

Polycarbonate for Motorcycle Windshields and Other Stuff

Steve Warmath

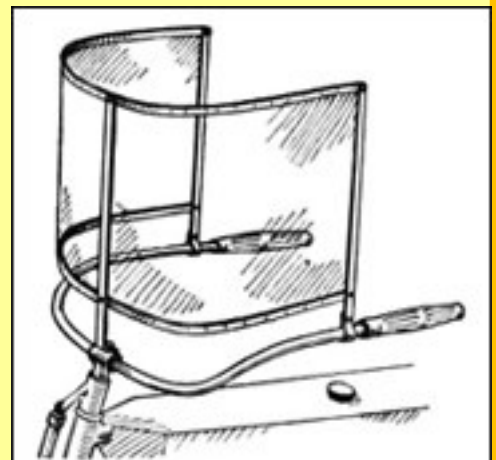


Not long after the first motorcyclist rode down the unpaved highway of history, some clever rider came up with the idea of a motorcycle windshield... probably because the car in front of him threw some cow dung his way or bugs in the face. There is little recorded information on the appearance of the very first motorcycle windshield, but early European road racers often employed a small fly screen made from a material the British referred to as Perspex. These were some of the earliest uses of the new polymethyl methacrylate (*PMMA*) plastic, developed in Germany by Rohm and Haas in 1928. This same material would later be marketed under names such as Plexiglas™, Acrylite™, and Lucite™.

In the 1930s and 40s, motorcycle windshields became popular, especially on large touring bikes. Early screens were made from materials like butyrate (*cellulose acetate butyrate*) and DuPont's Pyralin (*cellulose nitrate*). Both of these materials, however, were subject to chemical degradation from sun and weather, and these windshields quickly turned yellow and became flimsy. Wire frame stiffeners and PVC beaded edges were then added to extend the life of the average motorcycle windshield.

By the mid 1960s, windshields made from acrylic plastic material, such as Acrylite® and ICI Lucite®, became the standard in the motorcycle industry. Acrylic plastic had excellent clarity and optics, and was much stronger than a cellulose windshield. But when an acrylic windscreen broke, it shattered into razor-sharp, flesh-eating shards of plastic. For that reason, many riders stuck with their old yellow Pyralin windshields.

In 1975, National Cycle was the first company in the world to introduce and use General Electric's new MR4000 polycarbonate material (later called **FMR hard coated Lexan®**) for motorcycle windshields. National Cycle's advanced windshield design and polycarbonate's inherent durability led to the first modern styled, optically clear, custom motorcycle windshield. They called it the **Heavy Duty™**, and made windshield applications for both Harley-Davidson® and Japanese motorcycles, foreshadowing the soon-to-emerge metric cruiser market. Soon after, the same material was used to develop a direct replacement screen for the popular BMW® R100RT, which led to recognition by BMW North America for outstanding product development.



Plans for a do-it-yourself motorcycle windshield from a 1912 issue of Popular Mechanics

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But, however impact resistant polycarbonate is, its naturally soft surface must be hard coated (*polymerically glazed*) to have sufficient abrasion resistance for use as a motorcycle windshield. GE's original FMR hard coated polycarbonate had 3X the abrasion resistance of acrylic material, and it became the motorcycle industry standard until National Cycle made a "quantum" leap in hard coating technology. Their exclusive **Quantum™ hard-coating**, developed in 2004, offered scratch resistance **10X greater than FMR and 30X greater than acrylic**. Quantum is the new state-of-the-art for windshield hard coating. Hard-coated polycarbonate is now the accepted norm for both OEM and aftermarket motorcycle windshields. Why? Consider that ALL motorcycle helmet face shields must be made from polycarbonate to be DOT approved. Consider also that all military and commercial aircraft windshields and canopies are made from polycarbonate.

The reason is that acrylic (and even High Impact Acrylic or "aircraft plastic") will shatter under moderate impact, often resulting in injury to the rider. In that respect, the introduction of polycarbonate windshields was an innovation in motorcycle **safety** as well as durability.

Other Stuff- Murphy's Law: Creative Solutions to Not-So-Common Problems

Candy Miller had a question for me about how to keep her windshield from fogging up. For moisture related fogging, there are some advertised products to help with this problem by polishing your windshield. Look at what is available and choose a product that you like for the price.

A Cloudy Film

Trying to see behind something that has a fog like appearance or is clouded over is quite difficult. Driving a motorcycle with the windshield fogged up can lead to disastrous results. Some people will try some basic cleaning of the motorcycle windshield and then throw it away when it does not become clean. However, by adhering to few simple tips, you can defog the motorcycle windshield and save yourself the money you would spend on a new one.

Non-Abrasive Cleaners Only

The polycarbonate plastic that the windshield is made out of is quite strong. However, that does not mean that small abrasives can not scratch the surface. When cleaning the fog off the motorcycle windshield, you will want to use mild cleaners that will not break down the surface of the plastic. Stay away from cleaners that include any type of isopropyl alcohol and ammonia.

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