



Your Windshield is not just a "wind shield" anymore...

Windshields in the Past

Prior to 1919 "horseless carriages" were very few in numbers and operated at relatively low speeds. As a result, safety was not one of the high priorities of the first motor vehicles manufacturers. However, as motorized vehicles grew more common and their speed increased, the wind and debris thrown into the faces of drivers became a serious concern.

To alleviate this concern, manufacturers included glass as a "wind shield". This did not solve the problem completely, however. The new "windshields" did make the drive more comfortable, but they did not adequately protect from flying debris. Objects would frequently fracture early windshields causing dangerous glass fragments to shower occupants.

In 1919, Henry Ford solved the problem of flying debris by using a new technology founded in France called glass laminating. Windshields made using this process were actually two layers of glass with a cellulose inner layer. This inner layer held the glass together when it fractured. Between 1919 and 1929, Ford ordered the use of laminated glass on all of his vehicles.

Windshields Today

Today, windshields are no longer held together with cellulose but with a high strength vinyl called Polyvinyl Butyral (PVB). This PVB must be .030 of an inch thick to provide the strength needed to hold the occupants in the vehicle, as well as the flexibility to reduce injury if a person is thrown into the glass. All currently fabricated windshields use this specification to satisfy federal motor vehicle safety standards for vehicle manufacturers.

Did you know that proper windshield installation is as important to your safety as seat belts, air bags and anti-lock brakes?

That's right! Today, auto glass is more than just a shield to protect the driver and occupants from wind, weather and debris. Now the windshield also keeps you and your family from being thrown from the vehicle in case of a collision and adds to the structural strength of the vehicle as a whole.

Proper auto glass installation is the key to your safety. There is a right way and wrong way to install auto glass. Auto glass installation requires a very strong yet flexible adhesive to bond the glass to the vehicle frame. This adhesive must have great strength to withstand the pressures put upon it in the event of a collision. The most widely used adhesive is called "automotive grade urethane".

What is automotive grade urethane?



Automotive Grade Urethane is a unique product. It needs to be strong and flexible, bond to smooth and rough surfaces, withstand adverse weather conditions and still be workable.

Automotive urethane strength is measured in two ways; tensile and lap shear.

Tensile strength is measured by the pounds per square inch (PSI) of force necessary to pull apart two hard surfaces until the bond fails. If you adhere your coffee cup to the kitchen table and pull it vertically off the surface, the strength needed to separate it from the table would be called tensile strength. Automotive urethane usually has more than 1000psi of tensile strength.

Lap shear strength is also measured by pounds per square inch until failure. However, to test lap shear strength, objects are pulled in a diagonal fashion. If you were to pull the same coffee cup off the table diagonally, the strength needed to separate it from the table would be lap shear strength. Automotive urethane has more than 500psi of lap shear strength. This is especially important in collisions where a roll-over occurs. Strong lap shear strengths are important to add to the structural strength of the vehicle body.

Just as strength is important, flexibility is equally important. Urethane must have flexibility to allow for vehicle body movement. Your vehicle is not completely rigid. It bends and flexes with the roadway. The glass, however, is rigid. If the adhesive is too inflexible, the glass would break every time you drive over a rough road surface.

Urethane must also adhere to different types of surfaces. Glass is very smooth yet the metal frame of the vehicle is rough. Automotive adhesives must be able to bond, with equal strength, to all of the various surfaces used in the manufacture of motor vehicles.

One unusual thing about urethane is the way it cures or hardens. Unlike paint or other adhesive products that use a solvent carrier that dissipates into the air to dry or cure, urethane takes moisture that's present in the air (humidity) and uses it to cure the product to its strong, rubber-like consistency.

What happens if the humidity is low?

That's a good question! In some areas of the country humidity levels are very low. An example of this might be Arizona or in the Northern states where cold air in the winter turns humidity to snow. Low humidity slows down the cure rate of urethane products. So it stands to reason that moisture must be added to promote faster cure.

In most cases, simply adding water after the installation will give the urethane enough moisture to begin the cure. However, in the situation where mobile service is offered in low moisture locations, the answer may not be as simple. Warm air holds more moisture than cold air. In cold dry climates, it may be necessary for the installation to take place under controlled conditions, such as a heated garage or repair facility.

Are there automotive adhesives that don't need moisture to cure?



Yes! There are currently new adhesives on the market that require no moisture for cure, but they do need some warmth for the curing process. These products are usually a little more expensive than urethane, but the quick release of the vehicle may sometimes be worth the costs.

How can I help ensure my family's safety?

- Insist that a strong automotive grade adhesive be used to bond the glass.
- Don't let the glass be installed on corroded metal.
- Follow to the letter the directions given by your technician.
- Drive the vehicle only when the adhesive has fully cured.
- Always wear seat belts and insist that all passengers wear them too.