



**PRINTING INDUSTRIES
ASSOCIATION OF AUSTRALIA**

Reducing VOC solvent use in the Printing Industry

A report on the availability, suitability and use of products which reduce air emissions in the Printing Industry

- **LOW- VOC SOLVENT AND NO- VOC SOLVENT SOLUTIONS ARE WIDELY AVAILABLE**
- **IN SOME INSTANCES, APPLICATION AND COST PERFORMANCE IS SUPERIOR**
- **BENEFITS FOR HEALTH & SAFETY AS WELL AS FOR THE ENVIRONMENT**
- **LISTING OF SUPPLIERS & PRODUCTS**

DISCLAIMER

This report mentions many proprietary brand names of chemicals and equipment. No endorsement is implied in any way, these products are named to assist in the understanding of issues relating to VOC emissions in the printing industry.

Report prepared in consultation with the **NSW Environment Protection Authority (EPA)**.

Research conducted for the **Printing Industries Association of Australia** by Andrew S McCourt, Industry Consultant.

Why we need to look at VOCs used in print

Exactly what are VOCs and what do they do?

VOC stands for *Volatile Organic Compounds*. Almost all are derived from the petroleum distillation process and are used as solvents, drying agents and cleaning agents in various printing processes. Press and blanket washes contribute the greater part of the industry's VOC emissions but plant-derived alternatives do exist.

Emission of VOCs lead to the formation of photochemical smog (ozone) by reacting with oxides of nitrogen, other pollutants and sunlight. Photochemical smog affects human health. A number of VOCs are considered to be hazardous air pollutants, e.g. Toluene, MEK etc. Many plant oils can be used as vehicles for pigments in ink. In fact, prior to the early 1960s, linseed, soy, corn and canola were common ingredients in ink. Petroleum products were substituted on a large scale from the early 60s on, primarily because presses were running faster and needed shorter drying times. However, modern technologies, such as UV/EB curing, do enable fast drying times using plant-derived or aqueous inks and coatings.

Pollution is caused by the evaporation of organic solvents. Organic solvents evaporate at different rates. The vapor pressure of a solvent will indicate how quickly it will evaporate. A high vapor pressure solvent will evaporate quickly (eg. toluene).

MONEY UP IN SMOKE?

Case studies both in Australia and overseas clearly show that many solvents used for press washing and in fountain solutions lose up to half of their volume before they even get to perform the work they are intended for. For example 40-50% of IPA (**Isopropyl Alcohol**) employed in alcohol dampening systems evaporates in the fountain. Similar volumes of press cleaning solvents will evaporate before any cleaning function is accomplished. IPA substitutes and reducers have proved to be just as effective as wetting agents but more economical in use since almost 100% of the substance performs the work it is intended to do. Added to this is the greatly reduced risk of fire due to the higher flashpoints of non-VOC chemistry, leading to low insurance premiums.

- 1) Toluene
- 2) Methyl Ethyl Ketone (MEK)
- 3) Glycol Ethers
- 4) Xylene (mixed isomers)
- 5) Tetrachloroethylene
- 6) Methyl Isobutyl Ketone (MIBK)
- 7) Methanol
- 8) 1,1,1-Trichloroethane (TCA)
- 9) Dichloromethane
- 10) Ethylene Glycol

Product categories and alternatives

CATEGORY	VOC REDUCING STRATEGIES
Fountain Solutions & IPA Alcohol	Use IPA reducing or alternate chemistry. Use mechanical IPA simulator. Switch to waterless offset. Cover all IPA containers
Blanket & Roller washes	Use reduced VOC chemicals, or non VOC citrus and other plant-derived cleaners. Allow longer drying time. Install automated, enclosed washing system.
Dampener Roller washes	Use reduced VOC chemicals or mechanical water-jet methods of dampener cleaning
Deglazers	Use organic deglazers and enjoy longer roller life, quicker start-up after shutdown and improved quality
Offset Inks	Change to vegetable-based process inks. Pantone colours are becoming more widely available also. Newspapers can use Soy based inks easily.
Flexographic Inks	Cover all ink and reducer trays. Switch to water-based inks. Install UV/EB curing. Clean aniloxes with non-solvent 'mico-clean' method. Can reduce VOCs by 60%
Gravure Inks	Consider water-based packaging gravure. Capture all fugitive emissions and recycle or oxidise. Consider switching jobs to Flexography. Can reduce VOCs by 70%
Screen Process	Centralise stencil wash-up. Investigate Computer-to-Stencil technology. Consider inkjet alternative & UV
General cleaners, & degreasers	Switch immediately to citrus and vegetable-based products for lower costs, superior performance, improved worker health & safety and non-VOC liability.

How can VOC use be reduced without harming print businesses?

- **You can make a difference starting today!**
- **Save money in material, insurance, worker safety and compliance costs**
- **Old habits die hard! Persevere with reducing VOCs. Everyone benefits.**

There are several ways that VOC emissions from the printing industry can be reduced, and indeed are being reduced. There is no 'perfect answer' since the diverse nature of printing processes, finishing techniques and substrates – both paper and non-paper based; dictates many possible solutions or combination of solutions. One, or a combination of several, of the following strategies will result in a reduction in VOC emissions and possible cost savings as well.

When VOC products are reduced, many cleaning substitutes are more efficient (eg. vegetable, citrus or water based): less is needed and costs are lower. Often less cleaning is needed, so there is less down time for changing between print runs. Where substitute inks are used, cleaning solutions with less/no VOCs and less toxins can be used.

(1) DIRECT SUBSTITUTION

This is where a chemically identical plant-derived biochemical is substituted for a petrochemical. Because the chemical is identical in its molecular structure, the benefits are limited to the way in which it is produced from a renewable resource. As a comparison, the chemical Phenol which is used in the printing, plastics and textile industries, can be produced from plants as well as from petroleum. However, when it is produced from crops, bio-phenol generates 80% less pollution than when it is made from petroleum.

(2) INDIRECT SUBSTITUTION

This is where a functionally similar, but chemically different plant-derived chemical replaces a petrochemical. An example of this is d-limonene derived from citrus fruits, which is an excellent substitute for petroleum based solvents such as TCA. D-limonene is so safe that it is used in hand washes such as Permatex 'Fast Orange' distributed by A E Hudson.

(3) PARTIAL SUBSTITUTION

As the name suggests, this is where some VOCs are still used in a chemical or ink mixture, but in reduced volume. Often plant-derived chemicals are used in combination, virtually all Soy-based inks contain some petroleum-based content. These hybrid products can still have a dramatic effect on reducing VOC emissions, whilst maintaining on-press performance. IPA alcohol reducers used in fount solutions are a good example of partial substitution, such as the Eurowet, Sprint Plus and Apex fount solutions from DS Chemport Australia. High-flashpoint (61C +) chemistry also limits VOC emissions.

(4) PRODUCT SUBSTITUTION

This means actually replacing a petroleum derived end product with a biological end product . 100% vegetable-derived inks are available and

improving all the time and much research is being conducted with water-based inks which require UV or EB radiation curing in order to polymerize the pigments. In the packaging industry, starch-based polymeric materials can be used as substitutes for petroleum-derived film substrates and plastic containers, virtually eliminating pollution at all stages of the product's life cycle. Virtually all adhesives can now be water-based.

(5) PROCESS SUBSTITUTION

A very significant way in which VOC emissions can be reduced is by adopting completely new methods of producing print, which by their very nature do away with the use of many VOC petrochemicals. Such a process substitution is **Waterless Printing**. Waterless printing facilitates the use of vegetable-based inks. There are other environmental gains with waterless printing.

