

Clean Air Regs

The air is cleaner, but regulations are driving VOCs still lower...



● Air pollution has decreased in the last 25 years, according to the U.S. Environmental Protection Agency. Picture courtesy of the EPA.

There's good news where air quality is concerned: U.S. skies are clearing all across the country, even in urban areas once thought to have high levels of toxic air pollutants. Recent emission estimates from the U.S. Environmental Protection Agency show that air pollution has dramatically decreased in the last 25 years and particularly in the last 15, as a result of the combined efforts of government, industry and citizen groups.

Among those who have contributed to pollution reductions are

paint and coatings manufacturers, who have systematically decreased the amount of volatile organic compounds in their products.

Interestingly, research indicates that the public largely is unaware of the progress that has been made where air quality is concerned. When surveyed, most Americans report that they believe U.S. air quality is poor and continuing to deteriorate. But this is simply not the case.

Air quality is improving even while factors that generally contribute to pol-

lution have increased. "Nationally, total pollution levels have decreased by one-third since 1970. This progress is truly remarkable when you consider that during the same period of time, the U.S. population grew by more than 30 percent, people drove more than twice as many miles, and our economy more than doubled in size," reported The Foundation

for Clean Air Progress, a non-profit, nonpartisan organization designed to inform citizens about the air they breathe.

Even some of the most industrial states are seeing pollution decreases, according to monitoring data. Under an EPA program designed to lower emissions of ozone-producing nitrogen oxide (NOx) in the East, states collectively have reduced their NOx emissions by 57 percent since 2000 and by 72 percent since 1990. Nearly 70 percent of the areas that did not meet the

national air quality standard for eight-hour ozone in 2004 now have better air quality than the standard requires.

Of course, cleaner air has come at a cost. Since the Clean Air Act of 1990, regulations aimed at reducing the creation of ozone-forming smog have come at a fast clip at every level of government. These regulations have placed a financial burden on those industries that have been forced to change the way they do business.

Within our own industry, regulations aimed at lowering volatile organic compounds in architectural and industrial maintenance coatings have weighed heavily on paint companies. While a national rule was enacted in 1998 to set VOC limits for AIM coatings, stricter regulations at the state level often have trumped it. As a result, paint companies have had to return to the R&D table time after time to reduce the VOCs in their products.

Rising to the challenge, paint companies have created a new generation of low-VOC and even zero-VOC coatings. In just 25 years' time, they also have helped reduce the amount of VOCs released into the atmosphere by nearly 260 million tons. This is an achievement worth celebrating, but the challenge continues. At this writing, the EPA was considering even tighter VOC regulations at the national level.

Good Isn't Good Enough

The EPA in 2007 will be revising the AIM national rule at the request of the Ozone Transport Commission and the Clean Air Act Advisory Committee. The OTC, in particular, is calling for stricter measures that match its own.

The OTC is a multi-state organization created under the Clean Air Act responsible for advising EPA on ozone movement across state lines. The OTC also is responsible for developing and putting in place regional solutions to ground-level ozone in the Northeast and Mid-Atlantic regions. There are similar groups throughout the United States, including the Lake Michigan Air Directors Consortium. However,

LADCO has yet to adopt VOC limits as strict as those of the OTC.

The OTC's limits are among the most stringent in the nation and were patterned after those of California's Air Resources Board. Noting that OTC states "have demonstrated leadership in NOx and VOC reductions," the commission in June passed a resolution requesting that the EPA consider revising the national AIM rule based on OTC measures, with a target date of Jan. 1, 2009.

At this writing, it was unclear what steps the EPA would take, if any, to address the OTC resolution. What is clear is that paint companies can't relax any time too soon.

"With regulatory pressures at the local, state and now federal levels, the industry is facing a 'perfect storm' of architectural and industrial maintenance regulatory initiatives," said David Darling, director of Environmental Affairs at the National Paint & Coatings Association, which represents coatings suppliers nationwide.

Additionally, the EPA is considering new standards for particulate matter, called "PM fine," which are particles of 2.5 micrometers in diameter or smaller. Clean air agencies view VOC emissions as contributing to PM2.5 formation. This is an issue that will play out in the coming months, undoubtedly with more ramifications for paint companies.

