



# FLAAR Reports

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SERIES for printing with Solvent Inks

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## Evaluation of Tiara Lyson Opal II Solvent Ink Printer





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Lyson Tiara Opal II at SigGraph trade show.

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**Brand name, model:**

The Tiara Opal II comes in 64” regular size and 87” grand format size.

*When was this model first introduced?*

I am guessing the 64-inch Opal II was introduced in mid-2003.

**Price**

We estimate the price will vary from \$38 to \$42K. The price varies considerably and depends on what level of service and training you wish. It is a serious mistake to skimp on training. PO Box companies that just send a crate often lack the experience to provide adequate tech support.

Don't forget to add shipping costs.

**Size, shape, technology, mechanical**

*Is this printer made originally as a solvent ink printer, or is it retrofitted with solvent ink? If retrofitted, what was the original brand? What other printers are the same chassis?*

The Opal II is a retrofitted Mutoh Falcon II Outdoor. The waste tubing, pumps, and everything in the ink delivery system has been removed and replaced to withstand the ink solvents.

The previous models were the Tiara Opal 46 inch, and Tiara Opal 63 inch.

The identical chassis has been used by Uniform to make their Uniform Fusilier. This is a retrofitting of the Mutoh Rockhopper II, the European version of the Falcon II Outdoor, outfitting it with “true” solvent ink.

Neither the web site for Uniform Digital nor the website for B&P Lightbrigade identify whether the ink is from Lyson or somewhere else. They do not specify whether the printheads are covered in their warranty, nor how long the Epson printheads will last using this kind of solvent ink

**Specifications: Printhead**

*What printheads are used? Xaar, Spectra, Hitachi, Epson, or other? Explain the pros and cons of each head relative to their ability to handle solventinks.*

Uses Epson printheads, the same used in the Epson 10000. I would want to learn the statistics of how long these printheads last using solvent ink.

*Is the brand and model of printhead identified in the specifications?*

Most spec sheets do not identify the printhead.



Lyson Tiara Opal II at Sigraph 2003 trade show.

*How many printheads per color? How many nozzles per printhead? How many nozzles per color?*

Four heads; each head runs two colors. The 87-inch model has eight heads.

	Ink type	Colors	printheads	Nozzles per printhead	Total nozzles	Nozzles per color
Canon 8200	Water based	6	1 combo print-head, Canon thermal	7,680	7,680	1,280
HP 5500	Water based	6	6 HP thermal	512	3,072	512
Encad 1000i	Water based	6	6 Lexmark thermal	640	3,820	640
Encad VinylJet	Unique IR treated water based	4	4 Lexmark thermal	208 (?) uncertain	832	208 (?) zero info on Encad website
Epson 7600	Water based	7	Epson piezo	360		96
Epson 10600	Water based	6	Epson piezo DX3	360		180
ColorSpan 72s	True solvent	4	16 Hitachi piezo	96	1,536	384
Roland SolJET EX	Eco-solvent plus		6 Epson piezo	360	2,160	360
Mimaki JV3 160S	Close to true solvent	6	Unsure, 2 or 3, Epson	Probably 360		180
Mimaki JV3 16SP	Close to true solvent	6	4 Epson piezo	Probably 360	1,420	180 in 6 color mode
Mutoh Junior	Eco-solvent plus	4	1 for black, 1 combo for the other 3 colors			
Mutoh Falcon II Outdoor	Eco-solvent plus	6 or 2 x 4	Epson piezo	360	1,420	180
Mutoh Toucan 64	True solvent	4 or 6	Spectra			128
Seiko Color-Painter 64S	Close to true solvent	6	Seiko version of Xaar head	512	3,072	512
Tiara Opal II, same chassis as Mutoh Falcon II Outdoor	Lactate solvent	2 x CMYK	4 Epson piezo,	360	1,420	360

*What is the true dpi of this printhead? How is this dpi calculated? How do you calculate perceived dpi that you use instead of true dpi?*

Claimed dpi is 720 since no one would bother to try to print at 1440 for signage. 1440 dpi would be too slow and use up too much ink.

*What is the drop size? Is this listed in the published specs?*

It is not usual to list drop sizes; ColorSpan 72s is unique in listing its picoliter size.

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

One year warranty comes with the printer. An extended warranty is \$4,100 per year and includes a check up of the printer after six months, I guess sort of preventative maintenance.

*If piezo heads fail, who is responsible for paying for replacement heads?*

Customer pays for the printheads if the machine is out of warranty.