- No water/alcohol fountain solution needed
- Dot gain is greatly reduced
- Jobs are completed more quickly, there is less paper waste
- Quality of colour on recycled stocks is better
- Higher ink densities because ink is not diluted with alcohol reducer
- Higher screen rulings possible –up to 800lpi

Sydney printer The Pot Still Press has adopted waterless printing (see case study). Most multi-colour presses manufactured today are 'waterless-ready' and older presses can be retro-fitted with the necessary temperature controlled roller technology. Waterless printing is better for recycled paper.

Waterless printing is featured on the Heidelberg QuickMaster 46 Di A3 size press which uses Presstek 'PearlDry' plates. These plates provide an added environmental advantage in that they require no chemical processing thus eliminating VOC and other emissions from developers and fixers. This technology is finding its way onto larger B2 presses, such as the KBA/Scitex Karat 74 rated at 15,000 sheets per hour.

Another process that can replace conventional printing is **Digital Printing** market. The market for this process is still emerging. This process is currently fairly slow, but suited to short-run colour jobs, digital printing eliminates most of the intermediate VOC-emitting stages altogether. Toner-based digital printing from companies such as Xerox, Canon, Xeikon, Agfa, Océ, Barco, Ricoh and IBM, use no ink or plates. The colours are applied using electrostatic technology and then fused onto the paper with heat. With ink-based digital printing such as that from Indigo and Elcorsy Technology, again VOC emissions are drastically reduced.

The Elcorsy web printing press previewed at IPEX 98 and to be ready for market in 2000, offers enormous environmental benefits. Not only does this technology use no plates – its hard steel central impression cylinder is rated for 50 million impressions – but Elcorsy uses 100% alcohol-free polymeric water-based ink requiring no heat curing as it dries almost instantly following transfer to the paper. The cleaning of impression cylinder between rotations is accomplished with jets of water and soap only, thus eliminating VOC emissions for clean-up too. The Indigo E-Print A3 series of presses use ink containing a low-VOC rating solvent known as Isopar-L. No alcohol or water is used in the press and all excess ink and oil is reclaimed and recycled within the machine itself.

Flexographic printing is already succeeding as a substitute for wet offset in the folding carton market. Flexography lends itself to the successful use of water-based inks and lacquers, which have the added benefit of eliminating taint and odour from food packaging in particular. UV/EB curing of inks almost totally eradicates VOCs from Flexographic printing.

In the global printing industry, only Flexography and Digital printing are increasing their market shares, which bodes well for certain VOC emission reductions.

(6) MECHANICAL SUBSTITUTION

This is where a washing/cleaning process previously involving chemicals is supplanted by a mechanical method. Examples of this include the Micro-Clean system distributed in Australia by Aldus Engineering. Micro-Clean is designed for anilox inking rollers, used mainly in the print converting sector, which are traditionally cleaned by scrubbing with solvents. Instead of solvents, Micro-Clean fires thousands of microscopic polymer beads at the roller surface, scouring the hardened ink particles off, which are then extracted by an 'air-wash' system for normal disposal. The beads are re-usable up to about 100 washes and are then replaced. This method actually cleans more efficiently and prolongs roller life. One US printer has calculated over \$400,000 in savings since switching to Micro-Clean. For offset dampener roller cleaning, two mechanical products appear to be available on the Australian market. The Unigraph "Water Claw" from A E Hudson Pty Ltd requires no plumbing yet cleans rollers with a high pressure water jet, the effluent of which is filtered and recycled. A similar product is the "SpeeDeeKleen" from Seaga Pty Ltd, which cleans dampeners in about 30 seconds. Both units claim to condition the rollers, thereby extending their life and saving further costs. A 3-month study by Brisbane City Council showed estimated savings of \$31,820 per annum in their printshop (see case study).

An often overlooked mechanical substitution is the press itself. Old, worn presses require much more alcohol to cover up press problems by diluting the ink more. Heidelberg estimates that a B1 press operating on two shifts consumes about 3,000 litres of IPA at 8% dilution per annum, plus another 1,200 litres of additives at 4% dilution. Poorly maintained and older presses can require up to three times these amounts.

(7) CAPTURING FUGITIVE EMISSIONS

Technologies are available to capture emissions that would otherwise become fugitive, i.e. escape through windows, vents, doorways etc. Using extraction techniques, the air is 'scrubbed' of the solvent gases which are then incinerated or sometimes recovered and re-used as cleaners. However, it is the opinion of many international printing authorities that it is better to reduce the emissions in the first place and avoid expending energy and capital on air scrubbers and incinerators.

SUMMARY OF VOC OVERVIEW

- VOCs are Volatile Organic Compounds derived from petroleum
- They are present in press chemicals, cleaners, adhesives and inks
- Press chemicals and cleaners are the major source of VOCs
- Reduction and substitution will result in cleaner air and safer work
- Alternatives exist and are readily available in Australia.

COST BENEFIT FOR LOW/NON-VOC ALTERNATIVES

CHEMICAL CATEGORY	COST FACTOR PER LITRE	ACTUAL BENEFIT IN USE
High Flashpoint (61C+) Blanket & Roller washes containing some VOCs	+15% to +73%	Little or no loss to evaporation. Very low fire risk. Less chemical used. Improved worker health & safety. Overall, no price penalty.
IPA reducers and eliminators	Approx. same as normal fount	Eliminates up to 50% loss of IPA before it does its job. No fire risk. Lower insurance premiums. Overall cost saving
Vegetable & Citrus-based blanket, roller & general washes	+200% to +250%	Very much less is used and none is lost to evaporation, therefore as with all concentrates, can cost less to use. Longer drying times need to be anticipated. Roller life is extended due to conditioning effect. No fire risk and excellent for worker H&S. Lower insurance premiums.
Vegetable-based offset inks	Same or +8%	Better quality print. Superior hold-out, no separation of pigments, better storage and low odour.
Water-based Flexo and Gravure Inks	Same or less	Enables elimination of Toluene etc. No taint or odour for food packaging. When used with UV/EB curing, best colours possible. No fire risk. Excellent worker H&S. No govt. compliance costs. Overall cost-reducer and client pleaser.

CASE STUDY # 1

VEGETABLE-OIL INKS LOWER VOCs AT MERRITT MADDEN PRINTING

Company: MERRITT MADDEN PRINTING
Location: Waterloo, NSW
Ownership: Merritt Madden
Employees: Approximately sixty
Field of endeavour: Printing of high quality general commercial print

Merritt Madden Printing is a leading general commercial sheetfed printing establishment in Sydney's industrial hub of Waterloo. Under the stewardship of Production Manager Rein Stohr, Merritt Madden has almost eliminated mineral oil-based inks from its presses, with only some special Pantone colour inks remaining mineral-oil based. Monthly usage is approximately 400Kg of vegetable-oil based ink, 75-80% of the total ink used.

Merritt Madden uses only larger-format presses and vegetable-oil ink is used on all of them:

1 x Heidelberg Speedmaster 102 5-colour	(102cm wide)
1 x Komori Lithrone 640 6-colour	(„ „ „)
1 x Komori Lithrone 440 4-colour	(„ „ „)
1 x Komori Lithrone 426 4-colour	(66cm wide)

INK SUPPLY

The vegetable-based inks used at Merritt Madden are manufactured by K+E in Germany under the NOVAVIT F908 BIO brandname. K+E is owned by BASF and the Australian distributor is Printing Technologies Pty Ltd.

