Ahead of the PAC²E
Pollution Prevention For Painting & Coating Compliance Enhancement

In partnership with EWA’s Design for the Environment
Editor’s Note:

Being a historic proponent of case studies, demonstrations and “hands-on” technical assistance, I was pleased to see the results of a recent survey conducted by the Waste Management Assistance Bureau of the Iowa Department of Natural Resources. In an effort to better understand how pollution prevention assistance could be improved for regulated businesses, input from 300 Iowa companies was sought regarding factors they considered when making pollution prevention changes. The survey found that credible economic data, testimonials and case studies were effective in encouraging pollution prevention practices. The internet, interestingly enough, received relatively low marks for usefulness, especially with small business.

This issue of the Ahead of the PAC is abound with case studies, some of which may surprise you, change your philosophy or cause you to re-assess your coating operation. Again, comments and suggestions on our newsletter efforts are always welcome.

Brian Gedlinske
Editor

Process Training Case Study: Pretreatment Alternatives
Process Training staff partner with an Iowa business to evaluate an alternative pretreatment process.

Auto Refinishing: Proper Surface Preparation
Turn paint failure into success by following three simple guidelines to ensure your finish will look and perform to its highest potential.

Case Study 1: Automotive Refinishing HVLP and Conventional Air Spray
Process Training staff evaluated the performance between High Volume-Low Pressure (HVLP) and conventional air spray guns at an Iowa auto body shop.

Case Study 2: Pressure Feed HVLP vs. Conventional Air Spray
The findings of an in-house comparison of pressure fed HVLP and conventional air spray equipment using a high viscosity industrial coating.

News Briefs
A photo journal of attendees and presentations held at SATA’s Demo Night hosted at the IWRC’s Process Training facility June 17.

Case Study 3: Industrial Finishing
IWRC’s Process Training staff help an Iowa manufacturing facility improve its spray finishing operation.

Pollution Prevention for Painting and Coating Compliance Enhancement is a cooperative effort of the Design for the Environment (U.S. Environmental Protection Agency) and the Iowa Waste Reduction Center at the University of Northern Iowa.
Process Training Case Study:

Pretreatment Alternatives

by Brian Gedlinske, John Whiting and Jim Olson
Iowa Waste Reduction Center

Background Information

Kol-Gol manufactures custom display racks and wire formed products in Lansing, Iowa. The manufacturing process includes wire forming and welding followed by pretreatment (i.e., cleaning, iron phosphatizing and rinsing) of the wire formed product in preparation for powder coating. Because a conversion coating is applied to the substrate, wastewater discharged from this process is subject to the Metal Finishing Category of the Federal Pretreatment Standards (40CFR, Part 433). To reduce or eliminate its industrial wastewater discharges, conserve water, and simplify its environmental compliance responsibilities, management was looking for alternatives to this pretreatment process.

Process Changes and Evaluation

Kol-Gol contacted Process Training staff at the Iowa Waste Reduction Center (IWRC) after reviewing information on plasforization, an alternative to traditional aqueous pretreatment systems (see the article Keeping Pretreatment Simple, in the January 2001 issue of Products Finishing magazine). Plasforization appeared to fit Kol-Gol’s needs based on the following process claims:

- No wastewater is generated from the process;
- The chemical cleans, phosphates and seals in a single stage at room temperature;
- Process times are short, ranging from 60 to 90 seconds; and
- The chemical has unlimited life, and requires only chemical additions as makeup for drag-out.

