



FLAAR Reports

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SERIES for printing with Solvent Inks

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Get Started

Solvent & Eco-Solvent Ink Printers From A to Z

**True Solvent, Eco-Solvent, Lite-Solvent, and Mild-Solvent
Inkjet Printers**





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Caption for front cover photograph: Mimaki JV3 printer at PMA 2004 trade show

Introduction

This glossary has been written in order to assist

- All those who come to a FLAAR website to seek assistance in learning
- Sign shop owners and operators, of all levels of experience
- First-time owners of solvent-ink printers
- All those who are thinking of starting a sign printing business

And an increasing category of readers of FLAAR Reports

- People in the digital imaging industry who seek training and education outside their own niche so they can better understand and communicate

From 1996 through today FLAAR has become the de facto source for reliable trustworthy information on water-based inkjet printers such as Canon, ColorSpan, Encad, Epson, HP, etc. We now intend to extend our 100% coverage to solvent and eco-solvent printers. We are doing major updates to key FLAAR Reports and have issued 10 new titles covering solvent and eco-solvent printers during summer 2004.

Glossary

3M Matched Component System Warranty, If you use specified material, specified ink and printer, and in some cases specified laminate, 3M provides their "Matched Component System Warranty) which is usually 3 years outdoors without lamination, 5 years outdoors if laminated. The MCS covers color fading, loss of adhesion, peeling, cracking or shrinkage. Avery has a similar warranty program for their Avery materials. The 3M and Avery longevity warranties are the best known in the industry and the only ones that are accepted universally.

4-color, a "four-color" printer means CMYK inks.

6-color, could be CMYK, light magenta, light cyan, or CMYK Red and Blue (Pentachrome). Other combinations are also possible.

7-color, Epson offers CMYK cm and light black; but seven colors is not available in any solvent ink printer. You don't need this level of quality for

banners and signage that will be seen only at a distance.

8-color, could be dual CMYK. Another option is the fuller range for the VUTEK UltraVu 3360 is CMYK, light cyan, light magenta, light yellow, and light black. Roland had a slightly different version for their HiFi printers circa 2001-2002, but only in water-based inks. Seemingly that color combination was not sufficiently popular since no subsequent Roland printer offered those colors. Mutoh has eight ink lines but only six colors + two cleaning fluids, or else dual CMYK.

abrasion resistance is a crucial factor in deciding whether to chose full-solvent or mild-solvent. If the surface of some inks is rubbed, scratched, or otherwise abraded, some inks will either come off totally or will show damage. BEFORE you buy, you need to know which inks, which substrates, and which kinds of abrasion or cleaning materials will wipe your image off the sign. Your clients will not be amused.

activated charcoal is the necessary material

used in industrial strength air purifiers which are needed if you have a solvent printer in your print shop. There are two main brands, one made in Switzerland and one made in Canada. The SwissAir SolventMaster gas and odor filter air purifier used to be the one associated with Mimaki. But at trade shows in 2004, the most favored air purifier has been purifiers made by Island Clean Air, from Canada. For additional information contact Ronald Peters, Vice President, ron@IslandCleanAir.com

actuator, a generic actuator is a mechanical device that translates an electric pulse, signal or electronic command into a movement. In the case of a **piezo** actuator, the PZT ceramic material is actuated by an electrical pulse. The actuation flexes the PZT material which pushes out a droplet of ink. This is the fundamental technology within a "piezo printhead." In other printhead technologies the ink is expelled by an expanding bubble.

airbrush is still a successful and popular way to decorate cars and motorcycles. www.Airbrush-Online.com will reveal how alive this technology is still today. The first Vutek printers in 1989 used computerized airbrush technology. These air pressure printers use transparent solvent inks that mix in flight before they land on the material. LAC printers still today are the last wide format printers sold in the US that attempt to use this early form of spraying paint with air under pressure. One ad for a Michelangelo airbrush printer claims "flawless continuous tone reproduction of photographs free of pixels, grain, dots, or line patterns." Yet the images I saw at the Mumbai, India sign trade show from a LAC airbrush printer were the worst images I have seen since I began in 1997. Maybe the ad means that the output is so splotchy that you can see the pixels, grain, dots, and line patterns. Think of painting with spray paint can but with an almost endless supply of air and paint. The Vutek 3200i offered 12 dpi. Max dpi was reportedly a whopping 18! The other meaning of airbrush is the traditional airbrush that was used to retouch photographs by hand. Adobe Photoshop software offers an airbrush tool.

aggressive, a beneficial feature of true solvent ink, namely an ink that aggressively attacks vinyl. In order to insure adhesion and therefore abrasion resistance, you want the ink to attack the vinyl and bond with the structure of the vinyl. This is encouraged by pre-heating the vinyl. See also **non-aggressive**

announcement date, is the day on which a new product is "announced." There is also often a separate launch or launching date. But the only date that counts is the shipping date, the day on which, supposedly, the printer will ship. Of course if the product is vapor ware, or a printer that has serious deficiencies, these dates cause embarrassment for the manufacturer.

applications for solvent ink, are nicely distinguished by Vutek.

- Flexface billboards vs pressure sensitive billboards
- Soft sided truck material vs hard sided trucks
- Transit shelter (usually translucent)
- Photo imaging vs high quality photographic (distinction unclear)
- Short run POP vs Long run POP (ramifications not specified)

FLAAR offers its own list of signage applications as Appendix A. Solvent ink would be appropriate for any applications on this list that are outside or otherwise in the sun, such as on windows.

