

BENEATH THE SURFACE



LUBRIZOL
ENGINEERED
POLYMERS

**ADVANCING
MATERIALS.
ELEVATING
PERFORMANCE.**

UNTAPPING THE POTENTIAL OF PPF PERFORMANCE CHARACTERISTICS

Today's paint protection film (PPF) does just what the name implies – it protects an automobile's original paint job. This protection is the same in Cleveland or Corpus Christi, Hong Kong or Helsinki. It's the same because the product development process is rigid, limiting the materials available to you and the opportunities to influence innovation at the point when it can have the greatest impact. By working with the TPU supplier and leveraging their advanced materials science expertise, you can unlock creativity in your PPF products and separate your brand from others in the marketplace.

PROBLEM

**Status Quo Discourages
Imagination and
Communication**

The spectrum of PPF solutions available from film processors is narrow, all offering the same basic value proposition: protection from weathering and stone impact. Even if we accept the premise that basic protection is all that matters to the end user, the opportunity to differentiate your PPF products from others is limited. Our research tells us that premise is flawed. Those users want more, but the homogeneity of existing solutions and entrenched product development processes limit your ability to deliver.

This isn't a failing of processors or TPU suppliers. Everyone involved is delivering exactly what has been required and asked of them. It's a failure of imagination. It's a failure to think beyond what is and to ask what's possible. And it's a failure of communication in the product development process. Innovation in PPF starts with TPU formulation, but your contact with TPU suppliers is limited. That disconnect leads to the current status quo.

IT DOESN'T HAVE TO BE THIS WAY.

OBJECTIVE

**Expanding the PPF
Universe for You and
Your Customers**

You and your customers value three characteristics in your products: durability, conformability and aesthetics, with the first taking priority in product development. The primary goal is to develop PPF products that meet the needs of your customers and meet or exceed warranty specifications. Conformability is a secondary concern, but there is a minimum threshold for ease of installation these products must meet. Aesthetic considerations start with optical clarity and gloss and are tied to durability in that the goal is to ensure the clear PPF product doesn't yellow, haze, or show visible cracks over time. In short, PPF should be invisible when installed on a vehicle.

These are fundamental properties that can be improved through materials science innovation. The right TPU supplier can create formulations that lead to PPF that lasts longer, is easier to install and remove, and maintains its appearance throughout its lifespan. Market forces have been working on this front for years, pushing warranties from 5 to 10 to 12 years...even unlimited durations as the applied science evolves to deliver competitive advantages. These are merely incremental improvements.

THEY ARE NOT THE BEST WE CAN DO.



UNTAPPING THE POTENTIAL OF PPF PERFORMANCE CHARACTERISTICS

SOLUTION

Exploring the Possibilities of Materials Science

Lubrizol Engineered Polymers leverages materials science expertise and advanced testing capabilities to develop innovative TPU formulations for paint protection film, but our role in PPF product development has been limited due to the traditional, siloed nature of the PPF industry. For too long, PPF brands have accepted a status quo that fails to leverage the capabilities of a TPU supplier with advanced materials science expertise. The time has come to move past what has been and embrace what can be.

Materials science, applied creatively and paired with advanced and accelerated testing, opens doors to possibilities you and your customers may have never considered. Imagine a portfolio of PPF products tailored to different climates – a solution formulated specifically for high heat and sun locations, or for areas prone to snow, ice and road salt. The right TPU supplier could produce formulations resistant to various chemical compositions common in acid rain or even in insects that can stain films on impact. And that's just scratching the surface of what might be possible across those three key PPF performance characteristics.

DURABILITY: We have the ability to develop TPU formulations that increase weatherability in extreme environments, such as high heat and sun or extreme cold. Other potential enhancements include the retention of strength and elasticity to make it easier for installers to remove the film at its end of life, or increasing chip resistance across thinner materials. Developing thinner films that maintain durability presents numerous benefits, including reduced cost, improved sustainability, and increased invisibility on the vehicle. Thinner films also could enable more common use of spot applications, adding additional protection to heavy-use areas or preventing additional wear or weather damage in areas where the paint is compromised.

CONFORMABILITY: When we use the term “conformability,” we are referring to how the PPF affects the installer experience. The objective is to make a product that can stretch without excessive force over the curves of an automobile. Thicker film provides more protection but is more difficult to apply.

With innovative materials science, it could be possible to develop TPU formulations to support a spectrum of PPF products with varying thicknesses, each optimized for the right level of conformability. This could enable full-body coverage by tailoring conformability applications all across the vehicle, creating thinner films that can be installed over mirrors and other tough-to-wrap spots.

AESTHETICS: Most TPU-based PPF products are clear – designed to protect and highlight the vehicle's original paint job. There are some accent applications, adding a dash of red or black or a matte finish to a stripe or a hood, but such specialty uses remain fairly rare and can be cost-prohibitive when considering a suite of color options. Pigmented coatings are a common solution, but those can be scratched, ultimately ruining the appearance of these products. Vinyl is the material of choice for digitally printable and color change wrap films, but vinyl demands compromises on multiple fronts, most importantly durability. With the right formulations, it could be possible to accomplish the same aesthetic effects with TPU-based PPF, without those compromises. Colors could be integrated into the TPU for an effect that masks scratches. In addition, other effects could be combined, such as custom matte, semi- or high-gloss finishes across the vehicle. It's not a stretch to imagine photosensitive products that react like indoor/outdoor lenses in glasses, dramatically changing the appearance of the vehicle between day and night.

This isn't science fiction. The materials scientists in Lubrizol's Engineered Polymers business have a unique combination of expertise and resources to help you create PPF with capabilities limited only by the imagination. Together, we can create something better.



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.



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