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## Cleaner Technology Demonstration Site Fact Sheet - *Fiscal Year 2002*

### InteliCoat Technologies South Hadley, MA

## Application of Green Chemistry Principals to Replace Traditional Solvent-Based Coating Systems

In fiscal year 2002, the Toxics Use Reduction Institute (TURI) identified several focus areas for its Cleaner Technology Demonstration Site (CTDS) program. One primary focus area was the application of green chemistry as a means of accomplishing toxic chemical use reduction. Green chemistry is a science-based approach to pollution prevention. It involves a set of principles for reducing or eliminating the use or generation of hazardous substances in the design, manufacture or application of chemical products. It seeks to focus on the earliest stage of materials and process design so that conventional end-of-pipe technologies can be avoided.

InteliCoat Technologies (formerly Rexam Image Products) applied for a CTDS grant to demonstrate its use of innovative alternative web coating formulations and processes. This demonstration fit in well with TURI's emphasis on providing an opportunity for Massachusetts industries and consultants to see practical applications of green chemistry. Employing green chemistry thinking, InteliCoat developed product lines that utilize non-solvent based coatings and reaction conditions, including water-based and UV-curable coatings, to significantly reduce the amount of toxic organic chemicals it uses and releases annually. InteliCoat presented information on its financial and environmental decision-making process for switching its primary product lines and the associated impact of the changes made for the company. Numerous industry representatives, environmental and engineering consultants, and regulatory agency personnel attended the demonstrations.

In conjunction with the CTDS presentation at InteliCoat, the Office of Technical Assistance, a non-regulatory agency affiliated with TURI within the Toxics Use Reduction Act program, worked with company representatives to develop the attached case study. The information contained herein provides a concise picture of the environmental and economic benefits realized by InteliCoat by implementing green chemistry in its operations. The work presented by InteliCoat and described in the attached case study clearly demonstrate that the application of green chemistry principals into daily production operations can provide tangible economic and environmental benefits to Massachusetts industries. For more information on green chemistry, the Cleaner Technology Demonstration Site program, or on the InteliCoat demonstration, please contact Pam Civic, Technical Support Associate for TURI (978-934-3142 or [Pamela Eliason@uml.edu](mailto:Pamela.Eliason@uml.edu).)



# **InteliCoat Technologies**

## **Toxics Use Reduction Case Study**

### **Reduces Air Emissions by Adopting Solvent Free Coating Processes**

#### **Summary**

InteliCoat Technologies (formerly Rexam Image Products) achieved toxics use reduction by adopting solvent free coating processes for the manufacturing of about 60% of their product line. This included the development and commercialization of both water borne and 100% solids UV-cure coating technology. Since the mid-1990's InteliCoat Technologies has invested over \$20 million on product/process development and production improvements to support this new coating technology. This investment has resulted in an 88% reduction of air emissions from volatile organic compounds (VOC) between the years 1990 and 2000. The savings from the reduction of raw materials resulted in \$1.25 million per year.

#### **Background**

InteliCoat Technologies is headquartered in South Hadley, Massachusetts with 350 employees. The company is a global leader in the manufacture of precision coated paper, film, and specialty substrates used in color digital imaging, electronic imaging and component manufacturing. Products manufactured at the South Hadley facility include a wide range of paper and film substrates used in large-format digital printing devices for display applications, film and paper for design engineering, and desktop media.

Prior to the 1980's, InteliCoat Technologies utilized a solvent coating manufacturing process for the production of coated paper, film, and other image media almost exclusively. This process involves mixing and applying a solvent-based coating to the surface of a web, then drying or flashing off the carrier solvent to leave the residual dry coating on the web surface. Historically coating solutions were predominantly solvent based to achieve required mix solubility with in-house resins and dispersions, accelerate the evaporation process, and to optimize drying, which in turn resulted in air emissions of volatile organic compounds (VOC).

InteliCoat Technologies made a strategic business decision in the late 1980's to invest resources into the research and development of using water-based coating technology for the manufacture of their new products. During the mid-1990's, due to increasing emphasis on environmental, health and safety protection and the rising cost of solvent, InteliCoat Technologies began increased efforts to explore alternative technologies for the application of the coating material.

#### **Toxics Use Reduction**

InteliCoat Technologies explored two separate technologies to reduce solvent usage. The first technology was water-based coatings, which are very similar to solvent-based coatings except water is utilized as the carrier and results in no VOC emissions when the surface of the coated web is dried.

