ENVIRONMENTAL TECHNOLOGY BEST PRACTICE PROGRAMME

BUSINESS AND ENVIRONMENTAL BENEFITS OF WATERLESS PRINTING

A GOOD PRACTICE CASE STUDY AT THE BEACON PRESS, UCKFIELD

GC238
FINAL RESULTS

This Case Study demonstrates how conversion from dedicated, alcohol-dampened systems to waterless, offset-lithographic printing can result in opportunities for cost savings, significant environmental benefits and improved product quality, while also generating new marketing opportunities.

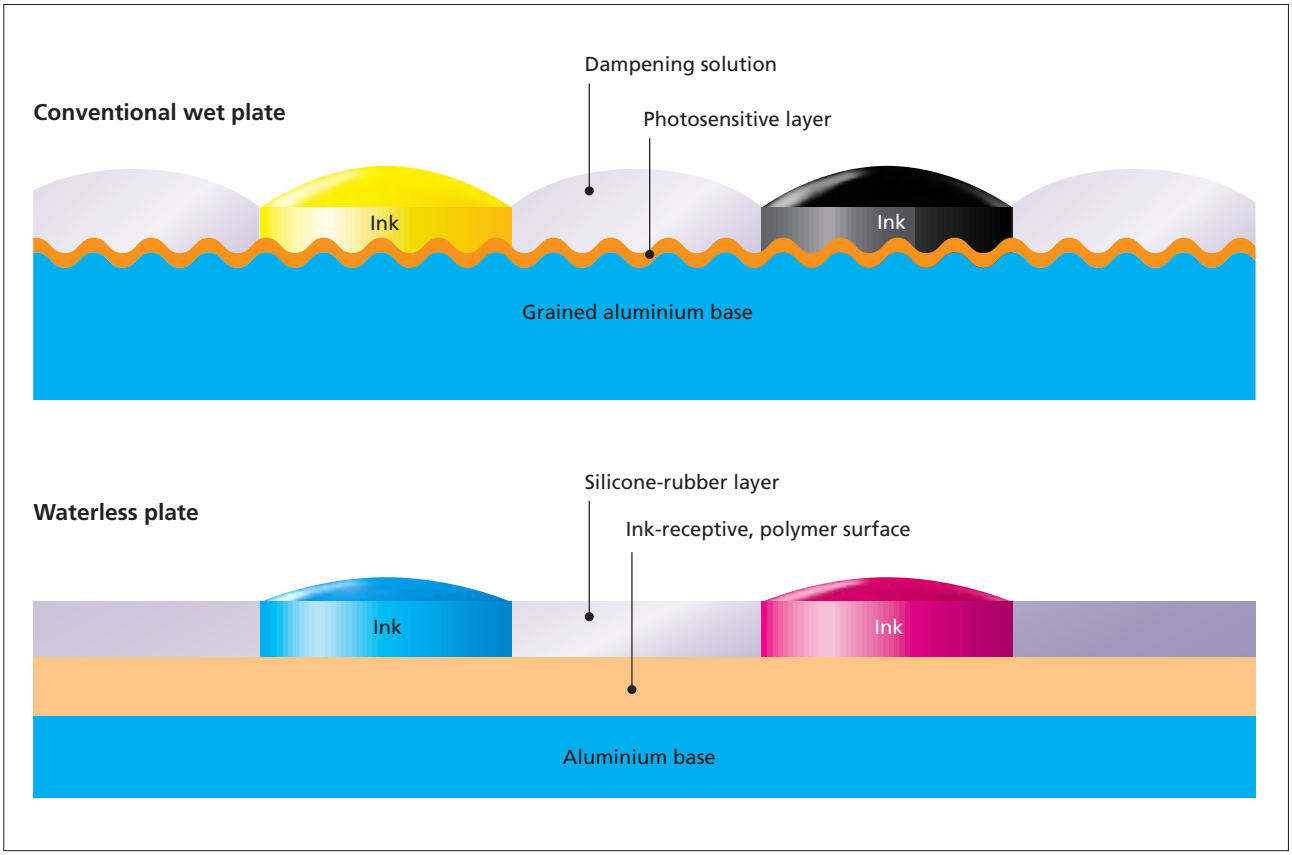
The Beacon Press is one of the first printing companies in the UK that has converted completely to waterless printing, having introduced waterless presses when existing machines were due for replacement. The extra capital expenditure incurred to purchase waterless technology has largely been offset by reductions in operating costs.