Because of plasforization’s potential waste reduction and pollution prevention benefits, Kol-Gol and IWRC Process Training staff elected to perform a joint pilot test of the product. Approximately 250 gallons of plasforization chemical Ecophor A 447 (a propylene glycol-based compound) were ordered from Carpenter Chemicals of Alexandria, Virginia. Kol-Gol and IWRC Process Training staff also began designing an immersion tank system specifically for the process. Process planning and design arrangements accounted for the following:

- A 300-gallon capacity, high-density polyethylene tank was acquired as the chemical tank for the pilot project. Secondary containment, consisting of a 650-gallon steel tank, was also provided in the event of a chemical tank release.
- For best plasforization performance, particulate removal and solution agitation was needed. This was accomplished by installing a pump

![Figure 1. Plasforization tank fitted with a drip pan.](image1)

![Figure 2. Pretreatment of wire good products using the plasforization chemical.](image2)
processed a 10,000 unit order through the plaforization tank. It also continued production through its cleaner-iron phosphate pretreatment process. Product performance was then evaluated through cursory inspection of pretreated and coated parts for each process. A cursory comparison of finished products pretreated with each process revealed comparable performance in regard to coating appearance and adhesion. A white-towel assessment of the uncoated ware, however, showed plaforization was superior at removing smut from the substrate (see Figures 3 and 4).

Overall, Kol-Gol was very pleased with the performance of Ecophor A 447. The only disadvantage noted for the plaforization process was the odor, which is considered an easily remedied problem with proper application system design.

At the conclusion of the 10,000 unit run, test panels were again pretreated using each process. These final sets of test panels, however, consisted of cold-rolled steel from sheet metal used in Kol-Gol’s production process. Again, one set of panels was processed through the plaforization chemical while the other was processed with the cleaner-iron phosphate system. The panels were then coated with a black epoxy powder coating, cured and submitted to the Sherwin Williams Company laboratory for salt spray, adhesion and impact resistance testing. A summary of the test results is shown in Table 2.

Discussion of Results
As indicated by pilot test results, Ecophor A 447 performance is comparable to Kol-Gol’s existing cleaner-iron phosphate pretreatment system. Although long-term use is needed for a more complete evaluation in regard to cost, environmental benefits and performance longevity, preliminary results indicate this pretreatment chemical is an attractive pretreatment alternative – particularly for applications involving indoor products, outdoor products with lower salt spray performance requirements, or for instances where wastewater disposal is problematic.

Because of the chemical’s odor, a temporary ventilation system was installed for the process tank.

To address environmental regulatory concerns during the pilot program, the Iowa Department of Natural Resources was notified of the impending waste management research pilot project. Under Iowa Administrative Code Section 455B.500, a person acting in conjunction with a state board of regents’ institution may conduct waste management research for a period of 120 days without authorization or permits.

The pilot program began following completion of the above items. At the beginning of the project, a set of untreated ACT test panels (3x5-inch cold-rolled steel) was pretreated using Kol-Gol’s existing cleaner-iron phosphate system and the plaforization chemical. After pretreatment, each set of test panels was coated using a white polyester powder coating and cured under identical conditions. Finished panels were subsequently submitted to the Sherwin Williams Company for salt spray, impact resistance and adhesion testing. The film build for each panel was also determined. Performance results for the test panels are presented in Table 1.

As shown, similar results were obtained for each set of test panels. Panels 6A and 6B, however, had a thicker film build. This may have contributed to the lower salt spray creepage and impact resistance results obtained for these panels.

Over a course of approximately nine days, Kol-Gol and bag filtration unit to circulate the chemical in the tank during operation.

The chemical tank design included a drip pan/shield to capture and route chemical draining from the part back into the chemical tank.
Auto Refinishing: Proper Surface Preparation

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If you have ever read an article on painting anything, the author always starts by stressing the importance of good surface preparation. Training classes offered by paint manufacturers begin the same way. Why keep beating this same horse? Simple - most paint failures are caused by poor surface preparation.

There are two kinds of adhesives: chemical and mechanical. Chemical adhesion refers to the ability of a coating to bond with the substrate. To be chemically compatible, coatings must have similar chemical compositions and be applied within correct time frames. For example, you could apply the clear coating of paint manufacturer “X” over the basecoat color of manufacturer “Y” and still have problems if you wait too long. If the base color dries past a certain point, the clear coating will not adhere well, even if the chemistries are compatible.