Aprion, a company in Israel that made a unique printhead first shown at DRUPA 2000. The acronym of the technology used is called M.A.G.I.C. Aprion is now owned by Scitex Vision. One of the few printers that uses this printhead is the CORjet, made to print high quality images on corrugated cardboard packaging material. Although Aprion printheads do not use solvent ink, these grand format industrial-sized (million dollar) printers are an alternative to solvent ink printers when you need to print on cardboard. A competing ink technology for printing on packaging materials would be the new FastJET by SunChemical. This printer was shown at DRUPA 2004; the FastJET uses UV-curable ink.

AquaVinyl, a PR name for Encad's unique pre-heating for vinyl, using a special ink (but not actually a mild solvent).

Arizona, a brand name, or really nowadays as model series of Océ. The first Arizona printers were made by Raster Graphics. Gretag Imaging bought all Raster Graphics products. Océ then bought all Gretag Imaging printer lines, including the Arizona model designation. Arizona models go back to the 1990's, and are still available today, such as the Arizona 30s, probably the oldest continuously manufactured printer that is still available today (or at least was still available up to 2003).

Arlon is a large well-known source for pressure sensitive vinyl graphics films

Avery is also known as Avery-Dennison, a giant corporation that makes everything from labels, inkjet photo paper, markers and highlighters to the pull-off postage stamps. Avery substrates tend to be considered as premium materials. Their Avery Dennison Graphics Division North America products includes white calendered vinyl to print on and overlaminated film. Avery has a Graphics University which we recommend. Contact louise.sullivan@averydennison.com, if no answer call 1-800-443-9380.

capping, putting a cap on a printhead to keep the ink from drying out and blocking the orifice. Capping is usually done at a service station. Solvent ink printers prefer to be kept running constantly but some models can be capped. Iris 3047 giclee printers need to be kept on and running ink through their system 24 hours a day. We finally got tired of this and mothballed that giclée printer. It's easier to do giclée prints on our HP 5000. But you have to clean and cap such a mothballed printer before you store it.

cartridge. Most printers that use Epson print-heads are required by Epson to use ink obtained through Epson. Epson does not make the ink but sells it, in effect as part of the fee for using Epson printheads. This ink has traditionally come in

rectangular cartridges of 220 ml. Since Canon, Encad, and HP have larger ink supplies, today most print shops would consider these Epson containers as far too small (and hence too expensive). So now Mimaki and Mutoh are experimenting with 440 ml cartridges. Epson wants to avoid using bulk ink systems, for fear that people will use more economical ink from competing companies. With Encad printers (that use bulk ink to begin with), "cartridge" means the Lexmark printhead and the ink feeding system that is directly connected to it. For the Encad-Lexmark printers the full term is "inkjet printhead cartridge." You can buy them with, or without, ink.

cleaning station, printhead cleaning station is where the heads spit (purge) and are wiped clean. You can usually see the residue in this service station. In some cases this may be where the heads are capped but usually the capping station should be separate, often on the other side of the printer. Traditionally the service station is on the right side.

cleaning time is the amount of time you have to manually clean your printer (Arizona brochure suggests 15 minutes per day). The principal times you might wish to, or definitely need to, clean your printer would be in the morning before starting and in the evening after finishing for the day. Of course if you clean in the evening and your machine spits on its own, automatically, all night, you may be able to start up the next morning with less cleaning needed.

coated material is any substrate which has been pre-coated with an inkjet receptor coating. Although water-based ink requires these coatings solvent ink is supposedly, in theory, not to need coating. The coating of the materials is very very costly. But the first generation of eco-solvent inks (2001-2003) did not adhere well to raw vinyl or other materials. So buyers, who were promised cheap uncoated media by alluring ads, felt defrauded and demanded their money back. The backlash was sufficient that the ink labs and printer companies scurried around to develop

a more aggressive ink. By late 2003 this new ink appeared. Although it still does not adhere as well as full solvent ink, it is good enough so as not to be a public embarrassment. See also **uncoated material**.

color bar, when you used old-fashioned solvent ink printers such as the early Arizona 30 and possibly the Arizona 90 and 180, your image had to have a color bar along at least one edge so that the printheads jetted out some of each color every so often. This was especially needed if the sign had lots of white space. Because white space means that none of the printheads will be firing. This means the ink will be drying out and clogging the nozzles. Today modern printers have an automatic spitting system: at the end of each pass every color spits at least one drop out. In the old days a comparable effect was achieved by having the printer spit directly onto the sign (off the image to one side). But this wasted ink and media. So be wary of buying a printer that lacks a total-color nozzle maintenance spitting system. We are not talking about a spit, purge, and wipe routine (which is something else even more crucial). The color bar has to do with a pass by pass preventative maintenance system. The color bar discussed here is not to control color proofs or to use in color management.

compressed air, the better solvent ink printers have on-board compressed air systems.

conformable material conforms to rivets and other hard-to-cover areas for vehicle wrap.

connectivity with an inkjet printer means what kind of cable(s) can you connect your printer and your computer or RIP server. Your options, among others, are **parallel (IEEE 1284)**, **SCSI**, **USB**, or **FireWire (IEEE 1384)**

cyclohexanone, often spelled cyclohexanon, is sometimes listed as a neurotoxin,. The best web site I have found so far on this remarkable chemical is www.jtbaker.com/msds/englishhtml/c7051.htm. They list the chemical formula as C₆H₁₀O. If you presently use a solvent ink printer, you will find this web site fascinating albeit morbid.

cyclohexanon-free; cyclohexanon is the ingredient in solvent ink, which, if you value your health or worry about your co-workers, that you do not want in your home or office. Some mild solvent inks such as for the Seiko ColorPainter 64S are supposed to be cyclohexanon-free. Most eco-solvent inks are free of cyclohexanon.

decap a printhead, take the cap off or move the printhead carriage off the capping area, which may, or may not be, the same as the service. Decapping can be manual or automatic.

