



# 3M *Holding Fast*

*High Performance Acrylic Foam Tapes for the Automotive Aftermarket*

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## 3M and Aftermarket Manufacturers Meet Evolving Challenges

The automotive aftermarket has experienced dramatic changes in the last 20 years in the quality and variety of decorative and protective trim and accessory products. The materials used in their construction are lighter, stronger and more flexible, and must withstand rigorous environmental conditions such as temperature extremes, moisture and petrochemicals.

These products depend on effective, reliable attachment systems to achieve the expected level of long-term performance demanded by the industry. Yet, improvements made over the years in automotive substrates continually pose new challenges for attachment systems. Fortunately, parallel advancements have been made in the composition and performance of these fastening systems.

### **Background**

Screws, rivets and clips were once the customary fasteners for attachment of automotive moldings and trim. However, the use of high performance 3M™ Acrylic Foam Tape to replace mechanical fasteners is rapidly expanding, for both OEM and aftermarket applications.



*Stainless-steel rocker panels from Professional Trim Products add protection and value, and attach reliably with 3M™ Acrylic Foam Tape.*

Tape attachment offers several advantages over mechanical attachment, including simplified application processes, reduced labor, reduced corrosion potential, quieter operation, and compliance with the provisions of vehicle warranties — which generally do not allow drilling of holes in body panels.

The earliest automotive assembly tapes were made of neoprene foam with adhesive on both sides. However, these first trim attachment tapes did not possess the performance properties needed to meet the challenges posed by evolving automotive applications.

3M acrylic foam tapes were developed to perform in conformance with the rigorous requirements of today's automotive assembly and aftermarket demands, and now offer much higher performance, longer life and improved reliability.

### **The Truth About Tape**

When an accessory is attached using 3M acrylic foam tape, the seal prevents moisture, automotive fuels, solvents, oils and other contaminants from seeping between the attached part and vehicle substrate, which could compromise the adhesive bond.

However, when these contaminants come in contact with holes drilled for a mechanically attached assembly, the result over time is often corrosion, rust and eventual part attachment failure, which can mean increased warranty costs and repairs. 3M acrylic foam tape distributes the inherent stresses of an application by spreading the load over the entire taped surface, rather than concentrating it at each point of attachment as with screws, rivets or bolts. Tape can also significantly reduce noise entering the vehicle passenger compartment by eliminating the rattles and vibration that result when a mechanically attached assembly begins to loosen and shift.

3M acrylic foam tape represents a lower total-applied cost than mechanical fastening systems. Its use eliminates sheet metal holes and weld studs, which cuts equipment costs. Fewer parts are required for assembly, thereby reducing labor and inventory costs.



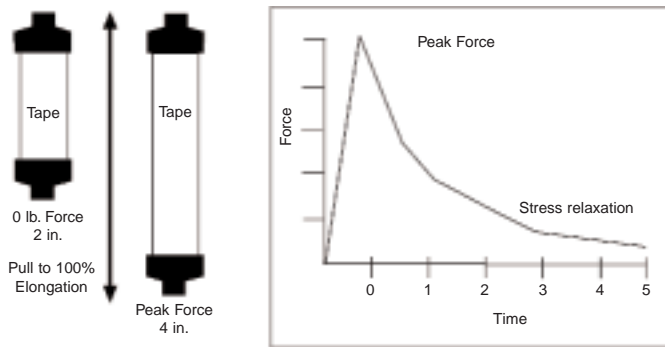
*Distinctive Industries' genuine wood dashboard trim attached with 3M™ Acrylic Foam Tape enhances the style of this 1998 Toyota Landcruiser.*

### Handling Stress

An important feature of 3M™ Acrylic Foam Tape is its ability to handle the stresses caused by surface mismatch, temperature changes and changes in physical alignment.

3M acrylic foam tape has a closed cell foam core with unique stress relaxation properties that allow it to elongate and relax when stressed, dissipating the induced stresses between an attached part and its substrate. (See Figure 1.) The stress forces are distributed throughout the tape core and are not concentrated in the adhesive bond line.

The tape core also has the ability to withstand a wide temperature range by absorbing the forces resulting from the expansion and contraction of attached parts. Because the tape is highly conformable, it allows for a better fit by compensating for mismatches between attached parts and the vehicle.



**Figure 1 - This stress test measures a tape's relaxation at 100% elongation over a five-minute period. The tape is pulled to twice its length and held in this fixed position. Chart shows how stress is dissipated during the five-minute period.**

### Tape Users' Perspective

"3M acrylic foam tape doesn't interfere with the appearance of our product because it has a low profile. It is easy to apply and can withstand tough weather conditions. I have never had a failure resulting from this tape since we began using it ten years ago," said Bob Toro, owner of Professional Trim Products, a stainless-steel rocker panel manufacturer in Laguna Hills, California.

Larry Owens, special projects director at Distinctive Industries, of Commerce, California, discusses the importance of a tape's ability to handle a wide range of temperatures. "Extreme temperature is one of the biggest challenges to long-term adhesion in automotive applications. The inside of a car is a much harsher environment than most. 3M acrylic foam tape is designed to handle these extremes."

According to Owens, 3M acrylic foam tape is the industry standard for attachment of interior wood dash trim. "We have conducted tape tests in our in-house lab as well as in the field, and we use the best tape on the market."



*This Toyota Camry features color-keyed fender trim and door edge moldings from Precision-Trim, Inc. — installed with 3M™ Acrylic Foam Tape by Mike's Stripes, of Boaz, Alabama.*

John Cherney, president of Precision-Trim, Inc., agrees, saying "3M acrylic foam tape is the best way to attach moldings to a vehicle. It provides a clean appearance and the durability and peace of mind we depend on. We simply know our products won't come back with failed tape."

Precision-Trim, located in Boaz, Alabama, manufactures body side moldings, door edge and fender trims sold through distributors to the automotive aftermarket.

### Change is Good

The automotive aftermarket continues to evolve, resulting in an array of new challenges and opportunities. As aftermarket products increase in quality and variety, possibilities for vehicle customization and personalization soar. Consequently, 3M must continue responding to industry changes by providing the aftermarket with dependable, effective attachment system solutions for automotive applications.



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