	Price	What is excluded in price?	Extended warranty cost	"Out of Warranty" fee	What about cost of replacing print-heads?
Encad VinylJet			\$1,295 for 12 months, \$2,330 for 24 months	\$ 500	Printheads are NOT included in any Encad warranty because thermal printheads are a consumable
Tiara Opal II			\$4,100		
Roland VersaCMM					
Mutoh Junior					
Other printers you are considering					

*What does each printhead cost to replace? Distinguish price for the printhead and also price for the service technician to come and do the installation if it is not user-replaceable?*

A printhead costs \$650 to replace plus \$150 per hour.

*How often can you expect head strikes? What causes them?*

If you use extra light vinyl, or if the vinyl is not flat, it will cause a head strike. But this kind of head strike will not of itself destroy a printhead.

*Connectivity? Parallel, serial, SCSI, USB, FireWire?*

Ethernet 100baseT.

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

An air scrubber is \$2,000, from Island Clean Air (a company we recommend).

### Construction (Build Quality)

*What about solid-ness of construction of the printer?*

Mutoh has plenty of experience and builds printers of acceptable quality.

*What about heater or dryer? Is there a pre-heater and post-heater both, or just one? Is there a printer under the platen? Where are the heaters located? Is heater on top of, or under, the media?*

This printer has four heaters:

- Pre-heater
- Heater in the printing area
- Two post heaters.

I will have to spend more time to understand the positioning of the heater in the printing area.



Lyson Tiara Opal II display at SigGraph 2003 trade show.

	Ink type	Pre-heater	Platen-heater	Post-heater	other	fan
Roland VersaCAMM	Eco-solvent	lacking	seemingly	yes		no
Roland Pro II SolJET	Eco-solvent	Possibly lacking <sup>1</sup>	Evidently yes	We are checking on this		
Splash of Color Solvent-JET	Pentachrome Lyson Solvent	yes	yes	yes		With three heaters a fan is not expected
Mutoh Falcon II Outdoor	Eco-solvent	yes	“fixer heater”	Post-fixer heater	dryer	Of all the eco-solvent printers this seems to be the most complete system
Mimaki JV3	Mild-solvent	yes	yes	lacking		Has fans instead of post-heater
Tiara Opal II	Lyson solvent	yes	yes	yes		Seems to have a second post heater
Seiko Color-painter	Mild-solvent	We are checking on this printer; there was no Seiko booth at NBM trade show.				
ColorSpan 72s	True solvent	yes	yes	yes		With three heaters a fan is not expected

*Can you turn them on and off? Can you vary their temperature? What is average monthly electric bill?*

Each heater can be turned off and on, and varied, individually.

*What about fans?*

There is no fan system since there are two post heaters.

*Are any systematic mechanical problems documented? For example, consistent complaints. If you asked outside industry experts would they reply, "ah, yes, Printer XYZ is known for potential XYZ glitches."*

The manager said the main mechanical problem was end users who were accustomed to aqueous based inkjet printers and had not yet understood the differences with solvent ink systems.

*Electrical needs: 110 or 220?*

Despite the four heaters it seems to accept 110 or 220.

### Tech support

*What is setup of the printer like? Can I do it myself? Does your cost include sending a person to set it up for me?*

You receive a 2-day setup that includes training.

*Where are spare parts warehoused?*

USA.

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

There are 16 resident tech support teams across the US. I presume this means Tekgraf-related teams.

*Is training necessary? classroom training available? Is factory training available?*

Factory training is for dealers only.

*What on-line training is available?*

No on-line training is available.

*Are dealers national (most companies) or regional (Roland allows a dealer to operate only within a limited regional area)? Do I have any choice in dealers? (How many dealers actually exist in my country?)*

Tekgraf itself is a national distributorship. Their dealers in turn may be national or regional: Scarab-Graphics is a good example: they sell nationally.



Lyson Tiara Opal II Inks at SigGraph trade show.



## Cleaning, maintenance

*How is head cleaning accomplished? Vacuum (suck), spray/purge & wipe, manual, automatic, other? Can you take the heads out and clean them individually?*

Yes, you can take out the heads and clean them manually. This is a rare trait.

The system spits ink to maintain ink flow and to help prevent clogging. There is a vacuum seal when the printer is docked.

*How hard is it to cap the system and turn it off, for overnight, over weekend, while you go on vacation? Is there a capping station?*

There is no sleep mode. The heads sit on their vacuum seal. There is no cellophane or Saran Wrap; it is automatic.

*How often does printer automatically do its own head purge to keep ink from clogging? How much ink is used per month?*

There is no constant purge; no need due to the vacuum seal. Just clean the wipers once a week.

*Upon start up, do you have to swab the heads? How long does this take? How messy is it? What cleaning materials are recommended? What is not recommended?*

Just turn the machine on and you can start printing.

*What happens if the heads clog due to lack of maintenance, say over a 3-day weekend or a holiday period?*

Engage in manual cleaning.