The advantages of conversion to waterless printing at The Beacon Press, include:

- **Elimination of on-press isopropyl alcohol (IPA), water and fountain solution**
- **30% reduction in paper wastage - and consequent cost savings**
- **Reduced press operating costs**
- **Improved quality and increased consistency of product**

GOOD PRACTICE: Proven technology and techniques for profitable environmental improvement

Fig 1 Comparison of alcohol-dampened and waterless plates



Background

With conventional, alcohol-dampened printing plates, non-image areas are water receptive and image areas are ink receptive. A thin layer of dampening solution, containing water, IPA and fountain additives, is applied to the plates by dampening rollers. Dampening solution adheres only to non-image areas, keeping them clean and ink-free (Fig 1).

Waterless printing does not require a dampening system. Instead, the plates are covered with an ink-repellent, silicone-rubber layer. Removing parts of this layer, using chemical development or a Computer to Plate (CtP) process, reveals the image areas. The remaining, unexposed parts of the layer form the non-image areas (Fig 1). Waterless presses use zonal cooling systems to maintain the different inking units at their optimum application temperatures.

The similarities of the two printing technologies mean that modern offset-lithographic presses can be used for both waterless and alcohol-dampened printing.

Environmental Benefits

Converting to waterless printing has resulted in the following environmental benefits:

Elimination of IPA use

As The Beacon Press had already reduced IPA consumption by using low-alcohol fountain dampening on suitable conventional presses, the change to waterless printing saved only 37 litres of IPA per million impressions, equivalent to around 3 050 litres/year. A printing business with a similar turnover to that of The Beacon Press and running normal alcohol dampening, would save around 14 300 litres/year.

Reduction in disposal of waste processing chemicals

Processing conventional wet plates resulted in 50 litres/week of spent developer that were disposed of as special waste and 50 litres/week of finishing gum that were disposed of to sewer. Processing chemicals for waterless plates are less hazardous and last longer. Waste from the waterless plate processor amounts to 2 - 3 litres/week of spent dye solution, and wastewater containing only small amounts of silicone.

Savings in water consumption

Eliminating dampening solution, which is typically 85 - 95% water, reduced water use by 26 m^3 in 1998.

Waterless Printing at The Beacon Press

PRODUCTS MILLENNIUM

The Beacon Press converted from alcohol dampening to waterless technology between July 1995 and February 1999, introducing waterless presses when existing machines were due for replacement. The Company is one of the first in the UK to use waterless technology exclusively. The new technology is a key component of the Company's pureprint® process, developed to minimise the environmental impacts of the printing process. The process has recently been awarded Millennium Products status by the Design Council, in recognition of innovation.

Reduction in paper wastage through shorter make-ready times

Alcohol-dampened presses are run while the operators attain the correct ink and water balance for acceptable print quality. At The Beacon Press, this practice resulted in an average paper wastage of 12.2% per job. With waterless technology, elimination of the dampening solution has removed this variable from the printing process. The average paper wastage is now around 8.5% per job, equivalent to a 30% reduction. Shorter make-ready times have also reduced ink consumption and energy use per job, as the presses run for less time.

Other Benefits

In addition to environmental benefits, The Beacon Press has realised the following operational and quality benefits.

- On a waterless press, raised non-image areas and the elimination of dampening solution reduce dot gain and also enable higher density screen rulings to be printed. Waterless product is now printed to 200-line screen compared with the 175-line screen previously used on alcohol-dampened presses. This produces sharper images and is proving to be an effective marketing tool.