For better or worse, paint companies are used to the pressure. Many have formulated their products to comply with the very strictest regulations across the country. Any change in the national AIM rule in particular won't affect larger national companies or those making or selling products within areas that have strict VOC limits, such as Southern California and the OTC states.

Valerie Johnson, communications manager for Eliokem Inc, a specialty chemical producer that supplies resins to the paint and coatings industry, explained how manufacturers must walk a thin line when formulating lower-

Understanding Smog

VOCs and NOx are two of six air pollutants regulated by the U.S. EPA under the Clean Air Act. (The others include particulate matter (PM), carbon monoxide, sulfur dioxide (SO₂) and lead.) At ground level, harmful ozone pollution forms when emissions of VOCs and NOx react in sunlight and heat. Peak ozone levels typically occur during hot, dry, stagnant summertime conditions. Given their weather conditions, Southern and Southwestern states can have an ozone season that lasts almost the entire year.

The largest source of NOx emissions comes from energy use, including combustion from passenger cars, buses, motorcycles and trucks, and stationary sources such as power plants, large industrial boilers and turbines. Other large contributors to NOx emissions are agricultural sources, such as fertilizer.

VOC sources likewise include on-road vehicles as well as pleasure crafts, such as boats, and lawn and garden equipment. VOCs are emitted from the internal combustion engines used to power these vehicles as well as from the use of fuel leaking around hose fittings. VOCs also are emitted by many consumer products, including aerosol products, rubbing compounds, laundry detergents, windshield washing fluids and, of course, paint and coatings.

To put VOC-emitting products in perspective, the Maryland Department of the Environment estimates that, on a summer day in Baltimore alone, paint and coatings account for about 12 tons of VOC emissions; light-duty gasoline trucks, 28 tons; lawn and garden equipment, 30 tons; and light-duty gasoline-powered vehicles, such as cars, 39 tons.

VOC coatings between meeting regulations on one hand and maintaining the coatings' performance characteristics on the other.

"In order to decrease a coating's VOCs, it is necessary to remove solvent from the formulations. This has the effect of increasing relative solids content, both pigment and binder, in the formulation, which has a negative effect on viscosity. Increasing the resin content primarily increases high-shear viscosity, which affects the coating's ability to be spray-applied," Johnson explained. "Increasing the pigment content primarily affects low and medium shear viscosity, which are important for flow, leveling and sag resistance. If the paint formulator's plan is to increase the binder, the resin selected must be optimized to permit good-spray application."

In the face of changing legislation, Eliokem has created new resins to help manufacturers comply. The development of these products, and their time-

ly correspondence with legislation, is indicative of the behind-the-scenes R&D within the paint and coatings industry. Among Eliokem's recent launches are:

- Plioway Ultra 350—because the OTC in January 2005 tightened the VOC requirements for specialty primers, sealers and undercoats from 450 grams per liter to 350 gpl;

- Pliolite LV72—at the same time, lower VOC limits were established for solvent-based swimming pool paints, from 340 gpl to 650 gpl; and

- Pliotec PA91—after the VOC requirements were tightened in July 2006 for the porch and floor paint category to 50 grams per liter.

"All of these resins were developed specifically to aid paint manufacturers in developing VOC-compliant products," said Johnson.

Looking Ahead

Where will VOC regulations go from here? Following the maxim, "If it

ain't broke, don't fix it," governmental entities undoubtedly will continue to tighten the controls that already have produced cleaner air. Nationally, air quality improves everyday, but millions of Americans still live in areas where ozone levels exceed EPA's health-based air-quality standards. They include parts of the Northeast, the Lake Michigan area, parts of the Southeast, southeast Texas and parts of California.

There are compelling reasons to continue the fight against pollution. Ground-level ozone has been linked to respiratory diseases, permanent lung damage, cardiac problems and even premature death. It also damages vegetation and ecosystems, leading to reduced agricultural crops and commercial forest yields.

Given the successes and the risks associated with failure, air-quality legislation, like death and taxes, seems unavoidable. As the air we breathe continues to improve, however, everyone benefits. And this is the best news. ■



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