“We changed from mineral solvent-based inks to K+E vegetable based primarily because of higher quality and printability. Reduction of VOC emissions is important and will become more of an issue, so it is good that we can achieve both higher quality and lower VOC emissions for no extra cost,” commented Rein Stohr, who has nothing but praise for the benefits of vegetable-oil inks which include:

- No price penalty – cost is same as for most mineral oil inks
- Batch consistency with Novavit F908 – inks remain more stable when stored
- Low scuff – scuffing can ruin good printing and Novavit F908 is scuff resistant
- No adjustment to press chemistry needed – Novavit F908 introduced without any major changes to press, operation or work practices
- Stable pigments – solvent ink pigments tend to ‘separate’ from carrier and move to the surface, but not with Novavit F908. Ink also stays ‘open’ longer.
- Superior performance when adding a coating after colours laid down.

DRYING TIME

According to Rein Stohr, Novavit F908 does require slightly longer time to 'set' or dry, but this presents no practical problem when a system of putting printed jobs aside for minimum times is implemented. His estimate is that Novavit F908 takes 15% to 20% longer to dry than most solvent-based inks. However, he is quick to emphasise that the improvements in print quality easily outweigh this longer drying time in importance.

Merritt Madden runs its fountain solutions with IPA alcohol at a low 8% and is currently testing various alcohol reducers and eliminators.

"Low and non-VOC chemicals are improving all of the time," says Mr Stohr, "and we will always test them and, if they meet our quality requirements, we will use them."

THE FUTURE

Merritt Madden's successful implementation of vegetable-oil based offset inks demonstrates that quality colour printers need not make major changes or investments in order to achieve a lowering of their VOC emissions. Whilst the range of Pantone colours currently available from vegetable-oil ink manufacturers is not as comprehensive as for mineral-oil inks, this is about to change.

German manufacturer Hostmann-Steinberg, part of the Huber Group, is about to introduce a broad range of Pantone colours with 100% vegetable-oil content from mid-late 1999. CPI Graphics is the distributor for Australia. Hostmann-Steinberg already offers some inks with between 50% and 60% vegetable-oil content.

"The addition of Pantone colours will enable us to totally eliminate mineral-oil inks based on non-renewable resources from our inventory," says Mr Stohr, "providing they deliver the quality and printability we require."

With its ink strategy, coupled with ongoing testing of IPA reducing fountain solutions and non-VOC blanket/roller/dampener washes as well as general cleaners and degreasers, the future for lowering VOCs at Merritt Madden looks very bright. There are additional benefits as detailed by Rein Stohr:

- **A better-smelling and safer workplace**
- **Use of low-flashpoint inks and chemicals reduces fire risk**
- **Possibility of lower insurance premiums as a result of less risk of fire**
- **No compliance or reporting costs when VOC emission becomes regulated**
- **Shorter make-ready times and therefore less paper waste because ink/water balance can be achieved quicker with more stable vegetable-oil inks.**
- **Quality and consistency improvements, happier customers.**

ENDS

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CASE STUDY # 2

WATERLESS PRINTING AT POT STILL PRESS REDUCES IPA ALCOHOL & OTHER VOCs

Company:	POT STILL PRESS
Location:	Artarmon, NSW
Ownership:	Part of the IPMG (Independent Print Media Group) Pty Ltd
Employees:	Approximately thirty
Field of endeavour:	Printing of high quality advertising and corporate print

Pot Still Press is one of Australia's renowned quality sheetfed litho printers. Established in the late sixties as a father-and-son business by the Gaze family, Pot Still has grown to occupy a 6,000 sq. ft. factory in Artarmon housing 2 x Heidelberg KORDs, a Heidelberg GTO-2, a Heidelberg Platen and 2 x Heidelberg Speedmaster/CD 102 6-colour presses. It is one of these presses, the Heidelberg 102CD that has been converted for waterless printing.

To recap on the process, waterless printing does not require traditional ink/water/alcohol dampening since the 'rejection' area of the printing plates is silicone-coated and ink viscosity is controlled by temperature rather than solvents. It was invented by 3M and named 'Driography' but commercialised by the Japanese Toray company. In Japan, approximately 25% of all printing is by the waterless method.

Pot still was a traditional offset shop, albeit a very high quality one, prior to the introduction of waterless. The ability to offer waterless printing has further improved the quality of printing Pot Still is able to offer. This is because higher screen rulings and higher ink densities are possible with the waterless method. The bonus of being environmentally more friendly and reducing VOC emissions, as well as printed waste, has been well accepted.

PERSEVERENCE PAYS OFF

The driving force for Pot Still's entry into waterless printing was print operations manager Ross Clark who freely admits that the main motivation was to produce better quality results, rather than to reduce VOCs. "Quality is always our main concern, with the environment coming a close second," explains Clark. "We have put four years of R&D into ways to reduce alcohol use (and therefore VOC emissions), and even on our non-waterless presses, we are running with much less alcohol than the average printer. We run alcohol-free on our smaller presses and reduced alcohol on the larger ones because the dampening systems are more complex."

The investment in waterless technology was initiated when Pot Still won the contract to print the award-winning *Best of Australian Geographic Photography*. This superb book for the Australian Geographic Society contains the best images from its library and probably would have been printed in Japan if a local high quality waterless printer could not be found. A team of four; Ross Clark, Andrew Hill, Greg Denning and Doug Alexander spent months

researching and testing waterless technology, creating a 300 lpi test forme to be printed conventionally and waterless to compare results.

The 102CD press was purchased in 1996 with global temperature control already fitted. The next step is to install zonal temperature control for precise plate temperature, and to experiment with ultra-high resolution stochastic screening with waterless. Vegetable oil inks have been tried with mixed success but, as Ross Clark says, these are improving all of the time and will be tried again. Printers using waterless are able to match the proof and start the press run much quicker since tricky water/alcohol dampening set up is eliminated.

COST FACTORS

Pot Still Press's investment in waterless printing has been considerable but, as Ross Clark states, it has delivered a marketing edge that is winning more top-quality work. Most modern presses come out of the factory 'waterless ready' with the necessary wiring and spaces for temperature control units, even if a dampening system is fitted for conventional printing. Retro-fitting temperature control systems on older presses is possible. A summary of the plus and minus cost factors is below:

- Waterless plates require a special processor, costing approximately \$60,000
- Waterless plates are currently three times more expensive than traditional plates, but this is expected to drop as Toray's patents run out and new manufacturers enter the market.
- Cost reductions in elimination of IPA alcohol can be significant for a busy print shop
- Further cost reductions in paper waste since jobs can be made-ready much quicker
- Waterless presses tend to be more automated and a lower skill level is required to get a job ready since there is no press chemistry to control and measure
- Considerable increase in print quality, with 300lpi screen ruling routine, means happier customers.

Pot Still Press is a good example of a printer who has reduced VOC emissions by both process substitution (having a waterless press) and chemical substitution (reducing IPA on its conventional presses). Currently about 10% of its work is printed waterless, with a goal of 50% over the next 2-3 years.

Pot Still Press operates a safe disposal policy on all toxic wastes through the Environmental Recovery Services Group. The production facility has special humidifiers installed and air purifiers in the exhaust fans, to help maintain a constant and healthy working environment.