## Inks

*How many kinds of ink are available? What kind of ink is this?*

One ink is available, a lactate solvent ink.

*What are the ingredients in the ink(s)? Is there Cyclohexanon? Is this a lite-solvent or eco-solvent?? What is the chemical composition of the ink?*



Detail of Lyson Tiara Opal II at SigGraph 2003 trade show.

Lyson ink has a different chemical formulation than other inks. It is my impression the Lyson ink has no cyclohexanon but be sure to check the ingredients listed on the MSDS.

*Does ink come in cartridges or bulk?*

Ink comes in both bulk and cartridges; in USA in bulk form.

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

The bulk ink has a chip on it.

*What is ink cost per liter (not per cartridge, but per liter)?*

The ink is \$150 to \$155 per liter. Prices vary depending on what dealer makes the quote.

	Ink type	colors	Cost per cartridge	Cost per liter	Ink cost per sq foot <sup>2</sup>	Ink and media cost
ColorSpan 72s	Full solvent	CMYK	2-liter containers	\$ 124.50	0.14	
Encad VinylJet	Water-based, interacts with IR	CMYK	400 ml, \$120 ink plus head is \$186	\$ 300		
Mimaki JV3	Full solvent	4 or 6	\$ 73 per 220 ml, price on Internet <sup>3</sup>	\$ 332		
Mutoh Toucan	Full solvent	4 or 6, depends on model	\$ 390 per gallon (roughly 4 liters)	\$ 122 <sup>4</sup>		
Mutoh Falcon II Outdoor	Eco-solvent plus		\$ 75, 220 ml	\$ 340	.30 to .50	
Mutoh Junior	Eco-solvent plus	4	\$ 75, 220 ml	\$ 340		
Roland VersaCMM	Called Sol ink but allegedly is identical to Eco-solvent plus	4	We guess \$ 75 per 220 ml			
Roland SolJet Pro II EX	Called Sol ink but allegedly is identical to Eco-solvent plus	6	We guess \$ 75 per 220 ml	\$ 340	\$ 0.36 and up	\$ 0.65
Seiko ColorPainter 64S	Less aggressive than full-solvent but more strength than eco-solvent	CMYK + light cyan and light magenta	1 liter cartridges \$299	\$299		
SolventJET (Splash of Color)	Lyson solvent ink	CMYK + red and blue	\$89 per 220 ml	\$ 199	\$ 0.28	
Tiara Opal II (ScarabGraphics)	Lyson solvent ink, Lactate solvent	Dual CMYK	\$155 per 1 liter bottle	\$ 155		

*How many colors?*

This printer has 8 ink lines, but not for 6 colors, but rather for two-times CMYK.

The test images had nice magenta, good reds, nice blues. These are colors that historically many Roland printers have had trouble reproducing.

*Is there any ink color or kind which gives a problem that you don't get with the other color inks?*

Apparently the Lyson ink has red instead of Magenta, and blue instead of Cyan. Thus it produces great reds.

*Is output splotchy? What about banding? What causes the banding?*

On Metamark vinyl the output is very attractive. I would have to see output on regular vinyl to see the normal appearance.

*Can you hot-swap ink?*

Yes

*What ink-out alarm system exists?*

Yes, there is an ink out alarm.

*Is the printer enclosed? How is the enclosure vented?*

There is no enclosure but an air scrubber is available for \$2000 to park alongside and absorb some of the solvents.

Some printers now have "counters" which report how much ink has been expended for each print. Most printer manufacturers admit that these counters are generic estimates: they do not really count how much ink is actually squirted out the heads. *So how about your printer? Does it even have a counter and if so, what is it really counting?*

The counter tells you how much is left.

*Do you need to have a band of printable colors along the edge, outside the main printed area, to keep all printheads and their colored inks firing on each pass and ready to print (so as not to dry out when not be used by the colors in the design)?* If your design has lots of empty white space, and then just cyan letters, this would mean your black, magenta, and yellow heads were not firing for a long time. On an old-fashioned inkjet printer these heads would dry out, and clog.

You don't need a band of printable colors along the edge. But I was so busy asking other questions I did not check to see if there was a spit gutter.

## Media

*Media core diameter? Options for other core diameters?*

The core diameter not listed in basic spec sheet.

*Front loading, back loading? Paper path? In the paper path, can you see wrinkles, incipient skews?*

The printer is back loading, with a straight paper path, as are all Mutoh-built machines.

*Can more than one roll be printed on simultaneously?*

This feature is not expected on a printer other than grand format.

*Are edge guards present? Is there a vacuum system?*

No edge guards but there is a platen vacuum system.

*Is a take-up system present? Standard reel or special?? Can media dry fast enough?*

Yes there is a take-up reel. The media can dry fast enough due to the two heaters dedicated to drying.