digital screen press is moniker used in an attempt by wide format printer manufacturers to speak to screen printers, to make inkjet printers sound simultaneously like a printing press and a screen press. Of course they are not really either. Several company's ad campaigns have used the digital screen press concept, most notably Gretag, who owned Arizona before Oce. Their Arizona 30 has been called the "Arizona 30 digital screen press." Oce continues this moniker on occasion, as in "Arizona 180 Digital Screen Press."

diode, the ColorSpan 72s has a Colorimetric photo diode (and an image sensor) on board. These electronic devices are to assist in on-board color management that is coordinated through the dedicated ColorSpan RIP. No other solvent-ink printer under \$150,000 has such a color management system on-board.

drop volume or **drop size** both mean the same thing, the size of the main drop which is jetted out the nozzle, measured in picoliters. See also **variable drop**.

drying system, may be a "post" heater or a row of fans or conceivably both.

duplex printing means printing on both sides of the material. Practically no solvent ink printer and rarely any water-based printer can print, automatically, on both sides. But pole signs and other banners may need to be printed on both sides. Thus there are some specialized printers that can print first one side and then automatically feed the other side, to print the other side via register marks.

dye solvent ink seems a contradiction of terms. It is generally assumed that solvent ink is a pigmented ink.

dynamic variable drop imaging technology Although Roland is usually credited with introducing variable drop sizes we tend to forget that the Iris 3047 proofer had variable drop sizes for years before that. Variable drop size is what gave the Iris its advantages as a giclee printer. Lexmark offers variable drop size printheads so I don't understand why Encad can not produce variable drops. HP and Canon thermal printheads are not capable of spontaneously varying the drop sizes. They can produce more than one drop size (in theory, but not yet in practice) by having different nozzle configurations on the same printhead, but chose, so far, not to do this. Mutoh and all clones of Mutoh (Agfa, Gerber, Spandex, Sign Warehouse/PrismJET, etc) call their drop sizes "dynamic variable drop." Roland and Epson have essentially the same system but use a simpler term, just "variable drop."

eco-solvent is a made-up name that attempts to make nasty mild solvent ink more socially acceptable. Eco-solvent ink must lack **cyclohexanone** to be called eco-solvent. The idea is that with no or minimal VOCs, with less offensive odor, that people will think the ink is okay for the environment and for your health. I am not sure I would want to buy stock in whatever company made up this name. Seiko refuses to use the word eco-solvent, in part because their ink is probably stronger, and in part because Seiko points out that these inks are not as warm and cuddly as ads try to make them out to be. Mimaki realized

that the first generation of eco-solvent inks would be a disaster, so Mimaki USA essentially refused to offer the JV-2. Only now, in 2004, does Mimaki offer a mild-solvent, but it has not yet been used much by anyone.

eco-solvent plus is the hurried replacement in 2003 for the first generation of eco-solvent inks (2001-2003). The first generation used by Roland and Mutoh got a quick reputation for being incapable of providing anywhere near the level of capabilities that the ads so loudly claimed.

environmentally friendly inks is a term dreamed up by clever managers and PR folks to bamboozle sign shop owners and printer operators into not looking too close at the MSDS. Any ink with dyestuff or the chemicals needed to handle pigmented color is unlikely very friendly to growing organisms. The ink used on cookies and cakes is the only ink I would eat, and only for photo opportunities.

Envision Inks evidently related to the after-market SolventJET conversions offered by Ahern & Soper, All Graphics Supplies, NIDI Technologies, and Splash of Color (TheBigPicture magazine, Jan/Feb. 2002, p. 10).

Epson piezo printheads were designed for using with water-based inks. The solvents in solvent based inks may either dissolve or corrode the printheads, or dissolve or corrode connections in the ink line which will bring dissolved or corrosion remnants as minute debris to clog the heads. The degree to which mild solvents and eco-solvent ink causes comparable degradation of Epson printhead life has not been established.

extended gamut means more colors than a "normal" gamut. There is no accepted industry definition of extended gamut or normal gamut either. A company that claims an extended gamut is usually trying to show how their inks produce a wider range of colors than their competition.

feeding, media feeding system is the mechanical devices that move the substrates through the printer. Roland, Mutoh, and Mimaki use a straight-through media path, with the media loaded and fed from the rear. Encad has a comparable system. HP, in distinction, has a torturous route in order to maintain better control (less chance of skew). Encad has a reputation for media skew.

FireWire is the name trademarked by Apple for **IEEE 1384** connectivity between computer peripherals. See also **parallel**, **SCSI**, and **USB**.

flatbed as compared to a **roll-to-roll** printer. A flatbed printer is usually a flat table for printing materials that do not handle well wound up on a roll. So if you want to print on a sheet of aluminum, or a piece of marble or wood, you can't wind that around a roll or reel.

fleet graphics means **signage** for **bus wrap**, **truck wrap** for entire fleets rather than individual cars. Fleet graphics has a wider definition, since truckside advertising does not necessarily wrap around the truck, so is not "truck wrap" but is still vehicle graphics.

flex or **flexface** means flexible material as opposed to traditional signs that were on or stuck to rigid material. Also spelled "flex face." This material may receive strength from a layer of scrim, a pattern of mesh. Flex face may also be distinguished from material that is stuck onto a backing, since once stuck it is not flexible and gets its strength from sticking to the material. This banner material, PVC, may be referred to as flexible vinyl or flex face. May be reinforced and/or water resistant, depending on source.

flush means to use a cleaning solution to clean out either a printhead or an entire ink line. Normally you would have to flush if you wish to switch to a different kind of ink.

gallon, a unit of measure for liquids. A US gallon (as opposed to an Imperial, British, gallon) consists of 4 quarts. A gallon equals 3.785 liters. For rough comparisons one liter is slightly less than one quart.