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See addendum on following page for overseas news

Addendum to waterless case study:

WATERLESS NEWS FROM THE USA AND SWITZERLAND

- Waterless printing **grew 220%** in the USA in 1997
- West Coast printer Printery Communications eliminated all IPA alcohol from its factory in 1985 and now uses Soy-based inks with **less than 1% VOCs**, and waterless presses
- Curtis Printing, a US waterless printer states that ink densities increase from 20% to 40% when printing waterless, yielding **superior results** even at 150 or 175 lpi
- Lithotone of Indiana reduced their overall IPA consumption by 38% by switching one-third of its production capacity to waterless. During this time, their **sales rose 13%**, yet they were still able to achieve this reduction in IPA use.
- **Recycled papers print better** on waterless presses due to reduced piling and picking
- Both R R Donnelley and Quebecor – two of the world’s largest printers – are running **waterless on high speed web presses** from Heidelberg-Harris
- AVD Goldach of Switzerland installed a MAN Roland Rotoman D running waterless and **clocked savings of \$340,000** in saved paper (200 tons) plus 66,000 gallons of water; 6,600 gallons of IPA alcohol and 880 gallons of dampening chemistry in year one.

CASE STUDY # 3

SMALL OFFSET SECTOR IN NEED OF INCREASED AWARENESS OF VOC ISSUES

Company: KWIK KOPY PRINTING, PITT STREET, SYDNEY

Name: Steve Allan

Equipment: 3 x Itek 985 single colour; 1 x Itek 3985 2-colour; Ryobi 512 2-colour

“Price and service, that’s what we act on where our suppliers are concerned,” points out Kwik Kopy’s production manager Steve Allan. “We have recently changed ink manufacturers and this decision was based purely on price and service. In fact, I don’t recall even receiving any information on how environmentally friendly or otherwise one brand of ink or chemical is against another.”

Steve’s comments are worth taking on board for all suppliers to the small offset industry. After all, 82% of Australian print shops employ less than 10 people. An opportunity exists to educate and train this workforce in the use of low and non-VOC products for improved worker safety, cleaner production and less pollution all round.

On the subject of VOCs and IPA reducers; “The information may be out there but you have to search hard to find it. Besides, our minimal experience indicates that low-VOC products take twice as long to dry and invariably cost more too.”

“With paper, much more information is sent out from the manufacturers. The recycled element of a stock is indicated by percentage and there is an easy-to-use coding system highlighting, for example, what products are chlorine bleach-free. This education is backed up with commercially viable incentives to try out different paper stocks. Paper companies seem to be a lot further down the track than ink and chemical suppliers on environmental issues. Even the customer has some prior knowledge and may specify a chlorine-free or recycled stock. I’ve never witnessed a customer asking for their job to be printed with vegetable-oil based inks.”

The message is clear, more information, more education and more incentive is needed from ink and chemical suppliers to assist smaller offset shops to contribute to the NSW EPA’s ‘Cleaner Industries’ objective.

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CASE STUDY # 4

FINANCIAL AND ENVIRONMENTAL GAINS IN DAMPENER CLEANING AT THE PRINTING OFFICE, QLD.

Company: THE PRINTING OFFICE
Location: Brisbane, Qld.
Ownership: Formerly Govt. Printing Office
Employees: Approximately fifteen
Field of endeavour: Medium-sized general commercial

The Printing Office (TPO) is typical of a medium-sized general commercial printer that comprises approximately 80% of Australia's industry. Motivated by a desire to reduce solvent use for both health & safety and environmental reasons, TPO decided to trial a mechanical method of cleaning dampener rollers, that eliminated solvents and detergents.

The machine chosen for the three-month trial was the SpeeDeeKleen, manufactured in Australia by WIN Manufacturing Pty Ltd of Adelaide.

WATER PRESSURE ANSWER

Clean Dampener rollers are essential for wet offset print quality and efficiency. If they become clogged with ink, the water/ink balance on the plate becomes impossible to control. TPO was previously using solvent sprays to clean the dampener rollers, and then hosing them down in a tub. Each wash could use as much as 200 litres of rinse water as well as the high-VOC solvent. The subsequent wringing out of the dampener covers caused accelerated wear to the fabrics.

The SpeeDeeKleen machine is an enclosed high-pressure water jet cleaning device whereby the ink is removed and then filtered out of the residual water, which can then be re-used for the next cleaning operation. Because of this water recycling, plumbing is not required. The rollers are also dried within the machine as they spin at high speed to shed water centrifugally. The manufacture claims that dampener rollers are press-ready in around 2 minutes, as opposed to 10 minutes by the conventional method. Because wringing is also eliminated, it is claimed that dampener covers last up to 10 times longer.

SpeeDeeKleen was originally designed for the popular Heidelberg GTO52 press dampener rollers but the manufacturer claims that it will clean 80% of the rollers in use in Australia on other presses also.

EQUIPMENT

TPO is currently running the following presses

- 1 x Heidelberg MO single colour
- 1 x Heidelberg GTO52 single colour
- 1 x Heidelberg GTO52 two-colour
- 1 x Heidelberg GTO52 five-colour
- 1 x Heidelberg QuickMaster 46-DI (Waterless digital press – no dampeners)

BENEFITS ALL-ROUND

TPO'S trial of SpeedeeKleen has revealed the following:

- Reduced solvent emissions and less odour
- Water usage greatly reduced – estimated saving of 285,000 litres per annum
- Dampener roller covers have extended life resulting in further cost savings
- Press down-time reduced resulting in improved productivity
- More frequent, efficient dampener cleaning resulted in quality gains

FINANCIAL BENEFITS

- Estimated cost savings per annum of \$31,820 by using SpeedeeKleen
- Additional savings of 285,000 litres less water used
- Payback period of purchase price (approx \$7,000) is just 2.6 months

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MINI CASE STUDIES

BRIEF DESCRIPTIONS OF OTHER VOC-REDUCING INITIATIVES

COMPANY	METHOD	RESULT
WR GRACE AUSTRALIA, Vic	On Flexo press, install enclosed doctor Blades, automate ink viscosity control, Install and close lids on solvent containers, Electric pumps with removable motors	\$600,000 p.a. saved. 2.3 yr pay-back.
AMCOR CARTONS, Qld	On Sheetfed Offset press, install automatic Blanket, roller & dampener cleaning system To replace manual methods.	Reduction of 1200 L Solvent pa.
CUTLER BRANDS P/L, SA	For Screen process, install CPS Stencil Cleaning System to centralise all Cleaning and screen de-inking	60% less solvent use \$164,000 Saved.
EMERALD PACKAGING, USA	Flexo printer, gradually eliminated Solvent-based inks on two presses and Now runs 4 presses all on water-based ink	VOCs down from 50 tons pa (1988) to 15 tons
PACKAGING SPECIALITIES USA	Flexo printer, emitted 702 tons of VOCs in 1989. Installed oxidiser and 100% Room capture of fugitive emissions Now emits between 35 and 40 tons pa	95% lower VOC emissions
PRINTERY COMMUNICATIONS USA	Waterless Offset printing and total Eco-friendly business, incl. Chlorine-free Paper, vegetable ink, citrus cleaners etc.	Rapid growth, many new customers

See website listings at end of report for more examples

Practical reduction of VOCs – where to buy

REDUCED AND NON-VOC ALTERNATIVES

CALCULATING THE COST SAVINGS

A common misconception concerning ‘alternative’ chemistry and inks for printing is that they are more expensive. True, on a litre-per-litre comparison they may seem more expensive, due to higher cost of raw materials. However, a closer look reveals that when overall use of low and non-VOC products is taken into consideration, in many cases the cost of use is actually lower.

