

CGPP

Cleaner Greener Production Programme

AT A GLANCE

This project involved the joint efforts of Irish Flexible Packaging and Manders Coatings and Inks and focused on the development of a range of water-based inks as an environmentally friendly alternative to the solvent-based inks widely used by the printing industry. The aim was to produce water-based inks which would deliver the same quality and durability as solvent-based inks when used for printing on film and wax-coated paper

The technology that was developed during the course of this CGPP project delivers significant environmental benefits, as it totally eliminates the use of solvents in all aspects of the manufacture and usage of inks.

As a direct result of its involvement in this CGPP project, Irish Flexible Packaging has reduced solvent emissions from its Co Wicklow plant by 20 tonnes per annum.

IRISH FLEXIBLE PACKAGING LTD

Irish Flexible Packaging (IFP), which is based in Carnew, Co Wicklow, employs 25 people and had a turnover of €5 million in 2003.

IFP manufactures a range of materials, including printed waxed coated paper; polypropylene for bread wraps, and printed film for confectionery products. The company also offers a packaging design service for its customers. IFP is one of the largest suppliers of wax-coated paper in Europe.



MANDERS COATINGS AND INKS

Manders Coatings and Inks was founded in 1955. The company operates in two markets: printing inks and paints. Manders' products include sheetfeed inks; newspaper and publication inks; packaging inks; silk screen inks and printers' supplies.



NEW TECHNOLOGY COULD TOTALLY ELIMINATE SOLVENTS USAGE IN PRINTING INDUSTRY

AIMS OF THIS PROJECT

The main aim of this project was to develop a water-based ink that could be used to print on polypropylene bread wrap while delivering the same print quality and durability as solvent-based inks.

A successful outcome to this project would pave the way for significant reductions in solvent emissions, thus creating major environmental benefits.

PROJECT DESCRIPTION

The companies' CGPP project teams worked together to develop water-based inks for the film or (polypropylene and polyethylene) sector of the bread wrap and confectionery market.

One of the challenges faced by the team was how to overcome customer perception of water-based inks as having poor wear and tear resistance and relatively poor visual appeal – characteristics which might be acceptable for short shelf life products such as plastic shopping bags but which would be unacceptable in the competitive consumer food products market.

Solvent-based printing presents a number of hazards to human health and to the

environment, as set out below. As ink dries on the material being printed, solvents are released – either as point emissions via a stack to the atmosphere, or as fugitive emissions within the plant.



Fig 1. Finished printed bread wrap

- Solvent emissions contribute to the creation of greenhouse gases, which in turn are linked to the Global Warming phenomenon.
- The use of solvents in manufacturing processes may require an IPC licence, or other regulatory controls.
- Solvents increase the risk of fire. As a result, fire insurance premiums are higher in manufacturing operations that involve the use of solvents.
- Where solvents are stored on site, bonded storage areas must be used.
- Spills of solvent-based material may lead to soil and ground water contamination.

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- Large quantities of solvent-based inks may have to be transported from ink suppliers to printing plants. Because solvent-based inks are classified as hazardous materials, costs for both handling and transport are higher than those applying to water-based inks.



Fig 2. Analox roller

The use of water-based inks eliminates all of the above disadvantages.

Traditionally, however, water-based inks have not been used for film wrap packaging: their use has been limited to products that have a short shelf life. This is because water-based ink did not adhere sufficiently well to the film.

This CGPP project comprised a number of trials: the first involved the formulation of a water-based ink with the appropriate physical properties. Simultaneously, Irish Flexible Packaging modified the Analox rollers on its printing machines to accept the ink. With the ink formulation completed, a number of trial print runs began, each using polypropylene film.

The printed materials were then assessed for reproduction quality, scratch resistance (the nail test), and lifting resistance (the tape test). Based on the results of each assessment, the ink formulation was adjusted in subsequent trials to improve colour density and other relevant properties.

ACHIEVEMENTS

The trials were regarded as successful in that water-based inks were used to print new designs on film: the inks delivered both good wear resistance and good print quality – particularly for small type including bar codes and ingredients lists.

Initially, good wear resistance and good print quality were not consistent in every case, as some graphic designs and colour specifications did not lend themselves to the requisite level of adjustment. However, recent trials at the Irish Flexible Packaging plant have confirmed that water-based inks produce excellent print quality on polypropylene, and the company is confident that by mid-2005 it will be using water-based inks for all printing on polypropylene.