glycol ether, a toxic solvent used in some inks. If you wish to lose your appetite, check out this toxic timeline, www.svtc.org/hu_health/getime.htm. You can perhaps learn more from the Lyon-dell website, as they make glycol ether for inkjet inks.

grand format means more or less the same as **super-wide format**. These adjectives seek to distinguish solvent ink printers that can handle a billboard image with a single sheet. There is no hard and fast rule, but certainly any printer with a printing width 80 inches or more is grand format. These printers can produce many more applications than billboards, such as truckside advertising, but that is really just a moving billboard. Wide format is generally described as 24" through 72". Grand format (or super wide) is may considered anything over 72" in width

HAPs means Hazardous Air Pollutants. Check out www.americansolventscouncil.org/resources/pdfs/glossaryRegTerms.pdf.

HDPE, high density polyethylene resins. We cover this in the glossary of signage materials.

heater and **dryer** are sometimes synonymous and sometimes not. The pre-print heater is not intended to dry anything because there is no ink at this point; the pre-print heater opens the pores of the substrate to accept the solvent ink better. Same with the heater associated with the printing surface. Then the next heater is the one to work on drying the ink-media combination. You need to have the substrate dry before it can go onto the take-up spool (or the print will smear or stick).

Hitachi piezo printheads are used in the Matan version of the Techwin printer from China, and the ColorSpan 72s. The ColorSpan 72s is designed, engineered, and manufactured (as far as we know) in the USA and has no relation to Techwin or Matan. Hitachi printheads are presumably at least designed in Japan. See also the separate glossary chapter on printheads for solvent ink printers.

hot swap means to change ink without ruining the print. The printer will usually stop printing, but if you can get the ink in fast enough, the printer can continue without leaving a noticeable defect. Some other printers can be loaded on the fly while printing; they don't even stop printing. Of course this assumes the printer is merely low on ink and has not run out of ink totally.

hype, "400 x 400 dpi – yes that's 4 times more resolution!" If their previous model offered 4 times less resolution, it must have been pretty awful. This ad then goes on to claim "400 x 400 dpi, giving an appearance of well over 600 DPI." The same brochure offered "rocket speed" and "ultra high speed printing."

IEEE stands for the Institute of Electrical and Electronics Engineers, Inc. Their web site is www.IEEE.org. Among its many activities, the IEEE sets standards for some of the connectivity cables between computers and peripherals such as inkjet printers.

IEEE 1284 is the standard for parallel port connectivity between a printer and a computer. For more details see www.fapo.com/ieee1284.htm.

IEEE 1384 is the generic name for what Apple has trademarked as **FireWire** for Mac computers. So when used on a PC, you have to call it IEEE 1384. Irrespective of the trademark, almost everyone calls this manner of connection FireWire irrespective whether on a PC or a Mac. The word has quickly become as generic as Kleenix.

Ink delivery system; in the case of solvent ink printers the solvent cleansing is part of the ink delivery system.

ink flow

ink flush, to my mind an ink flush is when you want to clean out one kind of ink before you insert another kind of ink. This may involve using a flushing or cleansing solution.

inkjet receptor coating is like a primer on top of the inkjet paper or substrate. The inkjet receptor coating is filled with chemicals which interact with targeted chemicals in the ink. The best media and inks are those which are developed in tandem with each other. This is why you can't just buy Brand X material and assume it will work with your particular printer. The chemicals in your ink may have been developed to work best on some other kind of material (usually more expensive).

jet recovery is not always mentioned in spec sheets.

Konica printheads See also the separate glossary chapter on printheads for solvent ink printers. Konica were reportedly the printheads used by the ill-fated XES oil-based printer. Konica used presumably their own heads in the ill-fated Iguazu proofing printer, shown prominently at DRUPA 2000 and Photokina 2000. That printer was reportedly not able to be manufactured to specs, and it failed to ship in Europe. It was seldom if ever shown at US trade shows. So twice Konica printheads have been in printers that failed.

KT board, a kind of inkjet printable sign board.

launch, as in launch date. First there is the "**announcement**" date. Finally comes the **shipping date**. And a few months after all this you might actually have a chance to receive your new printer.

lc is one way to abbreviate light cyan. Regular cyan is abbreviated as capital C. There are two ways to write out a 6-ink system: CMYKlclm or CMYKcm. K is black. Light cyan can also be spelled Lc. I prefer the designation CMYKcm.

life, printhead life, is measured in billions of drops per nozzle.

lite-solvent. There is no official definition of lite-solvent or a distinction between lite-solvent and mild-solvent. There is no official body that has defined eco-solvent ink either.

Lm also spelled lm, light magenta

LOD inks, Lyson OutDoor or Lactate OutDoor ink. This is a kind of solvent inks made by Lyson in England. When the ink is CMYK + Red + Blue, the full name is Lyson LOD Pentachrome solvent-based ink. Pentachrome is this batch of six inks; LOD is the kind of solvents preferred by Lyson.

long-life piezo heads: is not an apt word for Xaar printheads since they have a reputation for failure and need for replacement; however I would accept long-life with Spectra or Epson piezo heads with water-based inks. Epson printheads are not long-life with solvent inks..

low hazard supposedly means ...

low odor: I defy any ink company or inkjet printer reseller whose spouse would allow one of their printers to print 8 hours a day inside their home, in the same room as their children played or slept.

mapping out jets is accomplished routinely by printers using HP thermal printheads. With piezo printheads you rarely see this mentioned

in specs. ColorSpan, however, offers jet replacement on the fly. If one jet is clogged the printer senses that and compensates with another jet on the next pass.

material safety data sheet (MSDS). It is probably required by law to post this for hazardous materials that are used in the workplace as well as to educate workers about the contents of the MSDS for materials that they come into contact with.

media: when inkjet paper has an inkjet receptor coating on it, then the combination of the paper and the coating is called media. In layman's terms, media is pre-coated material any composition that is used in inkjet printing.

