

Water-Borne Coating Improves Air Quality

Drum manufacturer switches to water-borne coating tailored to meet the company's requirements...

Stiffening environmental regulations have led many manufacturers to change operating practices to improve air quality. In late 1994, Republic Container, a Nitro, West Virginia-based manufacturer of steel drums, switched from solvent- to water-borne coatings to lower the amount of volatile organic compounds (VOCs) emitted. The drums are used for shipping and storing chemicals, lubricants and other liquid or powder materials.

"We were meeting the 4.3 lb/gal VOC restriction enforced by West Virginia's Department of Environmental Protection (DEP)," said Jim McKnight, Republic's president. "But we knew the department would lower that number in the near future. Our goal was to reduce VOCs below 3.5 lb/gal to stay ahead of the game. And the only way to do that was to switch to water-borne coatings."

Meeting Quality Requirements. Republic worked with long-time coating material supplier Jamestown Paint to develop a water-borne coating system that would meet the company's needs and capabilities. The switch involved several challenges.

"One of our primary concerns was quality," said Mr. McKnight. "Typically, solvent-borne coatings offer a higher gloss, resulting in a better looking container. Water-borne coatings often look faded and dull and do not adhere to cold-rolled steel as well as solvent-borne coatings. This often causes a streaking effect." The water-borne coating also had to resist damage from chemicals and other lubricants stored in the containers.

The 55-gal steel drums are coated primarily with automatic spray machines and some hand-held spray guns. Republic's plant personnel wanted the new water-borne coating to be compatible with existing spray equipment. Also, one of the drum's three panels often is sprayed a different color than the other two, making it necessary to find a way to prevent overspray.

It required more than one year to develop a water-borne coating that worked with the existing spray equipment. Republic only had to replace a few nozzles. To avoid overspray, coatings were formulated so that any overspray from the second color was absorbed by the first color.

Environmental Improvements. Mr. McKnight stated, "The water-borne coating performs just as well as the coating we were using. And we have virtually eliminated hazardous chemicals. Once we trained our employees to work with the new coating, they found that water-borne was easier to mix and use."

After testing the water-borne coating on site and in the laboratory, a formulation was developed with a viscosity of approximately 55 sec on a No. 4 Ford cup and a flash point of 77F. VOCs were reduced to about 2.8 lbs/gal.

Economic Improvements. Although the raw materials needed to produce water-borne coatings are more expensive than those for solvent-borne coatings, the water-borne product is more cost-effective in the end. In 1995, Republic saved more than \$10,000 in paint costs.

"When you compare the cost of water to the cost of solvents, we are saving about \$1,000 per month," said Mr. McKnight. "And we have eliminated hazardous disposal costs. By not having to haul waste twice a month, we have also minimized the need to purchase waste drums, which can cost \$300 to \$500 apiece."

Mr. McKnight added that water-borne coatings are baked at lower temperatures and for shorter periods of time, reducing energy costs. "Water-based coatings are the wave of the future," he said. "By making the switch now, we're ready for tougher EPA regulations down the road." **PF**

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