VOC substitute chemicals for washing and cleaning retain nearly 100% of their volume right up to application and invariably require much less to be used. Most manufacturers state that their low/non VOC products actually work better when less is used. Some IPA reducers may require more volume, but still work out more economical, as **Varn’s general manager Brent Stephen** observes:

“From a fountain solution point of view, approximately 40% of every IPA litre purchased is lost by evaporation. This would equate to approximately 50 litres per month for an average (B2) colour press. IPA reducing/eliminating founts are not usually more expensive, however, in some circumstances require a slightly higher volume of usage. Even when this is taken into consideration, it is more economical to reduce/eliminate IPA. In addition to this saving, ink usage can be reduced.”

FURTHER COST SAVINGS

There are other ways in which low/non VOC products can benefit a business:

- Lower insurance premiums due to elimination of flammable liquids storage
- Improved worker health & safety – fewer days sick and a more agreeable-smelling workplace. Fire risk greatly reduced
- No compliance costs and detailed statutory reporting if VOCs are eliminated or significantly reduced

LISTING OF KNOWN SUPPLIERS AND PRODUCTS

The following listing is compiled from information provided by suppliers to the Australian printing, packaging and graphic arts industry. All relevant suppliers were invited to provide information about any VOC reducing products in their range. Whilst the majority of pressroom chemical suppliers have provided information, and this is by far the larger source of VOC emissions, not all ink suppliers have provided information concerning their vegetable and water-based inks and coatings.

Any omissions are in no way prejudicial to those suppliers and all inclusions are in no way an endorsement for the products mentioned.

As with all new consumables, it is recommended that testing be carried out prior to changing from existing chemistry.

INDEX OF VOC REDUCING INKS & CHEMICALS

<u>PRODUCT</u>	<u>PAGES</u>
Blanket, Roller and Dampener washes	19, 20,21, 22, 23, 24, 25, 26, 29,30, 36,
Fountain Solutions – non or low IPA	19, 21, 22, 23, 25, 29, 30, 39
Plate cleaners	19, 20, 24, 26,
Deglazers	21, 23, 24, 29, 30
Offset vegetable-based inks & coatings	22, 25, 26, 29, 30, 31, 35, 36, 39
Waterless Offset Inks	25, 29, 39
Water-based Flexo inks	26, 31, 33
Flexo/Gravure reducer, bio-ethanol	34
Adhesives, water-based	23, 27
Emulsions & Resins for ink making	32
Mechanical roller + anilox cleaners	37
Screen process inks, UV curing	26, 33
Flexo platemaking washout solution	28

AIM GROUP AUSTRALASIA PTY LTD

PO BOX 5016
VICTORIA POINT
QLD 4165

Tel: (07) 3207 7410
Fax: (07) 3207 9656

(0418 748899 in NSW)

PRODUCT	APPLICATION	VOC EFFECT
62C MP	Blanket wash for newspaper printing	Very low VOC
ENVIROPRINT	Blanket & roller wash, general purpose	Very low VOC
ENVIROWASH	Blanket wash/solvent, general purpose	Low VOC
RAPID WASH	Blanket & roller wash for Speedmaster	Reduced VOC
PRISCO CHROME	Chrome Roller cleaner	Reduced VOC
PRISCO MRC	Metering roller cleaner, contains no acetone or Isobutyl alcohol	Reduced VOC
PRISCO WEB KLENE	Aqueous plate cleaning solution, may be applied without stopping or slowing the press	Reduced VOC
PRISCO OMEGA	Plate Cleaner	Reduced VOC
PRISCO OMNI	Plate cleaner for Aqueous plates, gum added	Reduced VOC
NEUTRAL N6	Fountain solution for newspaper printing	Reduced VOC
PRISCO 2566	Fountain Solution concentrate for web & sheetfed applications, permits minimal alcohol to be used	Very low VOC
PRISCO 3451	Fountain Solution concentrate for sheetfed presses Non-toxic and nil phosphates	Reduced VOC
ALKALESS 3000	Alcohol substitute for sheetfed presses with continuous dampening; used together with 3451	Very low VOC
QWG-M2	Fountain Solution concentrate for web, sheetfed & continuous forms presses, eliminates alcohol	Very low VOC
PRISCO 54 P3N	Acid Fountain Solution for brush-dampened web presses; reduces or eliminates alcohol	Low VOC
PRISCO MA-4	Fountain Solution concentrate for newspaper presses using subtractive plates	Low VOC

Aim Group Australasia also offers on site analysis and special formulations if needed. Training in how to get best results and economy from their 'Safer Alternatives' is also available.

VARN INTERNATIONAL

PO Box 29
Doveton
VIC 3177

Tel: (03) 9703 2300
Fax: (03) 9796 4771

PRODUCT	APPLICATION	VOC EFFECT
CRYSTAL WASH	Blanket & roller wash, 50/50 vegetable/mineral based	Low VOC
NON-VOC WASH	Blanket & roller wash made to EC requirements. High flashpoint and water miscible	Nil VOC
NATURAL WASH	Blanket & roller wash, combined vegetable/solvent base. Designed for latest automated washing systems	Low VOC
JOURNAL WASH	Blanket & roller wash with high flashpoint and anti-Corrosive properties. Water miscible	Reduced VOC
NEWS WASH	Blanket & roller wash for coldset newspapers. High Flashpoint and water miscible	Reduced VOC
EC WASH	Blanket & roller wash formulated to meet ecological Safety requirements. High flashpoint, water miscible	Low VOC
V-60	Blanket & roller wash suitable for presses that recycle washes by filtration or distillation. High flashpoint	Reduced VOC
WASH A-230	Blanket wash specially formulated in cooperation With Heidelberg, Bottcher & Baldwin	Reduced VOC
COLOUR WASH	Wash, two-step for quick colour changes	Reduced VOC
VWM WASH	Blanket & roller wash, water miscible	Reduced VOC
WASH V-120	Blanket & roller wash, premium quality with rubber rejuvenators and antioxidants added	Reduced VOC
PRO-KLEEN	Cleaner/degreaser concentrate. Non-flammable.	Reduced VOC
TRUE BLUE	Plate cleaner for sheetfed or webfed. Non-flammable	Reduced VOC
MRC	Metering Roller Cleaner, high flashpoint for continuous and other dampening roller cleaning systems	Reduced VOC
UV WASH	Blanket & roller wash for UV inks, aromatic-free	Low VOC
SAVROL	Dampener detergent concentrate, biodegradable	Low VOC
FLEXOWASH	Wash-up detergent for water-based inks; biodegradable	Low VOC

VARN INTERNATIONAL (continued...)

PO Box 29
Doveton
VIC 3177

Tel: (03) 9703 2300

Fax: (03) 9796 4771

PRODUCT	APPLICATION	VOC EFFECT
FOUNTCLEAN	Dampening Systems Cleaner concentrate, anti-bacterial and fungicidal; non-foaming	Reduced VOC
TOTAL PLUS AR	Fountain solution for TOTAL elimination of Isopropyl Alcohol. Ph buffered for all water types	Nil VOC
ALCOFREE	Fountain solution formulated for sheetfed presses. Eliminates IPA	Nil VOC
WEB FOUNT AF	Fountain solution for web offset presses formulated to Either reduce or eliminate IPA	Low/Nil VOC
SUPERSPEED AF	Fountain solution for high speed heatset web offset presses Eliminates IPA and corrosion inhibited	Nil VOC
TAKE IT OFF	Deglazer for rollers & blankets	Reduced VOC
PREVENT	Ink spray, antiskimming for most conventional sheetfed Inks. No propellant trigger-spray, high flashpoint	Very Low VOC
REVITOL	Deglazer and roller/blanket revitaliser	Reduced VOC

All Varn washes are water miscible, allowing 20% water to be mixed with the wash, therefore reducing VOC emissions. Further reduction has been achieved by the used of chemical solvents to produce high flashpoint/ low vapour pressure washes. Certain products are vegetable-based which further reduces VOCs and Varn's Fountain Solution alcohol elimination products drastically reduce overall VOC emission by printing plants.