*Precisely how many kinds and types of substrates will work in this printer? And rate them by "work perfectly" through a continuum to "function but not flawlessly." Will this ink print on everything that a Vutek will?*

Substrates that are too thick won't work.

*What are preferred applications to print with this machine?*

At some point we will need to do a site-visit case study to learn what are preferred applications.

*What applications are possible but mediocre? Is backlit saturated enough with one print, or do you have to print two and mount them together? Do you have to set saturation level higher for backlit?*

To accomplish backlit you must carefully do profiles.

Heat is crucial; you must set heat per specific substrate.

*What kinds of substrates will not work with this kind of solvent ink? Does this printer's ink require special media? Is it coated? Even if not coated, is it the really low-cost stuff, or is it limited (and hence by that very fact a tad expensive?) What applications would be better printed on another type of ink, media, or machine?*

Don't try to print on poster boards.

*Is printhead height adjustment available? Manual? Automatic? How much? What thickness media is accepted?*

Yes, the head can be adjusted between 1.2 and 0.1 mm to accept media 1.7 to 0.6 mm thick.

*Is there self-detection of media width?*

Yes.

*Is there a reliable counter of media length remaining?*

No.

*Is there manual feed capability of sheets (sheet feed)?*

Yes

*Do you get roller marks on some media? Which media? How bad are the marks?*

Excess heat may result in roller marks on some media. This is fixable (turn down the heat).

*Is backlit saturated enough with one print, or do you have to print two and mount them together?*

Backlit is okay with a single print.

*Is 3M warranty available? Is Avery warranty available? What are the full added costs in ink, media, and lamination for such a warranty?*

The 3M warranty is available for certified materials.

## Image Quality Analysis

At other trade shows I have seen outstanding output from the Tiara Opal II on Metamark photo vinyl. At NBM graphics and sign trade show (June 2004) there was light banding, the image was grainy, but not seriously splotchy. I would estimate that the Metamark helps avoid the splotchy appearance that other lesser vinyls suffer.

## RIP, driver, color management

*Is a RIP included?*

Wasatch Lite and ColorGate are available. I did not get whether the ColorGate is also a lite.

## General or Miscellaneous

*Can this printer be left to run overnight or otherwise unattended?*

It was not really ideal to let it run overnight unattended.

*Please look at the ad claims for this printer in magazines and on the internet. What aspects of these ads will a buyer of that model soon find out are perhaps slightly exaggerated? Do the ad specs include enough facts?*

We have one active unresolved complaint from one end-user, I believe it was in Mexico. Although such a complaint can happen with even the best printer, his problems with what was promised in advertising, and what he actually ended up with, deserve to be considered. With this serious complaint on file, we would need to have independent site-visit case study opportunities to get other points of view before we can comment further.

As we continue to update these reports we will check on the ad claims and compare them to what end-users report. A company in Las Vegas evidently tried out a wide selection of solvent ink printers and ended up selecting the Tiara Opal II, and bought it from ScarabGraphics (which also sells Mimaki printers).

## Please add your own suggestions

If you know of any questions we overlooked, please let us know.

**For further information**

If you are considering an Opal II solvent ink printer, and wish additional information, please consult ScarabGraphics. They can be reached at [ken@scarabgraphics.com](mailto:ken@scarabgraphics.com). They sell Canon, HP, Opal, and Mimaki printers nationwide.

**(Footnotes)**

<sup>1</sup> It is not yet clear to us how many heaters the SolJET Pro II has. We would also like to check and see how many heaters the first generation SolJET had.

<sup>2</sup> Figures on ink costs vary from honest to dishonest and everything in between. The only way to get factual ink costs is to run benchmark tests in a neutral and independent institute. Due to the expenses involved, this is traditionally done as sponsored research.

<sup>3</sup> Most resellers want you to telephone so they don't list the cost of the ink. Some PO Box type of resellers use bait and switch. So we never know whether the prices stated are real. The only prices we believe are those listed by reputable companies that we know personally such as Scarab Graphics, [www.ScarabGraphics.com](http://www.ScarabGraphics.com). ScarabGraphics offers Mimaki ink for \$68, but we do not know if this is the official ink or after-market ink. You can ask them.

<sup>4</sup> It is surprising how hard it is to get ink prices. Manufacturers don't always sell the ink, so no prices on their sites. Some resellers are coy and want you to telephone. So we have a lot more work ahead to get the prices. One thing, however, is that if you ask a competitor, or read their "selling against" literature, the ink prices they quote for their competition are usually the highest list price, is sometimes out of date, and you can usually get slightly better prices on the Internet. We will correct any prices in this chart as we are able to obtain better information.

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