Mechanical adhesion is as simple as abrating the substrate to increase the contact area. Sanding an automotive finish effectively doubles the surface area. For example, imagine the distance from point A to point B as a straight line. Now sand across that distance with sandpaper. Under a powerful magnifying glass you would see valleys and peaks caused by the abrasive. The effective distance from A to B now includes the descent down one side of the abrasive scratch and the ascent up the other, doubling the distance from A to B. When paint peels off an automobile, it tends to occur at difficult-to-sand areas such as around door handles or trim pieces.

Surface Preparation

Every automotive paint manufacturer begins their suggested surface preparation steps with the admonition to wash the car from A to B. When paint peels off an automobile, it tends to occur at difficult-to-sand areas such as around door handles or trim pieces. Following a drenching water rinse, but before sanding begins, the automobile finish needs further decontamination with a wax and grease remover. Wax and grease removers are designed to loosen the contaminant's hold on the substrate. There are three distinct types of wax and grease removers, the most common of which is petroleum-based solvent. Petroleum-based removers are designed to float surface contaminants to the top of the solvent film long enough to be wiped dry and clean. If the wax and grease solvent is allowed to evaporate completely, contaminants just return from where they came. If dirty rags are used, contaminants are just smeared around instead of being removed.

Petroleum-based solvents contain volatile organic compounds (VOCs). As a result, several areas of the country forbid the use of petroleum-based wax and grease removers. There are also alcohol-based wax and grease removers, these alcohol-based products float contaminants to the top of the wet film. However, unlike VOC-laden petroleum-based removers, they do not form smog in the presence of sunlight. They also offer other advantages. For example, they are better suited for cleaning plastic substrates. On a plastic body part like a flexible front bumper, sanded and exposed plastic readily absorbs petroleum-based solvent. Depending on ambient temperature and air movement, it may take over 30 minutes for this solvent to fully evaporate from the part. Consequently, a typical auto collision repair shop waits 30 minutes before finishing the plastic bumper with several coats of primer, sealer and color. Alcohol-based wax and grease removers, however, are not absorbed as easily and typically evaporate faster.

Soap-paste wax and grease removers are another alternative. These cleaners use various combinations of soap, detergent and soft abrasives to scrub panels clean. They are compliant in regulated areas as no solvent is used in the process. Additionally, the thorough scrubbing required with this type of wax and grease remover often produces a cleaner panel than its liquid counterparts. No matter which type of wax and grease remover is used, you may assess cleanliness by pouring clean water onto the panel. If the water sheets off, the panel is clean and free of organic contaminants. If the water beads up, contaminants are still present. If they are not removed before sanding, they will be driven deep into the old finish by the sandpaper. This may cause fisheyes (the crater-like appearance caused by fresh, wet paint flowing around un-removed contamination) and/or adhesion problems down the road. If the water on the panel beads up, try switching wax and grease remover types. Switching from solvent to alcohol to soap paste is often an effective method for removing stubborn grime. As a last resort, try very hot water and laundry detergent. Some dealer-applied paint sealants resist almost every kind of cleaner. Sometimes the enzymes used to removegrass stains from your clothes are effective at breaking the paint sealant's bond to the old paint.

Abrading and Masking

Once the surface tests clean, careful abrasion is the next step to insure great paint longevity. Automotive sandpaper is all constructed in the same fashion. A backing (most often paper but sometimes cloth or plastic) is coated with adhesive then abrasive particles. The adhesives are most often animal hide glue or man-made waterproof resins. The abrasive itself is also manmade as naturally occurring abrasives like emory, garnet and Flint are too soft to last very long in auto repair. The longest lasting, sharpest and most expensive abrasives are ceramic. The next most durable is aluminum oxide. The most brittle, least durable abrasive is silicone carbide. It is most often used in finer grits (80 ANSI and smaller) as the paper clogs with friction melted paint long before the abrasive is worn away.

