96. What is the original warranty period?

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

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

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

So far I have met the Kongsberg distributors or dealers in South Africa and Ukraine. Both these companies are pleasant and helpful.

CLEANING & MAINTENANCE NEEDS

98. Is there a vacuum suck cleaning system, like a traditional vacuum cleaner?

The cutter has a suction hose with a vacuum cleaner to reduces the risk of being hit by small work pieces or by a breaking router bit. This should keep clean and do not leave the machine running if is full because might cause damage to the machine.

Nilfisk vacuum for Esko Kongsberg i-XL 24, Esko Artwork booth at SGIA 2009.

MAINTENANCE

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

Maintenance is limited to the inspection and cleaning of the table surface, guideway, rollers, racks, pressure reduction valve, base and the surrounding area; The table surface should be kept clean at all times. For cleaning, use iso-propyl alcohol, use a vacuum cleaner to keep the inside of the conveyor belt clean.

100. What weekly maintenance is required?

The guide-ways and the bearings should be thoroughly cleaned and oiled very lightly with Tellus R10 oil.

Clean the surface of the transmitter and receiver carefully using light soap and clean water.

The automatic draining action of the air pressure reduction valve should be controlled:

Switch off the air compressor and allow the air pressure to fall. Switch on the air compressor and check that any water in the glass bowl of the pressure reduction valve drains out automatically during the first few seconds of operation. Remove and clean the bowl if the automatic draining action does not operate or if it appears to be an excessive amount of dust in the bowl.

101. What monthly maintenance is required?
The racks should be brushed clean, and re-greased lightly with Aeroshell no. 7 grease.

Every other month, or after the table surface has been cleaned, the closed vacuum holes in the surface should be opened in order to retain the hold-down efficiency. Use a steel pin, 0.5 - 0.6 mm, and with the vacuum system switched on, free the vacuum holes by pushing the obstructions down into the table.

102. How do you clean the transport belt?
For cleaning, use iso-propyl alcohol, use a vacuum cleaner to keep the inside of the conveyor belt clean.

103. How often do you need to clean the transport belt?
The surface should be kept clean at all times.

104. How should a cutter be prepared for sitting unused for a long time?
The User Manual indicates that for more than 4 weeks storage of a spindle or a HSMU requires:
- Turn the spindle by hand about 20 turn every 4 weeks.
- Spindle must be stored horizontally

Maintenance is limited to the inspection and cleaning of the table surface, guideway, rollers, racks, pressure reduction valve, base and the surrounding area; The table surface should be kept clean at all times. For cleaning, use iso-propyl alcohol, use a vacuum cleaner to keep the inside of the conveyor belt clean.

SAFETY & HEALTH CONCERNS

105. How is safety treated in the printed literature?

The manual starts off with safety, as is appropriate. What I immediately liked about the safety section was on the noise level, saying clearly that hearing protection should be worn. I compliment Kongsberg on being realistic (noise is an attribute of other brands as well).

The second appropriately blunt warning is for "ejection of parts." This also is a natural result of anything that is cutting or routing at high speeds. Other brands would have the same need for a warning.

Further into the manual, there are more safety warnings, such as for "hard board production" Section 4.9, page 31.

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

106. Who sets safety parameters, the machine or the operator?

Both operator and cutter designate the safty parameters, the user guide indicate some safety devices:
   • Ensuring that no unauthorized persons come close to the system.
   •
   • Yellow / black tape: the yellow / black tape indicates the warning area. This area is restricted to operators and other trained personnel.
   •
   • Warning lamp on the top of Y carriage: if the light is OFF indicate that the servo is off, if the lamp is ON indicates that servo power is on, safety system is enabled, table is in operation, and if is blinking indicates that the safety system is activated.
   •
   • Dynaguard safety sistem: the photocell safety system are two light beams in front of the traverse and two behind. In addition, there is a stop mechanism mounted on each end of the traverse. Machine movement will stop and servo power will be switched off if: one of the light beams is broken or for instance when a person is standing too near the table.

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

The red emergency stop button stands up from the right side of the operator work table (at the right front of the cutter).

At the Kongsberg XL Series you will find the emergency stop buttons up from the right side of the operator.

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

The machine gantry stops if it hits you. I asked by there were no yellow diagonal warning tape on the portion of the gantry that sticks out. So the operator had the gantry hit him, and the gantry stopped immediately. This was on the XL. The XP has a higher acceleration.

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

There is a stop mechanism mounted on each end of the traverse, the machine movement will stop and servo power will be switched off when a person is standing too near the table.

110. What keeps dust from leaving from cutting area?

The milling tools have a skirt completely encircling the tool area. It is very effective at not letting dust and chips fly out.

