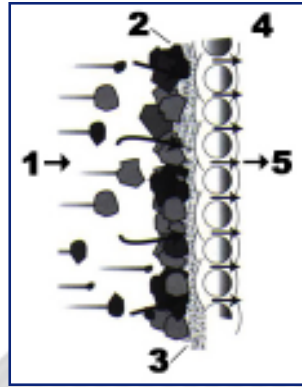


The dust-laden air (raw gas) (1) flows through the filter element from the outside inwards. Retained dust on the surface forms a filter cake (2). The micro-porous filter layer made of PTFE (3) prevents dust particles from penetrating into the base material. The clean gas (5) emerges on the other side of the filter matrix (4).



The filtration efficiency is over 99.99% and results in a clean air stream, regardless of the initial dust loading, of less than 1 mg of glaze per cubic meter of air handled through the booth. This air can safely be returned to the plant environment, eliminating the need for make-up air. In some environments, the air discharging from the filter units is cleaner than the ambient air in the plant. To reduce air disruption and turbulence in the plant, we return the majority of the air to the supply side of the booth.

In summary, dry filtration with Herding Filtration Technology reduces the cost for booth maintenance and replacement filters and eliminates the cost of de-watering the captured glaze and of air make-up, helping our customers reduce the lowest total cost for glazing their products.

The jet pulse cleaning system applies a pulse of air at predetermined time intervals to the interior of the filter elements, causing the dust deposits adhering to the outer surface to be dislodged. Accumulated dust drops down into a removable collection pail to facilitate clean-out.

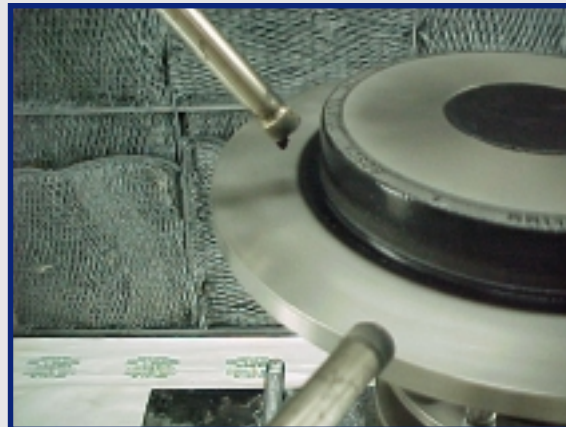
Precision Spray Guns Reduce Paint Costs Significantly

When you spray paint, a lot of it gets wasted. It's called over-spray, and it adds up to big costs for paint, filters, cleaning, emissions controls, and other waste-related costs. Reduce overspray and you improve the bottom line.

Nutro has developed a better spray gun for paint applications that require precise control of the spray pattern. Brake rotors require rust preventative coatings on some surfaces without overspray onto the braking or mounting surface. This type of application usually requires masking the areas that cannot be painted, then cleaning the masks as they become laden with paint.

Precision spray greatly reduces overspray, sometimes eliminating the need for masking.

Precision spray is made possible by HVLP spray guns using nozzle extensions with custom-made spray tips for tight pattern control. Nutro has begun incorporating these guns into brake rotor paint systems and other tasks where pattern control is required.



Precision spray guns coat just the top hat of the rotor.

While the customized spray guns are more expensive than off-the-shelf guns, they quickly repay their cost in saved paint and associated labor costs.

"Some of our customers have been able to eliminate masks," says Mike Bargmann, Nutro's brake parts account manager. "Others have been able to reduce the time between cleaning their masks from every 10 minutes to just three or four times per shift. This has been a great savings for them."

Another area where the guns prove useful is in spraying rotors where new performance specifications require higher paint film thicknesses than ever before. "When you need to spray 9 mils of paint you can easily get a drippy mess, but with the precision spray we can lay down more paint, more uniformly without puddling and dripping," adds Bargmann.

The narrow spray pattern is also useful on complex-shaped surfaces. Painting with ordinary guns is a compromise of a wide pattern covering several surface planes. Several narrow pattern precision guns can break the task up into sections to achieve consistent results.



