
Enhanced Protective Glass

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Automotive Association

New Glazing for Automobiles

Protection for its Occupants
Enhancement of the Performance



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- Enhanced Protective Glass
 - Laminated windows for the automobile's side, rear and roof
 - Variety of constructions offer multiple benefits to meet OEM and consumer needs

Emerging Technologies

- Current Auto Glass Paradigm
 - Tempered glass side windows were established as the best available technology nearly 30 years ago
- Emerging Technology
 - EPG - Laminated glass windows
 - Laminated glass has been used in windshields for over 60 years

Current Auto Glass Issues

- Many issues remain with today's auto glass systems
 - Side and back window occupant ejection deaths and injuries
 - 8000 Deaths/year in the US
 - No reaction surface for side or roof airbags once the tempered glass has broken
 - Laceration injuries from flying tempered glass
 - >275,000 Injuries/year
 - Vehicle security is global issue
 - \$8.5 Billion cost in the US

The Benefits of EPG



- Protection from
 - Intrusion
 - The Sun
 - Noise
 - Ejection

The Change to EPG



- EPG is becoming recognized as the best available technology
 - Laminated glass windows (glass/plastic) are available in thicknesses of 4.0mm
 - Variety of different functions and performance levels
 - Laminate durability now meets the OEM's need for open edge side windows
 - Addresses the issues of ejection mitigation, reaction surface for airbags and vehicle security
 - Improves fuel economy and passenger comfort

Advances in Glass

- Many glass companies have developed the following advances in glass laminate technology
 - Optics of thin glass in bent pairs to produce visually acceptable laminates
 - Heat strengthening of the glass to meet door slam and durability requirements
 - Lamination technology and capacity to produce OEM quality parts for any position

Advances in Interlayers

- Many plastics manufacturers have developed the following advances in glass laminate technology
 - Multiplicity of glass systems using single-layer plastic interlayers
 - Flexible to rigid systems developed for performance in different door designs
 - Specialty performance products providing additional benefits

Development

- Development teams including OEMs, glass companies and plastic interlayer suppliers have been established
 - Understand and improve the performance of windows to meet OEM requirements
 - Implement EPG in many vehicle platforms
 - 20+ programs worldwide
 - Implementations in Europe moving to standard and smaller, non-luxury vehicles
 - North America and Asia entering the market
 - Currently, EPG in over 1.0MM vehicles worldwide

Industry



- Industry groups are beginning to broaden the approach to integrate complementary technologies
 - EPGAA
 - AORC - Automotive Occupant Restraints Council
 - SAE - Society of Automotive Engineers
 - Establishment of a security testing standard
 - DIN – German Standards Committee

Government



- Governmental Approvals
 - US - Z26 already has a laminated glass standard established for safety and durability requirements
 - Europe - R43 already has a laminated glass standard established for safety and durability requirements

NHTSA's Findings

- NHTSA* established a testing program in 1991 for advanced side glazing
 - Objective: to reduce ejection deaths
 - Findings to date
 - Reductions of ejection deaths between 500-1300/year possible
 - Several glass/plastic systems show ejection-mitigating performance
 - Could aid airbag performance
 - Limited risks for other issues - HIC or laceration
 - Updated Report is due shortly

* National Highway Transportation Safety Administration

Future Auto Glass Systems

- The demand for EPG in automobiles is a reality
- Auto glass laminates are being recognized for these benefits
 - Safety - ejection mitigation, laceration reduction and reaction surfaces for airbags
 - Solar - IR and UV reduction
 - Sound - noise attenuation
 - Security - theft reduction
- In the future, windows will do more, adding new levels of performance to automobiles

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