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

The exhaust system built into the milling (routing) portion of the overall system is excellent and is better than that of most other cutters.

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

Normally the vacuum pump is the nosiest part of any flatbed or cutter. But on some models of cutter the acceleration of the gantry is the nosiest aspect. On the XL model at VISCOM Paris '09, I did not hear any objectionable noise from any function of the machine (keeping in mind at a trade show there was plenty of noise from other booths). The other booths with other products were producing consistently more noise than the Kongsberg.

At VISCOM Paris '09 the noise of the i-XL24 was not objectionable. Actually most other machines nearby at the same trade show were making more noise than the Kongsberg cutter.

113. What is the noise level of the acceleration of the gantry?

The acceleration of the XL gantry along its X-axis is not a piercing sound.
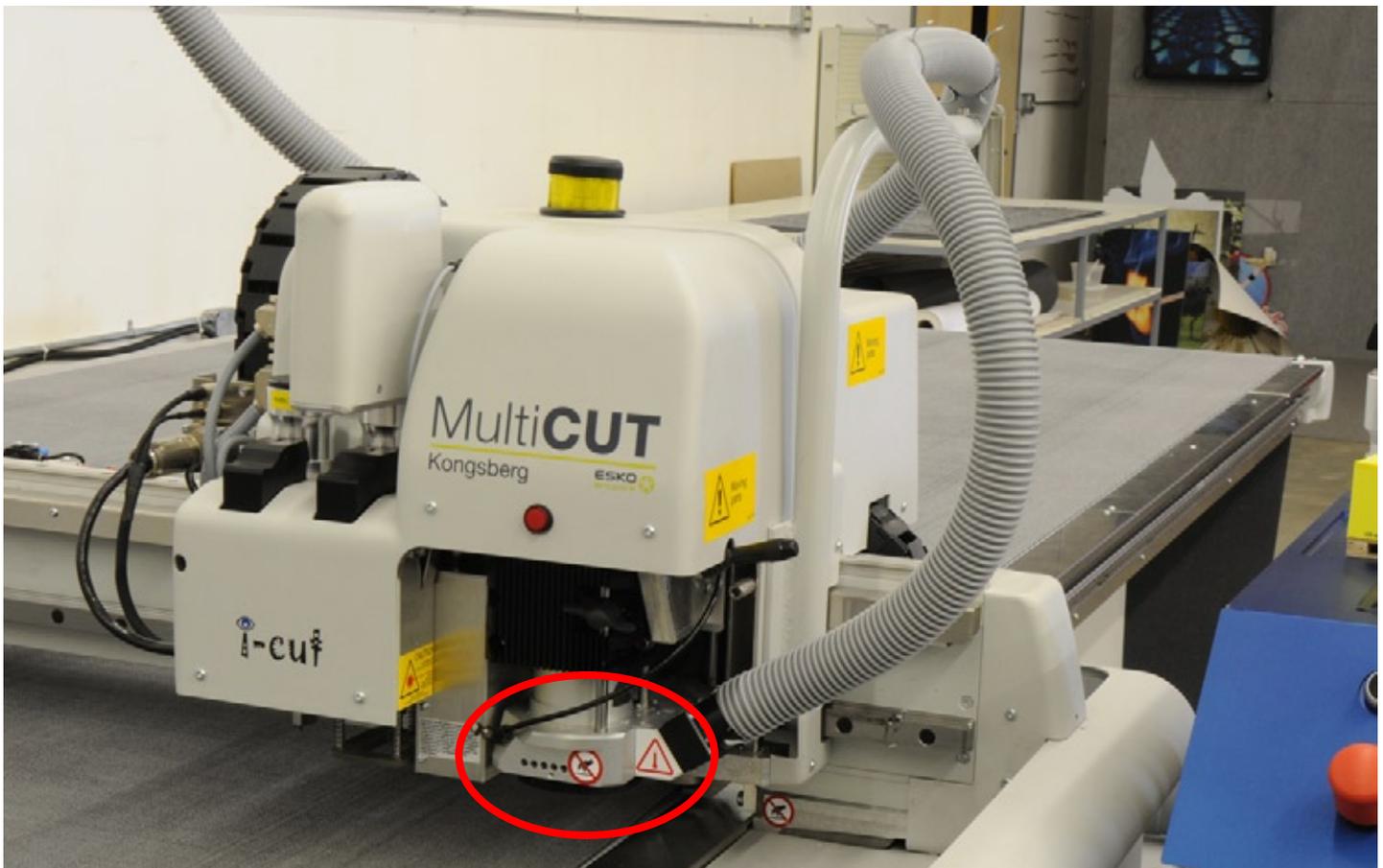
The milling tools have a skirt completely encircling the tool area. It is very effective at not letting dust and chips fly out, also the user manual recomend that all personnel working near the machine should use eye protection.