MEK, methyl ethyl ketone, a highly volatile substance and probably something you, your spouse, and your children would prefer is not in the inkjet ink you are exposed to every day.

Melamin (plywood?) glues and adhesive materials

mesh Any fabric, knitted or woven, with an open texture, fine, or coarse.

Metamark a brand name of a kind of vinyl that produces outstanding quality with less splotchiness than regular vinyl. Metamark is evidently a British company but seemingly their material is available in the USA too.

Micro-Quad technology, is the house-brand for ColorSpan 72s

mild-solvent **sort of means less solvent (less cyclohexanone) than full strength solvent ink. See also** lite-solvent and eco-solvent.

Mimaki JV2-160II MS, JV2-180II MS, MS=mild solvent. This was the printer introduced probably late 2002 or early 2003, but evidently quickly withdrawn. I have a simple one-page flyer on it, \$19,995 for the basic version (including RIP and PC RIP Server); \$22,995 for the wider model 180. I was told that this class of printer was withdrawn very quickly after the then head of Mimaki USA indicated he felt it would be misleading to advertise such a printer. His prediction was totally correct: both Roland and Mutoh evidently had serious issues with their approximately comparable first generation mild solvent printers (each for different albeit logically both media-ink inconsistency reasons).

modification. If the ad claims “no modification necessary for using an Epson, Roland, Mimaki, or Mutoh printer with our solvent inks,” be wary. A savvy buyer knows that you need modification. These printers lack **pre-heaters**, usually lack a heated **paten** too. These printers probably lack a flush system or a mechanism to keep the print-heads fully functional.

modified for solvent inks: well at least this kind of jerry-rigged printer is better than a non-modified Epson 9000. But when I want a 4-wheel drive vehicle, I prefer to have it factory installed, rather than modified in a local garage. 4WD usually works best with an off-road suspension system, for example. It helps to have wider tires to keep your car’s tender underside from being dragged over rocks.

non-aggressive solvents, a contradiction of terms in my mind. You need an aggressive solvent to bond with raw vinyl. So a non-aggressive solvent means a non-aggressive ink translates into less adhesion and poor abrasion resistance.

nonporous surfaces a glaze makes a ceramic surface nonporous. Any surface that is vitrified is nonporous. surfaces such as glass, ceramic, or metal where the tendency of the ink to absorb slightly or bond with an application is absent.

nozzle plate

organic solvent inks, SolventJet’s name for their current generation inks which are Lyson Pentachrome inks.

overcoating means either **top coating** (with a liquid or spray) or regular lamination with a thin film.

paten

paten heater

Pentachrome ink, trade mark of Lyson, CMYK Red and Blue. See also **LOD** ink.

photo-realistic,

piezo, piezo-electric printhead, a kind of printhead technology used by Brother, Epson, Hitachi, Seiko, Spectra, and Xaar. In essence a piezo printhead uses an electrical impulse to flex the piezo-ceramic **actuator** which, on command by the electrical impulse, changes shape and thereby pushes the ink out of a reservoir through a nozzle to form each inkjet drop. The actuator is PZT (Plumbum Zirconate Titanate, better known as Lead Xirconate Titanate). A piezoelectric material is one that can expand when electricity is applied. The competing and very different kind of thermal printheads are used by Canon, HP, and Lexmark (for Encad). Thermal printheads can’t handle solvent ink, so all printheads used with solvent ink are piezo technology.

plotter, what is the difference between a plotter and printer? A decade ago architects and engineers used “pen plotters” to print their CAD drawings. A mechanical pen, with black ink, did the drawing. Hewlett-Packard was the leader in pen plotters for CAD drawings in those years.

When Encad and other companies showed how inkjet printheads could be controlled by similar mechanisms as worked for years on pen plotters, wide format inkjet printing was born. Today old-hands at HP still refer to their machines as plotters and to the printheads as pens. But this is not the terminology you should learn. The correct word is printhead, and the proper term is printer, not plotter. Today the term plotter sometimes refers to a vinyl cutter. In the wide format printing industry, most old-timers at reprographic shops still refer to any machine that prints CAD images as a plotter, even if the machine is a normal inkjet printer to the rest of us. Using the word plotter for a wide format inkjet printer is not bad, it is just a tad dated, and not really correct in the sense of the mechanical technology employed.

post-heater is the heater after the substrate has been printed. So it is a post-printing heater, to help the solvents to evaporate off and leave just the pigmented colorants. Some printers have a post-heater, such as Mutoh and hence Agfa Grand Sherpa Universal; many other printers have just a set of fans.

pre-coat means to put an **inkjet receptor coating** on a material, such as to help mild-solvent ink interact with some materials..

preheat, Skyton claims to preheat the ink. Most systems preheat the vinyl and then heat again to dry it. I will have to do more research to compare and contrast the value of heating the ink as well as the vinyl itself.

pre-heater is to open the pores of the media to better receive the ink. Ideally there should be three heaters: pre-heater, **platen heater**, and **post-heater**.

pre-print, "Heated media pre-print and print areas" (ColorSpan 72s) is translated in their own brochure, "maintains uniform surface temperature across printing area to control dot gain on various media."

printable area is normally less than the full width of the media. Epson is one of the few printers that offers flawless edge to edge "borderless" printing. Thus the Mutoh Rockhopper 38 (the European version of the Mutoh Junior in the US), accepts media that is only 37.55" wide and prints only 36.77 inches wide. So by the time you trim it down you really have less than 37 inches. So calling it a 38-inch printer is a slight exaggeration.