Varn has a programme to calculate current and projected VOC emissions using their replacement products. Cost comparison is also calculated.

DS CHEMPORT (AUSTRALIA) PTY LTD

Suite 1/545 Kingsway
Miranda
NSW 2228

Tel: (02) 9540 1019

Fax: (03) 9525 4437

PRODUCT	APPLICATION	VOC EFFECT
ROTOWASH-BIO	Blanket and roller wash for newspaper and commercial Web offset applications. Vegetable.mineral content	Low VOC
NOVASOL S-2	Blanket and roller wash, vegetable-based, water miscible Non-flammable and concentrated.	Nil VOC
NEWSWASH 011406	Blanket and roller wash for heatset & coldset web offset Presses	Slight reduced VOC
ROTOWASH 60	Blanket wash, hydrocarbon-based	Slight reduced VOC
ROTOWASH 80	Blanket wash, aromatic free. Low vapour pressure	Reduced VOC
ROLFIN	Roller cleaner in gel paste form for UV and conventional Inks; stable formulation	Reduced VOC
EUROWET 1388	Fountain solution formulated for fast web offset coldset and heatset presses. Permits 50-80% reduction in IPA use	Reduced VOC
SPRINT PLUS	Fountain solution formulated for use with DSC's LAE (Lithographic Alcohol Eliminator) device	Nil VOC
APEX	Fountain solution formulated for modern sheetfed presses. Permits 60-80% reduction in IPA use	Reduced VOC
LAE	Non-chemical magneto-hydrodynamic device that eliminates need for alcohol when used with Sprint	Nil VOC

COATINGS

AQUA DUCT F400	Varnish emulsion for web and sheetfed presses, water-based Apply via ink duct on wet or dry ink. FDA approved	Low VOC
UV GLOSS W860	Varnish for high gloss UV applications	Low VOC

HURST AUSTRALIA PTY LTD

10 Bellona Avenue
Regents Park
NSW 2143

Tel: (02) 9644 6888

Fax: (02) 9644 6534

PRODUCT	APPLICATION	VOC EFFECT
EKOTEX VA #129	Roller wash based on vegetable esters	Nil VOC
TOPS #114 VOC	Deglazer paste for use after normal wash up, eliminates need for multiple wash-ups and conditions rollers	Reduced
IRS PASTE #115 VOC	Roller solvent paste that reduces volume of wash-ups	Reduced
UNIVERSAL #306	Fountain concentrate for use with or without IPA	Reduced/low VOC
WASSERSTOP 400	Fountain concentrate from Druck Chemie formulated to Reduce alcohol in medium and large sheetfed presses	Reduced VOC
WASSERSTOP 603T	Fountain concentrate for medium to large sheetfed Presses requiring drying stimulation in the dampening System. Ideal for coated stocks	Reduced VOC
DAMPENAID #316	Replacement for isopropyl alcohol, non-flammable	Very low VOC
CONDITIONER #175	Dampening roller conditioner designed to clean and Desensitise metering and other rollers in continuous Dampening systems. Enables less alcohol to be used.	Reduced VOC

ADHESIVES

NUMBER 337	Adhesive padding compound, water-based fast drying	Reduced VOC
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TOYO INK PTY LTD (Distributor for Kenwick Chemicals of Victoria)

81 Edgerton Street
Silverwater
NSW 2141

Tel: (02) 9648 5022

Fax: (02) 9748 6836

PRODUCT	APPLICATION	VOC EFFECT
BIO WASH WM	Blanket and roller wash, citrus blend, water miscible	Low VOC
ENVIROSOLVE HF	Blanket and roller wash, for larger sheetfed and web Presses, non flammable, water miscible, free from aromatics, Glycol ethers, alcohol, ketones and chlorinated solvents	Low VOC
ENVIROSOLVE	Blanket and roller wash as above but faster evaporating	Reduced VOC
BIO DAMPENER	Dampener wash, citrus based detergent for cloth dampener covers. Also free of caustic soda and phosphates	Low VOC
METERSOLVE	Roller cleaner for bare backed rubber dampeners. Citrus based and restores water receptivity	Low VOC
BIO DEGLAZE	Deglazer for rollers & blankets, citrus based, free from Petroleum hydrocarbons	Low VOC
BIO RUBBER REJ.	Rejuvenator for hand washing rollers and blankets, citrus-based.	Low VOC
BIO PLATE CLEANER	Plate cleaner for all types of metal plates, citrus based	Low VOC
BIO GUM WASHOUT	Plate cleaner & gummer for short term storage, citrus-based	Low VOC
HI ETCH	Plate cleaner, heavy duty abrasive to restore plates after Long periods of storage	Reduced VOC
STANDARD PLATE	Cleaner, non-abrasive for metal and plastic plates	Reduced VOC

Toyo Ink act as distributors for Kenwick Chemicals which are made in Victoria. Kenwick has focussed on low-odour formulations to make print shops smell more attractive and in so doing, has also achieved lowering of VOC levels.

AUSTRALIAN PRESSROOM SUPPLIES PTY LTD

57 Radford Road

Reservoir

VIC 3073

Tel: (03) 9460 9099

Fax: (03) 9460 9673

PRODUCT	APPLICATION	VOC EFFECT
SOLSTAR 4065	Blanket and roller wash suitable for automatic and manual systems, aromatic and naphthene free	Low VOC
PRIFER 3309	Blanket and roller wash, vegetable ester based, very High flashpoint, odourless	Very low VOC
DAMPSTAR 4.6/6.5	Fountain solution containing IPA replacement compounds. Reduces or in some cases eliminates need for IPA	Reduced/low VOC

COATINGS

APS HIGH GLOSS APS DOUBLE SIDED APS MATT COAT APS SATIN FINISH APS NEUTRAL	Non-petroleum based varnishes, low odour, taint etc	Low VOC
WATERLESS INKS	Inks for the waterless process in both Pantone and CYMK colours	Low VOC

COATES BROTHERS AUSTRALIA PTY LTD

PO Box 99
Auburn
NSW 2144

Tel: (02) 9645 4888

Fax: (02) 9645 1513

PRODUCT	APPLICATION	VOC EFFECT
<u>INKS & COATINGS</u>		
SOYNEWS 2000	Inks for the newspaper industry; soya-bean based and mineral-oil free available in process and selected Pantone colours	Low VOC
UNICURE UV	Inks using UV curing primarily for printing packaging onto paper and board. With UV process curing and drying is accomplished with UV light an solvents are not used	Nil VOC
DELTALAC	Aqueous coating with almost no residual odour, ideal For food packaging, for flexo, litho and gravure	Very low VOC
PACIFIC	Water-based flexographic inks for printing of polyolefin Substrates	Low VOC
ORCA	Water-based gravure ink for printing coated board used in the fast food industry. Low odour	Low VOC
FOILKRAFT	Water-based anti-glare inks for gravure and flexo printing Of Kraft backed foil for building insulation	Low VOC
AQUASTAR	Water-based flexographic inks for high quality corrugated and solid fibreboard printing. Four colour set available	Low VOC
HYDROCELL	Water-based flexographic inks for the printing of decorative Tissue, e.g. kitchen towels and toilet rolls. Available as dye-based or fully pigmented colours	Low VOC
FESTIVAL	UV curable inks for flexographic printing of labels, papers, Top-coated plastics and some uncoated plastics	Nil VOC
<u>SCREEN PRINTING</u>		
VIOSPEED	UV screen ink containing zero solvents; non-flammable	Very low VOC
VIOCURE NF	UV screen ink specially formulated for decoration of Polyolefin containers	Very low VOC
OPUS FLX	UV screen inks formulated for irregular surfaces on outdoor Grade pressure-sensitive PVC	Very low VOC