114. What moving parts might hit a person if they are standing near the cutter?

In most instances if the moving gantry were to hit something or someone, the gantry would stop. I have seen this tested and it worked but obviously I can't predict every single velocity and every single angle (if a person were kneeling on the floor his head would be on the receiving end).

I would tend to suggest that diagonal yellow-banded warning tape or design be on any leading edge (Grapo flatbed printers have this kind of warning). And/or put such warning tape down on the floor to show an area in which the gantry could reach a person in that area.

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

The user manual suggest:

• Wear close-fitting clothes to avoid being caught by the beam or the tool head which can cause injuries.

• Wear gloves to protect against cuts from materials with sharp edges.

• Use eye protection.

• Use hearing protection when working with the machine for a longer period of time.

116. Is the Operator Manual so poorly translated that you might make a mistake; a mistake that could be damaging to your health, or otherwise dangerous for your printshop?

The User Manual is in better English than most manuals from equipment from Japan and significantly better than manuals from China.

117. How are the cut fragments shielded from hitting the operator? Does operator have to wear safety glasses?

The user manual recomend that all personnel working near the machine should use eye protection.

Here you can see the moving parts of one model of Esko Kongsber XL Series.

VISION TECHNOLOGY

### 118. Which brand vision technology is used?

Esko bought *i*-cut so they own their own vision technology.

119. Is the actual origin of the vision technology identified in the spec sheet brochure by brand or also by model, or not at all?

Yes, you quickly learn that *i*-cut is part of the Esko Artwork family of products.

120. How many cutters are sold with the vision system as compared with cutters sold with no vision system?

In the Sign & Display industry more than 75% of tables are supplied with *i*-cut and less than 25% without. Naturally the percent of people who order *i*-cut vision system is increasing (you can also obtain the *i*-cut vision system on some other brands of flatbed cutters).
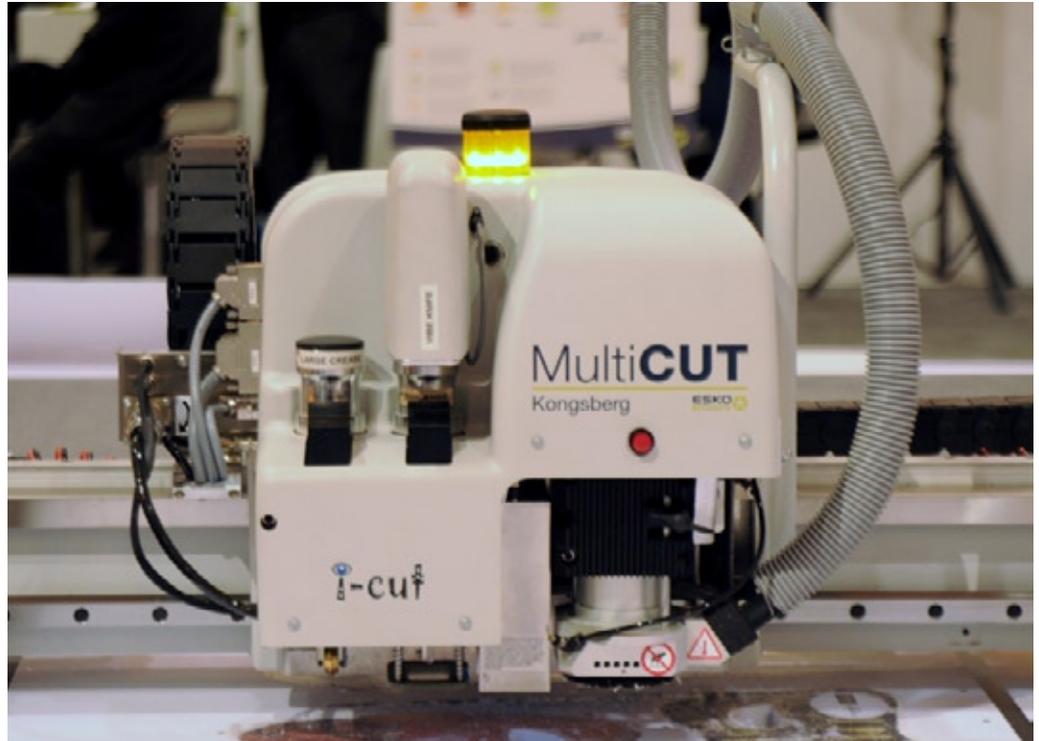
Esko Kongsberg iXL series count with their own i-Cut vision technology as you notice on the picture.