QA scanning at The Beacon Press

- The elimination of IPA has reduced fire risks and improved working conditions by reducing staff exposure to solvent fumes. The use of personal protective equipment by press operators is no longer required.
- Press downtime has been reduced because the waterless press has no dampening system to be cleaned.
- Waterless-press rollers need replacing less frequently. The plates are less prone to damage and do not need to be covered in gum arabic to protect them during storage, thus shortening labour time.
- The elimination of dampening solution has ensured that the annual VOC consumption at The Beacon Press remains below the threshold required for registration under Local Air Pollution Control (LAPC), despite increased production. The requirement to register under LAPC carries an annual fee and also necessitates labour and management time. Therefore, these costs have been avoided.

Economic Analysis

The extra capital expenditure associated with installing waterless technology at The Beacon Press is around £1 300 per printing unit per year, based on a five-year replacement cycle. This additional cost includes dampening systems for each press, purchased to ensure that their resale market will not be limited to waterless printers.

Considerable cost savings can be realised by many companies by eliminating the use of alcohol-dampening solution. In most cases, this is likely to make it cheaper to use waterless printing. However, because The Beacon Press had already changed to low-alcohol fountain solution, the quantified reductions in operating costs associated with waterless printing are only marginal (Table 1). Actual savings are likely to be higher than those shown, as the data in Table 1 do not take into account:

- the costs associated with registration under LAPC, which would consist of an annual fee to maintain an authorisation for the whole site (£815) and staff time to administer the authorisation (estimated at £700);
- elimination of fountain additives, estimated at 600 litres/year for normal alcohol dampening (at 2% - 4% of dampening solution) and more if using low-alcohol fountain solution;
- reduced resource consumption (eg ink and electricity) due to shorter make-ready times;
- savings in labour and management time due to simplified operations and reduced press downtime;
- cheaper purchase and disposal of plate processing chemicals;
- the economic benefits associated with marketing opportunities offered by the adoption of waterless technology.

In addition, the cost of waterless plates, which accounts for the greatest additional operating cost, is expected to drop as more companies adopt waterless technology and, hence, more plate manufacturers enter the market.

Table 1 Annual operating cost savings per printing unit at The Beacon Press

Item	Savings (£/year)
Reduction in paper wastage	3 617
Cost of plates[1]	(4 236)
Roller replacement	178
Elimination of IPA[2]	226
Elimination of downtime associated with maintenance of conventional presses	608
Cleaning	0
Total annual savings[3]	**393**

[1] Based on costs for conventional wet plates. The operating cost savings will be greater for companies already using alcohol-dampened plates that are suitable for CtP technology.

[2] The Beacon Press used a low-alcohol fountain solution. Similar-sized printers using typical amounts of normal alcohol-dampening solution would realise savings of around £18 000.

[3] Excluding costs associated with LAPC registration and unquantified savings and benefits.

The Beacon Press

The Beacon Press is a medium-sized lithographic printing company located in Uckfield, East Sussex. It undertakes all aspects of document layout, press plate preparation, printing and final document finishing for a wide range of clients. The Company currently employs about 80 people and has an annual turnover of around £7.5 million. The Beacon Press has established a reputation for environmental awareness and has received 15 environmental awards in the last ten years.

Comments from The Beacon Press

We have enthusiastically committed ourselves to waterless printing which we believe offers major advantages over traditional lithographic printing methods. The process represents the way forward for any printing company seeking to achieve the twin benefits of superior print quality combined with practical help for the environment - both in the widest sense and within the factory itself. Our staff now enjoy a working environment with significantly reduced solvent emissions.

Mr M Fairbrass
Chairman
The Beacon Press

"Waterless printing represents the way forward for any printing company seeking to achieve the twin benefits of superior print quality combined with practical help for the environment..."

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Tel: 029 2076 8329
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Mr J Jonker

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Press Equipment:

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Brentford,
Middlesex
TW8 0AA

Tel: 020 8490 3500
Mr S Cavey

Cooling Systems:

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Clough Road,
Severalls Business Park,
Colchester,
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Plate Supplier:

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7 Old Park Lane,
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* There may be other suppliers of similar equipment. Please consult your trade directories or contact the Environment and Energy Helpline which may be able to provide more details on request.

FOR FURTHER INFORMATION PLEASE CONTACT THE ENVIRONMENT AND ENERGY HELPLINE ON

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