Air powered machine sanders come in hundreds of shapes and styles, making the flat areas easy to sand thoroughly. Unfortunately, since auto repair is purchased by labor time, there’s a prevalent temptation to skip the careful hand sanding needed around tiny trim ports and inverted body curves. Final hand sanding (continued on back cover)
Introduction and Background Information

In an effort to compare performance between High Volume – Low Pressure (HVLP) and conventional air spray, Process Training staff began working with an Iowa auto body shop that used a siphon feed conventional air spray gun for its finishing work. The intent of the case study was to assess how switching from conventional to HVLP air spray affects coating usage.

Methods and Procedures

Before working with the facility, two sets of identical automotive parts (each set included a truck hood and fender) were prepped for the study by Process Training staff. These parts were primed, sanded and taken to the auto body shop for a base coat – clear coat finish.

Based on coating manufacturer specifications, the ready-to-spray metallic base had a viscosity of 15 to 17 seconds on a #2 Zahn cup and contained approximately 9 percent solids by volume. The ready-to-spray clear coat finish was reported to have an application viscosity of approximately 15 seconds on a #2 Zahn cup and contain approximately 24 percent solids by volume.

The body shop operator used a conventional siphon feed air spray gun fitted with a 0.070-inch fluid nozzle to finish the first set of parts. After loading up the cup gun with each coating material and allowing the operator to set up the spray gun to his satisfaction, the mass of spray gun and its contents were weighed to the nearest tenth of a gram. The parts were then given two coats of base followed by two coats of clear. After applying the second coat for each material, the spray gun and its contents were re-weighed to determine the mass of base and clear coat sprayed to finish the parts.

The same operator was then provided a gravity feed HVLP spray gun fitted with a 0.055-inch diameter fluid nozzle. After becoming acclimated to the spray gun, the same operator was allowed to apply two coats of base and clear to a set of parts. Pre and post-weights were again taken on the spray gun and its contents for each coating material.

Film build measurements were again taken on the spray gun type. Before each part was finished, Process Training staff collected baseline film build measurements across each part at designated intervals. Film build measurements were again collected at these same locations after the part was finished and cured. The finish quality was also subjectively evaluated by a Process Training staff person and an independent observer. Both sets of parts (i.e., those finished with conventional air spray and those with HVLP air spray) were judged to be comparable in appearance.

Findings

A summary of the case study findings is presented in Table 1. This includes information on the spray guns, the mass of each material sprayed, and average film build on the parts for each scenario.

As indicated in Table 1, approximately 13 percent less base coat (by mass) was sprayed with the HVLP spray gun when compared to the conventional air spray gun. However, with the clear coat, the conventional siphon feed spray gun sprayed less material (approximately 12 percent less than HVLP). Average film build measurements obtained for the hoods were quite similar. The HVLP fender, however, exhibited an average film build that was approximately 33 percent greater than the conventional air spray fender. This undoubtedly contributed to the greater amount of clear coat sprayed with the HVLP spray gun.

Implications

In short, the dramatic transfer efficiency differences often cited between HVLP and conventional air spray were not realized by the case study findings. This was particularly evident for the clear coat data where conventional air spray actually used less material than HVLP. Although the higher film build on the HVLP fender undoubtedly accounts for some of this material, it’s important to remember that the fender represents, at best, 30 percent of the hood’s surface area.

A similar conclusion may also be extrapolated from the base coat data. For example, if the HVLP spray gun sprayed the base coat at the generally accepted transfer efficiency (TE) value of 65 percent, this would mean that approximately 203.5 grams of base coat were deposited on the targets (i.e., 65 percent of 313.1 g). If 358.9 grams of base coat had to be sprayed with the conventional air spray gun to deposit that same 203.5 grams of coating on the targets, this would mean that conventional air spray achieved a TE of approximately 57 percent. This 8-percent difference in TE is a far cry from the 87 percent differences often cited in the literature. Although the HVLP spray gun applied the base coat more efficiently, the differences in material consumption (between HVLP and conventional air spray) do not support the large differences in TE often found in the literature.
Introduction

Findings of Case Study I prompted Process Training staff to perform an in-house comparison of pressure fed HVLP and conventional air spray equipment using a relatively high viscosity coating. The intent of the study was to assess the performance of HVLP and conventional air spray in regard to transfer efficiency, production speed and finish quality when spraying a relatively high viscosity industrial coating.