Features

121. How many passes can this cutter achieve?

The cutter has two or three passes quality.

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

Using the machine with two or three passes makes each pass goingo a step deeper of the media. The number of passes depends on material type, thickness and bit diameter.

Bi-DIRECTIONAL VS Uni-DIRECTIONAL

123. What are the different results in speed; in quality?

To obtain best quality when cutting details, as small circles, they recommend reduce the cutting speed.

TOOL Positioning

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

When producing the tool heads are lowered and raised automatically (motorized). In manual mode you can raise and lower heads by a button at the control panel.

125. Is there a row of tools parked somewhere in a position that the gantry and tool carriage can access them and change tools automatically or at least semi-automatically?

The new router-cutter of MultiCam has this feature across the end of the machine.

MOTORS FOR GANTRY: Stepper, Linear, Magnetic ?

126. Describe the motor and the system that moves the gantry? Is the motor for the carriage a brushless linear servo motor or a stepper motor?

The Kongsberg XL cutter series uses appropriate brushless servo motors.

The only major UV printer brand that still uses an antiquated stepper motor is the Mimaki JF-flatbeds. A stepper motor moves the carriage (or other part of the printer), in steps of set distance. Downside is that they are not as accurate since they don't provide feedback that can be monitored and allow correction on the fly. The crucial advantage of a servo motor (usually an AC servo motor) is that it provides feedback and can correct its position-ing. But since a servo motor is significantly more expensive, it is missing from many UV-curable printers.

The Kongsberg XL cutter series uses appropriate brushless servo motors. The advantage of using a servo motor is that it provides feedback and can correct its positioning.

SUBSTRATES

127. What sizes of material can be cut?

Model	
i-XL20	1.75 m. x 1.62 m.
i-XL24	1.75 m. x 3.42 m.
i-XL42	2.28 m. x 1.62 m.
i-XL44	2.28 m. x 3.42 m.

128. What is the difference between media width and actual cut width?

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

129. Can you adjust carriage speed?

In the control panel main menu it´s a option in which you can adjust the speed setup.

SUBSTRATES, Materials, Applications, and Issues

130. Can you measure the height of the material with a sensor, or is it manual?
Yes, there is a measuring foot which is lowered to the material surface before the job is started in order to measure the material thickness.

131. If you have to load a really long roll, are their clamps or any other system to allow you to secure the first portion so the first portion won't undo itself while you are several meters away trying to load the other end?
The Durst Rho 351R has clamps so if only one person is available to load a long roll, he can clamp down the first portions that he feeds up and over into the platen area while he is still working on the other end of the roll to get that up and into the roll-feeding system.

SUBSTRATES, Materials, Applications, and Issues

132. What materials can this cutter cut perfectly?
At VISCOM Paris '09 I watched the Kongsberg XL cut Re-Board very nicely (there are about five different brands of this kind of recyclable material).

133. What materials can this cutter cut only okay?
It helps if the material is a clean, homogeneous surface, and should all be the same thickness

Dave Nevell Esko Kongsberg operator, kindly help us cutting the FLAAR samples.

FLAAR Maya sculpure cutting sample printed on dibond by Grapo in the Manta UV printer and then cut by Esko Artwork, SGIA 2009.

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

Heat can build up in a cutter from several causes. The MultiCUT head of Kongsberg offers an air-cooling system for the milling bit. Instead of sucking heat up and out, it blows directly on the bit.

One way to dissipate heat is to have good ventilation drawing the hot air up and out of the carriage area. The vacuum tube is intended to pull up dust and debris but it can also suck out the odor as well as to remove some of the heat too.

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

You do need to be aware of how to prevent static electricity build up:
- No carpets or rugs on the floor. Indeed you should consider anti-static tiles or carpet.
- Use a humidifier during winter months to avoid dryness
- Learn which media are susceptible to gathering a static charge.
- Consider a printer that has specific anti-static features:
  - ◊ Grounding
  - ◊ Static bar(s).