COATES BROTHERS AUSTRALIA PTY LTD *(continued...)*

PO Box 99

Auburn

NSW 2144

Tel: (02) 9645 4888

Fax: (02) 9645 1513

PRODUCT	APPLICATION	VOC EFFECT
<u>ADHESIVES</u>		
AQUALAM 444A	Laminating adhesive for flexible films and cellulosic Substrates, water-based, FDA approved	Low VOC
MOR-FREE 403A	Solventless 2-part polyurethane adhesive for lamination Of transparent and aluminium-content substrates	Low VOC
SNAK-FLEX 102	Water based single component adhesive for laminating Flexible substrates for packaging of dry foods	Low VOC

Coates Brothers indicate that UV inks provide the most efficient method of reducing or eliminating VOC emissions. UV inks are 100% solids and require no solvents as drying and keying is accomplished by UV energy. Every 1Kg of solid in a solvent-based ink releases 4-7Kg of VOCs into the atmosphere, plus fugitive emissions through evaporation, cleaning and spillage. Investment in UV printing equipment can be high but long-term benefits are great. Coates offers a consultative service to printers considering switching to UV printing.

ANDERSON & VREELAND AUSTRALIA PTY LTD

108-110 Carnarvon Street

Silverwater

NSW 2128

Tel: (02) 9748 2577

Fax: (02) 9748 2525

PRODUCT	APPLICATION	VOC EFFECT
POLY SAFE	Washout solution specifically used in the manufacture of Photopolymer plates for flexographic printing. Eliminates Perchlorethylene, & Butanol	Very low VOC

NB: This product is only applicable to the Flexographic platemaking industry

CPI INKS

(Hostmann-Steinberg)
115 Woodpark Road
Smithfield
NSW 2164

Tel: (02) 9681 0555

Fax: (02) 9681 4882

PRODUCT	APPLICATION	VOC EFFECT
HI-WASH	Blanket & roller wash, high flashpoint, water miscible	Reduced VOC
CONSOLWASH	Blanket & roller wash, water miscible to 25%	Reduced VOC
GLAZOFF	Deglazer for blankets and rollers, detergent based	Reduced VOC
CONSOL DAMP'R	Wash for dampeners and also for general press and machine use, floors etc. Blend of ink solvents, cleansers and detergents. Biodegradable and non-caustic	Reduced VOC
SUBSTIFIX HD	Fountain additive for reduction or elimination of IPA. Levels of 0-5% IPA achievable	Low/very low VOC
REDUFIX-R	Fountain additive formulated for heatset web offset Printing enabling reduction or elimination of IPA	Low/very low VOC

INKS & COATINGS

HBL INKS	Vegetable-oil based inks for laser printed forms and self-duplicating continuous forms	Reduced VOC
REFLECTA DRY 5070	Inks for the waterless litho process	Low VOC
ACRYLAC	Metallic Gold and Silver Inks, water-based and with no heavy metals	Low VOC
ACRYLAC	Varnish, water-based available in a variety of glosses	Low VOC
RESISTA	Ink by Hostmann-Steinberg with 58% vegetable oil	Reduced VOC
RAPIDA	Ink by Hostmann-Steinberg with 50% vegetable oil	Reduced VOC
REFLECTA-ECO	Ink by Hostmann-Steinberg using 100% veg. Oil	Low VOC
RESISTA-ECO	Ink by Hostmann-Steinberg using 100% veg. Oil	Low VOC
ALPHA-VEG	Range of inks by H-S for various offset applications	Low VOC

CPI's Hostmann-Steinberg range comes from a factory in Germany with a stated environmental policy that is audited by the EC System for Environmental Management and Environmental Auditing. During 1999, the introduction of a range of Pantone colours using 100% vegetable oils is planned.

A E HUDSON PTY LTD

PO Box 316
Lidcombe
NSW 2141

Tel: (02) 9643 8200

Fax: (02) 9643 8211

PRODUCT	APPLICATION	VOC EFFECT
ABW-2001	Blanket & roller wash for automatic and manual systems	Low VOC
RRC-2001	Roller wash containing zero chlorinated hydrocarbons. Water miscible	Low VOC
DER-2001	Deglazer and blanket rejuvenator containing zero chlorinated Hydrocarbons	Low VOC
WGW-2001	Plate cleaner white gum wash-out for multimetal, positive and negative plates. Suitable for long-term storage	Low VOC
ADC-2001	Aqua Dampener Cleaner, water-based, non-flammable	Low VOC
SSC-2001	Plate cleaner to remove scratches and condition baked or unbaked metal plates	Low VOC
UNG-2001	Plate gumming solution, universal	Low VOC
FFP-2001	Fountain solution formulated for larger presses using Alcohol dampening	Reduced VOC
BFP-2001	Fountain solution for small offset presses	Low VOC
EASY STREET	Blanket & roller cleaner in gel form from Van Son for fast Drip-free colour changes	Very low VOC
FAST ORANGE	Hand cleaner, citrus-based, biodegradable	Very low VOC
<u>INKS</u>		
SONA DRY	Ink by Van Son for the waterless method	Low VOC
MEGA LASER	Ink by Van Son for preprinting of laser and high speed copier paper. Soy and vegetable oil based	Low VOC
UNIPAK	Water-based metallic litho inks containing less than 2% VOCs. Available in 9 shades of Gold plus Silver	Very low VOC

A E Hudson states that its entire range of 2001 Print Chemistry, formulated in Sweden and made in Australia, is manufactured with the environment and reduced VOCs in mind.

PRINTING TECHNOLOGIES PTY LTD

PO Box 162
Beaconsfield
NSW 2014

Tel: (02) 9698 8111
Fax: (02) 9699 1591

PRODUCT	APPLICATION	VOC EFFECT
<u>INKS & COATINGS</u>		
NOVAVIT F908	Litho Ink from K&E free of mineral oils	Very low VOC
SUPERVITESSE	Litho ink from Trenal for high-speed newspaper coldset Web offset presses with overshot duct. Vegetable-oil based and available in process and select Pantone colours	Very low VOC
SUPER G	Litho ink from Trenal, as above but for medium speed Presses with overshot/undershot ducts	Very low VOC
SUPER GG	Litho ink from Trenal as above but for slow presses With undershot duct	Very low VOC
TRENAL LASER	Litho inks from Trenal for printing of coloured laser Forms and continuous stationery. 100% vegetable oil	Very low VOC
ROYMAL	Clear aqueous coatings for paper converters, aluminium foil converters and film converters. Application by gravure, flexo or offset. FDA compliant for food packaging	Very low VOC
HYDROKETT	Flexo ink from Akzo Nobel, water-based for printing on coated and uncoated papers	Very low VOC
HYDROFILM	Flexo ink from Akzo Nobel for printing on synthetic plastic materials, water-based	Very low VOC
AKZO NOBEL UV	Flexo inks for UV curing presses.	Nil VOC
LITO FLORA DRY	Waterless offset inks from Akzo Nobel	Very low VOC
LITO FLORA SHINE	Offset inks, 100% vegetable oil based suitable for matt and coated stocks	Low VOC

