



design FOR THE ENVIRONMENT Auto Refinishing Project

Using Waterborne Basecoats in Collision Repair Shops: A Case Study

What Is EPA's Design for the Environment (DfE) Automotive Refinishing Partnership?

EPA's DfE Program forms partnerships to reduce risk to people and the environment through pollution prevention. DfE has been working with the automotive refinishing industry since 1997 to identify and promote safer, cleaner, and more efficient practices and technologies. The DfE team conducts best practices workshops and site visits for collision repair businesses and schools. A best practices outreach kit, checklists, fact sheets, case studies, health and safety information, and links to numerous resources are available on the DfE web site at <http://www.epa.gov/dfepubs/projects/auto>.



A Switch to Waterborne Is on the Rise!

Switching to waterborne from solvent-based automotive refinishing paints is becoming more popular in the U.S. for health and environmental reasons, as well as stricter environmental regulations in California and Canada. Original equipment manufacturers (OEMs) and collision repair shops in Europe and some OEMs in the United States already use waterborne paints extensively.



Larry Visser, the owner of Visor's Collision Center in Chicago, switched to waterborne basecoats in 2005 and learned a number of valuable lessons along the way. This case study shares Larry's story and may help you decide if your shop is ready to make a switch from solvent-based to waterborne basecoats.

Should You Consider a Switch?

Larry successfully switched to waterborne basecoats and liked the results, which include:

- **Increased productivity:** Fewer coats—and less time—are required to complete a job. As a result, Larry reports that he gets more jobs completed per week and uses less paint. Waterborne basecoats may cost more than solvent basecoats but, according to Larry, “the cost is more than offset by the increase you'll see in worker productivity and the money you'll save by purchasing less paint.”
- **Painter Retention:** Initially, Larry found it difficult to convince his painter that switching to waterborne basecoats was a good thing. Now, Larry's painter actually prefers using waterborne basecoats and enjoys a cleaner environment. Larry believes his painter is unlikely to leave his shop to work for a shop that still uses solvent basecoats.
- **Reduced insurance costs:** Waterborne basecoats are less flammable and less toxic than solvent-based paints. Larry believes this was a factor in lowering his shop's insurance premiums.
- **Staying ahead of the regulatory curve:** Larry finds it easier to comply with current federal and state regulations limiting volatile organic compounds (VOCs). By switching to waterborne basecoats, Larry's shop has a head start in complying with future regulations that require further reductions of VOCs and/or hazardous air pollutants (HAPs).
- **Customer satisfaction.** There is some evidence that waterborne basecoats provide a more durable finish (e.g., less brittle and more chip resistant) than solvent-based finishes—an improvement Larry's customers appreciate. Larry's customers also like the color match of waterborne basecoats with the OEM's finish on their vehicle.

Benefits of Waterborne Paints

Larry discovered that the benefits of waterborne basecoats stretch far beyond business—they make sense for worker health and safety, as well as the environment. Solvent-based automotive paints contain VOCs and hazardous air pollutants that contribute to air pollution and cause numerous adverse health effects, including eye/skin irritation, and central nervous system effects. Organic solvents may also damage the liver and kidneys, and cause, cancer, respiratory, reproductive and other effects.

Waterborne paints contain much lower levels of organic solvents and are less toxic than solvent-based paints. However, automotive paint manufacturers stress that automotive paints should always be used by professionals, along with proper control technologies and protective equipment to minimize emissions of air toxics and prevent respiratory, eye, and dermal exposures. In addition, some basecoats still contain lead and hexavalent chromium pigments.

Waterborne coatings, along with lead-free and chromium-free paints, are safer choices for the workplace and the environment!

Warning! Automotive paints contain isocyanates (and polyisocyanates), the hardeners or catalysts in clear coats and some primers. Isocyanates are strong dermal and lung sensitizers and the leading cause of occupational asthma, so protect your skin and lungs from exposure to paints containing isocyanates.

The Scene: Visser's Collision Center

Larry's shop, Visser's Collision Center, is a medium-sized collision repair shop in the Chicago area with two painters. The shop performs 15 to 20 jobs a week and uses the Standox® paint system.

Larry's shop caters to high-end vehicles such as Mercedes and has been using waterborne basecoats



since 2005. Larry decided to switch to waterborne basecoats for several reasons after his paint

supplier recommended that his shop should try waterborne technology. Larry wanted to protect his workers from solvent exposures and he wanted to make the switch for business purposes—he feels that waterborne basecoats will become the trend in the industry. Larry wants to be one step ahead of the curve. Since the paint supplier encouraged Larry to make the switch, Larry seized the opportunity and took full advantage of the supplier's free training and support.

Training your painter and following the paint manufacturer's guidelines are keys to success!

Larry and his painters worked closely with the paint supplier. The supplier came to the shop for two weeks to provide training for his painters and to set up the shop for use of waterborne basecoats. Today, both Larry and his painters are happy with the results and glad that they made the switch.

A Successful Conversion to Waterborne

Many shops can successfully use waterborne automotive paints. If you have a well maintained, clean shop and dedicated and talented workers, you should consider using waterborne technology. As Larry observed, "the switch to waterborne basecoats was fairly easy with the help of my paint supplier and the dedication of my painters. The product has saved time and increased productivity and protects the health of my workers and the community."

The Challenges...

Although sold on a switch to waterborne basecoats, Larry still faced several challenges to get the new system up and running, as described below.