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

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

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

Here are some sticker application samples. This cutters can be a fast solution for short runs on packing markets.
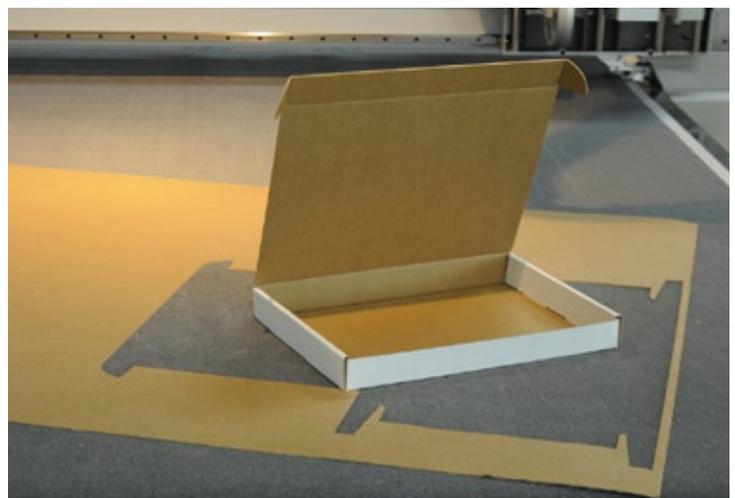
Above you can appreciate some kongsberg XL Series applications 2009.

TOOL replacement Cost

137. Where is dust and detritus collected? In a tray? In a bottle?
This are collected by a suction hose and a vacuum cleaner.

138. How often does the waste container need to be emptied?
This should keep clean and do not leave the machine running if is full, because might cause damage to the machine.

kongsberg XL has a suction hose and a vacuum cleaner to collect the dust and detritus.

The waste container should keep clean and do not leave the machine running if is full, because might cause damage to the machine.

Supply System, Tubing, Filters, etc

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

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

The energy chain is the plastic linked system that holds all the cables and ink tubing so that it does not get rubbed while being moved back and forth to feed the carriage.

ODOR caused by cutting of the material

140. How much odor is emitted by cutting or routing?
Odor will vary greatly depending on what material is being worked, which tool is being used, and at what speeds. For normal signage materials I could not detect any smell (when cutting Forex). I have a very sensitive nose.

PRODUCTIVITY & ROI (Return on Investment)

141. Can you sell the output at the machine's fastest output speed or is the quality at that speed not acceptable to most client standards?
90% of the different brands of printers can unlikely produce usable output at their fastest claimed speed. So I call these speeds "junk mode." It is false advertising in probably half the spec sheets. As we move further along in our inspections of flatbed cutters, we will check to see whether advertised speed specs are idealistic or realistic.

ADVERTISING CLAIMS

142. Do certain parts of the cutter need to be repaired or accessed so often that you have to remove safety plates or protective plates to make access easier?
This would be mainly with Chinese-made cutters.

143. How often do people return this cutter and say they want their money back?
This is mainly with Chinese-made cutters. But, any time you are seriously thinking of any cutter it is essential to learn what the recall or return rate is. In other words: how many printshops return this cutter because it is either not what they expected or not what they need.

This does not automatically mean that the cutter is bad; it may mean that the printshop had an unrealistic expectation. Sometimes the printshop did not anticipate how much maintenance and care the cutter needed in the evening and in the morning.

It is likely that every single brand out there has cutters they have had to take back. But you ought to learn how many, and why.

If the manufacturer, distributor or reseller is honest and gives you the actual facts, this is a company to trust.

If they say there have been no returns, this is statistically unlikely (but not impossible).

GENERAL CONSIDERATIONS

144. How many cutters of this model are in use; in the USA; in the rest of the world?
It is helpful for a printshop owner, who is making their short list of which cutters to consider buying, to know how many cutters of each brand have been sold. Obviously cheaper brands may sell more units than a top-of-the-line cutter such as Kongsberg.

145. What will the resale value of your cutter be in three to five years?
Elite brand names tend to have a better resale value than cheaper brands and models, since a cutter that is well made to begin with tends to hold up.

COMPARISONS WITH OTHER CUTTERS

146. What features on the other cutters may be issues?
I would ask serious questions of any cutter that claimed to be a digital cutter if I saw a whole row of giant mechanical levers across the front of the machine. Such mechanical controls are what I noticed when inspecting the Anderson (DPC) UV flatbed printer from Taiwan. This manufacturer made CNC routers for past decades.

But other UV printers don't have such antiquated mechanical handle-like controls. They are an anachronism (even if functional, they don't look very chic). They look a bit 19th century (and I mean the 1800's…., not even the 1950's).

• Other cutters may not be as versatile.
• Other cutters may not be as heavy duty construction and material.
• Other cutters may not be as experienced with cutting thick and heavy material (if their background is cutting textiles or leather).

The one Zünd cutter at VISCOM Paris had debris (dust and pieces of cut material) all over the table and also had frizzles around most of the edge of the main board. Plus the mat was covered with detritus. This reminds me of a printshop south of Ljubljana (Slovenia). They had a cutter in a separate room and an Oce Arizona or equivalent Fuji in the adjacent room. The cutter had to be placed in the separate room to keep dust away from the UV-curing flatbed. It would be interesting to see whether the cutter there was a Zünd or a Kongsberg. Turns out it was a Zünd.