ALBRIGHT & WILSON SPECIALITIES PTY LTD

313 Middleborough Road

Box Hill

VIC 3128

Tel: (02) 9895 6651

Fax: (02) 9899 1948

PRODUCT	APPLICATION	VOC EFFECT
<u>EMULSIONS AND RESINS FOR INK MANUFACTURE</u>		
JONCRYL ECO 94	Solution of glycol ether -free acrylic resin for pigment dispersions & overprint varnishes. Major component in manufacture of aqueous no-solvent inks and coatings	Very low VOC
JONCRYL ECO 694	Acrylic resin, glycol ether-free for pigment dispersions & overprint varnishes. Less than 1% VOC	Very low VOC
JONCRYL ECO 2177	Emulsion for printing inks & coatings, glycol ether-free Primarily for flexo and gravure packaging applications Where odour-free waterbased polymers are required	Very low VOC
JONCRYL ECO 2189	Emulsion for printing inks & coatings, as above	Very low VOC

The Joncyl Eco range of aqueous polymers are supplied to manufacturers of inks and coatings in the flexo & gravure packaging sectors, particularly for food, confectionery and cigarette applications where odour is intolerable.

GALAXY INKS

PO Box 83
Illawong
NSW 2234

Tel: (02) 9792 7611
Fax: (02) 9792 7213

PRODUCT	APPLICATION	VOC EFFECT
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UV & EB CURING INKS

INXCURE	UV curing inks for offset, flexo, letterpress and rotary screen printing	Nil VOC
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Galaxy's range of UV curing inks from INX benefit from the UV process where UN energy is used to dry and cure the ink. Additional benefits are gained in worker health & safety (no solvents), insurance premiums (low fire risk) , quality of print and speed of delivery to the client – the job is ready as soon as it is off the press. EB stands for Electron Beam curing which achieves similar results to UV but uses electrons and can penetrate multi-layer substrate 'sandwiches' to cure adhesives. Galaxy Ink is also the Australian distributor for the US-made Radtech UV/EB curing hardware.

CSR DISTILLERIES GROUP LIMITED

1 Jones Street
Pyrmont
NSW 2009

Tel: (02) 9692 7631

Fax: (03) 9283 4528

PRODUCT	APPLICATION	VOC EFFECT
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<u>ALCOHOL REDUCER FOR GRAVURE & FLEXO</u>		
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FLEXOL	Bio-ethanol reducer and cleaner for flexo and gravure inks	See note
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Whilst the CSR ethanol products used in the printing industry are similar in VOC content to petroleum-sourced alcohol, bio-ethanol is the result of distilling molasses which is produced by boiling sugar cane. Because sugar cane is a renewable resource and absorbs carbon dioxide whilst growing, the net result is one of a 'greenhouse neutral' chemical. So where the use of ethanol is unavoidable, it is better to use bio-ethanol than petroleum-derived ethanol.

FERAG AUSTRALIA PTY LTD

1/119 McEvoy Street
Alexandria
NSW 2015

Tel: (02) 9698 9511

Fax: (02) 9699 9936

PRODUCT	APPLICATION	VOC EFFECT
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<u>INKS FOR NEWSPAPER WEB OFFSET</u>		
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HERITAGE	Soy-based inks for coldset newspaper offset printing	Very low VOC
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J L LENNARD GRAPHICS

937-941 Victoria Road

North Ryde

NSW 2114

Tel: (02) 9807 7200

Fax: (02) 9807 7300

PRODUCT	APPLICATION	VOC EFFECT
ROYAL CLEAN	Roller cleaning cream from Katsura, non-toxic, Non-flammable	Low VOC
ANCHOR	Aqueous coatings for offset printing	Very low VOC
ANCHOR	Range of pressroom chemistry including blanket, roller and dampener washes that are water miscible up to 40%	Low VOC
VAN SON	Vegetable dye-based inks specifically formulated for Wide-format inkjet plotters	Very low VOC

ALDUS ENGINEERING

1 Rhodes Street
West Ryde
NSW 22114

Tel: (02) 9809 0363
Fax: (02) 9808 2723

PRODUCT	APPLICATION	VOC EFFECT
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MECHANICAL CLEANING FOR TOTAL ELIMINATION OF CHEMICALS

MICRO-CLEAN	Device using microscopic plastic beads which are sprayed at Anilox cylinders, chrome rollers and parts used in flexographic printing to completely clean cells and surfaces	Nil VOC
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A E HUDSON PTY LTD

PO Box 316
Lidcombe
NSW 2141

Tel: (02) 9643 8200
Fax: (02) 9643 8211

MECHANICAL CLEANING FOR TOTAL ELIMINATION OF CHEMICALS

WATER CLAW	Dampener roller washer device using water to blast rollers clean. No plumbing, water is recycled and filtered.	Nil VOC
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SEAGA PTY LTD

20 Wentworth Street
Clyde
NSW 22142

Tel: (02) 9897 2422
Fax: (02) 9897 2588

MECHANICAL CLEANING FOR TOTAL ELIMINATION OF CHEMICALS

SPEEDEEKLEEN	Dampener roller washer device using water to blast rollers clean. No plumbing, water is recycled and filtered.	Nil VOC
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PEMARA GRAPHIC MACHINERY

274 Ferntree Gully Road
Notting Hill
VIC 3168

Tel: (03) 9543 6266
Fax: (03) 9543 8062

PRODUCT	APPLICATION	VOC EFFECT
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WATERLESS OFFSET PRINTING

TORAY	Pemara is Australia’s leading supplier of technology for waterless printing. By eliminating the need for ink/water balance and rheology control using alcohol, waterless printing offers an excellent method of reducing VOC emissions	Very low VOC
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PROLITH INTERNATIONAL PTY LTD

19/1 Cowpasture Place
Wetherill Park
NSW 2164

Tel: (02) 9756 5511
Fax: (02) 9756 6161

PRODUCT	APPLICATION	VOC EFFECT
2-IN-1 FOUNT	Universal fountain solution that automatically adjusts pH and conductivity and eliminates IPA alcohol	Nil VOC

USEFUL INTERNET WEBSITES FOR FURTHER INFORMATION ON REDUCING VOC EMISSIONS

http://www.erin.gov.au/portfolio/epg/environet/ncpd/auscase_studies/

<http://www.pneac.org/pneac.html>

http://www.edf.org/pubs/EDF-Letter/1993/Nov/k_pollprvc.html

<http://es.cpa.gov/techinfo/facts/mass/tura-fs6.html>

http://www.epa.gov/opptintr/dfe/flexography/case_studies/case1

http://www.epa.gov/opptintr/dfe/flexography/case_studies/case2

<http://www.maricopa.gov/sbeap/printp3.htm>

<http://www.ilsr.org>

<http://www.printery.com/>

<http://www.waterless.org>

<http://www.varn.org>

<http://www.cciw.ca/glimr/data/first-printing-rep/intro.html>

<http://www.deq.state.va.us/opp/factshts/print.html>

<http://trenal.be>

<http://www.epa.gov/optintr/dfe/lithography/pubs.htm>

END OF REPORT
E&OE

A S McCourt 1999