Methods and Procedures

Spray application equipment used for the study included a variety of HVLP and conventional spray guns pressure fed by a diaphragm pump. Because of the viscosity of material, fluid nozzle sizes selected for the study ranged in diameter from 0.070” to 0.087”.

Atomizing air to the spray guns was conveyed through a 25-foot section of 3/8-inch air hose fitted with large capacity quick disconnects. Fluid from the pump was conveyed through approximately five feet of 3/8-inch fluid hose to a Micro Motion Elite fluid metering sensor. This metering system was used to monitor and record the amount of material sprayed for each spray gun on a mass and volume basis. It also provides information on the density, temperature and fluid delivery rate (on a mass or volume basis) of the material sprayed. After exiting the sensor, the fluid traveled through approximately 25 feet of 3/8-inch fluid hose to the inlet of the spray gun.

### HVLP vs Conventional Air Spray Performance Data

<table>
<thead>
<tr>
<th>Spray System</th>
<th>Fluid Pressure</th>
<th>Fluid Pressure</th>
<th>Atomizing Air Pressure</th>
<th>Field Delivered Fluid</th>
<th>Transfer Efficiency</th>
<th>Average Flow</th>
<th>Total Dry Spreading</th>
</tr>
</thead>
<tbody>
<tr>
<td>HVLP (IC)</td>
<td>60 psi</td>
<td>30 ps</td>
<td>45 psi</td>
<td>6.3 gallons/minute</td>
<td>60%</td>
<td>5.0 ft/min</td>
<td>8.8 lbs</td>
</tr>
<tr>
<td>Conventional</td>
<td>40 psi</td>
<td>40 ps</td>
<td>50 psi</td>
<td>5.5 gallons/minute</td>
<td>60%</td>
<td>4.0 ft/min</td>
<td>6.7 lbs</td>
</tr>
<tr>
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<td>40 psi</td>
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<td>6.7 lbs</td>
</tr>
</tbody>
</table>

*Note: spray performance was measured at the exit of the atomizing air. Flow rates were calculated based on the density of the material sprayed.*

*Note: air was supplied to the spray gun at a working height of 6 feet.*
Sherwin Williams Kem 400 alkyd enamel was sprayed during the study. This product was selected because of its fast-drying characteristics and suitability for a broad number of industrial applications. Paint viscosity and solids content measurements were taken and recorded throughout the course of the study. Throughout the comparison study, the viscosity and percent solids of the coating remained relatively constant. The viscosity measured approximately 16 to 17 seconds on a #3 Zahn cup while the percent solids of the material was determined to be approximately 46 percent by mass.

Flat test panels measuring 16.5 by 12.5 inches and constructed of 1/16-inch aluminum were used as targets. Prior to painting, each panel had been cleaned and labeled with a unique identification number. Each set of six panels were then arranged in the configuration illustrated in Figure 1, providing a total surface area of approximately 8.6 square feet (ft²). The pre-coating mass of each panel was also measured and recorded to the nearest tenth of a gram for subsequent transfer efficiency (TE) calculations.

For consistency, the same Process Training staff person performed all the spray finishing. This same person was also responsible for adjusting each spray gun’s atomizing air pressure and sizing the spray pattern with the shaping air valve. Additionally, the fluid needle adjustment knob was set to a full open position for each spray gun. Each set of panels was given two coats with approximately five minutes of flash-off time between coats. For comparative purposes, an effort was made to spray HVLP and conventional air spray guns at comparable fluid delivery rates (measured at a five-foot working height). This was accomplished through fluid pressure adjustment and nozzle size selection. The first fluid delivery rate used for the study was approximately 2.0 to 2.4 ounces per minute (oz/min). After finishing a set of panels at this rate with each type of spray gun, fluid delivery was increased to a rate of approximately 3.6 to 3.8 oz/min.