- **Booth Modifications:** Waterborne basecoats need heat and additional airflow to dry properly. Larry retrofitted his two existing spray booths with Junair's QADs™ auxiliary air movement system, which provides additional blowers and heat to existing spray booths that are required for waterborne systems. The estimated cost to retrofit one spray booth is approximately \$25,000. Larry says that spray booth filter maintenance is very important, since clogged filters interfere with the

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booth's airflow and affect the drying process. Occasionally, a shop can also use a portable blower to provide additional air movement for small jobs and cut-ins.

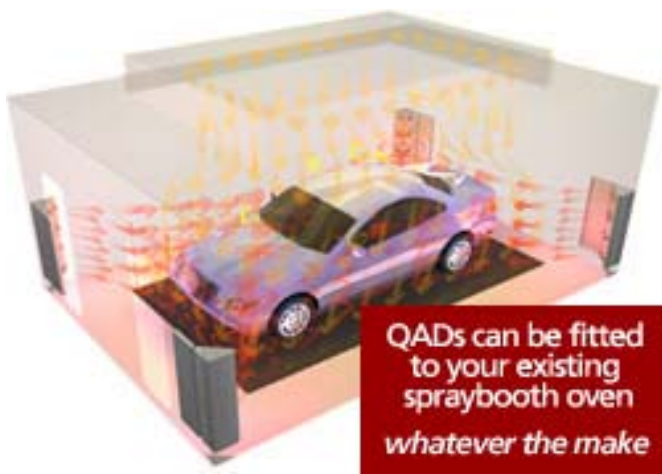


Photo provided courtesy of Junair Americas

- **Adjustments to Spraying Technique:**

Waterborne basecoats cover and dry differently than conventional coatings. Waterborne basecoats also differ in their viscosity, making them particularly sensitive to changes in temperature and humidity. To compensate for these differences, Larry purchased new spray guns with the proper spray tips (1.0-1.3 mm) and his painters adjusted their spraying technique and drying time depending on temperature and humidity. Larry's painters adjusted quickly and felt comfortable with the spraying technique after only one week of training by the paint supplier. Larry also discovered that waterborne basecoats require only one to two coats to provide coverage and the color matching was excellent. However, since fewer coats are needed, it can be more challenging to achieve a proper blend. Because fewer coats also mean that less paint is needed per job, Larry's painters have learned how to adjust the amount of paint to mix for each job.

- **Disposal of Used Cleaning Water and Paint**

Waste: Spray guns and other equipment in contact with waterborne basecoats must be cleaned with water between each color change. Used cleaning water must be disposed of as hazardous waste. Larry's shop set up a separate collection drum for

this wastewater and contracted with a new hazardous waste hauler to take it away. Larry noted that it was a challenge to determine the proper disposal of this wastewater. However, he found a new hazardous waste hauler that handles both his wastewater and other hazardous waste generated at his shop.

Always check with local authorities about proper handling, storage, and disposal of hazardous waste.

- **Mixing Room Modifications:** Generally, waterborne basecoats must be maintained at a temperature above 55°F, or the shelf life is significantly reduced. This created a significant challenge for Larry because the room gets fairly cold over night and on weekends during the winter months. Keeping potential fire hazards in mind, Larry is considering adding heat to the space or other paint storage options as a long-term fix.



Photo provided courtesy of DuPont Performance Coatings

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The Regulatory Landscape

In the U.S., some state and local jurisdictions are taking the lead in regulating automotive refinishing emissions. California and several northeastern states have developed practice standards for shops in selected air districts to reduce VOC emissions. Canada is also requiring a switch to waterborne basecoats. Keeping on top of the regulatory landscape can help you decide if the time is right to switch to waterborne basecoats.

How Can I Get More Information on Switching to Waterborne Basecoats?

Talk to your paint and equipment suppliers and ask them to determine if your shop is a candidate for waterborne technology. Visit a facility that uses waterborne technology. Read about waterborne conversions in the trade press and on paint manufacturer's web sites. Take the first step!



www.epa.gov/dfe/pubs/projects/auto/

For additional information, visit the DfE Auto Refinishing Partnership website at <http://www.epa.gov/dfe/pubs/projects/auto>

and the virtual auto body shop on the CCAR-Greenlink website at <http://www.ccar-greenlink.org/cshops>.

Taking the First Steps

If you decide to make the switch to waterborne basecoats, take these initial steps to make this change:

1. Contact your paint supplier about waterborne basecoat options and training opportunities. Your painters will need training on how to effectively spray waterborne coatings, including use of spray gun tips that provide a larger spray fan for applying thinner coats.
2. Evaluate your shop's equipment, especially the spray booth, and make the appropriate upgrades. The key to optimal drying of waterborne paints is in the temperature, humidity, and air movement over the surface. One source suggests uniform air flows of at least 11,000 cfm, sufficient heating, and clean air, among other factors. You may need to retrofit your existing booth, use portable blowers, or a combination.
3. Spray gun passages and paint cups should be constructed from corrosion-resistant materials (e.g., stainless steel or plastic). Consider replacing your aluminum cups with single-use/disposable plastic cups.
4. Evaluate your shop's air supply and filtration system. Compressed air used in spraying waterborne coatings, as well as the hoses, must be very clean and free of any lubricating oil residues. Even a minute quantity of oil can contaminate the coating.
5. Using dedicated spray guns and cleaning systems for waterborne vs. solvent-based coatings is highly recommended, due to the different cleaning methods and waste streams generated by each.

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