

Reprinted From:

**PF**

# PRODUCTS FINISHING

PFonline.com



## *Reducing Liquid Coating Costs*

Plural-Component  
System Boosts  
Efficiencies - 16

### PLATING

Arresting Indoor Air  
Quality Criminals - 12

### ECOAT

Measuring Ecoat Film Build  
Is a Top Priority - 20

### CLEANING

Properly Following  
Cleaning Protocols - 25

### POWDER COAT

Pretreatment for Cast Zinc,  
Aluminum Parts - 38



# Automotive Shop's Liquid Coating System Pays Off

A plural-component system boosts efficiency while slashing downtime for this Ohio shop.

Robot-mounted rotary atomizers in one of the two robotic coating lines in Ground Effects' Ohio facility apply a rust-inhibiting, two-component coating to an automotive hub assembly.

Parts used on "super-duty" trucks demand durable coatings that inhibit corrosion and rust, and plural-component coatings seem to fit the bill for one manufacturer serving the automotive industry.

Ground Effects in Windsor, Ontario, Canada, is a supplier of a wide range of interior and exterior automotive parts, and also offers mass vehicle customization and surface-coating services such as electrocoating, powder coating, decorative film coating and polyurea spray coating. In 2015, the company opened a new facility in Westlake, Ohio, to meet the needs of a new customer and apply a specialized rust-inhibiting coating to super-duty vehicles and related parts. This facility houses two robotic coating lines and one manual coating line.

## Rough Start

When the company initially installed a plural-component system on all three of its coating lines, things got off to a rocky start. The rust-inhibiting coating material is a 5-1-ratio resin-to-catalyst mix. The aggressive catalyst, which accelerates curing time, causes the mixed



material to have a short pot life of only 15 minutes. Because of this, Ground Effects needed a plural-component system that could:

- deliver and apply the material quickly and efficiently to prevent premature curing, and
- use a minimal amount of purging solvent in the frequent system flushes in order to exceed EPA requirements.

Unfortunately, the original plural-component system it had installed met neither of these two requirements. For months, the team at the Westlake facility fought material buildup, plugged mixing manifolds, clogged application guns and broken seals.

Transfer efficiency with the system's turbine-powered, air-atomized, electrostatic spray guns also was not as expected. The guns required about 45 psi to atomize the paint and generate the electrostatic charge. According to the Westlake team, this created too much bounceback in corners and recessed areas of parts, resulting in excessive paint waste and booth maintenance.

Taking into account wasted coating material, spare parts usage, production downtime and labor expenses, it cost Westlake Ground Effects an average of \$400 to \$500 each time the system failed. In less than a year's time, the company had spent more than \$52,000 for downtime and parts—on a new system.

Frustrated with the system's performance, the team determined a better solution had to be available.

### Getting Things in Gear

Earlier in his career, one of the Ground Effects team members had had a positive experience working with Nordson electrostatic

air-spray equipment, so the shop contacted Nordson Industrial Coatings in Amherst, Ohio, to discuss finding that better solution.

Rob Schwamberger, a Nordson liquid systems specialist, visited the Ground Effects facility and, after reviewing and studying the coating process and the company's needs, suggested a complete revamping of the spray painting processes in the facility. He recommended the Nordson OptiMix 1 plural-component system and Trilogy air-atomized electrostatic spray gun.

The OptiMix 1 system is designed to provide electronically controlled proportioning and mixing of solvent- and water-based coatings for use in airless, air-assist airless, air-spray, high-volume low-pressure (HVLP), low-volume low-pressure (LVLP), electrostatic and rotary atomization spraying. Schwamberger says the system uses dynamic dosing to achieve complete material mixing and easily handles mix ratios ranging from 0.5-to-1 to 50-to-1, making it suitable for most painting and coating applications. In addition, it makes use of as many as 10 valves for controlling base materials and catalyst materials, enabling the system to manage as many as 10 individual recipes. Users can easily change material chemistries and colors with the push of a button, he says, and an audible alarm alerts them to incorrect material ratios or end-of-material-pot-life situations.

Available in air-spray or HVLP configurations, the Trilogy electrostatic spray gun features a 93-kV power supply that generates the higher tip voltages required to improve transfer efficiency and coverage. The power supply also can be switched between kilovolt mode and automatic feedback current (AFC) for improved penetration into recesses and Faraday cage areas, Schwamberger says.