After curing, panels were again weighed to the nearest tenth of a gram to determine the mass of coating deposited on each part. Finish quality was also evaluated through visual inspection. To assess film build, ten dry film thickness measurements were collected at two-inch intervals diagonally across each panel. The average mil build for the entire set of panels was then determined.

Each set of panels was also ranked based on gloss and surface texture. This was conducted by displaying each set of panels side by side in no particular order. Without knowing the panel set ID numbers and conditions in which they were finished, three Iowa Waste Reduction Center (IWRC) staff were invited to rank the four sets of panels in order of gloss and degree of smoothness.

Findings
Table 1 summarizes the findings of the study. Information presented includes the type of spray gun used, the amount of paint used to finish each set of panels, the TE, and the average film build for each panel set. It also includes information on the operating parameters used to finish each set of panels (e.g., fluid pressure, atomizing air pressure, fluid delivery rates [with and without atomizing air to the gun], and nozzle size). Subjective data recorded for finish quality (in regard to gloss and smoothness) is provided in Table 2.

As indicated in Table 1, a negligible difference was found between the TE’s obtained for HVLP and conventional air spray. Information in Table 1 suggests conventional air spray equipment is capable of achieving a TE comparable to HVLP while operating at a slightly higher fluid delivery rate. The volume of material used by each spray gun to finish the panels was also relatively consistent, ranging from approximately 6.3 to 6.9 ounces.

Another significant finding of the comparison was the finish quality achieved with each spray gun at different fluid delivery rates. As shown in Table 2, the HD panels (sprayed with the HVLP spray gun at a fluid delivery rate of approximately 3.6 oz/min) consistently ranked last for smoothness. A noticeably higher degree of orange peel was present on the HD panels. The panels identified as HC, CD and CF were comparable in appearance with respect to smoothness. This is reflected in the inconsistent ranking order assigned by each staff person and from staff comments on how difficult it was to rank these three panel sets.

In regard to gloss, the HC panels consistently ranked lowest. Again, based on the inconsistent ranking order and staff comments, the remaining panel sets (HD, CD and CF) were comparable in appearance.

Implications
The comparison study findings suggest the following in regard to TE, finish quality, production speed and fluid viscosity:

- For higher viscosity coatings, conventional air spray guns may be used just as efficiently as HVLP spray guns if they are properly set up and operated. As Table 1 indicates, conventional air spray guns are capable of achieving TE’s comparable to HVLP air spray.

- From a finish quality perspective, conventional air spray equipment may be the best choice for high solids/viscosity coatings and production rates. As illustrated by study findings, the higher atomization energy levels available to conventional air spray equipment make it better suited for atomizing high viscosity coatings at higher fluid delivery rates. Consequently, conventional air spray guns may produce the desired finish when spraying high performance high viscosity coatings in a production environment while the finish produced by an HVLP air spray gun may fall short of expectations. As indicated above, this may be achieved without sacrificing TE.

- Findings suggest HVLP’s reputation for TE may simply reside in the fact that its design lowers the ceiling for excessive setup parameters, a particularly beneficial attribute when spraying easily atomized coatings. That is, when compared to conventional air spray, HVLP design restricts the degree to which operating parameters (i.e., fluid and atomizing air pressures) can be set to excessive levels. While advantageous for low viscosity or easily atomized coatings, this attribute puts HVLP at a disadvantage with more difficult-to-atomize high performance coatings.
The Iowa Waste Reduction Center's Process Training facility, located in the Cedar Falls industrial park, was the site for SATA Demo Night held June 17. Automotive Finishes inquired about using our facility to host the event.