147. What aspects of the selected cutter help decide in its favor?
End-users who ask other printshops that already have a Kongsberg tend to be influenced by user satisfaction.

CONCLUSIONS:

148. Are you satisfied with this cutter to the point that you would recommend it to someone else?
I would not waste my time spending days inspecting this cutter and weeks preparing this report if I did not find that this cutter had merit.

149. Are your customers satisfied with the print results from this cutter to the point that they recommend you by word of mouth to other potential clients?
At VISCOM Paris a print shop manager came up to say hello (seeing the FLAAR logo on my shirt) and since I was standing next to a Kongsberg cutter, I asked if he knew the brand. He said "people we talked to said the Kongsberg was the one to get."

I would add my experience when talking to printshop owners. When I asked (over the past five years) which was the ultimate cutter to acquire, experienced printshop owners tended to say Kongsberg. But at the mainstream level, there is more brand recognition for Zünd as a brand. In other words, Kongsberg is respected for being the best flatbed cutter par excellence but since if you did a survey and asked for a synonym of the word digital XY flatbed cutter, the name Zünd comes up (like Kleenex is synonymous for tissue paper).

150. If so, why would you recommend that others buy this same cutter?
This present stage evaluation is precisely what evaluation means: we look at, inspect, and write about what we find. The recommendation per se comes when we have undertaken additional site-visit case studies (which are being planned). But since an evaluation is a long-term process (there are good reasons why no one else takes the time to do a serious evaluation), we wanted to get this first version out by the time of SGIA.

There are four stages to a FLAAR evaluation:
• "first look" at major international trade shows (accomplished over the past three years, all around the world).
• demo room testing (initiated at MGE headquarters, Lake Geneva, northeast of Chicago)
• factory visit (will be a next stage)
• and site-visit case study in a printshop (two inspections of an XL Kongsberg cutter at DGS, in Illinois, in June and again in September; two more site-visits are being planned for the near future).

Pros

So far, this is literally the cleanest XY router system I have seen. In other words, there is less splatter, dust, and chips than most other brands. Naturally this depends on what material you are trying to cut, and which tool you are using. The vacuum cleaner seems to work best over the router (milling) tool.

Has sheet loader that can load a single sheet up to 100 lbs (about 45 kilos).

The machine is so reliable that it can be left to cut on its own while the operator is away doing other things elsewhere.

A fully equipped Kongsberg system can do contour nesting. The ability to do contour nesting action BEFORE you print the work will save you thousands of dollars in material costs. If your RIP software can't do contour nesting, then you will waste miles (or kilometers) of material over time (literally).

Cons

Price; there is a saying, quality has its price. A second saying is, "you get what you pay for."

But, this is a serious cutter from a serious (European) company. If you are at the high-end (or wish to get to that point), then Kongsberg is certainly a brand to look at.

Potential issues (not serious enough to be a fully negative point)

If you will constantly do roll-fed materials you need the conveyor belt. This can pull material from a roll, but does not (yet) have a dedicated take-up reel at the other end. It can, however, off-load the roll-cut material by simply having the conveyor belt deposit them at the end (onto a table that you can easily place to receive them). Just ask for the CD, "Automated digital finishing systems for signs and displays: The Kongsberg i-XL-Series" and you will see in the video how you can handle roll-fed material at both input and out the other end.

If I were in charge of design and functionality, what would FLAAR add?

If you go to a trade show that has a dozen brands of CNC routers and digital cutter-routers, you see every imaginable kind of design. Aristo are more chic in design. Some American and some French brands look like they were designed 45 years ago and have not yet entered the 21st century. I would definitely make a few design (style) improvements.

The series needs more accommodations for handling roll-to-roll substrates, since a lot of packaging is indeed roll-fed. And by far most signage is still roll fed (though most of this is cut on a simple Roland or comparable cutter.

Comments & Suggestions

The easiest place to experience a Kongsberg cutter is in the *i*-cut headquarters in Lake Geneva, an hour northwest from Chicago. A key advantage of visiting this location is that you can see both Zünd and Kongsberg cutters and speak with staff who have years and years of experience with these Zünd cutters (since MGE was the Zünd dealer in those years). Naturally they do not have a new Zünd G3 model, but still, I found it informative, and well worth the time, to make the effort to visit Kongsberg demo room. You can send your own files in advance, and ship the specific kinds of materials that you wish them to cut on (if it is a special material that they would not keep in stock).