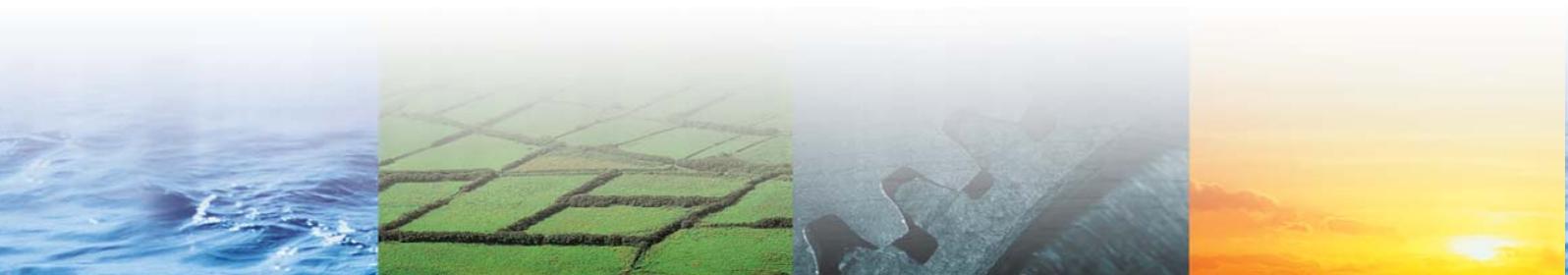
As a direct result of its involvement in this CGPP project, Irish Flexible Packaging has reduced annual solvent emissions from its plant by 20 tonnes.



Fig 3. Printing wrap

OBSERVATIONS

Handling water-based inks poses a particular challenge in that greater efforts must be expended on the cleaning of printing machinery. This is because once the ink has dried it is no longer water-soluble. With solvent-based inks on the other hand, cleaning may be achieved simply by rewetting the ink with solvent.



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Based on IFP's experience of using water-based inks to print on paper, the company believes that the cost of printing on polypropylene film would be about 20% cheaper than if it were to continue using solvent-based inks.



Fig 4. Printed wrap in the process of being slit.

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LESSONS

A number of lessons were learned during the project.

- Co-operation between supplier and end-user is mutually beneficial.
- There is now a greater understanding of the significance of the various parameters that affect print quality. This will allow faster development of water-based inks in the future.

MORE INFORMATION

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CLEANER GREENER PRODUCTION IS...

the application of integrated preventive environmental strategies to processes, products, and services to increase overall efficiency and reduce risks to humans and the environment.

- Production processes: conserving raw materials and energy, eliminating toxic raw materials, and reducing the quantity and toxicity of all emissions and wastes
- Products: reducing negative impacts along the life cycle of a product, from raw materials extraction to its ultimate disposal.
- Services: incorporating environmental concerns into designing and delivering services.

CLEANER GREENER PRODUCTION REQUIRES...

new attitudes, better environmental management, and evaluating available technology options. We need to take good environmental practice to the stage where it is an inherent part of any business operation.

HOW IS CLEANER GREENER PRODUCTION DIFFERENT?

Much of the current thinking on environmental protection focuses on what to do with wastes and emissions after they have been created. The goal of cleaner, greener production is to avoid generating pollution in the first place.

This means:

- Better efficiency
- Better business
- Better environmental protection
- Lower costs
- Less waste
- Less emissions
- Less resource consumption

WHY IS THE CLEANER GREENER PRODUCTION PROGRAMME BEING RUN?

The Irish Government, through the National Development Plan 2000 - 2006, has allocated funds to a programme for Environmental Research, Technological Development and Innovation (ERTDI).

The Department of the Environment and Local Government asked the Environmental Protection Agency (EPA) to run the CGPP as part of the ERTDI programme. With the programme continuing to 2006 about 60 businesses will be supported to implement cleaner greener production and to demonstrate their achievements to the rest of Ireland.

The long-term goal is to ensure that cleaner, greener production becomes the established norm in Ireland. The programme seeks to promote environmentally friendly business through increased resource productivity, waste reduction, recovery of materials, improved efficiency in a product value chain, energy management, and a change of culture within organisations.

The programme aims are focussed on avoiding and preventing adverse environmental impact rather than treating or cleaning up afterwards. This approach brings better economic and environmental efficiency.

PROGRAMME MANAGERS:

The Clean Technology Centre (CTC) at Cork Institute of Technology was appointed to manage the programme in association with O'Sullivan Public Relations Ltd, and Energy Transport Actions Ltd, (ENTRAC).

The CTC was established in 1991 and is now nationally and internationally regarded as a centre of excellence in cleaner production, environmental management and eco-innovation across a range of industrial sectors.

WHERE CAN I GET FURTHER INFORMATION?

This case study report is one of 29 reports available from the organisations that participated in the first phase of the Cleaner Greener Production Programme. A summary of all the projects and CD containing all the reports are also available. More information on the Programme is available from the Environmental Protection Agency

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