Summer 2003

COATING SYSTEMS
INFORMATION AND
APPLICATIONS FROM
NUTRO CORPORATION

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- ◆ UV liquid technology speeds up production
- ◆ New product introduction: Coolac®

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Automotive Supplier Turns to UV Liquid

Unit Parts, a major aftermarket supplier of automotive starters and alternators, was looking for a cost-effective and environmentally friendly solution for its finishing needs. Mike Jones, Unit Parts' Director of Process Coating and Finishing, was asked to investigate and recommend a solution to improve his company's paint finish quality. Unit Parts had several goals: improve the aesthetic quality of its coating, eliminate or reduce VOC's from its painting process and double its painting capacity.

Based on his previous experience in the paint industry and ownership of a powder coating shop, Jones' first instinct was to install a powder line and benefit from the positive features of powder coating technology – ease of application, environmental friendliness, and the ability to reclaim and reuse the powder.

However, there were challenges with installing a powder coating system. A conventional powder system would have required installing the cure oven and cooling tunnel on the roof of the facility due to floor space limitations. A powder system would also have required a lot more work in process (approximately 40 minutes total cycle time) than their existing liquid coating system. On top of that, a powder system would not allow Unit Parts to process heat-sensitive subassemblies.

While researching alternative technologies, Jones discovered 100% solid, UV-curable, pigmented coatings. This technology attracted Mike's attention because of the low temperature cure process, low VOC content and instantaneous cure time. The low temperature process is ideal for heavy metallic parts, which typically require a long cool down time if cured in a conventional oven. Heat-sensitive components are not adversely affected. Unit Parts' products survive multiple operations after painting due to the high abrasion and stain-resistance properties of UV-cured coatings. Finally, the part looks better than parts from the competition.

"I recognized that UV technology was on the cutting edge," Jones says. "I knew that there would be a lot of R & D dollars involved and that the technology would advance very quickly. We wanted to get in, get situated, and then wait for the technology to catch-up."

A chain-on-edge conveyor transports the parts through the finishing process. Operators manually load the parts on interchangeable workholders. The parts enter the spray booth and rotate in front of an electrostatic atomizer. The spray booth incorporates stainless steel baffles to collect the majority of overspray coating. Because the material is 100% solids, collected overspray can be pumped into a container for recycling.



Rotary Atomizer

After leaving the booth, the parts enter the curing chamber. Microwave-powered UV lamps provide greater reliability and extended bulb life. Flexible mounting offers Unit Parts the ability to add capacity to the system with respect to line speed and/or part geometry.

Cured parts exit the UV chamber through a shrouded tunnel that protects the operator from UV exposure. Operators unload the parts and place them in dunnage for transport to final assembly.



Exit UV Chamber

Parts are in process for less than four minutes from load to unload. The system occupies only 800-square-feet of floor space, approximately ten times less than a typical powder system with the same capacity.

Since the installation of this system, Unit Parts is reaping the rewards of adopting this technology. Production has more than doubled, paint defects have been reduced from 12% to less than 0.1%, and VOC emissions have been dramatically reduced.

Most importantly, Unit Parts is supplying its customers with a superior coated product.

“UV curing is very reliable,” says Jones. “We have had excellent results as far as the lack of rejects, which is very repeatable from hour to hour, day to day, week to week. We can come in on Monday morning after a weekend of being shut down, turn on the system and have it run just as it did on Friday when we shut it off. This is a very repeatable process.”

Coolac® - Recycling Waterborne Paints

We recycle newspapers, cans and bottles, so why not paint? Until recently, the technology was not available to industrial paint applicators. However, since 1997, the firm of Range & Heine GmbH has been developing and installing a product called Coolac® that makes paint recycling a reality. Nutro Corporation is now the exclusive licensee of this patented process in North America and Brazil.

If you spray paint your product, you know that overspray is expensive and an environmental burden. Beyond the cost of the wasted paint, you have the cost of the filters, the labor to change the filters, the cost to dispose of the filters, and the added burden of cleaning that booth. If you are utilizing a waterwash booth in your system, beyond the cost of the coating you are throwing out, you also have the added costs of the water, the chemicals and the wastewater treatment. In this era of lean manufacturing, these are the non-value-added costs you are probably working hard to eliminate.