The European demo center is at Esko Artwork headquarters in Gent, Belgium. Asia demonstration centre is Singapore, Far East in Japan. Local demonstration centres also in Uk, Germany and Italy. Plus many OEM partners who run demonstration systems in many countries.

Success Stories

Every major brand of any kind of high-end digital signage product has success stories. FLAAR tends to prefer a site-visit case study, because a Success Story is usually just a few paragraphs, or if in a trade magazine, two to four pages. A Success Story does not mention the aspects of the equipment that perhaps should be improved, features which are missing, etc.

But it is still useful to look at the Success Stories that a company provides. The one I like the most is the use of a Kongsberg cutter to prepare materials for the Inaguration of President Obama, January 2009.

First issued November after SGAI 2009.

Caldera RIP Software

Books and Publications on Color Management & ICC Color Profiles

Glossary of terms on Color Management & ICC Color Profiles for wide format printers, digital cameras & scanners

Color Management in the Real World Site Visit Case Study with Grand Format Solvent and UV-Curable Printers
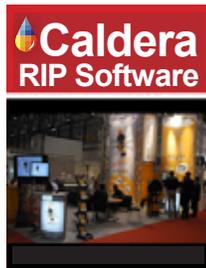
These reports on RIP software and Color Management for serious UV printers are free downloads on all FLAAR web sites (follow the link to 'free downloads') http://www.wide-format-printers.net/reviews_reports_evaluations/free_download.php

RIP, COLOR MANAGEMENT, and ICC Color Profiles options

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

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

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

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

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

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

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

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

Caldera also offers a highly regarded spectrophotometer from Barbieri, the leading color management company in Italy (they are headquartered in the same city as Durst, the manufacturer of Rho UV-cured printers).
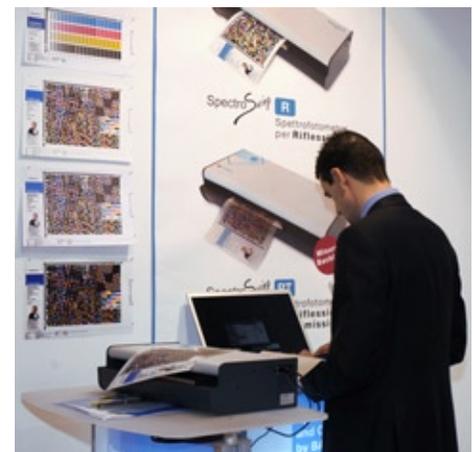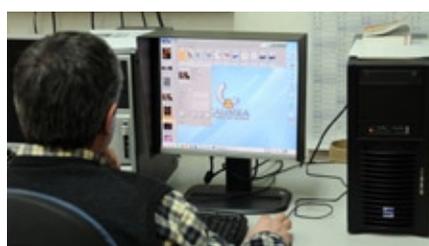
For further information on Caldera contact Joseph MERGUI mergui@caldera.fr **If you have questions about color management**, if you are in the US you can contact: ImageTech at: www.ImageTechDigital.com Mark Spandorf (owner and president), mark@imagetechdigital.com or 510 238-8905. If you are in Europe or the rest of the world you can contact **BARBIERI** directly at: BARBIERI electronic snc, info@BARBIERIelectronic.com www.BARBIERIelectronic.com Tel.: +39 0472 834 024 Fax: +39 0472 833 845

Reality Check

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

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

Licensing Information

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

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

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

Update Policy

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

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

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

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

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

Please Note

This report has been licensed to download during several months on one other web site in addition to all FLAAR web sites. But if you receive this PDF from any other manufacturer, distributor, dealer, sales rep, RIP company, media, or ink company you may have a pirated copy.

If you have received a translation in a language other than English, 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. Some 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 workaround. And not all glitches manifest themselves in all situations, so our evaluator may not have been sufficiently affected that he or she made an issue of any particular situation. Yet such a glitch that we don't emphasize may turn out to be adverse for your different or special application needs.

Equally often, what at first might be blamed on a bad product, often turns out to be a need of more operator experience and training. More often than not, after learning more about the product it becomes possible to produce what it was intended to produce. For this reason it is crucial for the FLAAR team and their university colleagues to interact with the manufacturer's training center and technicians, so we know more about a hardware or software. Our evaluations go through a process of acquiring documentation from a wide range of resources and these naturally include the manufacturer itself. Obviously we take their viewpoints with a grain of salt but often we learn tips that are worthy of being passed along.