Autobody collision repair technicians, dealership employees, and wholesalers from all over the Midwest were among the attendees at the event. It included presentations by Tony Larmier on the various makes and models of SATA spray equipment, waste reduction and pollution prevention opportunities, and proper spray gun setup and spray technique.
Introduction and Background Information

In the Spring of 2002, Process Training staff visited an Iowa manufacturing facility to assess its spray finishing operation and offer suggestions for improving its application efficiency. Attrition, job transfers, and layoffs had left the facility with little experience in the spray finishing department. The facility was using conventional air spray equipment pressure fed by pail-mount diaphragm pumps. The waterborne coatings, primarily white and black, were applied to the products manufactured at the facility without reduction. Based on product information for the coatings, the white had a viscosity of 76 Krebs units and a solids content of 32 percent by volume. The black was reported to have a viscosity of 34 seconds on a #3 Zahn cup and a solids content of 45 percent by volume. Spray guns used to apply the black coating were fitted with 0.070-inch fluid nozzles while the white was applied using a 0.086-inch fluid nozzle size. Fluid pressures for these products ranged from approximately 24 to 43 psi. Atomizing air pressures used at the facility ranged from 44 to 90 psi.

Although the facility possessed a relatively new HVLP spray gun, the gun was not being used. It was suspected that spray operators found the HVLP spray gun to be too slow for production. Upon inspection, the HVLP spray gun was found to have a 0.055-inch fluid nozzle, supporting suspicions that the spray gun wasn’t capable of keeping up with production.

Process Changes

After reviewing the facility’s operation, Process Training staff implemented the following changes:

✓ The facility’s HVLP spray gun was also fitted with a 0.110-inch nozzle and placed on line for the black coating. This larger fluid nozzle size was better suited for the facility’s coating and production speed.

✓ All along the way, production personnel were kept informed of what process changes were being made and why. Their input was also sought out and addressed in regard to finish quality and production speed.

Results

The engineering director for the facility noted the following benefits:

• Staff are much more knowledgeable in regard to equipment operation;

• Finish quality improved;

• The facility’s coating consumption rate using the conventional air spray gun dropped 30 to 50 percent for a comparable production run and;

• Reduced overspray should result in significant savings in spray booth maintenance and booth filter replacement.

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irregular areas is required for finish longevity. There is no substitute for attention to detail – especially in auto refinishing.

Once thoroughly and carefully abraded, the substrate must be re-cleaned with wax and grease remover to eliminate the residue from sanding and handprint body oils. Test for cleanliness by the sheeting water method.

Masking against paint overspray is a time consuming, labor intensive process. Automotive tapes and masking papers are treated to resist solvent penetration. Solvent will wick right through untreated tapes and papers, staining the underly- ing finish. More expensive auto masking papers are coated on the back with paraffin wax or plastic film to prevent solvent penetration. More expensive auto masking tapes have sophisticated adhesives that will not easily transfer off the paper onto the paint. When many body shops routinely heat their paintwork to 140°F for faster cure times, better masking tapes are a must. Under heat, less expensive adhesives will release from the paper backing, causing additional cleanup time to remove them from the car before delivery.

Tires, headlights and door handles are often masked using special covers made specifically for these areas. Snap on plastic plates can cover headlights quickly while wire-edged canvas covers prevent overspray from reaching wheels or tires. Mobile masking machines that dispense masking tape and paper together are a must. Most machines dispense four different widths of paper to facilitate fast coverage of protected parts.

Final Steps

Once cleaned, sanded and masked, the vehicle is tack-wiped with a treated cloth to collect dust. Tack rags are cheesecloth treated with non-drying shellac. Unfolding the sticky cloth to full size (most often 18" x 36") and wadding it into a loose ball does the best job collecting dust. Newer tacking systems, consisting of sponges treated with special non-transfering adhesives, are also available. In either case, frequent replacement ensures a clean paint job.

There is still no substitute for clean, carefully prepared substrates. Any finish will look and perform better if the pre-work is complete and methodical.