productivity, jargon for printing enough, fast enough, to be productive. If you are not productive compared to your competition you may not be able to compete. Epson models 7000, 9000, Roland Hi-Fi Jet PRO, Mutoh of that generation suffered from the slowness of their piezo printheads which reduced their productivity. Plus banding, when and if it occurred, necessitated repeating the entire print, after spending time, energy, and money flushing ink through the system to purge whatever caused the heads to cease printing. Today, dual CMYK on the Mutoh Falcon II, dual six colors on Mimaki JV4 and Roland Pro II should bring these piezo printers above their previous slow crawl.

production mode, variously defined. May be fastest mode, in which case output is probably junk which picky clients would not accept. But on some printers production mode is the bare minimum that is acceptable by clients who want low price over high quality. For Océ, draft or billboard is the fastest mode; production is middle; high quality is their best mode. It is usually the number of passes which makes the difference. Draft may be **2-pass**, mid-range may be 4-pass, better quality may be 6-pass.

pseudo-solvent ink is my designation for anything but true full-strength solvent ink. Eco-solvent, mild-solvent, and lite-solvent are all pseudo-solvent in their own way.

purge, to forcefully pump lots of ink through a system to try to get rid of air or other impurities or clogging of an ink line or printhead. If you are

purging the printhead you may then need to wipe it clean. This tends to be done automatically. Purging takes time and wastes a lot of very expensive ink. You may have to purge six or more times in immediate succession.

rewind unit is rarely found. One is pictured in the Gandhi Innovations brochure. A rewind unit allows you to wind from one core to another, or when printing on both sides.

RIP, Raster Image Processor, a kind of software that is used to run inkjet printers and other devices. We have a complete glossary on RIPs, so please see that chapter.

rocket speed, a claim by an American rebranding of a Korean solvent ink printer. A rocket would never leave Earth's atmosphere if it moved this slowly. The same brochure claims "ultra high speed" printing in 8, 4, 2, and 1 pass mode. The quality at 1 pass mode would most likely be junk. "Blazing speed," claimed by Roland, is also misleading because Roland is among the slowest of the printers (because it uses Epson piezo printheads). The reason the claims are actionable as seriously misleading is because you do not get the high quality (that the same ads claim) when you print at the machine's fastest speed. Besides, even the fastest speed of a Roland is hardly blazing. Rocket speed is even more misleading. Most printers with Epson heads, at high quality mode, can best be said to be "less slow than their own previous generation printer." None of these printers are really fast until you use dual CMYK in which instance you don't get the benefits claimed for 6-color high quality mode. So the ads verge on bait and switch. You are baited by high quality, but switched when you find out you get the worst quality the faster you attempt to print. These problems are not limited to Roland; Canon, Encad, and HP are not able to produce their best quality at their fastest speed either. But no solvent ink can pass through the Canon, Encad, or HP thermalprintheads.

roll lifter, Gandhi Innovations offers a wheeled gizmo to allow you to lift the heavy rolls of substrate from the floor up to the printer.

roll to roll vs sheet-fed **flatbed**. Roll to roll (or reel to reel) means paper, substrate, material, or media which is wound around a cardboard core and delivered as a roll of material. Your printer has to have a mechanism to hold these rolls. In distinction a flatbed printer is a flat table to print on rigid and often thick materials that cannot be wound around a reel. Many printers are hybrids or otherwise take both rolls of media and flat rigid thick materials as well.

roll to sheet is an unusual method used by some Scitex Vision printers. A flatbed printer would tend to print sheet to sheet.

SCSI, pronounced Scuzzy, is a form of connecting computer peripherals that was popular in the 1990's. SCSI is very fast but the cables have to be very short. Also, you absolutely have to turn all peripherals off before you can connect a SCSI cable. If you connect a computer with a peripheral while both are turned on, you can damage both, seriously. There are many sizes and shapes of SCSI connectors. You have to

scratch resistance is a problem with most inkjet prints but especially for eco-solvent and UV-curable inks on some surfaces.

service station, is the area where the printhead will be cleaned and serviced either on the fly while in use, or where the printheads will be parked when the printer is not in use.

signage, generalized word to lump together all kinds of signs. A representative list of diverse kinds of signage is presented in the Appendix to this PDF.

SolaChrome is the house brand of the solvent ink from ColorSpan for their 72s printer.

solvent (*noun*)

The component of an ink formulation which dissolves the other constituents such as dyes, humectants, etc., to form a homogeneous liquid. "Any dissolving, thinning or reducing agent."

solvent ink implies the colorant is carried by a vehicle, in this case "solvents." In water-based ink the vehicle is water (and lots of other chemicals). I list here the solvents that one web site happened to list; this was the first site I landed on and the list looks useful. You can acquire a full list from any MSDS. www.inkjet.com.au/Technical%20Bulletins/Techbulletin0006.ht

Solvent	
Methanol (Methyl Alcohol)	
MEK (Methyl Ethyl Ketone)	
Ethyl Acetate (Acetic Acid Ethyl Ether)	
Acetone (Methyl Ketone)	
Ethanol (Ethyl Alcohol)	

solvent flush is the solvent cleaning fluid that large production solvent ink printers have to use to flush out stuff that might block the ink lines or printhead nozzles. see **ink flush**

Spectra, a brand of piezo-electric printheads. Expensive but considered as long-lasting and of a high quality. Several printer manufacturers have started out with Xaar printheads (the original Durst Rho, pre-production model of Mutoh solvent ink printers), but then switched to Spectra.

speed vs quality trade off. Every printer manufacturer and reseller list their top speed and their top quality. Most manufacturers and resellers blissfully fail to warn buyers that you can never achieve the hyped speed with the claimed quality. The truth is that the faster you print, the worse the quality becomes. The reason is because to achieve quality the printheads must go back and forth, back and forth, over the same area, micro-weaving dots to make up for defects in the first pass. A Roland must make 32 passes to achieve its top quality.