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

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

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

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

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

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

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

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

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

Results you see at trade shows may not be realistic

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

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

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

Trade show examples tend to be on the absolutely best media. When you attempt to save money and use economy media you will quickly

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

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

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

Factors influencing output

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

Actually you may have people with even more experience than we do, since we deliberately use students to approximate newbies. FLAAR is devoted to assisting newcomers learn about digital imaging hardware and software. This is why Nicholas Hellmuth is considered the "Johnny Appleseed" of wide format inkjet printers.

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

For example, you will most likely need a color management system which implies color measurement tools and software. To handle ICC color profiles, you may need ICC color profile generation software and a spectrophotometer since often the stock pre-packaged ICC color profiles which come with the ink, media, printers and/or RIPs may not work in your situation. Not all RIPs handle color management equally, or may work better for some printer-ink-media combinations than for others.

Be aware that some RIPs can only accept ICC color profiles: you

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

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

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

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

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

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

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

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

The major causes of printer breakdown and failure is lack of main-

tenance, 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 smeltering heat or freezing cold during shipment.

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

Availability of spare parts may be a significant issue

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

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

Lack of Tech Support Personnel is increasing

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

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

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

Any new printer, no matter who the manufacturer, or how good is the engineering ane electronics, will tend to have teething issues. Until the firmware is updated, you may be a beta tester. This does not mean the printer should be avoided, just realize that you may have some downtime and a few headaches. Of course the worst case scenario for this was the half-million dollar Luscher JetPrint: so being "Made in Switzerland" was not much help.

Counterfeit parts are a problem with many printers made in China

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

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

Many materials don't feed well through hybrid (pinch roller on grit roller systems) or combo UV systems (with transport belts). Banding,

both from poor feeding, and from bi-directional (lawnmower effect) are common on many UV-curable inkjet printers.

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

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

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

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

Be sure to check all FLAAR resources

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

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

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

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

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

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

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

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

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

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

These are some of the most
Recent FLAAR Reports (2007-2009)
You can find these and more reports at: www.wide-format-printers.NET

Introduction to UV Curable Inkjet Flatbed Printers

Anatomy of a UV-Curable Printer

Bibliography on UV-Cured Inkjet Printers

Classifications of more than 60 UV-Cured Printers

How to Buy a UV-Cured Inkjet Flatbed Printer
FAQs for UV Printers

UV Glossary
(Primarily Flatbed Printers)

Brief History of the Development of UV-Cured Inkjet Printing

How does a latex ink printer differ from a UV-Curable Printer
How does latex ink & UV ink flatbed differ from a Solvent Inkjet Printer?

UV Lamps for flatbed Inkjet Printers

Introduction to UV-Cured Inks
including Cationic UV Ink

Tips, Info, Help, Documentation on Piezo Printheads Used in UV-Cured Inkjet Printers

Most recent UV Printers

Roll to Roll UV Printers for Billboards & Banners
Gandinnovations Jeti 3348 UV JetSpeed

Roland LED-UV Curing & Varnish
VersaUV Print&Cut LEC-300

Entry-Level Hybrid UV Roll-to-Roll
LED Curing Mimaki UJV-160

HP Scitex FB6100
Formerly NUR Tempo UV Flatbed

Flatbed UV Printer
Teckwin TeckStorm

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

FLAAR Reports — Trends in UV Flatbed Printers documented at DRUPA 2008

FLAAR Reports — UV Printers Trends 2008 SGIA '08 PART I

FLAAR Reports — Flatbed & Roll-to-Roll UV Printers SGIA '08 Part II

FLAAR Reports — Chinese-Made UV Flatbed Printers Shanghai '08 Trade Show

FLAAR Reports — UV Printer TRENDS VISCOM ITALY '08

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FLAAR Reports — TRENDS, Part II: Markets & Technologies UV-cured printers at ISA 2009

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FLAAR Reports — UV COMBO FLATBEDS Shanghai 2009

FLAAR Reports — TRENDS IN HYBRID STRUCTURE UV PRINTERS Shanghai 2009

FLAAR Reports — UV Roll-to-roll Observable at Shanghai 2009

FLAAR Reports — UV Flatbed Printers at APPPEXPO, Shanghai '09

UV Printers Manufactured in China, Korea and Taiwan

FLAAR Reports — Chinese UV Inkjet Printers 2009 Comprehensive FLAAR Inventory

FLAAR Reports — Chinese UV Inkjet Printers 2008 Comprehensive (Complete) FLAAR Inventory

FLAAR Reports — UV Printers Manufactured in Korea 2009 Trends, Markets & Applications

FLAAR Reports — UV Printers Manufactured in KOREA 2008

FLAAR Reports — List of UV Printers Manufactured in Taiwan 2009