The second technology was UV curable coatings. These coatings are unlike solvent or water based coatings because they are largely 100% solids and do not require a carrier solution for application to the web. There are three main components that make up UV curable coatings: liquid oligomers, liquid monomers, and

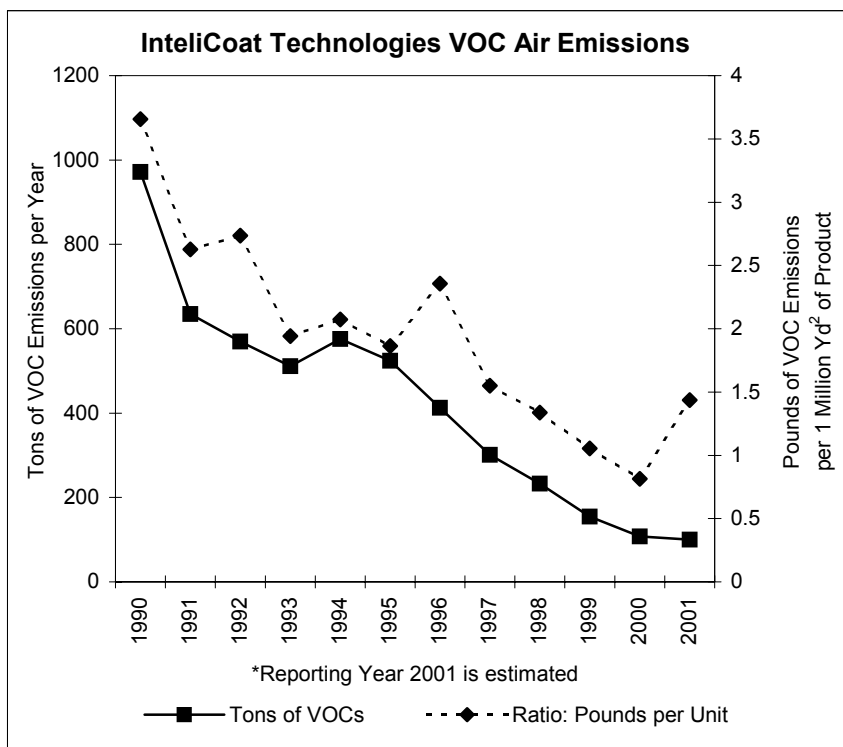
photoinitiators. This quick process involves applying the coating to the web and passing it under a UV light, where the photoinitiators in the coating absorb the energy from the light and form “radicals”. This initiates the curing process as the radicals attach to the monomers and oligomers, typically creating a solid cross-linked stable network, and producing the desired coating properties on paper or film in a matter of seconds.

Since 1995, InteliCoat Technologies has integrated both water-based and UV cured technologies into 80% of all new products, for example the company’s use of an aqueous ceramic coating for components in the electronics industry. InteliCoat Technologies has adopted the philosophy to continue to expand the development of water-based and UV cured technologies, as well as explore other green chemistry technologies.

## Results

*Emissions:* The adoption of the solvent free coating processes resulted in significant environmental benefits. InteliCoat Technologies has achieved an 88% reduction in air emissions of volatile organic compounds since 1990, compared to their 2000 air emissions, and an approximate 98% reduction since 1979.

Qualitatively, InteliCoat Technologies has benefited by improved employee health and safety. The adoption of solvent free coating has directly reduced employees’ exposure to toxic solvents. Therefore, employee health and safety has improved through the substitution of “less hazardous” solvents and the reduction of flammable solvents. The company has also improved community relations in the past decade as a result of their green chemistry initiatives.



*Economics:* InteliCoat Technologies has experienced a dramatic cost savings as a direct result of using the solvent-free coating processes. The cost of raw materials was reduced by approximately \$1,250,000 per year. In addition, the waste disposal costs was reduced by approximately \$13,000 per year. On an economic market view, there has also been recognition of InteliCoat Technologies’s environmental responsiveness in green chemistry commercialization (water borne coatings) by a major OEM customer. This recognition is both a positive measure of manufacturing performance and critical for sustaining and growing the business.

This case study is one in a series prepared by the Office of Technical Assistance (OTA), a branch of the Massachusetts Executive Office of Environmental Affairs. OTA's mission is to assist Massachusetts facilities with reducing their use of toxic chemicals and/or the generation of toxic manufacturing byproducts. Mention of any particular equipment or proprietary technology does not represent an endorsement of these products by the Commonwealth of Massachusetts. This information is available in alternate formats upon request. OTA's **nonregulatory** services are available at **no charge** to Massachusetts businesses and institutions that use toxics. For further information about this or other case studies, or about OTA's technical assistance services, contact:

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