



BENEATH THE SURFACE

FROM MOLECULE TO MODEL, STREAMLINING PPF PRODUCT DEVELOPMENT THROUGH SIMULATED INSTALLATION

The development of paint protection film (PPF) is a multistep process and requires precision across materials, processes, and the numerous parties who contribute to the finished product. Integration of the development process through knowledge of TPU chemistry, film extrusion, accelerated testing, coating technologies, and installation under one roof could avoid many of the traditional obstacles. It also would enable and encourage innovation, simplify troubleshooting, and deliver tremendous value to brand owners. With the introduction of a new PPF installation simulator, Lubrizol can deliver this holistic understanding and continue the commitment to being a preferred industry partner.

PROBLEM

Real-World Feedback, Refinement, and Troubleshooting Lag

ESTANE® TPU is a key ingredient in premium PPF products and undergoes extensive laboratory and real-life testing before it goes to film producers to ensure the chemistry is sound and its performance meets necessary requirements. Most recently, Lubrizol added a state-of-the-art pilot film line that produces commercial quality film and allows PPF brand owners alongside Lubrizol's materials scientists to recognize nuances before a TPU product advances through PPF design and reaches the market. To help understand how film produced with ESTANE® TPU performs in real-world conditions, Lubrizol has developed accelerated weather testing capabilities to simulate environmental conditions and deliver results in a matter of days – results that otherwise would take months to determine.

These are important capabilities in the PPF product development cycle. Lubrizol's materials science expertise, pilot film line, and advanced testing capabilities have streamlined this cycle by shortening development timelines and enhancing product development and performance. However, final product prototyping and installation testing still require coordination through others, which introduces potential inefficiencies and delays.

UNTIL NOW.

OBJECTIVE

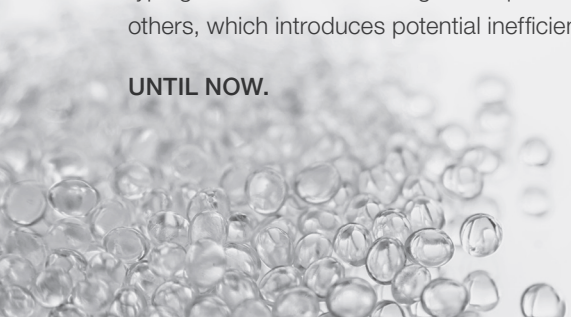
A One-Stop Shop for PPF Product Development

To meet installer and end user needs, PPF must deliver on a variety of performance characteristics. It must prevent chips and scratches, maintain optical clarity over time, and preserve the vehicle's original paint job. There is another attribute that at times is taken for granted – conformability, or the ease of working with and installing the film on the car. PPF that lacks the right conformability can tear, sag, peel at the edges, or bubble, leading to costly wastes of time and material, repeated fixes or replacements, and dissatisfied customers.

While film undergoes tests for durability and weathering that replicates real-world conditions, there is no substitute for physical installation testing when it comes to understanding the installability of the final product. The multilayer construction of PPF introduces multiple variables, and feedback from installers allows the development team to mitigate potential issues. Third-party installers may act in this capacity, but at times, the first test of a PPF's installability is an actual commercial installation – a high-wire act for installers potentially facing cost overruns and frustrated customers if an installation doesn't go smoothly.

By introducing installation testing as the capstone of a validation process that begins with molecule development and continues through highly-capable pilot line extrusion and accelerated weathering tests, the risks of those end-stage installation issues shrink significantly.

ENTER LUBRIZOL.



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SOLUTION

From Molecule to Model with Lubrizol

Recognizing this gap in the development cycle and leveraging its unique expertise in PPF development, Lubrizol collaborated with the Auburn Career Center, located near Cleveland, Ohio, to build a PPF installation simulator for advancing their capabilities. Using the simulator, Lubrizol can now assess prospective solutions from TPU to PPF construction and validate installability through practical experience.

The installation simulator was produced from the front end of a luxury car, attached to a custom fabricated frame with wheels for ease of positioning. It also includes many functioning mechanical and electronic features that students at the career center introduced as part of their educational experience. The end result allows Lubrizol to integrate practical PPF installation testing. The PPF installation simulator is located at Lubrizol's technical center in Brecksville, Ohio.

"This project for Lubrizol was a tremendous opportunity for our students to gain real-world experience in metal fabrication, autobody repair, and electrical circuit design. It also increased awareness of the growing PPF application which will be introduced through our Automotive Collision Repair program thanks to Lubrizol," said Justin Bruno, a lead instructor for Automotive Collision Repair at the Auburn Career Center and a certified PPF installer. "We are grateful for Lubrizol's partnership and pleased that we can both benefit from this experience."

Superintendent Dr. Brian Bontempo adds, "Auburn Career Center was thrilled to collaborate on this innovative project. Thanks to Lubrizol, Auburn students and teachers were able to be part of this unique, hands-on, learning opportunity. We appreciate Lubrizol for supporting our students by entrusting us with this project and value our partnership."



For the PPF simulator, Lubrizol intentionally chose a luxury vehicle with complex geometry and design features. The front end features dramatic curves, contours, and details that present challenging elements during the installation process. Although mainstream adoption of PPF is increasing, luxury vehicles remain the dominant consumer of premium PPF products. If an installer is comfortable applying the PPF to this simulator, installation on other vehicles should not be an issue.

This partnership with the Auburn Career Center is consistent with Lubrizol's collaborative approach to PPF development and an important final step in bringing PPF development and validation capabilities under one roof. Ultimately, that is the true value of the simulator. It isn't common that a single organization can orchestrate the development of PPF – from creation of the TPU molecule all the way through installation modeling. Working directly with PPF brand owners, Lubrizol can leverage these capabilities to streamline PPF innovation and expand the universe of PPF to introduce exciting new characteristics without extending timelines or budgets.



Acting as the hub of a more integrated, innovation-focused product development process, Lubrizol Engineered Polymers can leverage enhanced, accelerated testing processes and streamlined communication across the value chain to drive customer-focused innovation to benefit you and your customers.



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