Throughout Europe, close to 300 Coolac® overspray recycling system have been integrated into systems spraying waterbased coatings. The initial installations of Coolac® in Europe were in window manufacturing facilities. However, today the markets Coolac® has effectively penetrated include the automotive, wood, and general industrial. Customers from these markets are reporting that paint costs are down 30%, and that their overall operating costs have dropped by 75% on average.

The beauty of Coolac® is in its simplicity of theory, design, equipment and operation. Typical waterborne paints contain 30% to 50% solids and 3% to 15% solvents (VOC's). The balance is water. Evaporation begins with the water, so to prevent this evaporation we first need to control the spray environment by keeping the relative humidity between 50% and 60%. The next step is to maintain the temperature of all booth surfaces exposed to overspray below the dewpoint temperature of the booth air. By doing so, water vapor condenses on these surfaces, providing a moisture barrier to the paint. Gravity pulls the paint overspray and condensation down to a

collection point. The accumulated overspray (typically 30%) will be re-mixed with the original paint supply, in most cases, without additional processing.

If your operation sprays as little as 15 to 25 gallons of waterbased paint in a dry filter or waterwash spray booth per day, we can show you how you can justify the capital expense of a Coolac® system in less than a year. Even quicker if you are spraying more than this in a multiple shift operation.

The cooperation and approval of your paint supplier is critical in confirming the suitability of your paint for recycling. Akzo, BASF, Lilly, Metal Coatings International, PPG, Siegum, Stewart Brothers Paint Company, and Wörwag have already endorsed the Coolac® process and recycling of one or more of their paints.

If your current supplier is not committed to lowering your paint costs, we may be able to suggest a manufacturer that is currently recycling paints or is eager to test recycling under production conditions.

To make this testing possible, Nutro has a portable test unit that we can either run in our lab with your paint or install in your production booth. Reclaimed overspray can then be collected and sent back to the paint manufacturer for complete analysis and verification of the recyclability of your coating with the Coolac® system.

The techniques of controlling the spray environment and surface temperatures were conceived for use with waterborne paints, but can be modified for use with other coatings as well. An example is UV curable coatings, which react very well to heating the booth surfaces to lower the viscosity and encourage flow of 100% solids coatings. Again, allowing you to capture and reuse the overspray of these often expensive coatings.

If you have any questions about Coolac® or how you can reduce your painting cost up to 75%, contact a Nutro sales representative today.



Dry Filtration Reduces Costs in Ceramic Glazing Operations

Overspray collection in a typical glaze booth consists of primary filtration using stationary baffles and a wet scrubber for secondary filtration. The primary baffle system captures approximately 70% of the overspray. The material captured by the baffles is drier than spray-ready glaze, making it easy to recycle by adding water to achieve the proper viscosity.

Due to frequent color changes and the risk of glaze contamination, material that enters the wet scrubber is not suitable for recycling. In fact, chemical treatment and de-watering are required for disposal. Removal of this accumulated glaze from the wet scrubber system is a battle. Although a lot of glaze can be pumped out of the booth with the water, cleaning the booth to maintain efficiency usually requires several extra hours of maintenance per week. A second issue is that wet scrubbers exhaust outside the plant, creating the need for a large volume of heated make-up air to maintain proper ambient conditions.

For many years, dust collectors and powder paint booths have employed dry filtration with back-pulsing for capturing dry dust. Filters intercept contaminants in the air, and back-pulsing with compressed air cleans the filters. The filters used in these applications are either bag-type or cartridge filters with pleated media to increase filter area.



Booth with Cartridge-Style Filters

Despite the back-pulsing, these filters have a finite life and have to be replaced periodically to maintain filter efficiency. Such filters are generally unsuitable for glaze applications because the media absorbs water from the glaze, causing the filters to “blind”. Nutro glaze booths now incorporate a product that solves all of these problems.

Back in 1982, Herding in Germany patented a rigid filter element made from sintered-polyethylene with a PTFE coating. This durable media is impervious to water and has a useful documented life exceeding 10 years.

Even after 10 years of use, the filters can be stripped and re-coated for less than the cost of replacements. Thus the filter itself has an almost unlimited life.



Herding Filtration Module