Well 32 passes in a Roland can mean a single print takes up to an hour. If you are supposed to

be printing 73 copies of a job, obviously you will be heading for bankruptcy if it takes 73 hours to finish this one job. Besides, half way through the printer may start to band, or a color may drop out.

So there is a trade off relative to speed compared with quality: the best quality is at the slowest speed. Besides, the output at the fastest speeds looks like junk. This output is usually so poor that it wastes your ink and media. I can't imagine that sign shops use this speed even for proofing, because the appearance is so awful you can't use it to judge how the final print will appear anyway.

So if you want the truth, take the slowest speed. That is what you are stuck with. And a final comment, you can forget about 2880 dpi and 5760 dpi. Those dpi claims are pure nonsense. Most media can't hold that much media without cockling. Most Epson printers can't print these dpi ratings anyway (again, the media will not hold that much ink). The sole purpose of these phoney numbers is to bamboozle you into thinking the printer is better than a manufacturer who either is more honest or whose printheads don't attempt to produce what you can't use anyway.

spit gutter, sort of a spiton at one edge of the printable area, where the printhead automatically jets at least one drop of each color. The purpose is to keep the ink flowing in all printheads even if the design does not call for that particular color. If you had a large white field, and widely scattered letters of pure magenta, your black, cyan, and yellow inks would not be printing. As a result the K, C, and Y ink would tend to clog the nozzles as the solvent evaporated or otherwise dried out.

spitting ink is what the printhead does when it attempts to purge out air or other impurities which may be blocking the printhead. Spitting is done while at the **service station**

substrate is the material on which you print. If a material consists of several layers, the substrate is usually the main layer, towards the bottom.



sub-tank is a feature on some solvent ink printers such as the Infiniti FY 6250SL where the ink is pumped from main ink tank to an ink sub-tank.

suck. There are several ways to keep a solvent ink system clean: one is to force ink out the nozzles by purging. Of course this is expensive because you waste ink. The other manner is a vacuum suck, where the ink system is not pushing, but the printer service station has a vacuum cap that is sucking. I call the two systems "Vaccum / Suck" vs "Spit / purge & wipe." There may be variants, where it vacuum sucks and then wipes. We constantly add fresh facts as we return from field trips to gather documentation.

suction, head suction cleaning, sucking on the heads as opposed to pushing ink out. The purpose of both suction and purging is to get the debris, clogs, and other defects out of the nozzles so that the ink can jet properly.

Tiara Opal 43 and **Tiara Opal 63**, are retrofitted Mutoh Falcon Outdoor printers. This Mutoh is called a Rockhopper in Europe. This original Opal has been replaced by the Opal II.

Tiara Opal II, 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. Uses the original Epson printheads of the Mutoh.

Tiara Ruby, a 43" printer, the 43" version of the 62" which is the Tiara Opal. This would conflict with the Tiara Opal 43, so we will have to ask Lyson to explain their nomenclature.

Tiara Sapphire is a printer model based on a Seiko printer that originally used oil-based inks. Tiara fixes the printer so that it takes Lyson Pentachrome 6-color inkset.

top coating means different things to different industries. Normally it implies lamination, whether by liquid spray or varnish or glazing. The other meaning is an inkjet receptor coating, since this is usually the top coating layer in inkjet media. May also be spelled topcoating, especially when it means an inkjet receptor layer. However in most contexts, top coating means a lamination-like material.

true solvent, now that **pseudo-solvent** ink has been foisted on the public, the printer manufacturers that still use traditional solvent ink have to be sure they designate theirs as true solvent.

ultrawide, is not generally a standard term, but would mean super wide.

uncoated material would be raw vinyl or any material that has no ink receptor coating. A primer or any other pre-treatment implies a manufacturing cost, hence uncoated material is inherently less expensive than coated material. see also **coated material**, which should be called **media**

UV-curable ink is used primarily in industrial sized flatbed printers. UV-curable ink is more costly, as are the printers themselves. Advantage are fewer VOCs, less odor, and you can print on more materials without pre-treatment. But there are issues of adhesion and abrasion resistance. FLAAR has an entire Series on UV-curable ink flatbed printers available on www.wide-format-printers.NET.

vacuum system, vacuum cleaning system. Some printers clean themselves via a purge by forcing ink out. Other printers are cleaned by sucking the ink with a vacuum while the printheads are parked at the service station. I have never seen an independent laboratory tests which reveals whether vacuum suck is better than purge, spit & wipe.

vacuum table is an optional part of a printer. A cheap entry level printer would tend not to have any vacuum table. A vacuum table has little holes in it that use vacuum sucking pressure to hold down the media or material. The vacuum table is placed where the media goes over. This is the area where the printheads pass back and forth. It is essential that the substrate in this area be as flat as possible, both to avoid headstrikes as well as to control the distance from the nozzles to the substrates.

variable drop; thermal printheads can eject only a drop the size that is specified by the orifice of the nozzle. But some piezo printheads, most notably those of Epson, can create drops of variable size from the same printhead. The size varies on the fly, controlled by software. Roland is generally credited with being the first company to generate variable drops from an Epson printhead. Epson itself, Mutoh, and I would guess Mimaki also very quickly copied the Roland concept in their next generation printers.

