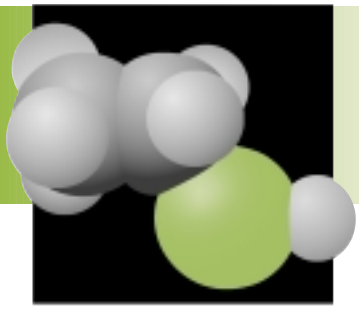
CHEMICALS

Project Fact Sheet



UV-Curable Coatings for Aluminum Can Production

Benefits

- Current energy savings of up to 62 billion Btu/year; potential industry-wide savings of 2.2 quadrillion Btu by the year 2010 if fully implemented
- As much as 55% reduction in capital and installation costs over thermal curing
- Estimated waste reduction of 1,800 tons per billion cans over thermal-curing
- Possible reduction of 2,580 tons per year of Volatile Organic Compounds (VOC) and reduction of 47,000 tons/year of CO_2 emissions if implemented industry-wide
- Creates up to a 10% savings in the cost of inks and varnishes
- Requires 10% less space than required by thermal-curing processes

Applications

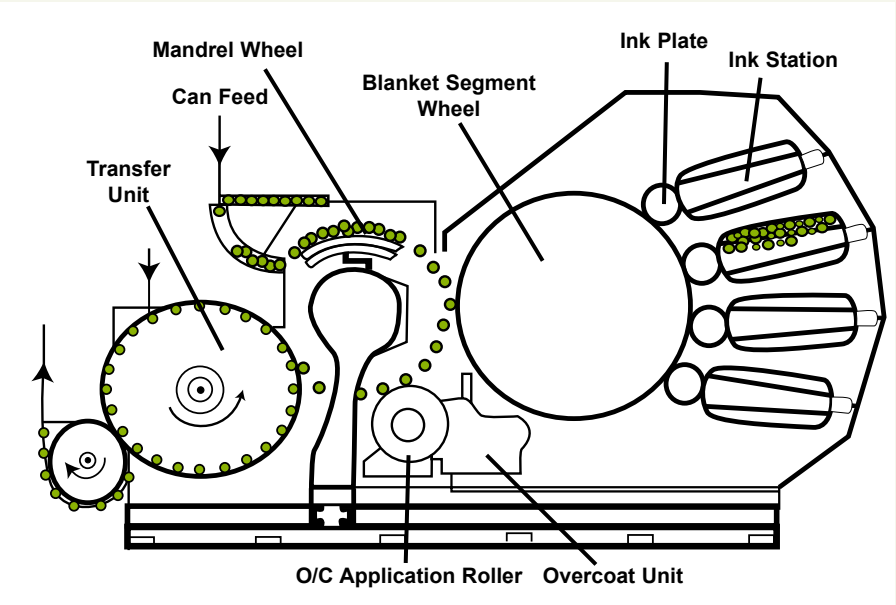
This technology can be used not only in the aluminum can industry, but in the automotive, airline, wood, paper, and plastics industries, as well.

Ultraviolet Light Curing Process Reduces Energy Consumption and Pollution

Coors Brewing Company has been using ultraviolet (UV) light curing technology on its aluminum beverage cans for 25 years. The company is now looking to share its cost-saving technology with other aluminum can producers. Traditional curing methods for creating external decorations on cans rely on convective-heat ovens to cure ink and over-varnish coatings. These thermal-curing methods require large amounts of energy and money, and can have unintended environmental impacts.

Coors' technique uses coating materials that cure when exposed to UV light, thereby eliminating the expensive heat treatments used by conventional coating methods. Additionally, the UV-coating process creates much lower emissions and a smaller pollution waste stream than rival thermal processes because it requires much less solvent than thermal processes.

UV-Curable Coatings for Aluminum Cans



Aluminum cans that have been prepared for curing are exposed to ultraviolet light at room temperature, thus eliminating substantial costs usually incurred through thermal curing.

Project Description

Goal: The project goal is to encourage the aluminum can manufacturing industry to adopt ultraviolet curing technology to reduce energy use, pollution, and emissions while also reducing capital and operating costs throughout the industry.

The UV-curing method relies on inks and varnishes that cure when exposed to ultraviolet light. Once cans are formed, washed, and transported to a printer, inks and varnishes are applied. Newly decorated cans pass through the UV-curing system where coatings are cured at room temperature. Microwave-excited mercury vapor lamps produce high-intensity UV-curing light. Energy consumption is reduced because oven air and large fans are not required in the process. The UV process also does not need the afterburners that half the thermal processes use to reduce pollution. Source reduction of waste is achieved because UV-curable materials contain only minimal amounts of solvents.

Energy and costs associated with different types of curing processes:

Type of Curing	Energy Use in MMBtu/year, facility + utility sources (1 billion cans/year)
UV-Curing Process	15,900
Thermal Process without Pollution Control	40,200
Thermal Process with Pollution Control	79,600

Type of Curing	Approximate Costs in capital and operating expenses (1 billion cans/year)
UV-Curing Process	$1,799,200
Thermal Process without Pollution Control	$2,197,200
Thermal Process with Pollution Control	$3,117,000

As a by-product of an industry-wide adoption of the UV-curing process, increased sales volume of UV-curable inks and varnishes may lower industry-wide operating costs.

Coors is demonstrating this new technology with assistance from the Colorado Office of Energy Conservation and the NICE^3 Program sponsored by the U.S. Department of Energy's Office of Industrial Technologies.

Progress and Milestones

The project has energy savings, cost savings, and environmental benefits, which have been verified by Coors. However, other aluminum can manufacturers have not to date adopted the process because the payback for retrofitting existing production lines is too long and, due to over-capacity in the aluminum can manufacturing industry, no new production lines are currently being constructed. Despite these conditions, Coors continues to promote the benefits of this technology.

Industry of the Future—Chemicals

The chemicals industry is one of several energy- and waste-intensive industries that participate in OIT's Industries of the Future initiative. In December 1996, the chemicals industry published a report, entitled ***Technology Vision 2020: The U.S. Chemical Industry****, that helps establish technical priorities for improving the industry's competitiveness and develops recommendations to strengthen cooperation among industry, government, and academia. It also provides direction for continuous improvement through step-change technology in new chemical science and engineering technology, supply chain management, information systems, and manufacturing and operations.*

OIT Chemicals Industry Team Leader: Hank Kenchington (202) 586-1878.

NICE^3—National Industrial Competitiveness through Energy, Environment, and Economics: An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partners for the first commercial demonstration of energy efficient and clean production manufacturing and industrial technologies. Total project cost for a single award must be cost-shared at a minimum of 50% by a combination of state and industrial partner dollars. The DOE share for each award shall not exceed $500,000 to the industrial partner and up to $25,000 to the sponsoring state agency for a maximum of $525,000.

Project Partners

Colorado Office of Energy Conservation
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NICE^3 Program
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