After a one-month trial of the equipment, Ground Effects saw that the Nordson spray guns provided better coverage on bolt threads and recesses than its previous turbine-powered electrostatic guns while reducing paint usage by more than 20 percent, Schwamberger says.

The shop's manual spray line coats hubs, engine components, brackets and cast parts for super-duty trucks. These parts range in size from ¾ inch (19 mm) to 12 inches (305 mm). Two OptiMix 1 plural-component systems now supply Trilogy manual electrostatic spray guns in the spray booth for 10 hours a day, four days a week, coating 3,000 parts daily.

### Optimizing Flushing and Solvent Use

While the new Nordson system did meet Ground Effects' requirements for better coating delivery and was proven to reduce paint usage, it also had to be efficient enough to prevent premature curing in order to be officially deemed a "better solution."

The shop's old system mixed the resin and catalyst materials in a remote manifold fed by two separate supply lines.

In the shop's manual coating booth, an automatic electrostatic spray gun applies a two-component coating.



A 6-foot (1.8-meter) dispensing hose then ran the mixture from the manifold to the spray guns. The mixed materials would begin to harden while in the manifold and in the spray guns.

“That’s where the failure was,” Schwamberger says. “You cannot spray coating material when it has hardened and blocked the lines.”

In contrast, the new system mixes resin and catalyst in the OptiMix unit right at the spray booth wall, and delivers the mixed material via a low-friction fluid line to the spray gun.

Ground Effect’s second major requirement of any new plural-component system was that the amount of purging solvent used in system flushes be minimized in order to meet EPA requirements. The purge process in the system uses a small amount of solvent with a large quantity of compressed air to flush the paint line, a method called air chop.

Nordson replaced the shop’s two individual 50-foot feed lines (one for the catalyst and one for the resin) and the 6-foot mixed-fluid line with a smaller-diameter, 35-foot mixed-fluid line with an integrated variable air-chop functionality. The air chop introduces compressed air and solvent into the fluid line at the same time, creating a scrubbing action within the system. This process reduces the accumulation of cured coating on the interior of the paint lines.

“A huge benefit is that you can change the amount of solvent versus the amount of air,” Schwamberger adds. “You can have 50-percent air and 50-percent solvent, or 70-percent air and 30-percent solvent, depending on the application. It’s all adjustable through the OptiMix 1 program. We’ve cut the flushing time down considerably, and the amount of flushing material we use in the line, by using more compressed air.”

In addition to cost savings and addressing EPA requirements, using less solvent provides benefits to others as well.



Nordson’s OptiMix 1 plural-component mixing system provides electronically controlled proportioning and mixing of solvent- and water-based coatings.

“EPA compliance is key, but Ground Effects also values their relationship with the community and the local fire department,” Schwamberger says. “Storing and using less solvent is good for everyone.”

### Super-Duty Cost Savings

After a successful one-month trial of the plural-component system, Nordson permanently installed the equipment and spent a week at the Ground Effects facility to work with operators and ensure they understood all of the system’s capabilities and were comfortable running it on their own.

Since then, the company has reported not only increased paint-transfer efficiency but also decreased maintenance costs and downtime. The Ground Effects team says it performs preventive maintenance every other week rather than every other day, as was required with the previous turbine-powered electrostatic system. Operators no longer spend time troubleshooting, experiencing downtime or buying rebuild kits. Instead, they replace the static mixer for about \$20 every couple of weeks, rather than incurring \$400 to \$500 of downtime

every few days with the previous system.

In fact, the shop determined that its savings in converting to the Nordson system in the manual booth have been so substantial, that it converted a second booth with two robots from the original paint-metering systems and turbine-powered electrostatic spray guns to the Nordson OptiMix 1 system with RA-20R robot-mounted rotary atomizers. The fine paint-particle size allowed by these atomizers, combined with Nordson’s special shaping-air kit, is designed to provide exceptional penetration into recesses and Faraday cage areas, Schwamberger says. This provides high transfer efficiency and uniform coverage on difficult-to-paint parts. ■■

*For information on Ground Effects, visit [gfxltd.com](http://gfxltd.com).  
For information on Nordson, visit [nordson.com/liquid](http://nordson.com/liquid).*