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venting means exhausting unhealthy VOCs or nasty odors to outside your office or workspace. Venting is what you need to do with any and all forms of solvent ink printers, whether “mild” solvent, lite-solvent, eco-solvent, other pseudo-solvents or full solvent. I commend Océ for noting that some of their printers require venting to outside

vehicle wrap is essentially the same as bus wrap but “vehicle” wrap is a more generic term. But **fleet graphics** can include truckside advertising which is not, technically speaking, “wrap”

vinyl, polyvinylchloride **PVC**, can stretch slightly so is useful to conform to rivets and other comparable parts of vehicles that need to be wrapped. Other materials such as polyester can't conform (stretch) as well.

the univalent chemical radical CH_2CH obtained from ethylene; a tough flexible synthetic thermoplastic; also referred to as polyvinylchloride.

viscosity. High viscosity is a thick ink that is not fully fluid. Honey or syrup might be considered to have a medium viscosity. Low viscosity means a free flowing “thin” liquid.

vision film. What is normally intended is one-way, see-through vision film, namely bus wrap that goes over the windows. Of course you can also desire vision film for windows of an office building or car dealership. The material is usually

PCV. A good definition and description is found on www.clearfocus.com/faqs.html. May also be called simply window vision film.

But vision film may be defined differently depending upon printer, ink, and vendor. The Noritsu Mytis dye sublimation printer offers white vision film in matte and glossy as well as backlit vision film. Their use of the term is atypical.

VOC emissions, Volatile Organic Compounds. Volatile means the substances turn into another form, in this case into a vapor. Although even some water-based inks may have some VOC emissions, it is primarily true solvent or mild solvent inks that have lots of these nasty volatile organic compounds. VOCs are unpleasant for health of humans and the environment also. Eco-solvent inks are supposed to have no VOCs. UV-curable inks have low VOC emissions. VOCs have several unpleasant effects; one is they help in forming ozone. Some EPA info on VOCs and HAPs is available in www.pmai.org/environ/library/pdf/CAA_Digital_Imaging.pdf.

VinylJet, from Encad, a Kodak Company.

waste ink tank; some printers spit or purge out so much ink to clean their nozzles that these printers need a waste ink tank to hold the expelled ink. Allegedly the waste ink tank in Epson printers pre-2003 had to be changed by a technician, an expensive and unpleasant event.

wipe, as in “**spit, purge, and wipe**,” a cleaning routine. The printer spits a small amount of ink or purges a larger mass of ink. Hopefully this pushes out any impurities or dried ink. But some of this gunk may remain on the nozzle plate, so a **wiper blade** is used in more sophisticated systems to wipe off the printhead.

wiper blades are used to clean gunk off the printhead nozzle plate at the end of a purge and wipe session.

Xaar is a company in England which makes industrial piezo printheads. Xaar printheads are competitors of Spectra, Hitachi, Toshiba Tec (TTec), and to a slight degree a competitor of Epson. Whereas Epson and Spectra piezo heads last a long time (often years), Xaar heads have the reputation for not lasting very long. But Xaar holds most of the patents for industrial piezo printheads, so the company survives despite the weak features of its heads. Seiko, Konica, and Brother have used Xaar patents to make printheads that produce better quality than Xaar’s own heads, so there is hope that Xaar itself will improve the output quality of their own heads. **Xaar** printheads. Tend to be low dpi, since not much dpi is needed for billboards or anything seen at a great distance. The typical Xaar head of circa year 2000 had about 180 dpi native resolution.

Appendix A

Common Kinds of Signs that your Print Shop can Sell

Signs can be employed in the following situations

- advertising signs,
- balloons
- directional signs,
- displays
- exhibits
- safety notices,
- identification,
- Recognition of achievement, such as “employee of the month”
- Display of mottoes, logos for brand identification
- inflatable graphics
- promotional signs,
- aisle markers,
- floor graphics (be sure to have anti-slip lamination, and insurance...)
- seasonal, holiday themes (Christmas, Easter rabbits, etc).
- sails on sailboats
- stadium signage (see event signage, spots signage)
 - o Sponsor signs at sports events
- display window, storefront
- poster,
- pole signs, may also be classified as pole banners
- POP, point of purchase, also known as Point of Sale
 - o sales,
 - o specials,
 - o bargains,
 - o prices,
 - o promotions,

- counter displays,
- floor graphics
- mobiles,
- warehousing signs,
- packaging, including proofs
- tradeshow signage is an industry into itself

Sources and Resources

Also check out the multitude of glossaries cited in the bibliography of the FLAAR glossaries on

- General inkjet printing
- UV-curable inkjet printers
- Giclee inkjet printing
- Glossary of inkjet media
- Glossary of RIP software for inkjet printers

http://bcc.ecnext.com/coms2/summary_0002_002381_000004_000016_0002_1

Lists of publications; no glossary, but lots of jargon that needs to be described.

www.decotechgroup.com/library_docs_html/tech_bull_pp_glossary/tech_bull_pp_glossary.htm

A glossary of common terms used in pad printing. No illustrations.

www.physikinstrumente.com/tutorial/4_7.html

“New Piezo Tutorial.” A glossary of a dozen succinct terms relative to generic piezo technology.

www.seyboldreports.com/SRPS/free/0ps24/P2412009.HTM

Describes a Vutek digital airbrush printer, 1996.

www.signware.com/technology.html

One page illustrated glossary of a printhead. However they do not identify whether it is a Xaar or Spectra, nor which model number.

www.wide-format-printers.org	www.fineartgicleeprinters.org	CLICK HERE TO VIEW EACH FLAAR NETWORK SITE
www.digital-photography.org	www.flatbed-scanner-review.org	
www.laser-printer-reviews.org	www.cameras-scanners-flaar.org	www.large-format-printers.org
www.FLAAR.org	www.ctpid.ufm.edu.gt	www.wide-format-printers.NET

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handle a basic PDF file.